NATURE CONSERVATION EDUCATION IN BHUTANESE PRIMARY SCHOOLS

Von der Pädagogischen Hochschule Heidelberg
zur Erlangung des Grades einer
Doktorin der Philosophie (Dr. phil.)
genehmigte Dissertation von

Sangay Biddha

aus

Punakha, Bhutan

2023

Erstgutachter: Prof. Dr. Klaus Dieter Hupke

Zweitgutachter: Prof. Dr. Alexander Siegmund

Fach: Geographie

Tag der mündlichen Prüfung: 29.11.2023

TABLE OF CONTENTS

ABSTRACT

The Kingdom of Bhutan's development philosophy of Gross National Happiness (GNH) emphasises the need to balance sustainable economic growth with environmental conservation, promotion of cultural heritage, and good governance. In consonance, Bhutan's Constitution entrusts every citizen with the sacred task of protecting the natural environment and preventing all forms of ecological degradation. Moreover, given the increasing global crisis of degrading the earth, climate change, resource depletion, and species extinction, the urgency of nature conservation in school education cannot be ignored. The need to articulate clearly how nature conservation education should be promoted in Bhutanese primary schools is, therefore, becoming increasingly urgent.

While some elements of nature conservation education are included in the school curriculum, not much is known about educator perceptions, school curricula, teaching and learning processes, and the role of school concerning nature conservation. Hence, this empirical study was necessary and timely to understand how nature conservation was perceived, taught and practised in Bhutanese primary schools. Social constructivism with an ethnographical research design was employed for this study. Relying on participant observation techniques for data collection, perspectives of 15 educators and 105 students of four Bhutanese primary schools were gathered. Three data collection tools, namely, a semi-structured interview, an open-ended questionnaire and field notes were used.

The study brought out a number of significant findings. Although Bhutan's unique features, such as being heavily forested, traditional farming practices and spiritual practices, are advantageous to nature conservation education, gaps and inconsistencies were seen in the school curriculum and practices. Firstly, the educators and students who participated in the study misunderstood nature conservation as environmental conservation. Secondly, the curriculum textbooks on nature conservation generally represent Western perspectives of nature conservation rather than the Bhutanese spiritual and cultural beliefs that are primarily influenced by Buddhism. Findings also showed that children in the four primary schools had limited opportunities for direct experiences with nature during their lessons on nature. Lastly, the role of schools in nature conservation education lacks clarity.

The findings from this study have direct implications for the Ministry of Education, teacher education colleges, and other primary education stakeholders in the country. Several strategies are suggested to address the gaps identified. These include professional development programmes for teachers to enhance their knowledge about nature conservation education. The next strategy is reviewing the science and social studies curriculum to integrate the Buddhist values of interdependence and harmonious living with nature. The study also flagged the need to create rich natural environments on school campus, including using the community forests for children to play, study and develop connection with nature. Lastly, the study recommends developing reading materials for children on themes of nature.

Key words: *nature conservation, environmental conservation, nature conservation education, primary school education, values of nature, cultural values, species literacy, connection with nature*

ZUSAMMENFASSUNG IN DEUTSCHER SPRACHE

Die Entwicklungsphilosophie des Königreichs Bhutan, das Bruttonationalglück (GNH), betont die Notwendigkeit, nachhaltiges Wirtschaftswachstum mit Umweltschutz, Kulturerhalt und guter Regierungsführung in Einklang zu bringen. In Zusammenhang damit betraut die Verfassung von Bhutan jeden Bürger mit der als heilig empfundenen Aufgabe, die natürliche Umwelt zu schützen und ökologische Verschlechterung zu verhindern. Darüber hinaus ist angesichts der zunehmenden globalen Krise der Umweltzerstörung, des Klimawandels, der Ressourcenverknappung und des Artensterbens die Dringlichkeit der Naturschutzbildung in der Grundschule nicht zu übersehen. Die Notwendigkeit, klar zu artikulieren, wie die Naturschutzerziehung in bhutanischen Grundschulen gefördert werden sollte, wird immer dringender.

Derzeit fehlt es international und lokal an Forschungsliteratur zur Naturschutzbildung. Insbesondere ist in Bhutan wissenschaftlich wenig über Naturschutzerziehung, Schullehrpläne und Lehr-Lern-Praktiken auf allen Bildungsstufen bekannt. Im Gegenteil, es gibt reichlich Literatur zur Umweltschutzerziehung, die jedoch für das Verständnis der Naturschutzerziehung nicht geeignet ist, da es sich um unterschiedliche Inhalte handelt. Die beiden Begriffe werden meist synonym verwendet, sind aber ideengeschichtlich verschieden. Daher war diese Recherche notwendig, um die aktuelle Literaturlücke zu schließen, damit mehr Klarheit in die Naturschutzerziehung in der Grundschule kommt.

Als buddhistische Nation sind die Bhutanesen aus ihrer Tradition heraus naturverbunden und suchen in ihrem philosophisch-religiösen Selbstverständnis im Allgemeinen eine Beziehung zur Natur in Harmonie und Ruhe. Die vom Buddhismus beeinflusste Tradition und Kultur ergibt eine symbiotische Beziehung zur Natur, in der alle Formen der Natur respektiert und verehrt werden. Darüber hinaus werden die GNH-Prinzipien und -Werte in die Lehrpläne der Schulen aufgenommen. Im Prozess der Entwicklung und Globalisierung haben jedoch auch die damit einhergehenden externen Kräfte auf die kulturellen und spirituellen Werte der Nation eingewirkt. In diesem Zusammenhang war diese Studie notwendig, um Lücken oder Widersprüchlichkeiten innerhalb des Lehrplans und der Praktiken der Grundschule in Bezug auf die Naturschutzerziehung zu identifizieren.

Die zentrale Forschungsfrage dieser Studie lautete daher: Wie wird Naturschutz in den Grundschulen Bhutans verstanden, gelehrt und praktiziert? Um die Naturschutzpädagogik in der

Grundschule aus verschiedenen Aspekten und Akteuren genau zu verstehen, wurden gezielte Fragen zu schulischen Lehrplänen und Lehr-Lern-Praktiken gestellt.

Methodisch orientiert sich diese Studie am Konzept des Sozialkonstruktivismus mit einem ethnografischen Forschungsdesign. Die grundlegenden Prinzipien der Teilnehmenden Beobachtung wurden als Datenerfassungstechniken verwendet, um die Perspektiven eines informationsreichen Insiders effizienter zu sammeln. Drei Datenerhebungsinstrumente, nämlich ein halbstrukturiertes Interview, ein offener Fragebogen und Feldnotizen, wurden verwendet, um Daten von vier bhutanischen Grundschulen zu sammeln. Das halbstrukturierte Interview wurde mit 15 Pädagogen durchgeführt, darunter Lehrer/innen, Schulleiter, Lehrerausbilder und Lehrplanspezialisten, und der offene Fragebogen wurde 105 Schülern der sechsten Klasse vorgelegt. Die Feldnotizen des Forschers wurden ebenfalls als wesentliche Daten für die Studie verwendet. Für Analysen wurde ein Framework für Analyseverfahren entwickelt und für die Analyseprozesse verwendet.

Die Studie brachte mehrere signifikante Erkenntnisse hervor. Erstens, obwohl Bhutans einzigartige Merkmale, wie die starke Bewaldung (72 Prozent des Landes sind bewaldet; zumeist noch in einem sehr naturnahen Zustand) in „realer“ Hinsicht, traditionelle landwirtschaftliche Praktiken und spirituelle Praktiken in eher lebenspraktischem bis ideellem Kontext, vorteilhaft für die Vermittlung von Naturschutzerziehung waren, wurden Lücken und Widersprüchlichkeiten im Lehrplan und in den Praktiken der Schulen festgestellt . So werden beispielsweise die Wälder nicht als Lernräume für den Naturunterricht genutzt, das indigene Naturschutzwissen der Menschen vor Ort nicht betont und die naturnahen kulturellen und spirituellen Praktiken in den Lehrplänen der Schulen nicht gebührend hervorgehoben. Naturschutzbildung sollte daher unter stärkerer Berücksichtigung der genannten Gesichtspunkte betrieben werden, damit „Natur“ und „Kultur“ nicht getrennt werden.

Zweitens repräsentieren die Lehrbücher zum Naturschutz im Allgemeinen eher westliche Perspektiven als die spirituellen und kulturellen Überzeugungen der Bhutanesen über die Natur, die hauptsächlich von der buddhistischen Sichtweise der Natur beeinflusst sind. Zum Beispiel suggerieren die Lehrbücher der Klassen vier, fünf und sechs überwiegend, dass Menschen die Natur zerstören, Verstöße bestraft werden müssen, die Waldressourcen bewirtschaftet werden müssen und „Schutzgebiete“ die beste Strategie für den Naturschutz sind. Leider stimmen diese Ideen nicht mit der traditionellen buddhistischen Kultur des Lebens in Harmonie mit der Natur

überein. Im Buddhismus sind Menschen Teil der Natur, und die Beziehung zur Natur ist intrinsisch, nicht extrinsisch, wie die Lehrbücher darstellen.

Drittens zeigen die Ergebnisse, dass Kinder in bhutanischen Grundschulen nur begrenzte Möglichkeiten für direkte Naturerfahrungen in der Schule hatten. Zum Beispiel wurden die meisten Unterrichtsstunden über Natur in den Klassenzimmern durchgeführt, obwohl sie idealerweise in der natürlichen Umgebung durchgeführt werden sollten. Zuletzt, auch die Schulen sind unorientiert über ihre Rolle in der Naturschutzerziehung. Zum Beispiel ist eine Schule ein Ort, um etwas über die Natur zu lernen und eine emotionale Verbindung zur Natur zu entwickeln, und kein Ort, an dem Naturschutzbemühungen durchgeführt werden, wie dies von den Schulen missverstanden wird.

Die Ergebnisse haben direkte Auswirkungen auf das Bildungsministerium, die Pädagogischen Hochschulen und andere Institutionen und Interessengruppen im Grundschulbereich des Landes. Es werden mehrere Strategien vorgeschlagen, um die festgestellten Lücken zu schließen. Dazu gehören Fortbildungsprogramme für Lehrer, um ihr Wissen über Naturschutzbildung zu erweitern. Die zweite Strategie besteht darin, dass das Bildungsministerium den Lehrplan für Naturkunde und Sozialkunde überprüft. Die inhaltlichen buddhistischen Werte der gegenseitigen Abhängigkeit und des harmonischen Zusammenlebens mit der Natur sollten in den Schullehrplan integriert werden und dementsprechend die westlichen Werte minimieren, die der bhutanischen Gesellschaft kulturell und spirituell fremd sind.

Drittens werden einige Maßnahmen zur Schaffung natürlicherer Umgebungen für Kinder vorgeschlagen. Beispielsweise würde die Schaffung von Ökogärten, Ökoteichen und kleinen Naturelementen auf Schulgeländen enorme Vorteile bringen. Eine weitere Strategie zur Schaffung natürlicherer Umgebungen besteht darin, den Gemeinschaftswald für die Naturerfahrung und das Lernen von Kindern im Freien zu nutzen. Der letzte Vorschlag ist, attraktive und einfach zu lesende Materialien für Kinder zu erstellen. Zum Beispiel wären einige Enzyklopädien der einheimischen Pflanzen und Tiere Bhutans für alle nützlich. Andere Lesematerialien wie Geschichten, Reime und Lieder, die sich mit Themen der Natur und ihrem inneren Wert befassen, würden der Naturschutzerziehung für die bhutanischen Kinder zusätzlich zugutekommen.

ACKNOWLEDGEMENT

I look back on my long, arduous journey—but truly gratifying—I cannot help but smile most deeply. Although it was tough juggling study, teaching and family for four long years, this endeavour was the most fulfilling of my life. However, this dream of mine would not have materialised without the love and support of institutions and individuals who invested their precious time, energy and wisdom in smoothening my journey.

First and foremost, I thank my Doctor Father, Professor Dr Klaus-Dieter Hupke, who guided and mentored me unflinchingly. I remain forever grateful for his patience, kindness and motivation from the conception of this research to the final stage. My deepest gratitude goes to Professor Hupke for the uncountable virtual and in-person consultations, the cornerstone of my seamless academic journey. I couldn't have asked for a better mentor and supervisor. Next, I extend my gratitude to Heidelberg University of Education (P-HD), Germany, for allowing me to study at their esteemed university, and to Baden Württemberg Foundation, for funding my residential stay in Heidelberg. Specifically, my deep appreciation and gratitude go to Ms Henrike Schón, Head of the International Office, for her kindness, encouragement and hospitality. I sincerely thank her for being my support system and always stepping out of her way to ensure my overall wellbeing.

I sincerely thank my other wonderful friends at Heidelberg, Carsten Rohlfs and his family, Steffi Sachse and Georg Zenkert, faculty of University of Education, Heidelberg, and friends of Bhutan. I thank them sincerely for their friendship and support whenever I needed it. My heartfelt gratitude goes to the Royal University of Bhutan and Paro College of Education, especially the President, Dr Dorji Thinley, and the management team for strongly supporting and making this achievement possible. My sincere appreciation and gratitude to all my close friends and well-wishers at Paro College of Education and beyond, without whose support, encouragement and prodding I would have faltered in my steps towards this goal.

I am truly indebted to Dr Eva Neubauer, whose hospitality and friendship played a critical role. Eva was not only kind enough to give me a 'home' to stay in Heidelberg, but was the most generous friend. I express deep gratitude to Eva, from the depth of my heart, for her genuine friendship, warmest hospitality, and unwavering guidance ever since we met.

Finally, I would like to extend my deepest gratitude to my family, whose support was equally critical, if not more. Without a family that nurtures you with abundant love, affection and positivity, it is simply impossible to get where you want to be. Hence, I thank my elder siblings and their families for their love, care and constant guidance. I also thank my loving sons, Ugyen, Tshetrim, Dechen and Namgay, for supporting and trusting their mother under all circumstances. Overall, I feel truly blessed to have received all your support and kindness in abundance. But again, I thank you all for making this dream come true.

Ka-drin-che, la.

DEDICATION

This dissertation is dedicated to

my late father, Karma, and

my late mother, Tshering Dema,

whose love powerfully continues to warm my soul;

and to my loving elder brother, Sangay Thinlay,

my Guiding Star.

LIST OF TABLES

LIST OF FIGURES

ACRONYMS USED

DCRD	Department of Curriculum Research and Development
DCPD	Department of Curriculum and Planning Division
GDP	Gross Domestic Product
GNH	Gross National Happiness
GNHC	Gross National Happiness Commission
GRF	Global Religious Future
MoE	Ministry of Education
MOFA	Ministry of Foreign Affairs
NAB	National Assembly of Bhutan
NBC	National Biodiversity Centre
NPO	Nobel Prize Outreach
NSB	National Statistics Bureau
PCE	Paro College of Education
PPD	Policy and Planning Division
REC	Royal Education Council
RGOB	Royal Government of Bhutan
RSPN	Royal Society for Protection of Nature
RUB	Royal University of Bhutan
TTC & DS	Teacher training Centre and Demonstration School
TEEB	The Economics of Ecosystems and Biodiversity
UNEP	United Nations Environment Programme
WWF	World Wildlife Fund

GLOSSARY

Bja dhi thrung thrung karmo	a popular Bhutanese folksong about the black-necked crane
Chang ma shing	a willow tree
Domba nga	five things to avoid according to Mahayana Buddhist tradition
Dzong	ancient fortresses
Dzongkha	national language of Bhutan
Ka-drin-che	'Thank you' in the national language of Bhutan
Karma	Sanskrit term referring to Buddhist principle of causality
Phodrang	citadel of deities
La	a polite form of expression in Dzongkha
Ley gyu-drey	the truth of action and consequence
Lhojong menjong	the southern land of medicinal herbs referring to Bhutan
Maja yang mo gawala	a popular Bhutanese folksong about the peacock
Monpa, Mon, Lhops, Layaps	tribal communities of Bhutan
Sa lhang	land begging ceremony
Sangay shamu	local Matsutake
Sisi shing	an oak tree
Tha damtshig	value of genuine trust and commitment to others
Tongphu shing	a pine tree
Tshenden shing	a cypress tree
Wangchuck	dynasty title of the Bhutanese monarchs
Zhib Tshol	research
Yatsa gempo	local cordyceps
Zocha	stinging nettles

CHAPTER 1

INTRODUCTION

1.1 Setting the Stage

Conservation education is increasingly becoming urgent in the school education system to fulfil global and national environmental goals. The Constitution of the Kingdom of Bhutan states that it is the "fundamental duty of every citizen to contribute to the protection of the natural environment, conservation of rich biodiversity, and prevention of all forms of ecological degradation" (RGOB, 2008, p. 11). Therefore, education, as the "engine of growth in nation-building," is critical in grooming future citizens who can contribute to nature conservation in Bhutan (MoE, 2014, p. 10).

As a Buddhist nation, the Bhutanese people are inherently close to nature and generally live in harmony and tranquility. The tradition and culture influenced by Buddhism render a symbiotic relationship with nature wherein all forms of nature are respected and revered. The belief in *karma*[1], the wisdom of interdependence and the relationship with nature have significance in terms of compassion and empathy for all living creatures. Buddhist practitioners like to be amidst nature for their prayers and meditation too. Furthermore, the cultural and spiritual beliefs of the existence of deities, spirits, and demi-gods dwelling in the trees, mountains, cliffs, and lakes lead to practising the natural way of conserving nature. For example, people avoid polluting and destroying these sacred areas as a mark of respect for the deities and spirits. However, this situation can change very quickly in the fast-paced globalised world.

Research on nature conservation education seems necessary and timely for Bhutan, given the changing global trends and pressures on the tiny nation to take action against all environmental issues. For Bhutanese children to grow up responsible for conserving the pristine environment and rich biodiversity and preventing ecological degradation, this research was necessary and timely to provide the right kind of education about nature conservation.

This chapter begins with a background of the study, including a brief introduction to Bhutan, its developmental philosophy, the Gross National Happiness (GNH), and other relevant

[1] The Sanskrit term referring to the principle of causality (the cause-and-effect cycle)

information. The problem statement, the research questions, some essential parts of the methodology used and the significance of the study are presented. Finally, the chapter concludes with a brief background of the researcher, interchangeably referred to as 'the author,' and an outline of the dissertation structure.

1.2 Background of the Study

1.2.1 Brief introduction to the country

Bhutan is a small Buddhist country in the eastern Himalayas between China and India in Southeast Asia (see Figure 1.1). Its total area of 38, 394 square kilometres is home to 727,145 people (NSB, 2021).

Figure 1.1 *A map of Bhutan and its neighbouring countries of Asia. Source: https:// koryogroup.com/travel-guide/bhutan-map-where-is-bhutan/*

Its terrain is mostly rugged mountains, heavily forested, and deep valleys with fast-flowing rivers (see Figure 1.2). The land begins at 160 metres of the sub-tropical and rises gradually to an elevation of 7500 metres, where the peaks are snow-covered (NSB, 2021). Due to these varied altitudinal and climatic conditions, Bhutan has a rich biodiversity of flora and fauna. Bhutan is well known as one of the world's ten biological hot spots and one of 234 globally outstanding eco-regions (Banerjee & Bandopadhyay, 2016; NBC, 2022). In addition, seventy-one per cent of the land is under thick forest cover (NSB, 2021), and the kingdom's constitution directs that the land should remain 60 per cent under forest cover at all times. Given below, Figure 1.2, gives an idea of the small country's high mountains, natural forests, fast-flowing rivers, and altitudinal variation.

Figure 1.2 *A view of mountains, forests and a river of Bhutan*
[Picture courtesy: Tashi Tobgay, PCE, Paro]

While *Dzongkha*[2] is the national language, English is the medium of instruction in schools and tertiary institutions (Wangchhuk, 2008). Vajrayana Buddhism is the state religion followed by most of its population, and a small section of people follow Hinduism. Bhutan has never been colonised by any other country but has been ruled by successive hereditary monarchs since 1907. Only in the 1960s, during the reign of the third King, Jigme Dorji Wangchuck[3], Bhutan opened its doors to modernisation and development. Under His Majesty's leadership, the nation started its 1st Five Year Plan in 1961 for progressive developmental activities and joined the United Nations in 1971 (MOFA, 2022). Since then, Bhutan has made remarkable progress in all development areas, including education, economy, and health. Bhutan is now a member of more than sixty regional and international organisations.

In 2008, the constitution of the kingdom—initiated by the fourth monarch—was amended, making a historical shift from an absolute monarchy to a democratic constitutional monarchy (NAB, 2022). Since then, the head of the state is the King, and the head of the government is the Prime Minister. The Gross National Happiness (GNH)—propounded by the fourth King—is Bhutan's identity in the global society. This unique development philosophy deeply rooted in Buddhism is a preference for 'spiritual happiness' over the country's Gross Domestic Product (Phuntsho, 2013).

[2] The national language of Bhutan
[3] Dynasty title of the Bhutanese monarchs

Education has always been a priority for Bhutan. Although modern education began only in the early 1960s, monastic or traditional education prevailed for centuries (Phuntsho, 2013). Education is delivered in three forms, general education, monastic education, and non-formal education (NSB, 2021). The monastic education, which is traditional Buddhist learning, continues in the monasteries and the *dzongs*[4] for monks and nuns. Non-formal education is a unique programme for adult citizens—who had missed school—to develop their basic literacy, numeracy, and functional skills. Currently, general education is more dominant in the country, with almost eight hundred primary and secondary schools and about eighteen tertiary institutes spread across the country (NSB, 2021). While primary education is from kindergarten to grade six, secondary education is divided into three levels: lower secondary is grades seven and eight, middle secondary is nine and ten, and higher secondary is eleven and twelve. Primary education is free for all citizens till grade ten—as mandated by the constitution—after which students continue their tertiary education in the colleges or vocational institutes within or outside the country.

Bhutan's economy mainly depends on agricultural production and hydropower, the primary contributors to the country's GDP. Agriculture is the primary source of livelihood for a majority of the population. About 80 per cent of Bhutanese households depends primarily on livestock and crop cultivation practised in small scattered plots (Norbu & Floyd, 2004). Farmers who, until a decade ago, were practising subsistence agriculture are gradually shifting to commercial agriculture due to improved roads and transportation amenities. Hydropower, the nation's capital income, is the major contributor to the country's economy. According to national statistics, six major power plants are currently in operation, and four are under construction (NSB, 2021). Bhutan also sells its surplus energy to the neighbouring states of India.

1.2.2 The Gross National Happiness (GNH) philosophy and its impact on education

Happiness for individuals is subjective, but in the GNH context, 'happiness' is multi-dimensional. It includes all aspects that contribute to the overall wellbeing of the people (Ura et al., 2012). It is not the "fleeting, pleasurable 'feel good' moods" because one cannot experience true happiness while the others suffer; but it "comes only from serving others, living in harmony with nature, and realising innate wisdom, and the true and brilliant nature of our own minds" (Thinley, *in* Ura et al., 2012, p. 7).

[4] ancient fortresses

The GNH philosophy is based on the Buddhist precept of 'happiness,' understood as the quality of the mind that arises from a positive mentality. As the nation's development approach, the GNH seeks "a harmonious balance between material wellbeing and the spiritual, emotional and cultural needs of the society" (GNHC, 2022, p. 1). Ura et al. (2012) state that the GNH philosophy is also based on the belief that "the beneficial development of human society takes place when material and spiritual development occurs side by side to complement and reinforce each other" (p. 7).

The GNH has four key pillars, good governance, sustainable socio-economic development, preservation and promotion of culture, and environmental conservation. They are divided into nine domains and 33 measurable indicators (see Figure 1.3).

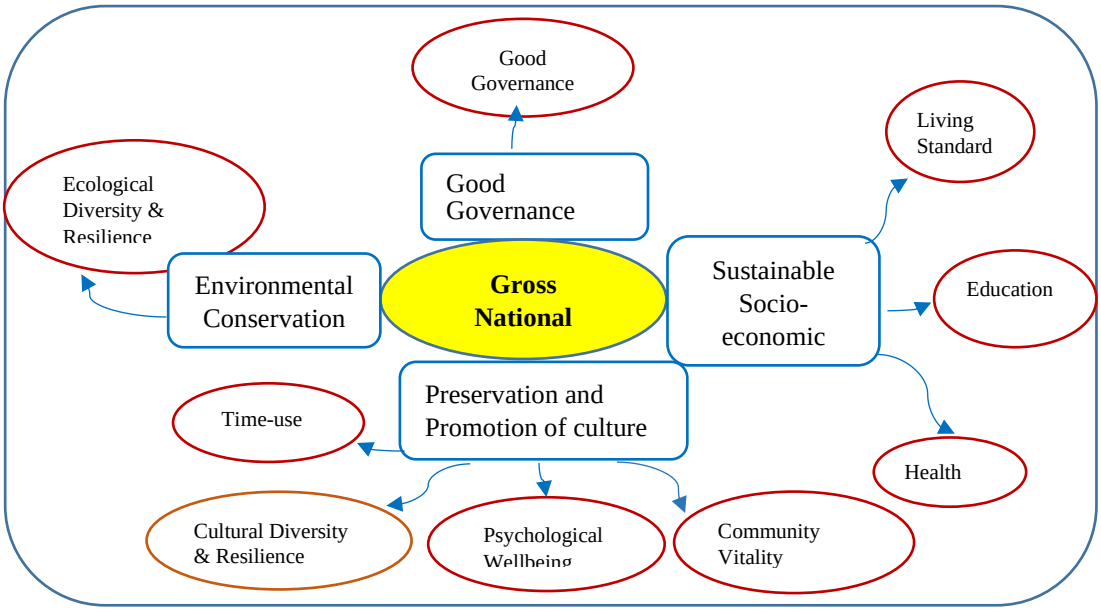


Figure 1.3 *Gross National Happiness: Four pillars and nine domains (Source: Author)*

Education is one of the domains in the GNH concept. The education system, as the 'engine of growth in the nation-building process,' bears the responsibility of providing free primary education to children and continually improving its quality to meet the requirements of the fast-changing global society of the 21st century. According to the government documents, such as the Education Blue Print, education has to build a character that embodies the principles and values of GNH and upholds the nation's unique cultural and spiritual heritage (MoE, 2014; PPD, 2020). In the wake of the increasingly complex and competitive world order and the mounting pressures of external influences with globalisation, Bhutan faces—like any small nation—the threats of losing

one's own cultural identity, its rich traditional values and practices. His Majesty, the fifth King, consistently reiterates this concern that Bhutan's identity only lies in its rich tradition and cultural values. Thus, it must be promoted among the younger generation (Ura, 2009).

In 2010, the Ministry of Education initiated a massive programme titled 'Educating for Gross National Happiness.' One significant strategy in the programme was infusing the GNH values, basically Buddhist values, into the school curricula for all levels of education. This way, children would learn rich Bhutanese traditional, cultural and spiritual values in school through textbooks, teaching, and learning activities. Given below is a table (Table 1.1) that illustrates the corresponding values of the four pillars and nine domains of GNH.

Table 1.1 *GNH pillars and domains with their corresponding values* (Source: *Adapted from Ura's (2009) article 'A Proposal for GNH Value Education in Schools*

GNH Pillars	**Domains**	**Specific values**
Good governance	Good governance	integrity, justice, genuine-ness, inclusiveness, wisdom, transparency, accountability, democratic, participation, responsibility, commitment, far-sightedness, empowerment
Sustainable socio-economic development	Living standard	Self-reliance, security, sustainability, adequacy, dignity of labour
	Education	Creativity, openness, diligence, patience, insightfulness, perseverance
	Health	Fitness, soundness, self-worth, prevention, precaution
Preservation and promotion of culture	Time-use	Stress free-ness, bonding, healthy lifestyles
	Cultural diversity & Resilience	Identity, sense of belonging, dignity, non-alienation, indigenous wisdom, diversity (language, traditional art, architecture, games, festivals, artisan skill)
	Psychological wellbeing	Compassion, generosity, forgiveness, gratitude, empathy, wholesome emotions
	Community vitality	Altruism, trust, reciprocity, fairness, fidelity, family bonding, solidarity, equality, equity, hospitality, cooperation, honour, sociability, cohesion
Environmental conservation	Ecological Diversity & Resilience	Interdependence, eco-consciousness, non-utilitarian, aesthetic, naturalistic, respect and care for nature

The values are drawn from the nine GNH domains and cover themes ranging from physical hygiene to cultural norms. Buddhist values like compassion, altruism, respect, generosity, and

reciprocity feature prominently across the nine domains (Ura, 2009). This brings the argument back to why traditional and cultural values must be fostered in children. It is all about the right livelihood, one's relationship with nature, and the only path to 'happiness' for all sentient beings. The following section explains the Bhutanese cultural values and how essential the intrinsic connection with nature is.

1.2.3 Bhutanese traditional and cultural values

> An educated and enlightened society of Gross National Happiness, built and sustained on the unique Bhutanese values of *Tha-Dam-Tshig Ley Gyu-Drey*.
>
> (MoE, 2021)

The Bhutanese cultural values, shaped by the Buddhist precepts, are about the right livelihood, relationship with all sentient beings, and individual self-discipline (Wangyal, 2001). Of the two core values, one is *tha damtshig*[5]*,* value of genuine trust and commitment to others, and the other is *ley gyu-drey*[6]*,* the truth of action and consequence, commonly referred to as *karma*, the Sanskrit term for the cause-and effect cycle. One's consciousness of interdependence, compassion, respect, and empathy for all sentient beings is necessary for good thoughts and actions to uphold the *tha damtshig* and accumulate good *karma*. Children should understand what those values mean in the Bhutanese culture and practise them too.

To uphold the two core values, children should learn the *domba nga*[7]. According to Wangyal (2001), *domba nga,* referred to five things to avoid as per the Mahayana Buddhist tradition, is about individual self-discipline. They include: avoiding killing; avoiding taking what is not yours; avoiding telling lies; avoiding consuming intoxicants; and avoiding sexual misconduct (p. 107). When individuals maintain these five ethics, a harmonious world is created where people live in complete harmony with other beings. In this way, the Buddhist values of loving kindness, respect, compassion, empathy, integrity, and honesty are all acquired. However, these values must be taught in the Buddhist cultural context rather than as universally understood. For example, the reason to be 'honest' should not be for fear of the law or to escape punishment, but should be 'honest' for a genuine commitment (*tha damtshig ley gyu-drey*) to others' wellbeing.

[5] Genuine trust and commitment to others
[6] The truth of causality
[7] Five things to avoid according to Mahayana Buddhist tradition

Although the values converge with the universal values, they differ in their particular traits. According to Ura (2009), western societies, like the United States or the United Kingdom, have overtly emphasised individual rights or individualism in the last fifty years, undermining commitment to others and resulting in distrust and disharmony. Ura argues that in the Bhutanese culture, 'trust' and 'commitment' are most vital for the collective happiness of "the entire community and towards building a GNH society" (p. 5). Therefore, the national education roadmap aims to prepare citizens for the globalised world with the required skills and competencies and to have *tha damtshig ley gyu-drey* as Bhutanese citizens (MoE, 2014; MoE, 2021).

1.2.4 Background on conservation education in the school

Conservation education in the schools of Bhutan was initiated by the Royal Society for Protection of Nature (RSPN) in 1987, not formally but as an extra-curricular activity. RSPN is a local non-governmental organisation, a counterpart of the United Nations Environmental Programme (UNEP) and the World Wildlife Fund (WWF). It initially aimed to involve the students in protecting wildlife by forming nature clubs to carry out nature-based activities in the schools (RSPN, 2022). Programmes like the 'Young Bhutanese Bird Watchers' and the 'Young and Green' were run through the Nature Clubs to encourage children to spend time in nature, appreciate nature and their ecosystems, and educate them about environment, garbage, afforestation and conservation. Since 2009, the nature club and its activities have been formalised as co-curricular programmes and integrated into the school system (RSPN, 2022). Hence, nature clubs continue to function actively in all schools of Bhutan.

In 2010, GNH values were incorporated into the school curriculum through the programme 'Educating for Gross National Happiness.' Conservation values incorporated into the curriculum included caring for and protecting trees, protecting the community forest, saving animals from extinction, and protecting the environment. Social studies and science are directly linked to conservation in the primary school curriculum. Another influence is the concept of 'Green School for Green Bhutan' introduced in 2010 by the former education minister, Thakur Singh Powdyel, as another approach to GNH Education (Yangdon, 2018). Of the seven school greeneries, physical greenery is the outlook of the 'naturally or environmentally green' campus. Over the years, this approach has positively impacted campus aesthetics with more ornamental trees and hedges. The

principals, teachers and students consider these plantation activities a part of their nature conservation efforts.

1.3 Problem Statement

The Kingdom of Bhutan's development philosophy of Gross National Happiness (GNH) emphasises the need to balance sustainable economic growth with environmental conservation, promotion of cultural heritage, and good governance. In this regard, Bhutan's Constitution entrusts every citizen with the sacred task of protecting the natural environment and preventing all forms of ecological degradation. Moreover, given the increasing global crisis of degrading the earth, climate change, resource depletion, and species extinction, the urgency of nature conservation education in the school education cannot be ignored. Nature is central to human existence, and people's relationship with it is critical to conservation education. Hence, some empirical research to closely understand this phenomenon is relevant and timely in Bhutan.

Currently, there is a dearth of research literature on nature conservation education internationally or locally. In particular, not much is known scientifically in Bhutan about conservation education, school curricula and teaching-learning practices at any level of education. On the contrary, there is abundant literature on environmental conservation education, but they are not viable for understanding nature conservation education since they are different entities. The two terms are commonly used synonymously, but they are ideologically distinct (see page 42). Environmental conservation has gained more popularity and attention globally than nature conservation. Owing to this reason, there is abundant research available globally on environmental issues such as sustainability, climate change, priority species, forest management, waste management and pollution; but very little is known about nature conservation education.

While there are a few studies conducted on connectedness with nature, they are not specific to primary school curricula or children's learning. For example, Rosalino and Rosalino (2012) studied Portuguese Junior High School students to evaluate the factors influencing people to conserve nature. This study does not shed any light on primary school children's learning about nature while at school. Another research conducted by Bruinia et al. (2015) focused on assessing children's connectedness to nature after administering a 'Getting to know nature' programme that included creative arts on nature, treasure hunt adventure, and virtual hiking. Similarly, other researches are slightly related to nature conservation but seem intertwined with environmental

issues and least related to nature conservation education for primary school children. Hence, this research was necessary to fill the current literature gap so that there is more clarity to nature conservation education in the primary school.

The quality of education is a valid concern of the Bhutanese Education system; thus, it has developed systematic ways to continually assess its quality. Since the curriculum directs students' overall learning, it must be periodically reviewed to maintain its currency, relevancy and meaningfulness. This empirical research on nature conservation education is necessary so that the insights gained from the findings help enhance the quality of children's learning. Nature conservation education for primary school encompasses two aspects: knowledge about nature; and the values of nature (Hupke, 2023; Hooykaasa et al., 2019; Hughes et al., 2018). Within this premise, this research explores how nature conservation education is delivered in the primary schools of Bhutan.

The GNH values are critical for Bhutan's cultural and spiritual identity in the fast-changing globalised world. Since 2010, the GNH values have been incorporated into the curriculum at all levels through the 'Educating for GNH' programme. The concern at this juncture is about the values embedded in the curriculum. In the process of development and globalization, the external forces accompanying it have impinged on the cultural and spiritual practices. Values could differ due to religious and cultural differences. For example, Buddhists consider humans as part of nature, while Christians believe nature as an external resource for human use. In this regard, this study was necessary to identify gaps or inconsistencies within the curriculum and practices of the primary school concerning nature conservation education.

1.4 Research Questions

The inquiry of this research is based on the central central question which reads as:

> *How is nature conservation understood, taught and practised in the primary schools of Bhutan?*

Specific questions were formulated to precisely understand nature conservation education in primary school from various aspects and stakeholders. For example, the informants' perspectives on school curricula, teaching-learning and practices related to nature conservation were critical. Since this concerned primary education, the principals, teacher educators, curriculum specialists,

teachers and students were considered vital informants. Given below are the five questions on which specific questions for data collection were based:

1) How do the informants perceive nature conservation education?
2) How does the primary school curriculum address nature conservation education?
3) How is nature conservation taught and learned in primary school?
4) How does the school practise nature conservation?
5) How does the teacher-education curriculum prepare student teachers to teach nature conservation in primary school?

However, as in any qualitative study, the central question and the sub-questions of this research have had to undergo numerous revisions before arriving at the final research questions given above. The details of the initially formulated questions and the revised questions with reasons for the changes made can be referred to in Appendix 3.3.

1.5 Methodology

This study adopted social constructivism with an ethnographical approach to fulfil its research intent. Since this study required gathering the insider's perspectives more efficiently, the fundamental principles of participant observation were employed. Three data collection tools, i.e., a semi-structured interview, an open-ended questionnaire and field notes were employed in this research.

For the analysis of data, the researcher used a framework created by adapting procedures from the works of Bogdan and Biklen (2007), Creswell and Creswell (2018), Gibbs (2007), and Punch (2009). The framework included steps to thematic coding, revising and updating the theme pool as and when new themes emerge (see Chapter 2). The findings were then presented thematically with multiple perspectives of different categories of informants.

1.6 Significance of the Study

This research on nature conservation education in primary schools is the first of its kind in Bhutan. As a result, the findings will contribute to the limited literature in this field at local and international levels. In particular, the findings will help teachers and students broaden their understanding of nature conservation from a Bhutanese scholar’s perspective. Since the findings are based on practitioners’ perspectives, including teachers, principals, teacher educators and

curriculum specialists, this study will enhance nature conservation education in the primary school. As a result, teachers and students will explore, learn, and engage in more intellectual discourses related to conservation education. This study is also expected to spark many scholars' interests in conducting more research or developing new research avenues. For example, organisations, government ministries and individual scholars interested in nature conservation education may conduct further research.

Value education will significantly benefit from the findings of this study. The Bhutanese education system strongly emphasises morals and values to be incorporated into all facets of the school curricula. In this regard, the findings from this study related to traditional Bhutanese values will provide more insights for curriculum reviewers, new curriculum developers and other practitioners. The findings may also provoke substantial debates and discourses on value education among educators. As a result, the quality of teaching-learning in the school will improve.

The findings of this study might also have some implications for government policies. With the new insights gained, new dialogues and debates on conservation education may ensue in the education sector and other relevant organisations, resulting in some government policy changes. For example, the infrastructures required by the schools to create learning spaces in the natural environments might need inter-governmental pledges and collaborative efforts.

1.7 Researcher's Context of the Study

The author is a lecturer at a teacher-education college in Bhutan. She teaches language and literacy modules, mainly in primary education, early childhood education, and other related programmes. Before this position, she was a primary school teacher for about twenty-two years (1987 to 2008), working in six different schools in Bhutan. In her initial years, she taught kindergarten, grades one, two and three; and later taught English to upper primary and junior high students. Having lived and worked for over two decades in a primary school system has been an advantage to this ethnographic study. For example, the author did not have to spend extra time and energy understanding the school culture and practices. The twenty-two years of living in the school was equivalent to a long-term 'lived experience,' an essential part of ethnography. This experience made connecting with the teachers, principals and students easier during data collection. Even now, as a lecturer, the author continues to visit the schools for teaching, supervision and research activities.

Concerning her professional training, the author initially underwent a two-year teacher training at Paro College of Education, erstwhile TTC & DS, and started her teaching career in 1987. Gradually, she upgraded her professional qualification and received a Diploma and a Bachelor's degree in primary education from Samtse College of Education, Bhutan. She also received a Master's degree in primary education from the University of New Brunswick, Canada, in December 2007. Thus, the author's interest in primary education for teaching and research is due to her professional training fueled by her passion.

The researcher's keenness in nature conservation education comes from her childhood experiences growing up in a small rural village called Toebisa in western Bhutan. Her parents were both regular farmers who practised subsistence farming on their small area of farmland. Besides cultivating crops and rearing livestock for milk and butter, they kept a few chickens for eggs. Being the youngest of four siblings was advantageous because she could follow her mother wherever she went, from visiting neighbours to working in the fields to collecting firewood or leaf litter from the woods. While the mother did her chores, she let her little daughter play as she liked.

One of the most cherished and vivid childhood memories that she recalls in the wild nature is playing freely in the woods. For instance, she recalls how her mother would sweep the blanket of dried oak leaves across the forest floor and heap it in one corner. Not far from there, the little girl would playfully jump onto the heap and go underneath, playing hide and seek. She would continue her adventure by walking through the thick blanket of leaves and jumping around until her mother would signal her that it was time for them to leave. By then, her mother would have already prepared a small load of neatly bundled leaf litter for her daughter to carry home. The crunching leaves beneath her little feet, the alluring wild scent, the prickly chestnut, the purple berries, and the little purple flowers she danced with were some of the precious experiences that she would cherish throughout her life. Decades later, her elder sister and family still continue to collect litter leaves for the cattle and remain close to the wild nature. Although a lot has changed over the years regarding road facilities and infrastructure in the village, the wild nature persistently remains fresh and alluring. It is still a delight to visit Toebisa, her home village, where nature is wild and aplenty.

This author's background is to position herself in this study's context and to provide some information for the readers' better understanding of this research. Creswell and Creswell (2018) state that the researcher's experiences are most likely to influence the interpretation of research

findings. Therefore, this background will help the readers to be aware of the possible biases and enable them to contextualize the findings better.

1.8 Outline of the Dissertation

This thesis is divided into seven chapters. Chapter 2 presents a review of the literature on nature conservation. It begins with discussing various views of 'nature' and its variant meanings. The subsequent discussion shows how nature and culture are inextricably connected, followed by a comparison of three different approaches to nature conservation adopted by the United States, Europe and Bhutan. Next, the nature conservation and environmental conservation ideologies have been compared and contrasted to prevent any confusion related to the two concepts. Eventually, the discussion narrows down to the essentials of nature conservation education, followed by a quick analysis of the primary school curriculum documents.

Chapter 3 presents the methodology of this study. First, it discusses social constructivism as the most appropriate research paradigm for this research. Second, it discusses the ethnographic research design with reliance on participant observation employed as a technique for data collection. A thorough discussion of the data collection methods, tools and analytical procedures follows this. Finally, the ethical considerations upheld in this study are explained in detail.

Chapter 4 presents the analyses and interpretation of the educators' perspectives on nature conservation education. Findings from the interview and the field notes are discussed under different sub-headings, such as perceptions of nature, nature conservation, its importance, curriculum, teaching-learning and school practices.

Chapter 5 presents the analyses and interpretation of students' perspectives of nature conservation education. Findings from the open-ended questionnaire are discussed in two parts: students' knowledge of plant and animal species; and students' perspectives on nature conservation, its importance, curriculum, teaching-learning and school practices.

Chapter 6 discusses the big ideas and their implications for nature conservation education in Bhutan. This section is the most significant part of the dissertation because the major findings are linked to the study's purpose and literature for further consolidation. In particular, the chapter discusses the gaps and inconsistencies identified in the study, followed by the implications for various stakeholders. Alongside this, some valuable suggestions have been offered to overcome

the challenges in nature conservation education. Finally, the chapter concludes with the limitations of the study and some possible areas for future research.

Chapter 7 concludes the dissertation by highlighting the significant findings of the study. It reiterates the big ideas and closes the report with final remarks of the author.

CHAPTER 2

UNDERSTANDING NATURE CONSERVATION

A Review of Literature

2.1 Introduction

This chapter reviews the literature on nature conservation education in primary school. First, the multiple views on ‘nature’ are discussed, beginning with the word's origin and its variant meanings. After that, a discussion on how nature and culture are inextricably connected is presented, followed by a critical analysis of the nature conservation perspectives of the United States, western Europe and Bhutan. The next is a succinct discussion of the differences between nature conservation and environmental conservation ideologies. Finally, the focus narrows to nature conservation education in primary school with discussions on essentials of nature conservation education and a succinct review of the Bhutanese primary school curriculum documents.

2.2 Views of Nature

The word ‘nature’ is loosely used in various situations but could mean different things in different contexts. Habgood remarks that the problem with the word ‘nature’ is that it has multiple and overlapping meanings (cited *in* Castree, 2005, p. 37). For example, I love *nature’s* beauty; this is the *nature* of my work; she has a sweet *nature*. The difference in the meanings used in the three statements is noticeable, but the overlapped meaning of 'nature' as something 'natural' is apparent. Furthermore, the views of 'nature' have evolved since the earliest times in history (Collingwood, 1960). According to Ducarme and Couvet (2020), even in conservation science, the definition of ‘nature’ is diverse, which “can be an obstacle or chance for the global conservation of ‘nature’ (p. 2). To this end, the word ‘nature’ has become highly elusive and multi-faceted, making it worth more deliberation for this study on nature conservation education. The origin of the word and the views held by cosmologists, different religions, and scientists or biologists are presented below.

2.2.1 Origin of the word ‘nature’

The word ‘nature’ was translated from the Greek word *physis*, which meant ‘growing’ or ‘producing,’ but the concept was still abstract even to the philosophers of the time (Ducarme & Couvet, 2020). Aristotle, the Greek philosopher and the world's most influential thinker of the early ages, avoided using the word *physis* in most of his books because of its abstract and evasive nature. In Aristotle’s view, *physis* could mean the growth *process*, the *element* from which things grow, the *principle of movement*, or even the *matter* [italics added] from which things were made. However, despite its multiple meanings from the past, it is safe to infer that 'nature' meant everything natural, and 'mankind' was considered a part of nature by the Greek philosophers, like in Buddhism (Ducarme & Couvet, 2020).

Later in the first or second century, the Romans used the word *natura* to mean birth or the initial character. Although this was very similar to the Greek meaning of 'nature,' the word changed over time. According to Ducarme and Couvet (2020), Cicero, a Roman philosopher, introduced "a classical opposition between nature and culture, the first being an initial state devoid of human influence, and the second one corresponding to an appropriation by human societies" (p. 2). Unlike the Greek thinkers, the Romans perceived the cities as places of filth and sin and the countryside as a place of a good life. This perception is very close to the modern Western societies' biblical view—that cities are evil and nature is holy. However, one common feature across its variant meanings is the naturalness of this phenomenon called 'nature.'

2.2.2 Cosmological views of nature

The cosmologists’ views about 'nature' from the earliest times in history have evolved. Collingwood (1960), an English philosopher, explains ‘nature’ in the context of three cosmological phases—Greek, Renaissance, and Modern Cosmology. In Greek culture, nature was viewed as a world of bodies in motion due to the ‘soul’ or the life in themselves. They believed that each body had a ‘mind’ and that the body’s intelligence controlled the regularity of the motion, first of its own body, then of the body’s environment. Here, the bodies of the movement included the whole universe, and the Earth was only a tiny part of it.

In Renaissance culture, while they agreed that nature was organisms in motion, they rejected the idea of the organisms having a ‘mind’ or the ability of the bodies to regulate their own movement. Instead, they believed that some external force caused the regularity or orderliness of the movement but not caused by itself or its ‘mind.’ Slowly, this thinking changed too. Modern

cosmology differed fundamentally from Greek and Renaissance but became closer to how 21st-century science understands nature. In their view, organisms, including humans, evolved by progressing and changing through time and space, and they 'begin to exist' and ‘cease to exist’ naturally (Collingwood, 1960). The feature of naturalness, the self-willed nature, and the lifecycle of biotic forms are indicated.

2.2.3 Religious views of nature

Religious traditions and culture strongly influence any nation’s cultural, social, and political framework. Ducarme and Couvet (2020) state that some of the wisdom of influential thinkers from the early ages, middle, and renaissance to the modern era seem to have also stemmed from their religious traditions, consequently influencing how people interacted with the world around them, including nature. The religious precepts on ‘nature’ may determine the fundamental conservation visions of a nation, like how the “Christian vision which may still be dominant in American-influenced conservation” (Ducarme & Couvet, 2020, p. 5).

While there are standard religious views of nature as something divine and godly across religions like Christianity, Islam, Hinduism, and Buddhism, there are fundamentally contradicting beliefs. The fundamental difference lies in the 'origination' of the universe. In Christianity, Islam, and Hinduism, the whole universe—from the sun, moon, earth, river, and mountains to plants and animals, including humans—is created by God (*the* Father in Christianity, Allah in Islam, and Brahman in Hinduism). God, the Creator, is the eternal supreme power that controls the entire universe, including the destiny of human beings. Conversely, in Buddhism, the universe is formed naturally, not created by any God, but as a result of the collective good *karma* of all sentient beings (Dalai Lama, 2018; Harvey, 2012). *Karma* means the process of cause and effect, where good actions beget good results and vice-versa and also believes in life after death (Dalai Lama, 2018; Wangyal, 2001). Christianity believes in the power of God for human destiny but not in the power of *karma.*

Dalai Lama, a renowned spiritual leader of Buddhism, explains, “whatever experiences we have now are consequences of preceding conditions, and nothing comes into being without a cause” (Dalai Lama, 2018, p. 60). According to the Law of *Karma*, good intentions and actions bring merits, while bad intentions and actions bring misfortune to one's present or succeeding life. However, in Christianity and Islam, God the Creator controls the fate of humans by seeking their complete submission and obedience. According to the Old Testament, the God created human

beings in his image, but they are born with the original defect of being inherently sinners (Emon et al., 2015; Gill, 2006). In this case, the Holy Spirit is always with human beings watching for their redemptive actions. However, whether it is a good fortune or misfortune, it is considered 'God's will,' which "commands the natural order to be preserved and forbids that it be disturbed" (Emon et al., 2015, p. 100). In this regard, the implication for nature conservation is that while Christians and Muslims attribute their temptation or wrong actions to their 'original sin' or the devil's force, Buddhists refrain from committing harmful or destructive actions for fear of *karmic* consequences.

The next difference is in the principle of 'dependence.' In Christianity and Islam, all humans depend only on God for mercy, redemption, and salvation (Emon et al., 2015). Animal creatures and plants are the God's gifts to humans for nourishment and pleasure. Gill (2006) quotes from the bible what God says:

> Let Us make mankind to Our image and likeness and let them have dominion over the fish of the sea, the birds of the air, all the cattle, all the earth, and all the creatures that crawl on the earth.
>
> See, I have given you every seed-bearing plant bearing its seed over all the earth and every tree with seed-bearing fruit. These will be food for you, for all the wild animals of the earth, for all the birds of the air, and for every creature that crawls on the earth and has the breath of life; every green plant I give for food. (p. 279)

The anthropocentric attitude of the West towards natural resources originates from this Christian tradition that everything on this earth is meant for human pleasure (Evans, 1997; Gill, 2006). As the biblical injunction of the Christian faith instructs to "fill the earth and subdue it, and have dominion over every living thing that moves on the earth," the excessive exploitation of the natural world in the West is justified (Meine, 2013, p. 279). Hence, this biblical injunction drives the consumeristic and utilitarian mindsets for exponential economic growth to demonstrate human control over the materialistic world. The contemporary conservationists of the 21st century still proclaim that "Nature is over" or that nature no longer runs the earth. We do" (Büscher & Fletcher, 2020, p. 4).

Conversely, Buddhism is founded on the principle of dependence on other beings, spiritual interdependence, and interrelationship (Allison, 2017; Dalai Lama, 2018; Harvey, 2012; Johnson, 1992). Humans are part of nature. According to Buddhist philosophy, nothing can exist independently "because all things come into being as a result of or depending upon, other causes and conditions" (Dalai Lama, 2018, p. 43). As a result, there is a deep appreciation and respect for

all sentient beings. Any sense of 'self-importance' felt by individuals conflicts with the practice of compassion and Bodhicitta, the altruistic mind of awakening (Harvey, 2012, p. 65). Unlike Christianity, there is a sense of "sameness" and absolutely "no sense of superiority" over other beings (Harvey, 2012, p. 147).

Furthermore, Buddhism's belief in *karma* and life after death strongly influences the relationship with nature. For example, the belief that other living creatures may have been one's mother in the previous lifetime results in mutual respect and reverence for other life forms. In contradiction, Christianity and Islam indulge in supremacy and control over living creatures because they have the will of God to control the rest of the universe.

Unlike other religions, Buddhism uniquely believes in 'spirits and deities' non-human forms of life who are supposed to be "the original owners of the land pre-existing the advent of Buddhism in the seventh and eighth centuries" (Allison, 2017, p. 216). They reside in trees, rocks, lakes, forests, mountains, or peaks in various territories (Allison, 2017; Johnson, 1992; Ura, 2001). They are believed to protect and control the territories to maintain the universe's natural order. In this respect, the Bhutanese people, mostly Buddhists, demonstrate respect, reverence, and a particular affinity with nature in more ways than other religions. Special rituals are conducted as petitions to seek permission from the deities to utilise the land for construction; and perform unique offerings to spirits to seek their forgiveness for defiling or polluting the sites under their control (Allison, 2017; Ura, 2001).

In addition, the Buddhist monasteries are known to be best located in the deep forests or the high mountains amidst nature because the practitioners seek to be closer to real nature for their practices and meditation (Sees Figure 2.1).

Figure 2.1 *Taktshang monastery built in the high mountains of Bhutan [Picture courtesy: Tashi Tobgay, PCE, Paro]*

In contrast, Christian churches and Mosques are commonly located in the middle of community settlements because the followers must attend the Sabbath or Mass on the seventh day every week. This difference is significant because Buddhism believes humans are part of nature, whereas Christians and Muslims believe humans and nature are separate entities.

Religious culture strongly influences preferences or priority lists for species conservation (Pilgrim & Pretty, 2010). The first type is the strong religious sentiments attached to the symbol of God and godly figures in animal form. In Christianity, the *lamb* is the pure and innocent Jesus, the *dog* is the loyal mankind, the *dove* is the holy spirit, and the *snake* is the devil. At the entrance doorways of all churches, one can also notice the symbols of the four evangelists, the *lion*, the *ox*, the *man*, and the *eagle* (Škrobonja et al., 2015). In Buddhism, animals do not symbolise the Buddha, but some specific animals are symbols of the deities or the dharma protectors. For example, the images and figures of the *lion*, the *elephant*, the *snake*, the *tiger*, and *peacocks* can be noticed on the murals, wall paintings, and wood carvings in Buddhist temples and even in homes of people (Choskyi, 1988; Ura, 2001).

Similarly, Hindus worship the *monkey* as God Hanuman, the *elephant* as God Ganesh, the *tiger* as Goddess Durga, and even the *rat* as God Ganesh. The implication for conservation is that religious cultures may impact the priority list for species protection. The same animal can be regarded differently, too. For instance, the snake is the devil in Christianity, and God *Naga* in Hinduism. At the same time, lions symbolise 'strength and power' across religions like Christianity, Islam, Buddhism, and Hinduism. Hence, lions may be unanimously preferred for conservation across religious cultures.

Religious cultures impact dietary habits affecting the priority list for species protection. Christians have no species-dependent dietary restrictions like Hinduism and Islam do. The *cow* is considered a sacred animal in Hinduism, so it is taboo to eat cow meat, whereas, in Islam, *pigs* are forbidden for consumption because they are considered very dirty. Buddhism has no dietary taboos, but since killing is a sin, vegetarianism is encouraged to reduce animal killing (Dalai Lama, 2018). In this way, one religion values a particular animal more than another. Irrespective of the differences in religious sentiments, the takeaway from this information is that these embedded religious values can influence nature conservation practices in people's minds. Rather than conserving all species for their intrinsic value, one might be more biased toward religious values

and prefer one species over the other in the decision process for conservation (Pilgrim & Pretty, 2010).

Finally, it is understood that Christianity and other religions believe that God created the universe and thus God is supreme. On the other hand, Buddhism believes that the universe is formed due to the collective good *karma* of all sentient beings. Religious traditions can influence the species' priority list for conservation as much as they influence their relationship with nature. Christianity views nature as an external resource for human use, and humans should dominate everything on earth. On the other hand, Buddhism views nature and humans as one entity, and they enjoy a symbiotic and intrinsic relationship.

2.2.4 Scientific views of nature

Even in modern science, the concept of 'nature' remains elusive and complex. According to Ducarme and Couvet (2020), there have been hundreds of studies focused on how best to conserve, protect or value nature, but "none of them deign providing a definition of it ... because this word is difficult to define" (p. 5). To this day, there is still no standardised definition of nature nor a standard approach to conservation, although most approaches are "utilitarian" or anthropocentrism (Runte, 2010, p. 62). A thorough critical discussion on three specialisations of science, namely evolution theory, ecology, and conservation biology, is essential for more insights.

2.2.4.1 Evolution theory

Charles Darwin's theory of evolution is widely accepted in modern science. According to this theory, all living organisms or species evolve, modify their characteristics over several generations and diverge to produce multiple offspring through *natural selection* (Darwin & Huxley, 2014; Losos, 2014). One should know the four biological facts to understand the *natural selection process*. First, each species has unique physical characteristics called genes, which are similar or different in some ways from other species. Second, these species with unique physical characteristics (genes) best suit a particular habitat or environment. These characteristics enable the species to survive, find food, resist diseases, and avoid predators. Third, due to the differences in their genes, some species are better suited for the habitat than others, which is why those fittest ones for the environment survive. In contrast, the weaker ones unable to adapt will likely perish in time. Fourth, organisms that survive in the environment are likely to reproduce, pass their genes

to their offspring and continue to adapt and change (Darwin & Huxley, 2014). In this context, humans are part of the millions of organisms that experience the natural selection process.

Interestingly, the Buddhist perspective that humans are part of nature and that a living creature could be one's mother in previous lives resonates somewhat with the evolutionary theory. For instance, past research shows that humans share similar genes with a fruit fly, which could mean the two descended from the same ancestors millions of years ago (Darwin & Huxley, 2014). For nature conservation, the theory of evolution helps people understand how overexploitation activities in the environment can affect the natural selection process and how even the species with physical characteristics best suited for the environment might find it difficult to survive. Individuals, groups, or decision-makers can use this knowledge to protect the species against new threats in the economic-driven anthropocentric world.

2.2.4.2 Ecology

Ecology studies plants, animals, and other organisms and their relationship with their environment. This branch of biology, interestingly, complements the Buddhist perspective of 'interdependence' in that the living organisms in the ecosystems rely on each other and their physical environment for food, protection, and reproduction (Casetta et al., 2019). Morgan (2022) defines 'ecosystem' as "a geographical area where plants, animals and other organisms, as well as weather and landscape, work together to form a bubble of life" (p. 1). Resonating the idea of 'interdependence' and 'inter-relationship', Murray (2018) explains the ecosystem in the following words:

> The term 'eco' refers to a part of the world, and 'system' refers to the coordinating units. An ecosystem is a community of organisms and their physical environment interacting together. Environment involves both living organisms and the non-living physical conditions. These two are inseparable but inter-related. The living and physical components are linked together through nutrient cycles and energy flows. (p.1)

Biologists now acknowledge that humans are part of the ecosystem, although debates on the nature-culture dichotomy continue for conservationists (Ducarme & Couvet, 2020). In addition, ecologists continue to study biodiversity for ecosystem services and how to sustain human comfort and pleasure.

The utilitarian approach deeply steeped in the biblical stance, even in science, is evident. For example, the main focus of ecology is to study and maintain rich biodiversity within the

ecosystems for ecological functioning and ecosystem services that benefit human beings. Biodiversity is the variability of plants and animals *within* species, *between* species, and ecosystems (Greenfacts, 2022; Casetta et al., 2019). The benefits people derive from the ecosystems, directly or indirectly, are called *ecosystem services* (Casetta et al., 2019; Sangeetha et al., 2019). Biodiversity provides the basis for ecosystems, and its quality is ensured by maintaining species *diversity*, *richness*, and *evenness* within the ecosystem. *Species richness* is the number of species in the given ecosystem; *species diversity* is the number of species from different categories of organisms; and *species evenness* is the given quantity distributed among well-defined categories (Casetta et al., 2019).

Although modern biologists acknowledge the presence of humans and their influence as favourable to biodiversity, debates continue about whether nature conservation should be with or without humans (Rozenwig, 2003 *in* Ducarme & Couvet, 2020). Instead, global conservation discussions mainly focus on biodiversity, ecosystem services and how to sustain or enhance the services for humankind (Anderson, 2018). Since rich functional biodiversity contributes to the society's economy, from natural services to health services to commercial services, the 'economics' or the commercial values of the services become a critical point for discussion (Marco, *in* Casetta et al., 2019). Hence, biodiversity conservation adopts the anthropogenic approach, influenced by "a set of utilitarian rationalities around market value" (Lockie et al., 2015, p. 10).

In the context of ecosystem services, ecologists may be influenced by the 'utilitarian' or the economists' views of conservation. All species may not be considered of equal value, but the more utilitarian value the species has, the more valuable it is for conservation. This approach contradicts the naturalists' vision of conservation or even the Buddhists' view that all creatures have equal intrinsic value. Marco (2019) asserts that some experts see the ecosystem service approach as "an unwarranted thwarting of the original mission of conservation, namely, the protection of biodiversity or, more generally, nature, for its own sake" (p. 321).

2.2.4.3 Conservation biology

Conservation biology is a relatively new discipline that developed in the mid-twentieth century to address the 'biodiversity crisis' facing the modern era. Reydon (2019) states:

> One of the main factors that contributed to both the establishment of conservation biology and the coining of the term 'biodiversity' in the 1980s was the realisation that species extinction currently

> proceeds at a much higher rate than the natural extinction rate and that this increased extinction rate is very probably due to the impact of the human population on the planet. (p. 171)

Hence, conservation biology was initiated to control the escalating rate of species extinction caused by the impact of urbanisation and human population growth. The growing panic was that "the species were becoming extinct before biologists could even describe, let alone study them" (Reydon, 2019, p. 395). It was realised that anthropogenic human activities and overuse of natural resources were accelerating the species extinction rate to a thousand times faster than the natural rate. This panic led to the 'environmental conservation movement' in Western societies.

Conservation biology is interdisciplinary, requiring knowledge input from other disciplines, especially from evolution theory, ecology, sustainable agriculture, social sciences, economics, human population, environmental history, and environmental ethics to make conservation plans (Meinard et al., 2019; Meine, 2013). However, the main focuses of conservation biology and ecology are different. While ecology focuses on maintaining biodiversity for eco-functioning, ecosystem processes, and ecosystem services, conservation biology focuses on protecting, maintaining, and restoring biodiversity, particularly "charismatic and endangered species" (Marco, in Casetta et al., 2019, p. 318). The only common interest is species diversity, ecosystems, and the sustainability of the environment.

Conservation biology has become a part of the global movement for environmental conservation, increasingly involving more participants from diverse backgrounds, both professional and common people (Casetta et al., 2019; Meine, 2013). Research points to a 'lack of species literacy' as one of the global challenges in conservation efforts. According to Hooykaasa et al. (2019), the knowledge of species is the starting point for people's interest in species conservation, and conservation education is one of its agenda.

2.3 Nature versus Culture

Nature and culture are so intertwined that one cannot talk about 'nature' without mentioning 'culture' and vice-versa. Culture is a 'way of life' for people who share similar meanings and interpretations of the natural world. Their ways of life have direct links with the natural environment, the plants and the animals of that geographical area. Reciprocally, the landscape and life forms are shaped by human beings through their evolving culture (Pilgrim & Pretty, 2010). For example, the unique Bhutanese culture thrived harmoniously with nature through the centuries,

even before the idea of conservation was initiated (Penjore & Rapten, 2005; Siebert & Belsky, 2007). Runte (2010) and Morgan (2022) argue that human beings and nature interact to influence one another in the natural order of evolution.

However, two age-old conflicting world-views impact conservation practices worldwide. One school of thought influenced by Christianity is that nature and culture are separate entities. The other school of thought influenced by naturalists is that nature and culture are one entity. Although the latter view sounds similar to the Buddhist precept, it lacks the inherent spiritual connection with nature. Based on the two contrasting world views, four conservation cultures emerged within the global conservation movement (Ducarme & Couvet, 2020). The first one acknowledges the importance of culture but dismisses the presence of human beings. Therefore, nature conservation is preserving the wonders of nature or places of spectacular sceneries—like the Yosemite Valley or the Grand Canyon monument of the United States—as a national cultural heritage and a way to preserve God's creations (Runte, 2010).

The second one also dismisses the presence of human beings and instead indicates an obsession for 'pristine wilderness' because that is where God resides, a place difficult for humans to penetrate. Therefore, nature conservation is to protect the pristine wilderness—like the Everglades, the Alaskan wilderness and the Amazon rainforests—against human disturbances. The existing protected areas to this day across the globe, including Bhutan, is this fundamentally capitalistic nature-human dichotomy (Büscher & Fletcher, 2020). The third perspective is 'ecology.' Unlike perspectives one and two, which exclude human existence, this perspective includes 'human presence' in the ecosystems. It believes that nature thrives in various ecosystems wherein organisms (including humans) depend on each other and their physical environment. Therefore, the conservationists ensured the proper functioning of the ecosystems that were quite inclusive of human beings wherever possible but in a scientific sense devoid of spiritual connection.

The last perspective is the most recent development in conservation history wherein human presence is acknowledged. In particular, the 'traditional farming systems' is considered beneficial for species protection (Ducarme & Couvet, 2020). Based on the evidence of the European culture that had practised centuries of traditional farming until they lost all their natural forests and farmlands to the aggressive and rapidly growing industrialisation and urbanisation. Although the perspectives of conservation as preserving the cultural heritage (Perspective 1), pristine wilderness

(Perspective 2), ecosystem (Perspective 3), and traditional farming systems (Perspective 4) remain firm in their own right, multidisciplinary ideas from biology and anthropology are converging for hopefully better conservation policies (Pilgrim & Pretty, 2010).

In the above context, it is clear that the first and second perspectives are based on Christian culture, while the third and fourth are based on scientific knowledge. While Bhutan—like hundreds of other nations—as a global partner has already adopted or incorporated all four perspectives over time, especially the 'pristine wilderness' and 'protected areas,' the traditional Bhutanese culture of spiritual connection with nature is a unique perspective. This unique perspective of traditional Bhutanese culture influenced by the Buddhist spiritual connection with nature could be the fifth perspective in conservation dialogues. For example, the Buddhist wisdom of compassion, empathy and respect for all sentient beings are beneficial in rendering a symbiotic relationship with nature.

2.4 Nature Conservation Perspectives: United States, Western Europe and Bhutan

It is essential to delve into the global perspectives, trends and concerns to understand the nature conservation of Bhutan. Nature conservation practices worldwide, including Bhutan, are influenced by the views of the United States and European Union through influential global organisations. For example, Bhutan is an active member of the World Wildlife Fund (WWF), the United Nations Environmental Programme (UNEP), and the International Union for Conservation of Nature (IUCN). Therefore, this study critically discusses the conservation perspectives of the United States, western Europe and Bhutan.

The perspectives include a brief history of human settlement and religious and cultural practices about nature conservation. In particular, it discusses the factors that contributed to their nature conservation approach.

2.4.1 Nature conservation in the United States (US)

The United States is a relatively young country of about four hundred years old, founded by a group of European settlers in the early seventeenth century. In 1620, on November 11, a ship called the Mayflower, with 102 passengers referred to as ‘pilgrims’ bound from England, arrived at Plymouth, Massachusetts (Whittock, 2019). According to Gish and Klinghard (2017), the group was a mixture of religious dissenters and economic aspirants from Britain and the Netherlands looking for the ‘new world,’ as they called it, the land of freedom and opportunities. That was how

the American dream began. Thus, the story of the pilgrim, Mayflower, and Thanksgiving symbolise the first settlers in American history.

Gradually, more settlers arrived, and the population increased rapidly, but in the process, they drove the tribal native inhabitants into the reserves and took over their lands forcefully. They were Europeans of the Christian faith who believed that it was God's will and man's duty to seek dominance over all the living creatures and the earth it lives on (Gill, 2006; Meine, 2013; Runte, 2010). To them, the native people were unproductive 'savages' equivalent to wild animals (Gish & Klinghard, 2017). Soon, east America had cities, towns, and factories spread vociferously. The colonists and capitalists continued to expand their territory and economy to pursue wealth aggressively towards the West (Runte, 2010). The traditional Christian belief—that everything created by God on this earth is for human pleasure—was powerfully demonstrated by their aggressive exploitation of land and natural resources to pursue material wealth.

During the American Revolution—the fight for freedom from British colonial rule for almost three decades of the eighteenth century—the country's need for 'national cultural heritage' emerged. Thomas Jefferson, the third President then, had requested Count de Buffon of France to support them in winning their independence from colonial rule. To this, the Count bluntly asked the President why he thought France should help a new country that had nothing to offer to the rest of the world and that it was a new world devoid of any cultural heritage (Runte, 2010). This eye-opener conversation between the President and the Count is highly significant in America's present concept of the national park systems and nature's scenic beauty that exist today.

The following years and decades were spent looking for scenic landscapes or natural wonders to be preserved as 'national cultural heritage' or 'national monuments.' The political leaders and the forestry officials believed that these scenic landscapes and wonders of Nature were God's gift to mankind. Therefore, they should be preserved and protected as 'cultural heritage' for national pride and recreation (Gish & Klinghard, 2017; Runte, 2010; Smith, 1971). To this end, the policy for the American National Park System articulates its purpose in the quote below:

> The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. (US Department of Interior, 2006)

'Unimpaired' means keeping nature as intact and pure as before, but it is well-known that the native Indians inhabited those lands for thousands of years before they came to their lands (Spence,

1999). Yosemite, Ever Glades, the Grand Canyon, Glacier and Yellowstone are examples of American national parks originally inhabited by the native tribal people. Currently, America has 423 national park sites under twenty national park types protected 'unimpaired' by the National Park Service for recreation and future generations (Lower & Watson, 2022).

The Christian vision of nature conservation is dominant in American-influenced conservation, especially the concept of national parks (Ducarme & Couvet, 2020). The American National Park System perceived humans as 'intruders' or 'destructive' since "all humans are sinners under the just judgment of God," but God creates nature for their pleasure (Emon et al., 2015, p. 101). However, excluding human beings from protected areas or national parks has often been challenged by some nature conservationists in America. Although evidence shows that the native tribal people had inhabited Yosemite Valley, Yellowstone, or Everglades for thousands of years, they were still removed and re-settled in reservation camps by the State government by the early twentieth century, undermining their importance in the natural ecosystems (Runte, 2010; Spence, 1999). On the contrary, conservationists now argue in the global debates that the indigenous ways of managing the ecosystems—like how the native tribes practised subsistence game hunting, food gathering, and other spiritual activities for thousands of years—should be incorporated as models for nature conservation.

The idea for 'Pristine Wilderness protection' was developed in the mid-twentieth century when the national parks became increasingly overcrowded with more visitors seeking recreation. Anthony Wayne Smith, President of the National Parks and Conservation Association, in his address before the Human Society of the United States in 1971, stated that the excessive overcrowding of visitors and automobiles at the parks was of serious concern, especially the pollution caused by the automobiles (Smith, 1971). Around the time—the mid-twentieth century—when the movement for environmental conservation was picking up, and Bhutan had also joined the WWF. American experts who visited Bhutan then were enchanted by Bhutan's pristine, untouched Nature (Seeland, 1998). This was around the time Americans were constantly blown away by nature's wonders and their instant plan was to preserve and protect them against human interference and destruction.

Therefore, the politicians and the economists of the time were concerned that the wilderness of the national parks—remote, pristine, and teeming with wildlife—was endangered due to human interference. John Muir, a conservationist and a founder of National parks, supported the idea and

claimed that pristine Nature was God's temple, so it must remain pristine and free from a material relationship with mankind (Runte, 2010). The government endorsed the Wilderness Act to avoid further disturbance from unmanageable human beings, especially the native Indians they thought were perpetrators (Evans, 1997; Runte, 2010). An extract from the Wilderness Act of 1964 stated:

> To assure that an increasing population, accompanied by expanding settlement and growing mechanisation, does not *occupy and modify* all areas within the United States and its possessions, leaving no lands designated for *preservation and protection in their natural condition* [emphasis added], it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. (US Department of Agriculture, 2022)

It is said that the Wilderness Act caused the removal of more tribal Native Americans from their native lands and traditional way of living.

The original human settlers of the United States were the Native American Tribal communities who lived in the prairies of American mountains for thousands of years, thriving in their ecosystems. Although by the 1960s, biologists acknowledged the role of Native Americans in the natural processes of changing landscapes through their tradition and cultures of hunting, farming and spiritual practices, the voices were weak against the strong voices of the economists (Runte, 2010). Anthony Wayne Smith, the President of the National Parks and Conservation Association in the 1960s, supported the biologists that human beings are part of a natural ecosystem. Runte quotes Smith's argument:

> Indeed, the practice of subsistence hunting, as understood by the Native cultures, can well be looked upon as part of *a natural ecosystem* that has sustained itself in Alaska for something like 10,000 years and which has proved itself compatible with the stability and diversity of both wildlife and human population [emphasis added]. (p. 208)

There were three significant ways by which the tradition and culture of the Native Americans influenced the landscape and sustained the ecological and biological balance for thousands of years. The first significant one was the purposeful use of 'fire' on the ground, which the Americans ironically thought was a disaster for nature protection. According to Spence (1999), intentional fire or burning of the ground created and maintained important plant and animal species. For example, Spence explains:

> Seasonal burns opened up broad savannas favored by ungulates, created ‘open districts’ in the forest … and encouraged the growth of valued grasses, shrubs, berries, and tubers. Smaller fires kept favored camping sites clear of underbrush and insect pests and served as an important hunting tool. (p. 44)

The use of fires also helped the ageing sequoia trees to regenerate. Runte (2010) describes how ground fires helped the sequoia groves in Yellowstone grow again and how without 'fire' the inevitable happens:

> Not only were young sequoias intolerant of shade and competitive vegetation, but their seeds required fire to burn away the forest litter that shielded them from bare ground. Although seedlings also perished in the ground fires that periodically swept the groves, enough of the younger growth had historically survived the flames to replenish the ageing sequoias. Ground fires were primarily responsible for this pristine environment. With fire suppression began the changes leading to the ‘dog-hair thicket of young pines, white fir, incense cedar, and mature brush’ common along the western slope of the Sierra. (Runte, 2010, pp. 182–183)

Another use of fire by the native Indians was to create vast grasslands for buffalo farming, like how they set fire to Yellowstone in 1989. The fire lasted for months and the authorities were assessing the long-term damages when elsewhere in Yellowstone “came alive in a sea of grass and wildflowers” (Runte, 2010, p. 231). It surprised everyone who thought the forest was doomed because of the raging fire. The expanses of grassland they had created were for the herds of buffaloes roaming the native prairies. Also, underfoot badly burnt trees were found, with millions of new seedlings taking root. The park managers who thought the damaged forests would take decades to recover suddenly had a new realisation. The burning of the forest by the Indians was a natural way to cleanse the old trees, and a whole new seedling forest was waiting to flourish.

Another was the traditional shifting of seasonal sustenance with their game animal and food-gathering practices. According to Spence (1999), the tribes moved from the highlands to the lowlands, changing their game animal with the season, and their food-gathering techniques also changed with the nature of the season. The tribes also barter animal goods and food plants within different tribal communities. Their subsistence hunting animals included the bighorn sheep, deer, elk, and buffaloes, and food plants included berries, roots, herbs, nuts, and insects (Runte, 2010; Spence, 1999).

The third nature-friendly culture of the native Indians was the spiritual practices. One fundamental belief among the tribal communities was that everything was created by a great spirit who lived in the mountains, hills, and cliffs. In the Blackfeet mythology, *Napi*, the deity, first created the mountains, rivers, prairies, hills, forest, and all the animals, and then the Blackfeet, and taught them how to hunt and gather the food plants in the mountains and on the plains (Spence, 1999). Most of their spiritual ceremonies, practices, and everyday customs were attributed to *Napi*, the Great Spirit's adventures. For example, the Sundance ceremony was held at Glacier Lake, wherein the natives painted their faces with plant dyes and performed dances. The hunters seek permission from animal spirits and only hunt what they need to show their intrinsic relationship with nature. Incidentally, the three significant practices of the native Americans, the use of fire, the shifting of seasonal animal herding and food gathering and the spiritual worship of deities and demi-gods are closely similar to the traditional Bhutanese practices. For example, the practice of shifting cultivation that requires 'fire' or burning areas of land to allow new growth and spiritual practices are common in the farming communities of Bhutan.

Finally, the takeaway is that the American ideology of nature conservation is protecting the 'pristine wilderness' believed to be untouched and 'unimpaired' but with the exclusion of human beings. The national parks, heritage parks, and other 'scenic landscapes' are their national symbols, portrayed as nature conservation strategies. Religious, political, and capitalistic goals primarily drive their ideology of conservation. Ultimately, their goal is to contribute to human pleasure and recreation and generate revenue for the state. The American ideology of nature conservation rejects the intrinsic human-nature relationship but instead antagonises humans as inherently destructive and a risk to nature's beauty. As a result, accessibility to national parks and other protected areas is restricted or limited for people. Conversely, biologists acknowledge that the tradition and culture of the Native Americans could be an alternative model for nature conservation (Büscher & Fletcher, 2020; Ducarme & Couvet, 2020).

2.4.2 Nature conservation in western Europe

Western Europe originates from a land that practised traditional farming and pastoralism more than eight million years ago. Like the Native Americans, the Europeans were initially hunters and food gatherers but slowly civilised their practices to agriculture and pastoralism about six thousand years ago. According to Bignal and McCracken (2000), "man has been continuously present in central Europe since the end of the last glaciation," and "about 6000 [years ago]

agriculture was introduced in the form of shifting cultivation" (p. 154). While the landscape was known for its primaeval forest from the Mediterranean to the tundra, it was also primarily known for its unusual landscapes with spatial structures of many clearings and park-like open spaces that formed a mosaic believed to be traces of the traditional farming culture (Bignal & McCracken, 2000). Therefore, it is interesting that Europe always had a more richly varied landscape and extensive tracts of open country, not closed forests (Tubbs et al., as cited in Bignal & McCracken, 2000).

Agricultural farming was the main occupation of the Europeans in the early ages. People farmed in the open spaces in the villages on small individual farmlands and used a form of shifting cultivation. Most of the forest was used as pasturing grounds for rearing livestock, primarily cattle, goats, sheep, and horses, and they moved their animals from the highlands to the lowlands, where the pasture was greener when the season changed. Like the Bhutanese rural communities, they used the forest to gather animal litter and food plants.

By the Middle Ages, the situation had changed with the rapid rise in population and also the rapid rise in aggressive anthropocentric activities. Since Europeans mainly were Catholic Christians, after the Roman Empire declared it a state religion across Europe (GRF, 2016), the biblical injunction to dominate the earth and control all its living creatures empowering the capitalists to pursue material wealth, was inevitable. Soon, the industrial revolution—which started in Great Britain in 1789—accelerated anthropocentric activities by multiple folds (Evans, 1997). Thus, Europe rapidly lost their rich forest cover and traditional farming culture, and soon within a few centuries, the primaeval woodlands were gone. For example, Germany would be 66.5 per cent under forest cover, under natural conditions, with luscious European beech and mixed beech forest (Spielmann et al., 2013). However, by the beginning of the nineteenth century, the country had only eight per cent of forest cover (Bignal & McCracken, 2000).

The advent of powerful machinery made work simpler and easier for the forest industry, but it caused devastation with more clearing of the forests for timber. People clamoured for the restoration of forests to continue meeting the demands for more market timber. According to Spielmann et al. (2013), a "quick restoration of forest resources by conversion of the forest to fast-growing coniferous tree species" took place (p. 2). However, the more trees were planted, the more they were felled, causing western Europe to lose all its forest cover. For example, Germany had

only eight per cent of its forest cover left by the beginning of the nineteenth century (Bignal & McCracken, 2000).

Although the forests across Europe have been restored by planting faster-growing coniferous, they are always different from what they used to be. They are anything but natural. Forestry officials manage the forest composition centrally for a balanced social, aesthetic, and economic benefit (Spielmann et al., 2013). In European history, the industrial revolution hit traditional agriculture the worst. Unlike the Native Americans, who have a history of traditional game hunting and food gathering in the wild prairies and the mountains, the Europeans have a history of traditional agriculture in the open space on the farms in the villages. However, the industrial revolution cost the loss of the traditional farming culture altogether.

The industrial revolution caused the loss of traditional agriculture systems too. For example, farmers' ploughs were replaced by tractors, and human labour was replaced by sowing machines and reaping machines (Evans, 1997; Hupke, 2023; Mason, 2019). Even in the countryside, more trees where many birds and insects had nested were felled to accommodate the giant tractors. Community lands previously used by local farmers for agriculture and grazing were increasingly privatised by aristocrats, gentries, or the upper class to expand their farmlands. Farmers were denied farmlands, grazing lands, or woodlands (Mason, 2019). Traditional livestock farming transformed into scientific cattle and sheep breeding for mass production (Bignal & McCracken, 2000). The connection between agriculture and pastoral farming was broken because they became separate specialised businesses. According to biologists, this separation of the two closely connected cultures caused the extinction of some species (Robinson & Sutherland, 2002). Gradually, more farmers were forced to abandon their farms and migrate to the cities for factory jobs (Bignal & McCracken, 2000).

Another significant cause for the loss of species and traditional agriculture in western Europe is the invention of synthetic fertilisers and pesticides. After Fritz Haber, a German scientist, invented the first chemical fertiliser in 1918 (NPO, 2023), more inventions followed. Using chemical fertilisers and pesticides improved the quality of food plants and increased their productivity. Thus, the food demands for the rapidly growing population in the cities were met (Mason, 2019). More production meant using more fertilisers and pesticides; similarly, more pesticides meant the elimination of more species. For example, more garden birds were killed by arsenic weed killers and worms and insects by some pesticides (Evans, 1997). More fertilisers,

natural or synthetic, meant fewer plant species. Nevertheless, the policies of the government, as Bignal and McCracken (2000) state, were directed towards intensifying farming and increasing food production. By the mid-twentieth century in Europe, traditional agriculture farming practices had almost disappeared.

Against the backdrop of European history with its massive biodiversity loss, conservation efforts had picked up momentum by the mid-twentieth century (Evans, 1997). Assessment of biodiversity loss by biologists in the European regions found that the species richness had always been in the open landscapes, in the fields, and not in the forests as presumed earlier (Bignal & McCracken, 2000). Despite the overexploitation of the people, many plant and animal species were found to have survived mainly in the agricultural farmlands. Even more surprising to the biologists was that many species that feed, nest, and hide were found to have inhabited or taken refuge in small natural features, such as forest margins, pasture margins, gravel pit holes, quarries, and walls (Bignal & McCracken, 2000; Poschlod & Braun-Reichert, 2017). Therefore, the European approach to biodiversity conservation is protecting the species in the farmlands and open spaces instead of in the forests like Bhutan. In this context, the European Union's approach to nature conservation is 'traditional agriculture.'

In the second half of the twentieth century, Europeans revived their traditional agriculture, especially farming. They restored the habitats in the farmlands, meadows, pasture lands, and small natural features like hedges, forest margins, farm margins, or stone walls. The United States has been protecting the wilderness and scenic landscapes as national assets or symbols. In addition to traditional farming, the people of western Europe are attempting to revive their history of human interaction with nature through an approach called 'close to nature.' The Forestry Department manages the European mountains that have been re-forested in the last hundred years. In addition, the 'close to nature' policy makes the forests open to all the people for recreation, work and study (Hupke, 2023).

Finally, the European idea of nature conservation is traditional agriculture and restoring the habitats in the open spaces, but not in the forests like Bhutan (Hupke, 2023). Their species richness lies in the open farmlands. On the other hand, the United States' idea of nature conservation is 'national parks,' that is, protecting 'pristine wildernesses' and 'scenic landscapes' through protected areas. However, both approaches have a utilitarian mindset, demonstrating an external human and nature relationship, unlike the Buddhist culture with an inherent spiritual connection.

2.4.3 Nature conservation in Bhutan

Although hidden in the inner Himalayas from the world's view until the 1960s, Bhutan's early human settlement dates back to the Neolithic age. Evidence shows the human influence on the landscape through agriculture, including cultivating cereals and raising animals (Phuntsho, 2013; Savada & Harris, 1993). No substantive archaeological study has yet been conducted but some linguists claim that spoken languages are rooted in the Tibeto-Burman language. Phuntsho (2013) suggests that the early settlers of the Neolithic age probably travelled from the modern-day Sichuan province in China and settled in Bhutan in three directions, northern, eastern, and southern.

The indigenous people of Bhutan are known to be the *Monpa* [8]of the east, *Lhop* or *Doya*[9] of the southwest, and *Layaps*[10] of the northern, all of which seemingly have links to the Tibeto-Burman origins because of their linguistic features. The *Monpa* tribe of the eastern region still practice similar traditions and linguistic cultures to the native Tawang of Arunachal Pradesh, India, which is just across the northeastern border (Letro & Wangchuk, 2016; Phuntsho, 2013). The *Lhop* or *Doya* lived in the inner southwest and are still known to be primitive in their ways of life, including their typical dressing and traditional bound practices. They are often mistaken for migrants from Nepal and India but differ from them, linguistically and culturally (Dorji, 2000; Sharma, 2005). The third tribe is the *Mon* which settled in the northern region and yak-herders by tradition, and at a later period, more migrants from southern Tibet settled in the rich valleys of central and western regions. From the southern borders, immigrants from West Bengal, Assam, and Nepal entered, forming a smaller portion of the country's Hindu culture (Savada & Harris, 1993).

Whether it is the *Monpa*, *Lhop,* or the *Mon* tribe and other early immigrants, they were all agriculturists by tradition and culture. The landscapes and forests within their settlements are shaped by their interaction with them through the cultivation of crops, herding cattle, and using forests for essential materials (Letro & Wangchuk, 2016). The *Mon* tribes depended mainly on pastoral farming and moved with the yaks from the highlands to the lowlands when it became too cold. Cereals like millet, buckwheat, and barley are still grown in the east, north, and south tribal

[8] Tribal communities of eastern Bhutan
[9] Tribal communities of southern Bhutan
[10] Tribal communities of northern Bhutan

areas. The cultivated landscape of Lunana valleys in the northern region is evidence of their farming practices (Phuntsho, 2013).

Phuntsho mentions stone implements like adzes—a tool similar to an axe—found in some Bhutanese households and the forests and fields by chance in the modern era. Michael Aris, the author of the book titled *Bhutan: The Early History of the Himalayan Kingdom*, had one of the adzes examined by Gale Sieveking of the British Museum; surprisingly, it was classified as an artefact that dates back to 2000 to 1500 BC. Also, some charcoal was found near the glacier, and some pollens were found in the sediments of the lake when the geologists were carrying out some work on glaciers in northeastern Bhutan (Phuntsho, 2013). Therefore, like the early European people, the native tribes of Bhutan were traditional agriculturists. The traditional use of the forests was for pasturing, gathering firewood, leaf litter, and food plants. This tradition and culture continue in rural communities.

The Bhutanese people have traditionally enjoyed a symbiotic relationship with nature for thousands of years. Even before the spread of Buddhism in the 7th century, the tribal communities like the *Monpa* and the *Lhop or Layap* had practised Bon—the worshipping of the nature spirit quite similar to the indigenous American culture—and these practices are still prevalent today as local culture in some parts of the country. Guru Padmasambhava, the great tantric Buddhist master in the 8th century, is claimed to have subdued many hostile evil spirits residing in Bhutan and converted them into deities that would preserve the teachings of Buddha and the land. Hence, the Bhutanese people have intrinsic reverence and respect for the mountains, ridges, forests, trees, cliffs, and lakes because they are *phodrangs* [11] of different deities (Rinzin et al., 2009; Ura, 2001).

Since the deities are believed to be wrathful and may unleash storms, hails, or diseases if their *phodrangs* are disturbed, destroyed, or defiled. For instance, cutting down a tree or polluting the forest can tantamount to destroying its abode. As a reaction, the deity is believed to bring storms, famine, drought, and diseases to the individual, family, or community (RSPN, 2006). It is a common practice for Bhutanese families to conduct rituals, oblation offerings, or purification in the house or the forest in times of illness, death, or birth of a baby. A land-begging ritual or *Sa Lhang*[12] (see Figure 2.2) is also expected before constructing a house.

[11] Citadel of deities
[12] Land begging ceremony

Figure 2.2 A *Bhutanese monk performing* Sa Lhang*, a land begging ritual*

[Source*: https://www.acc.org.bt/?q=node/1859*]

It is said that the deities are the "immortal owners or landlords" while the human beings are "ephemeral travellers passing through their territory" (Ura, 2001, p. 1). Therefore, it is not right for people to exploit resources beyond their needs. These traditional, cultural and spiritual practices are indigenous ways of nature conservation even before the concept of 'conservation' was known in Bhutan.

Buddhism shapes the positive attitudes towards nature conservation among the Bhutanese communities. The belief is that all living creatures—including the invisible ones—were one's beloved parents or relatives in their past lives (Dalai Lama, 2018). Hence, people demonstrate compassion and empathy for animals by not harming or killing them mindlessly. The belief in one's *karma* is significantly strong too. It is common to hear the Bhutanese claiming that if one kills or harms another living being now, he or she will suffer a similar consequence shortly or next life. In the villages, the farmers never eliminate unproductive livestock but keep them until they die naturally. Hardly any farmer will ever sell them to the butchers for meat.

The natural environment is essential for Buddhist practices, too, which is why Buddhist monasteries in Bhutan are located in the high mountains amidst the thick forested trees (see Figure 2.1). The pristine forest is important for creating a conducive atmosphere for meditation and enlightenment (RSPN, 2006). One can then imagine why the fourth King's simple-looking palace is built amidst the forest, unlike the Lords' magnificent and ornate Royal castles elsewhere. Hence, owing to all the Bhutanese traditions and culture deeply steeped in Buddhism, Bhutan has preserved its natural environment for thousands of years (Penjore & Rapten, 2005). Bhutan's 72% of pristine forest cover today may be attributed to the Bhutanese culture (RSPN, 2022).

In the early mid-twentieth century, when it opened its doors to the outside world, Bhutan was like a newly born country in the eyes of the international community. Global organisations instantly rendered support in the move towards modernity. Bhutan joined the United Nations in 1971. Then, the developmental activities began with numerous foreign aids. This was around the time the environmental conservation movement was on top of every global agenda. The panic was that the species extinction rate had increased a thousand times faster than the natural rate (Reydon, 2019). In this regard, the WWF was set to save endangered species worldwide when Bhutan became its member in 1977. It is said that the American officials who visited Bhutan then "were impressed by Bhutan's unspoiled beauty and biodiversity," so it was decided that these areas be protected as wildlife reserves (Seeland, 1998, p. 142), just the way national parks started in America in the nineteenth century. When Bhutan established its first national park, the United States had already established more than 200 national parks, heritage sites, reserves, and monuments, but at the cost of displacing the native tribes. Now Bhutan has about nineteen formally protected areas covering more than half the country's total area, including national parks, wildlife sanctuaries, strict reserves, and biological corridors (NSB, 2021; RSPN, 2022).

As a result of foreign investment in the country, development in all areas flourished rapidly. However, the forces accompanying it have also impinged on the nation's cultural and spiritual values. New conservation policies that ignored the existing traditional and religious norms of nature conservation were introduced. According to Rinzin et al. (2009), the influence of the donor countries is evident in the way government uses a "top-down approach" and ignores the "traditional norms of resource management" (p. 198). As a partner country to several global organisations like WWF, UNDP, IUCN, ABTO, UNICEF, TEEB, ICI, and NABU, Bhutan strives to meet international environmental conservation goals. The new conservation rules that conflict with Buddhist precepts emerged from the United States' idea of 'protected areas' (see page 27), which caused inconvenience and separated the local communities from the traditional use of the forest. Since it is the exclusion method, the people's traditional engagement with nature and their natural ecological knowledge is disregarded (Siebert & Belsky, 2007). Through this biblical principle of human-nature dichotomy, the farming communities are sidelined, their religious and cultural practices are ignored, and their traditional use of the forest is restricted (Rinzin et al., 2009). Bhutan's forestry legislation of 1995 directs all the forests and community forests to become government land and the forestry department to be managers of the forests and regulate forest

produce (RGOB, 1995). The trend of declaring more land under ‘wildlife reserves’ continues. Therefore, these debates among the Bhutanese decision-makers are helpful for Bhutan’s future.

Another external value emerges from ‘The Economics of Ecosystems and Biodiversity’ (TEEB). This ideology originates from European Union and is based on the principle of ‘Natural Capital’, which calculates the worth of species in monetary terms and ecosystem services (Balint & Jones, 2019). As a member of TEEB, Bhutan must assess and evaluate the natural resources in monetary terms and ecosystem services. When there is a price tag on species as per their ecosystem services and economic worth, a particular species may be considered more valuable than the other. However, these ideas are contradictory to Buddhist precepts. Firstly, humans and nature are never separate, and their relationship is intrinsic. Secondly, nature's worth is never measured in monetary terms or recreational values. Instead, people live in harmony with nature and practise the wisdom of compassion, interdependence and interrelationship.

The question is whether the idea of 'protected areas' or 'wildlife reserves' or the TEEB's idea of natural capital and other similar Western ideas are relevant to the Bhutanese culture. According to Seeland (1998), the Western idea of protected areas is not applicable in Bhutan because it already has a culture of predominantly self-sustained rural communities traditionally interacting with the forests. More protected lands for preservation means 'more restrictions', which only takes people farther away from nature. Resonating the point, Rinzin et al. (2009) argue that the Bhutanese farming communities' traditional forest use and resource management norms should be addressed because these are ingrained in their traditional way of life. In addition, Bhutan is a country— influenced by Buddhism—that perceives nature differently from the religious cultures of the donor countries.

The government of Bhutan has introduced the ‘middle path’ for conservation by implementing the 'Community Forestry Management Group' Strategy to involve the community in the 'people-oriented forestry and participatory forestry' programmes (Penjore & Rapten, 2005; Rinzin et al., 2009). However, a field survey conducted by Rinzin et al. (2009) on 210 residents in two protected areas in Bhutan found that the community forestry management regulations and the increasing government intervention to control forest use have affected the cultural and economic activities of the local people. According to Wang et al. (2006), 52.2 per cent of the local farmers disliked the park and the Conservation Act, which assigned new rules and ownership changes of forest land. However, another research by Rinzin et al. (2009) found in their survey that “people

are disgruntled at the change of ownership of land and having to live within the constraints of new conservation rules and regulations" (p. 199). The fear is that this could lead to the depopulation of rural areas and the abandonment of agriculture. In this context, the Western ideology that separates people from nature and eliminates human interference irrespective of their "historical ecological role or social implications" is still firmly embedded in the international projects on conservation (Siebert & Belsky, 2007, pp. 85–86). When external donors' expectations must be met (Rinzin et al., 2009), the country does not seem to have much choice.

2.4.4 Implications for conservation education in Bhutan

Conservation education is increasingly becoming a necessity for the future of Bhutan. The conservation values children learn today will determine their cultural practices and decisions as adults. As much as it is a global requirement, the nation aims to foster the right cultural values in the young minds so that they can carry out 'the fundamental duties of preserving the natural environment for the future generation' (RGOB, 2008, p. 11). Therefore, some implications for Bhutan's nature conservation education need to be discussed in the context of the various global conservation cultures—influenced mainly by traditional norms and religious beliefs.

On the one hand, Bhutan already has a rich tradition and culture influenced by Buddhism, which is advantageous for nature conservation. The philosophy of Buddhism teaches how to live harmoniously with nature, interdependent and respectful of all sentient beings. Bhutan's rich traditions and cultural practices demonstrate a spiritual connection with nature. The idea of 'impermanence' discourages greed for material wealth, and believing in *karma* helps people be compassionate to all living creatures. Furthermore, traditional agriculture—which Western societies have lost forever—is still practised by eighty per cent of Bhutanese households. These traditional norms of subsistence farming and forest use can be a model for the rest of the world. Most importantly, the government's GNH philosophy—which seeks to balance the nation's material development and spiritual wellbeing— is a valuable tool against the irrelevant change that comes with globalisation. In addition, due to its geographical location, Bhutan's varied altitudinal and climatic conditions are favourable for the survival of a rich biodiversity of flora and fauna.

On the other hand, Bhutan faces increasing international pressures—although with good intentions—to conform to the standards of global demands for conservation. While Bhutan benefits tremendously in all areas of development through global partnerships, the external values

of conservation influenced by their religious culture and capitalistic mindset may not always be appropriate to the Bhutanese culture. According to Siebert and Belsky (2007), "the global trends and ideologies could lead Bhutan to the western European and American perspectives that have dominated conservation and forestry practices for centuries" (p. 84). Conservation values that contradict Buddhist values treat humans as separate from nature and assume humans are inherently destructive and incompatible with biological diversity (Siebert & Belsky, 2007). According to Phuntsho (2020), the conventional value of nature—advocated globally—is the externalised relationship with nature for human comfort and worldly happiness. Thus, Western societies and religions consider nature conservation mainly for recreation, scientific studies and economic progress, and hardly for cultural and traditional values (Evans, 1997; Hupke, 2023; Siebert & Belsky, 2007). Economists, biologists and the policymakers of Western societies are more concerned about economic development and how to use nature to its maximum to save it from excessive exhaustion.

In this context, the challenge in conservation education in Bhutan is to critically sort out the values the education system should foster in children. The Bhutanese cultural values of nature—steeped in Buddhist values—must stand out from nature's conventional or economic values (Siebert & Belsky, 2007). Nature conservation education has two aspects: knowledge of nature and values of nature (Hooykaasa et al., 2019; Hupke, 2023). While scientific knowledge is gained from the science curriculum, the values of nature must be fostered through positive learning nature experiences at school and home. Besides what the syllabus prescribes, the teacher, the textbooks and the learning experiences are primary influences for children. According to Ura (2009), the content of the textbooks is crucial in influencing both the role of teachers and students in value education. His Majesty the fifth king—during his address to teacher graduates in 2009—also stressed the importance of putting "the right books, the right curriculum [and] the right direction" for children (MoE, 2014, p. 19). Thus, the curriculum and learning experiences for children must be infused with the traditional, cultural and spiritual values of nature, besides its scientific values.

2.5 Nature Conservation versus Environmental Conservation

The terms 'nature conservation' and 'environmental conservation' are commonly misunderstood and used synonymously or interchangeably in many contexts of conversations. However, they are ideologically different from each other and have distinct goals. Since the study

is focused on nature conservation, not environmental conservation, this study must explain the differences so that the ideologies stand distinct from each other.

As per conservation history, the nature conservation ideology emerged much earlier than the environmental conservation ideology. The former emerged in the mid-nineteenth century—during the period of rapid industrialisation—and the latter emerged only a century later in the mid-twentieth century. As mentioned earlier, the environmental conservation movement was started in the wake of a global panic due to rapid species extinction and depletion of the earth's natural resources caused by excessive use (Hupke, 2023). The difference starts with the kind of relationship they have with nature. While the naturalists have an 'intrinsic' relationship with nature, the environmentalists have an extrinsic one.

The former is derived from the naturalist ideology that nature has 'intrinsic' value and should be protected for its own sake (Marco, 2019; Pilgrim & Pretty, 2010). Thus, its goal is to maintain biological diversity by protecting wild species and habitats and improving their chances of survival (Baden-Württemberg State, 2022). The latter is derived from the 'utilitarian' or economists' ideology that nature has economic value. Therefore, biodiversity has to be protected and managed for human recreation and economic benefits (Anderson, 2018; Runte, 2010). Nature conservation focuses on protecting wild plant and animal species to maintain a rich biodiversity, whereas environmental conservation has a much broader and wider focus. For example, it focuses on biological diversity, sustainability, ecosystem services, resource management, and climate change.

In nature conservation, it is immaterial how useful or attractive the species is. All species must be protected irrespective of form and size since every species has intrinsic value. The minute one puts a price tag on a species, he or she is exempting the intrinsic spiritual connection with it. Conversely, in environmental conservation, species have different values depending on their utility or economic value. For example, the WWF lists charismatic species like the red panda, Bengal tigers and polar bears for conservation because they are attractive and valuable for eco-tourism. Environmentalists view nature as a valuable asset that can be measured and calculated according to its 'utility' (Anderson, 2018).

Activities might converge and look similar but their goals conflict with each other. One significant example is the Hydropower plant. Bhutan—a country known for many fast-flowing rivers—currently has at least five operational hydropower plants and four more plants that are coming up (NSB, 2021). These projects fulfil the environmental conservation goal of maintaining

clean air because they prevent people from using wood or gasoline for fuel. However, hydropower plants are damaging to nature conservation because damming the rivers is a "significant threat to aquatic biodiversity" (Costea et al., 2021, p. 2). After damming the river, the fish can no longer swim freely upstream and downstream or migrate from one river to another. Many species are affected for many generations to come. One might also consider animal rights organisations, such as PETA (People for the Ethical Treatment of Animals), as nature conservation but they are not. The goal of these organisations is to protect the rights of individual animals, but they are selective.

Both conservation ideologies call for the moral responsibilities of all individuals towards nature. Nevertheless, the difference lies in the relationship with nature— intrinsic or extrinsic. In nature conservation, the relationship with nature is intrinsic, a natural affinity with nature like in Buddhism (Pilgrim & Pretty, 2010; Ura, 2001). Humans are part of nature, and all forms of nature are equally dependent on each other. In contradiction, the relationship with nature is extrinsic in environmental conservation. All forms of nature are considered natural resources for human use, and their worth is calculated in terms of ecosystem service for economic, recreation or scientific benefits (Anderson, 2018).

Therefore, in nature conservation education, children develop an intrinsic relationship with nature and learn that all species must be conserved for their intrinsic value. Conversely, in environmental conservation education, children develop an extrinsic relationship with nature and learn that natural resources must be used, managed and protected for sustainability. The table below (Table 2.1) summarises the differences between the two ideologies.

Table 2.1 *Nature conservation versus environmental conservation*

Nature Conservation	**Environmental Conservation**
• Nature-centred, bio-centred and eco-centred • All species have intrinsic value • Human-nature relationship is intrinsic • Humans are part of nature. • Humans and nature are interdependent. • Protecting wild plant and animal species.	• Human-centred, utilitarian, anthropocentric, economic benefit • Human beings: medicines, food, mental health • Species have economic value • Human-nature relationship is extrinsic. • Natural resources are meant for humans to use. • Humans are inherently destructive to nature. • Prioritisation of endangered and charismatic species

• Deals with biodiversity, endangered species, maintaining and restoring species habitats	• Deals with climate change, biodiversity, ecosystem services, endangered species, economic benefit, sustainability, resource management & valuation of natural resources

2.6 Essentials of Nature Conservation Education

2.6.1 Species literacy for children

Species literacy is the “broad as well as in-depth knowledge about species” (Hooykaasa et al., 2019, p. 2). According to Hooykaasa et al. (2019) 'broad knowledge' is simply an awareness of species diversity and species richness, but ‘in-depth knowledge' encompasses background information about the species, such as its position in the ecological food chain and diet, its habitat (natural living environment), its life cycle and its behaviour. Species literacy is more than basic awareness or simply naming the species. It involves competencies and skills commonly called 'species identification skills.' The species identification skill entails observation of species and application of knowledge.

Species literacy is considered to be important for the lay public, including children, to support or engage in biodiversity conservation, irrespective of the purpose—whether it is for ‘intrinsic,’ ‘utilitarian’ or ‘aesthetic’ value (Hooykaasa et al., 2019; Melis et al., 2021). Hooykaasa et al. (2019) confirm previous research findings by Palmberg et al. (2015) and Schlegel and Rupf (2010) that species literacy stimulates people’s interest and fosters respect and affinity towards them. After all, people are expected to care less about species they know nothing about, leave alone protect them. Conservation activities start with knowing the local or native species; however, if one cannot even identify common and conspicuous local species, there is a disconnection from the native biodiversity. This lack of knowledge can affect nature conservation efforts.

Additionally, a lack of species literacy can hinder understanding biodiversity and its conservation activities. For instance, identifying the species, habitat, and its relationship with the other species in the environment will help people make judgments and informed decisions. Past research found that increased urbanisation separated people increasingly from the natural environment. Consequently, the relationship or the affinity with it increasingly became less, although the degree might differ from one community to another (Louv, 2005; Miller, 2005, as

cited in Hooykaasa et al., 2019). Another concern is the non-exotic or charismatic and neglected since people are known to protect well-known charismatic species rather than insignificant local ones (Ballouard et al., 2011, as cited in Hooykaasa et al., 2019). Nature conservation education for children should begin with learning about the native and local species around them and feeling their intrinsic value, but not based on how beautiful or useful they are to people.

In species literacy, it might also be helpful for children to know some scientific facts about how nature is essential for basic human survival—for physical, emotional and psychological health. For example, physical health benefits like medicines and psychological benefits like spiritual energy and calmness are derived from nature. Knowing about nature's potential for human survival and future opportunities might also be useful. For example, it is said that of the known "374000 plant species" (Christenhusz & Byng, 2016, p. 1), only a fraction of the total has been identified and used as essential food or medicines; the rest remains to be studied. Further, many plant species are waiting to be discovered, and many new species are being discovered every day. Edmond (2022) states that the researchers in the California Academy of Sciences 2021 discovered seventy new plant and animal species. Who knows, an ordinary weed that was overlooked or neglected earlier may cure a type of cancer in the coming days. To this end, children should understand that new species can be discovered using their species identification skills and new inventions of medicines to cure diseases in the future.

2.6.2 Developing connection with nature

The values of nature should be embedded in the lessons on species literacy. While children are learning about species, they also develop an emotional connection with them. Hooykaasa et al. (2019) assert that species literacy and direct experience with nature positively correlate to attitudes towards nature. In their research, Chawla (2007) and Hughes et al. (2018) found that childhood and adolescent experiences such as playing in the woods, picking flowers, hiking or camping in the wild nature were common experiences of the naturalists or environmentalists. Family role models or adults who show the value of nature through their appreciative attention to the elements of nature were also found to be beneficial (Chawla, 2007). Therefore, a connection with nature is essential during the formative years, whether at home or school.

As children engage with nature for fun and learning, they learn pro-nature behaviours. Hughes et al. (2018) describe pro-nature behaviours as enjoying being in the natural world, feeling part of nature, demonstrating empathy for creatures, enjoyment of nature, a sense of oneness, and

a sense of responsibility for the care of nature. These characteristics resonate with the Buddhist culture of living in harmony with nature with a sense of deep respect for all creatures. Some examples of specific pro-nature behaviours, suggested by Hughes et al. (2018), are putting out food for garden birds and insects, making homes for insects and birds at school or home, putting insects stuck inside safely outside, growing flowers and plants that birds and insects like; taking part in an event or group that help nature, picking up litter to help nature have a better home, and being a member of nature or wildlife group (p. 13).

Three principles of ecological psychology fit perfectly within the framework of nature conservation education for primary school. One is free or active play in the natural world in childhood, which leaves deep impressions on the mind (Chawla, 2007). Experiences in the wild are fascinating and stimulating because no two flowers or butterflies look the same, no two plants smell the same, nor do two rotting logs or mounts of mud hold the same constellation of insects. Indeed, nature is rich in responsive affordances to hold a child's attention and stimulate learning. Hence, letting children play freely in the natural environment is perfect for developing a connection with nature.

The second is the 'processes of joint attention with an adult' that provides significant value development opportunities. When the adult and the child pay joint attention to the elements of nature, it is a powerful moment for the child to learn the values the adult—parent, caregiver or teacher—is showing by example. The child picks up the same attitude of looking at nature fascinatingly and appreciatively and learns to value nature for its own sake. The third is 'being part of an organisation' and 'engaging in particular activities' during childhood or adolescence. Experiences during these critical formative years are effective in 'behaviour settings' that leave deep impressions, for example, being part of a nature club in the Bhutanese schools and engaging in nature-based activities. These moments provide children with opportunities to bond with nature and others.

In sum, nature conservation education aims to foster children's emotional affinity with nature so that they demonstrate pro-nature behaviours in their everyday life and support nature conservation efforts in their adulthood. Firstly, children's emotional connection with nature must be developed by providing opportunities for direct and repeated experiences with nature. Secondly, children's species literacy skills— identifying species, knowing about them, and their interdependent behaviours—must be developed concurrently.

2.7 Nature Conservation Curriculum in the Bhutanese Primary School: A critical analysis

This is a quick analysis of the curriculum documents on conservation education currently used in Bhutanese primary schools. The aim of this critical analysis is to understand nature conservation education as a prescribed curriculum for grades four, five and six in the Bhutanese primary school. For this task, the science and social studies curriculum documents, such as curriculum frameworks, teacher's guidebooks, and student textbooks have been used. Subsequently, the information gained from this section will serve as background knowledge to understand the informants' perspectives better.

2.7.1 Underlying principles and curriculum goals

The curricular framework for science and social studies is guided by the GNH philosophies (DCPD, 2022). For example, the GNH values and principles based on the core values of *Tha Damtshig Ley-gyudrey* (see page 7) are incorporated into the curriculum. Bhutanese culture and values are outlined as essential practices of Buddhism and its profound influences on the learners' spiritual, cultural and traditional way of living.

Another principle outlined is the children's relationship with nature and others around them. Besides the science content knowledge, the curriculum aims to foster values of interconnectedness, respect and reverence for nature. The communities are regarded as "storehouses of knowledge and practices about different aspects of Bhutan's environment and traditional and cultural values passed down over generations" (DCPD, 2022, p. 16). In this way, the curriculum encourages children to learn the traditional or indigenous local knowledge about the natural environment. Similarly, the social studies guidebook asserts that it is "all about the relationships, interaction, and interdependence between human beings and the nature around them " (REC, 2018, p. 1). Hence, the underlying principles and values seem ideal for nature conservation education.

2.7.2 Content coverage

Although no part of the curriculum has been specifically dedicated to nature conservation education in either social studies or science, there are several chapters and topics related to nature and conservation education. For example, the table below (Table 2.2) shows the titles of chapters or units closely related to nature covered in grades four, five and six.

Table 2.2 *Chapters and topics in social studies and science related to nature*

	Grade IV	Grade V	Grade Six
Social Studies	**Chapter 4: Forests** Importance of forests & Types of forest **Chapter 9: People and the Environment** Environment and its importance; human activities that impact the environment, pollution and its types; waste and its types; environmental conservation; conservation measures	**Chapter 2: Forests** (Importance of community forest; the significance of protected areas; interdependence between people and forest; traditional ways of protecting forest) **Chapter 10: People and the Environment** Causes of environmental degradation; the impact of human activities on the environment; ways to conserve the environment	**Chapter 4. People and the Environment** **(**Hydropower & Its impacts; preventive measures for the impacts of hydropower; preventive measures for the impacts of urbanisation; climate change; causes and consequences of climate change; ways to adapt and mitigate climate change
Science	**Chapter 8. Living Things and their Environment** Living Things and Non-living Things Plants and Animals in their Habitat How Plants Adapt in their Habitat How Animals Adapt in their Habitat Living Together Feeding Habits **Chapter 9: Green Plants** Effect of air, temperature, water and light on the Growth of Plants	**Chapter 8. Characteristics of Living Things** Animal Characteristics Plant Characteristics Individuals are Different Variation in Plants and Animals Life Cycle of Animals **Chapter 9. Green Plant** Parts of a Plant Functions of root, stem, parts of flower & their functions **Chapter 10. Living Things and their Environment 153** Food Chains, Food Web Saving Threatened Plants and Animals Disappearing Forest & Protecting Habitat	**Chapter 7. Living Things and their Environment** Humans and Animals Affect Habitat How plants & animals adapt to specific habitat Food Chain Pyramid Helpful and Harmful Micro-Organism **Chapter 8. Green Plants** Food for Plants Leaf- The Food Factory Transfer of Pollen Grains How Seeds are Formed Dispersal and Germination of Seeds **Chapter 9. Classification of Animal (**reptiles, fishes, amphibians, birds, mammals)

*(*Source: Textbooks for grades IV, V & VI)

2.7.3 Opportunities for nature experiences

The science curriculum recommends three strategies for children to experience nature. For instance, the teacher's guidebook describes an eco-pond, a nature study garden and field trips as advantageous for children's nature experiences, as given below:

> An *eco-pond* can be an existing pond or created collaboratively by students and teachers to provide exposure to an ecological system where plants and animals co-exist. Children learn the essence of interdependence and the concept of harmonious co-existence in the natural setting.
>
> A *nature study garden* is a small floral garden or a rock garden where indigenous plants are grown to harbor varieties of animals, including insects, birds, and small mammals. It can be on a small piece of land on one of the corners of the school campus.
>
> *Field trips or excursions* are visits to the community, usually for observation of natural and scientific phenomena in the real field to gain direct experience. Some interesting places of visits that are related to nature conservation suggested in the manuals are nature parks, botanical gardens, historical and religious places, and exhibitions.
>
> (Teacher's Manual, class five, pp. 7-9)

Garden-based learning has been widely used internationally in primary and secondary schools, especially in the USA, in the past two decades, and it is effective in nurturing students' species literacy skills and their eco-centric or bio-centric attitude and behaviours (Cheang et al., 2017). Taking children frequently outdoors to study plants and animals will allow them to gain knowledge and develop a natural affinity with the natural world. The field visits are great opportunities for children to connect with nature and learn about it with the teacher.

2.7.4 Values of nature conservation

The chapter 'Forest' of grade four social studies introduces the importance of forests and attempts to incorporate the Buddhist beliefs about 'deities.' However, it could have included some more information about the Buddhist precept of 'interdependence' and the spiritual relationship with nature to enhance the values of nature. The text reads:

> Forest is important for people. It is a source of timber for building houses and making furniture. It provides fresh air, clean water, and shelter. Forest also provides fruits and fresh vegetables such as fiddle-head, wild asparagus, and mushroom. Forest is a source of medicinal herbs, and it is important to protect forests.

> In Bhutan, some trees and forests are worshipped as places of local deities. People conduct rituals and offer prayers to please the deities to protect the community.
>
> (Social Studies, class four, p. 17)

While some information about spiritual practices has been included, the text lacks information on the inherent spiritual connection with nature. So, this text could be revised to inform children about the Bhutanese people's intrinsic relationship with nature, the value of interdependence, respect and reverence for nature and the deities.

The curriculum documents show that nature conservation is introduced from the Western perspective rather than the Bhutanese perspective. For example, the American symbols of nature conservation (see page 27), such as the national parks, sanctuaries, and reserves, are introduced as the best strategies to fulfil Bhutan's conservation goals. The text reads:

> Protected areas are the defined areas for protecting plants and animals. It is important to protect endangered species of plants and animals to maintain balance in the nature. Bhutan has maintained a large forest cover due to the protected areas. In Bhutan, protected areas include national parks, sanctuaries, reserves and biological corridors. Excessive use of resources from these areas is restricted. Bhutan has 10 protected areas covering more than half of the total area.
>
> (Social Studies, class five, p. 7)

Furthermore, the concept of 'community forests'—a softer version of 'protected areas'—is initiated as the best strategy for all agricultural communities of Bhutan. For example, the text reads:

> A forest that is managed by the community is known as a community forest. People have the right to use forest resources and at the same time, they are responsible for protecting them. The Community Forest is introduced to control deforestation caused by human activities such as agriculture, construction of roads, and logging and to manage forest resources. Dzozam community forest in Mongar is the first community forest in Bhutan. It was established in 1997.
>
> (Social Studies, class five, p. 5)

The community forest system, however, has caused the separation of humans from nature, and the forest management system still identifies with the national park systems of America.

The concept of conservation that believes in a human-nature dichotomy; human beings as inherently destructive—which is a Christian precept—and that forest resources should be managed and protected against people are indicated in the texts. The students' lesson activity reinforces the

perspective introduced in the textbook. For example, in the teacher's guidebook, the instruction for an activity reads:

> Students should sit in groups and first discuss and list why and how people destroy the forest based on their experiences. Using the listed words, they should make simple sentences and read them out to the class. Now let students read the text and discuss how people destroy the forest. They should list why and how people destroy the forest and find out ways to protect the forest.
>
> (Social Studies class IV, p. 41)

The American perspective of nature conservation is evident. For example, the text implies that people are inherently destructive, so the forest must be protected against them. The value of excluding humans from nature or the human-nature separation, which conflict with the Buddhist perspective—is embedded in the text.

Furthermore, in the text below, the indigenous knowledge of the local people who have lived there for generations is undermined. This is another national park concept—forest officials are the custodians of the forest resources. The text reads:

> You can discuss and write the questions about *rules* for protecting our forests together as a whole class. Ask a student to read the fourth paragraph. Ask students to suggest wording for the questions. Write the questions on the board as they [students] suggest. (E.g., you might write: What rules are there about cutting down trees? What rules are there about fires in the forests? Are there other rules for protecting our trees? What are the *punishments* for breaking the rules? [Emphasis added].
>
> (Social Studies class IV, p. 42)

The way 'forest' is introduced in the textbook is different from the reality of authentic Bhutanese culture. In the traditional Bhutanese culture, people have a natural relationship with the forest. The text above indicates that children must learn the 'rules' of protecting the forest and know the 'punishments' if they violate them. The reality is different. A field survey conducted by Rinzin et al. (2009) on 210 local communities revealed that many Bhutanese local communities see forests as "an important source of food" and a "source of spiritual health" but "not as something to be exploited" (195). The idea of 'rules,' 'regulations', and 'punishment' can scare any adult away from nature, leave alone children. Human beings are antagonised and separated from nature – which is the biblical 'utilitarian' view of the Western societies (Rinzin et al., 2009; Siebert & Belsky, 2007). Children's affinity with nature can only be developed by engaging them with nature but not by setting rules and regulations for forest care.

An analysis of the curriculum documents for science and social studies show that environmental conservation education dominates the conservation curriculum for primary school. For instance, the chapter 'People and the Environment' [social studies] and 'Living Things and their Environment' [science] have significant coverage of environmental conservation. The learning outcome is to "equip [children] with the knowledge and understanding of the local as well as the global environmental and ecological problems, their consequences and solutions" (REC, 2018, p. 2). The textbook describes 'conservation' in the following manner:

> There is a rapid change in the environment due to various human activities; therefore, it is important to conserve the environment for future. Protecting and saving the environment for future is called conservation of the environment.
>
> (Social Studies, class four, p. 45)

The texts on environmental education encompass endangered species, biodiversity loss, sustainability, climate change, pollution, wildlife and human conflicts, and natural disaster warnings. The textbook also suggests afforestation, reforestation, reduction of plastic use, waste management, cleaning campaigns, pollution control and other similar strategies to save the earth from further degradation. Building hydropower plants is also suggested as one of the effective strategies for conservation. In this view, nature conservation education is minimally included in the prescribed curriculum. The little that exists is mainly presented from Western perspectives, while the Bhutanese cultural and spiritual values of nature have not been incorporated.

Finally, the implication for nature conservation education is that the contents of curriculum documents—of grade four, five and six social studies and science—are dominated by Western conservation perspectives. In particular, the American idea of national parks is strongly represented and misses out on much of the Bhutanese cultural and spiritual values.

2.8 Chapter Summary

Nature in this study is referred to plant and animal species. Religious traditions and cultures strongly influence a nation's conservation ideals. For instance, Western perspectives are influenced by Christianity, which views nature and humans as separate entities—that nature is an external resource for human appeasement. Therefore, nature conservation protects biodiversity for human benefit. Conversely, Buddhism perceives nature and humans as interdependent and one entity—all forms of nature have intrinsic value; therefore, nature must be protected for its intrinsic value.

Evolutionary theory, ecology and conservation biology are three science disciplines that study nature. Evolutionary theory explains how all living organisms evolve and modify their characteristics to adapt to their surroundings. Ecology concerns living organisms and their interrelationships within an ecosystem and conservation biology deals with saving threatened species. All three disciplines converge to decide on a nation's nature conservation policies and strategies. However, religious cultures can influence the overarching goal of conservation.

Two age-old conflicting views impact nature conservation approaches. Nature and culture are separate entities; two, nature and culture are one. The former view is more dominant in global conservation approaches than the latter. For example, the American idea of national parks and resource management systems that exclude the presence of humans in nature is globally implemented. However, biologists now acknowledge the importance of human presence in ecosystems. Nature conservation perspectives of the United States, western Europe and Bhutan have been critically compared based on their historical backgrounds. The conservation goal of the United States is to preserve the 'pristine wilderness' and 'scenic landscapes' through the national park systems. The European Union's goal is to conserve biodiversity on the farms through 'traditional agriculture,' and Bhutan's is to protect the biodiversity of the forests using 'the middle path' through community forest management and national park systems. However, this study argues that Bhutan is a Buddhist country that already practices traditions, culture and spiritual norms that renders a symbiotic relationship with nature. Thus, external values that are not culturally relevant should be sorted out for conservation education in Bhutan.

Conservation education is essential for children to grow up as responsible citizens with the right attitude towards nature. Teaching children about nature and teaching the values of nature are two aspects. Besides learning scientific knowledge about species and their environments, children must develop their affinity with nature through direct and repeated experiences. It is also useful to know that nature conservation and environmental conservation have different ideologies and goals. While nature conservation originates from the naturalists' ideology whose goal is to protect biodiversity for its intrinsic value, environmental conservation originates from the environmentalists' ideology whose goal is to protect biodiversity so that ecosystem services are enhanced. The former is nature-centred, and the latter is human-centred.

A quick review of the curriculum documents reveals that the contents of children's social studies and science textbooks are dominated by Western values that exclude human presence from

nature. In particular, the values of the national park management systems are indicated. Hence, conservation education in the Bhutanese curriculum texts is presented more from Western and scientific perspectives but less from the Bhutanese cultural perspectives.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The methodology is an integral part of any research because the outcomes are based on how fitting the research design, methods and techniques are for the purpose. Cohen et al. (2018) call it "fitness for purpose," meaning the research design elements—from the paradigm, rationale, theories, methodologies, and data collection to analysis techniques—must be appropriate and perfectly match the study's intent. So, the research design must be reasonable and justified against the research problem and the critical research question. The critical question of this study, as mentioned in Chapter 1, is:

> *How is nature conservation understood, taught and practised in the primary schools of Bhutan?*

Five sub-questions related to curricula, teaching and practices were asked to gain an in-depth understanding of the phenomenon under study. The study adopted a research design that allowed sufficient exploration, process orientation, and rich descriptive data for qualitative analysis (Bogdan & Biklen, 2007). This chapter comprehensively describes the research paradigm, research design, methods and techniques for data collection and analysis procedures exhaustively used for this study.

3.2 Research Paradigm

Research experts describe ‘research paradigms’ as worldviews of what constitutes knowledge of that reality and how best we can understand or know about it (Bogdan & Biklen, 2007; Punch, 2009). Cohen et al. (2018) describe paradigms as "ways of looking at the world" or, rather, "lenses through which to define the problem" (p. 8). Paradigms do not necessarily drive the research because research is practically driven by its intent. However, when guided by a theoretical orientation or a research paradigm, it brings more clarity to the research process and helps organise thoughts and actions for inquiry (Cohen et al., 2018).

The worldviews of two paradigms, postpositivism and social constructivism, were compared. This study found social constructivism to be a perfect fit for understanding nature conservation

education in Bhutanese primary schools. Firstly, social constructivism has a subjective worldview, whereas postpositivism has an objective view. Social constructivists believe that there is a social world created by all human beings who are part of the physical world they live in. Hence they are all meaning-makers (Cohen et al., 2018; Creswell & Creswell, 2018; Punch, 2009). They believe that no external factors influence the physical world but the people themselves. Creswell and Creswell (2018) state that "we are all born into a world of meaning bestowed upon us by our culture" (Creswell & Creswell, 2018, p. 8), and the meaning is waiting to be co-constructed through open interaction within the cultural setting (Cohen et al., 2018; Creswell & Creswell, 2018). This worldview enabled ample scope for the researcher to generate meaning collectively through open interaction (Cohen et al., 2018). The researcher's prior experiences could also be utilised to modify or negotiate meaning with the informants' multiple interpretations (Bogdan & Biklen, 2007; Cohen et al., 2018; Creswell & Creswell, 2018; Punch, 2009). Hence, this study adopted the social constructivist worldview—also known as interpretivism since they are often combined and interdependent—to guide this research procedure (Creswell & Creswell, 2018).

Conversely, postpositivism has an objective view of the world. Postpositivists believe there is "an objective reality that exists 'out there' in the world," and it is rule-governed (Creswell & Creswell, 2018, p. 7). Everything in the physical world has a 'cause and effect' relationship, which is fixed (Creswell & Creswell, 2018). Researchers search for this causal truth, the relationship between causes and their effects. However, the belief is that truth can be known "only probabilistically and imperfectly," but never the absolute truth (Cohen et al., 2018, p. 17). As a result, theories, claims or perceptions related to the causal relationship researchers propose have to be tested to be validated, falsified or re-formulated for future research (Cohen et al., 2018; Creswell & Creswell, 2018; Punch, 2009). Since this study did not intend to look at a phenomenon objectively, investigate the rules or draw causal relationships, the postpositivist paradigm was unsuitable.

One significant characteristic of social constructivism is the 'interaction,' which helped this study fulfil its intent. For social constructivists, 'interaction' is a crucial element for constructing knowledge, individually or communally, within a sociocultural context (Punch, 2009). Cohen et al. (2018) state that people interpret their own world through their own views and understandings, which is why researchers listen to multiple perspectives to get a comprehensive understanding of it. The social constructivists' approach enabled the researcher and informants to interact, discuss

and share perspectives and experiences on the phenomenon under study. Meanings were allowed to emerge, negotiate and modify in the research process. Free and open interaction with participants and the researcher's own experiences were used to understand the meanings more deeply (Bogdan & Biklen, 2007; Cohen et al., 2018; Creswell & Creswell, 2018; Punch, 2009). In contradiction, the postpositivist approach does not have this feature of 'interaction'; even when used, it is limited to verifying a theory or hypothesis.

Another characteristic of social constructivism favourable for this study is removing the hierarchical role. Unlike post-positivism, which maintains the distance between the researcher and the participants, social constructivism breaks the hierarchy. Instead, it enables the researcher to build a close relationship with the informants and maintain 'equality' (Bogdan & Biklen, 2007; Cohen et al., 2018). Cohen et al. (2018, citing De Laine) argue that a close relationship means 'equality,' 'empowerment', and 'emancipation,' which will lead to higher reciprocity and open interaction with the informants. The social constructivist paradigm has enabled the researcher to ask open-ended questions and the informants to share their perspectives comfortably and freely (Creswell & Creswell, 2018). Therefore, this study adopted social constructivism as its research paradigm to collect rich data from the field by engaging with the informants, listening, interacting, interpreting and co-constructing meaning together.

3.3 Research Design

A research design for a study includes everything from the overall approach to the specific methods of data collection, analysis and interpretation. Creswell and Creswell (2018) call it "procedures of inquiry" (p. 1), whereas Cohen et al. (2018) call it a "foundational plan for approaching, operationalising and investigating the research problem or issue" (p. 28). The benefit of having a research design is that it brings more clarity and direction to the research process. Guided by the ideologies of social constructivism, a qualitative method steeped in ethnographical principles was adopted as the most fitting research design for this study.

3.3.1 Qualitative method

Of the three methods of inquiry, quantitative, qualitative and mixed method, the qualitative method was the most fitting because its essential features matched the purpose of this study: to understand nature conservation education in primary school. Creswell and Creswell (2018) explain

that the qualitative method is a process of "exploring and understanding the meaning individuals or groups ascribe to a social or human problems" (p. 4). Since the key issue of this research was to get an in-depth understanding of how nature conservation education was understood, taught and practised in primary school, the researcher required qualitative data from various stakeholders. Hence, the qualitative method was the right choice.

On the contrary, the quantitative method was unsuitable because the purpose of this study was not to test or verify a theory or hypothesis. For example, the quantitative process starts with a (hypothetical) theory and collects data only to prove or disprove the theory (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Similarly, the mixed method—a blend of qualitative and quantitative—was not preferred since this method also involves testing a theory or hypothesis to explain the results of the initial quantitative survey (Creswell & Creswell, 2018; Punch, 2009).

Five essential features of the qualitative method were employed to fulfil this research intent. The first is the naturalistic trait, wherein the researcher becomes the key instrument and considers collecting data directly. According to Bogdan and Biklen (2007), an issue or problem is best understood in the setting where the actions occur because “human behaviour is significantly influenced by the setting in which it occurs” (p. 5). Being in a natural setting was beneficial for building trust and having meaningful interactions with the informants (Spradley, 1980). Therefore, to get first-hand data from the informants, the researcher visited four schools, two urban and two rural schools of two districts in Bhutan, and interacted directly with the informants who were teachers.

The next feature is the emphasis on ‘informants’ meaning’ as crucial to an ethnographic study, besides the researcher’s insights as a key instrument (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). During the data collection, the researcher focused on ‘learning the meaning’ from the informants’ perspectives by keeping the questions open-ended to discover and explore the phenomenon (Creswell & Creswell, 2018, p. 182). The third feature used was the inductive approach to data analysis. Rather than starting with a set of hypotheses for verification as in the quantitative method, this research started from knowing almost nothing to increasingly building themes based on the data gathered from multiple sources. After a comprehensive set of themes had been established inductively, the researcher used the deductive method only to “look back at their data from the themes to determine if more evidence can support each theme or whether they need to gather additional information” (Creswell & Creswell, 2018, p. 181).

The fourth feature used was the 'researcher's reflexivity,' which concerns how the researcher's perspectives and background shape the study's interpretation (Creswell & Creswell, 2018). Since the researcher's perspectives shape the interpretation of the study, it was crucial to make the researcher's reflections, views, observations, and experiences in the research process transparent. In ethnography, the researcher and the informants are meaning-makers; hence, the researcher's field notes were used as data. Also, a brief background of the researcher has been included in Chapter 1 (see page 12) so that the research findings are understood in context.

Lastly, the fifth feature of the qualitative method used is the ‘emergent nature’ of research. Experts agree that if the research intends to get a deeper understanding of the issue, having a tightly prescribed plan is not a good idea (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Bogdan and Biklen (2007) state that “plans evolve as they [researchers] learn about the setting, subjects, and other sources of data through direct examination” (p. 54). To this effect, this research started with only a general framework that included the research paradigm, research design and method with possible data-gathering tools but was flexible in the inquiry process. Hence, the design of this research was written simultaneously while the research was going on, and the changes that occurred in the process have been described in detail under appropriate sections.

3.3.2 Ethnographic design

Five approaches of the qualitative research designs were available: ethnography, narrative study, phenomenological study, grounded theory and case study. Upon thorough comparative analysis, the ethnographic design was considered the most fitting because it "seeks to understand" perceptions and actions of a shared cultural group in their natural settings (Creswell & Creswell, 2018, p. 134). This study’s broad culture-sharing group is the ‘primary school culture.’ The other approaches did not match the intent of this research. For instance, grounded theory generates a theory on a phenomenon, and case studies examine a setting, event, activity, or individual in depth (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Both these approaches were not suitable. Similarly, the narrative and the phenomenological approach were not suitable. The former studies the lives of one or two individuals through their narratives, and the latter explores several individuals’ lives through their lived experiences (Bogdan & Biklen, 2007; Creswell & Creswell, 2018).

Ethnography concerns the study of a ‘culture,’ initially of far-flung exotic cultures, but it has increasingly become popular in educational research today. In the early twentieth century, anthropologists like Bronislaw Malinowski used ethnography to describe the 'exotic' cultures of far-flung places, such as the Appalachians, the Icelanders, or the Samoans (Bogdan & Biklen, 2007; Spradley, 1980; Yon, 2003). With the increased utility of the ethnographic approach in recent years, it is no more limited to studying ethnic cultures but used in educational institutions too. Margaret Mead was the first anthropologist to shift the approach from studying far-flung exotic cultures to studying education cultures in the 1920s (Monroe, 1992).

In educational settings like this study, ethnography focuses on studying “shared patterns of behaviours, language and actions” of a group in their natural setting (Creswell & Creswell, 2018, p.13). Cohen et al. (2018) describe ethnography as "a descriptive, analytical and explanatory study of the culture, values, beliefs, and practices of one or more groups" (p. 292). To this end, *culture* is central to implementing and interpreting data in ethnography. Since Bhutanese primary schools share a similar academic culture with shared practices, values and beliefs, this ethnography was an ideal approach to understanding their shared meanings and experiences associated with nature conservation education.

Four essential features of ethnography were employed to complement the five features of the qualitative method (see page 58) utilised in this study. The first feature concerns the ‘shared cultural meanings’ of the phenomenon. According to Spradley (1980), the 'shared meanings' is the meaning systems a group of people develops over time that only they understand. This study focused on understanding the ‘shared meanings’ concerning nature conservation in four primary schools by gathering rich descriptive and multiple perspectives from various stakeholders (Bogdan & Biklen, 2007; Punch, 2009; Spradley, 1980).

The second feature is the ‘rich and thick descriptions’—initiated by Cliff Geertz (1926-2006), an anthropologist —as a means to getting the holistic meanings of the informants’ experiences (Bogdan & Biklen, 2007; Cohen et al., 2018; Creswell & Creswell, 2018; Roy & Banerjee, 2012). Thick description is "detailed descriptions of the setting ... or offer many perspectives about a theme," making the findings more realistic and richer (Creswell & Creswell, 2018, p. 200). This feature was significantly utilised during data generation and presentation of the findings. For example, the researcher’s open interaction and probing techniques generated rich

and descriptive responses from all the informants. Similarly, rich and thick descriptions were used to present the findings of the study as shown in Chapter 4 and 5.

Since ethnographic research intends to obtain a holistic picture of the phenomenon, this research has employed the 'holistic approach.' Creswell and Creswell (2018) suggest that qualitative research should present a complex picture of the issue under study; this points to seeking multiple perspectives of stakeholders and identifying multiple facets involved in the situation. This study collected multiple perspectives through interviews and open-ended questionnaires to provide enough scope for exploring all facets of nature conservation education in primary school. A holistic report illustrating the reality of nature conservation in the four primary schools has been presented as an outcome of this research (Creswell & Creswell, 2018).

The fourth essential feature of ethnography is 'grasping the insider's perspectives' by becoming a participant or an insider. Bronislaw Malinowski, the first anthropologist who lived with the natives for a prolonged time to study the far-flung exotic cultures, introduced an ethnographic technique known as 'participant observation.' Hence, the researcher assumed the role of a participant to grasp the insider's perspectives by using participant observation techniques.

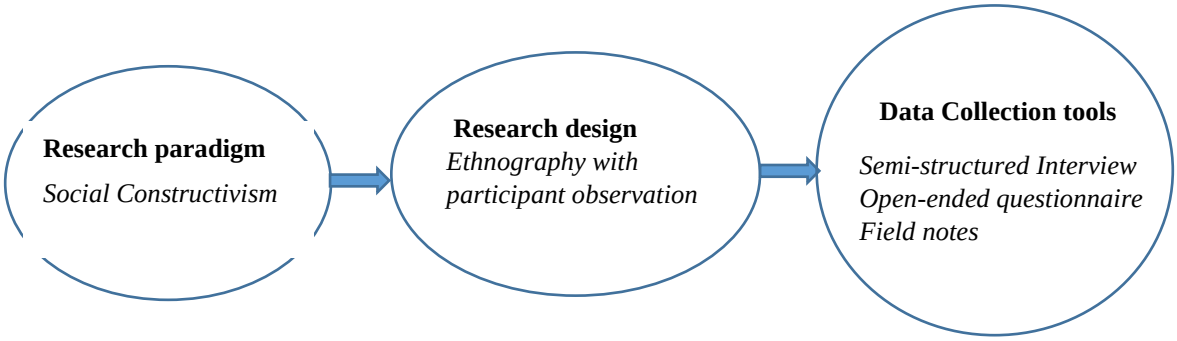
Participant observation is popularly used with ethnography to get access to the insider's perspectives and the shared meaning systems (Bogdan & Biklen, 2007). The role of the researcher in participant observation—from being a complete participant to being a complete observer—is given in the excerpt below:

> The 'complete participant' is a researcher who takes on an insider role in the group being studied and maybe who does not even declare that she is a researcher... The 'participant-as-observer', as its name suggests, is part of the social life of participants, documenting and recording what is happening for research purposes. The observer-as-participant, like the participant-as-observer, is known as a researcher to the group and maybe has less extensive contact with the group. With the 'complete observer', participants may not realise that they are being observed ..., hence this is a form of covert research. Hammersley and Atkinson (1983, pp. 93–95) suggest that comparative involvement may come in the forms of the complete participant and the participant-as-observer, with a degree of subjectivity and sympathy, whilst comparative detachment may come in the forms of the observer-as-participant and the complete observer, where objectivity and distance are key characteristics.
>
> (Cohen et al., 2018, p. 151-152)

The first two roles are comparative of *involvement*, and the other two are comparative of *detachment*. In this research, the researcher assumed the role of 'participant-as-observer' or a moderate participant (see pages 70 & 62). As a participant observer, the researcher could maintain a balance between the insider-outsider element so that the researcher can be an *insider* to access the insider's perspectives; and, at the same time, be an *outsider* "to absorb the situation with sufficient detachment" (Cohen et al., 2018, p. 551). It was convenient because, in this role, the researcher had to visit the research sites only during the data collection process and not have to live there for a prolonged time (Spradley, 1980). Besides, the researcher's prior experience as a primary school teacher could be used as part of the participant experience (Cohen et al., 2018; Punch, 2009; Spradley, 1980).

Hence, the ethnographic design with reliance on participant observation enabled the researcher to collect rich and more descriptive data, fulfilling the intent of this research. The details of the data collection tools (see page 70) and how they were employed are presented after the next section on ethical considerations. The figure below (Figure 3.1) illustrates the research design for this study.

Figure 3.1 *The Research paradigm and Research design*



(Source: Author)

3.4 Ethical Consideration

Ethical consideration in the research procedures is showing integrity, seeking consent from individuals and institutions, and protecting the research informants from potential harm or distress. Arifin (2018) states that the concern of potential harm to informants is more in qualitative research since it requires the researcher to intrude more into the informants' lives than in quantitative studies. It is even more sensitive when it involves children, who are more vulnerable than adults

(Arifin, 2018; Cohen et al., 2018; Punch, 2009). Hence, to ensure high standards of ethical consideration, this research has complied with the norms and policies outlined in *ZHIB 'TSHOL*[13]*: RUB Research Policies*, a research policy document of the Royal University of Bhutan (RUB).

The policies and guidelines are based on Bhutan's government policies, Bhutan's university policies and the international best practices in research ethics (RUB, 2014). In addition, some research ethics advised by Punch (2009), Cohen et al. (2018) and Creswell and Creswell (2018) were incorporated wherever relevant. The details of the ethical consideration applied before, during and after data collection are provided below.

3.4.1 Before data collection

The foremost step in advancing any research is getting the consent of "the gatekeepers" (Cohen et al., 2018, p. 16). The gatekeepers are the individuals or a university committee that check the project's worthiness, the researcher's competence, and the informants' safety before granting permission (Punch, 2009, p. 50). Initial permission for the research project was sought and obtained from the University of Heidelberg, Germany, and the Royal University of Bhutan. For example, a permission to go ahead with the research formulation and data collection was granted by Heidelberg University of Education, Germany, via an official letter on 10th September 2019 (see Appendix 3.1). Next, the permission required from the researcher's home university was granted by the Research Ethics Committee of Paro College of Education, Bhutan, vide letter no. PCE/ADM/05/2019-20/450, approval no. CRE/2019/39 on 6th September 2019 of the Centre for Educational Research and Development (see Appendix 3. 2).

The permission to visit schools for data collection was sought and obtained from the Ministry of Education, Bhutan, vide letter. No, DSE/SPCD/SLCU-21/2019/1975, on 12th September 2019 (see Appendix 3.4). Since two districts—where the four schools are located—were involved, an email (see Appendix 3.5) was sent to two district education officers, and copied to the four principals of the selected schools, on 19th September 2019 for information and seeking support. Along with the email, a photocopy of the Ministry's approval letter and the research information sheet (see Appendix 3.6) was attached. Following this, a letter to parents (see Appendix 3.7), printed on the Heidelberg University of Education's letter pad with prior permission, was sent seeking their permission for children's participation in the open-ended questionnaire. Along with

[13] Research

the letter, a consent form (see Appendix 3.8) for signature and a research information sheet for their information were attached. One of the schools happened to be a boarding school, so the hostel warden signed the consent forms on behalf of their parents. In addition, consent forms for students (see Appendix 3.9) to sign were distributed after their parents' permission was granted.

Similarly, the interview informants were contacted via telephone before the field visit to get verbal consent for their participation. A copy of the interview consent form (see Appendix 3.10) and a research information sheet were sent to the them beforehand so that they were well informed of the research project and its goal. A tentative schedule for the interviews and the open-ended questionnaire was discussed with the focal persons and the potential informants. The informants were informed that participating in this research was voluntary, and they could withdraw any time if they wished.

3.4.2 During data collection

It is mainly during the data collection that psychological, emotional or personal harm may be caused unintentionally (RUB, 2014). Therefore, the researcher mindfully executed the codes of ethics to avoid any harm. All informants were treated as equals and with respect, and their participation in the research was acknowledged. All participants were informed of the purpose of this research and explained how important their role was in fulfilling this study's goal. In addition, the informants were promised their right to privacy, confidentiality, and anonymity by concealing their names or the names of their organisations (Bogdan & Biklen, 2007; Cohen et al., 2018; Creswell & Creswell, 2018).

The informants were given the right to withdraw from participating at any stage of the research process. They were assured that their withdrawal would not adversely affect their personal or professional life. The research proceeded only with their informed consent and signing the consent forms (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). The digital audio recorder was switched on only after getting permission from the informant.

3.4.3 After data collection

The findings of this research have been reported fairly, credibly and accurately in a simple and appropriate language. To enhance the accuracy of reporting, rich and thick descriptions with multiple perspectives have been used to provide the readers with a clear and holistic understanding of the phenomenon (Cohen et al., 2018; Creswell & Creswell, 2018). As soon as the transcription

process was completed, the transcripts were emailed to the concerned informants for 'respondent validation' (see Appendix 3.21) and only after the receipt of their validation (see Appendix 2.22) from the informants, the coding process began. Furthermore, before finalising the research report, the findings were shared with a few informants for validation to enhance the study's credibility (Creswell & Creswell, 2018). After that, copies of the final report will be submitted to Paro College of Education, Bhutan, and the University of Education of Heidelberg, Germany, as part of the commitment and responsibility. Findings will then be shared with all stakeholders, such as the Ministry of Education, teacher education colleges, and other relevant organisations that may have a stake in primary education. The researcher also takes the ethical responsibility not to publish this material for more than one publication.

Regarding the storage of research data and associated materials, all the hard copies of data and related research materials are stored correctly in a safe locker. Hence, they are safe from damage, loss or theft (RUB, 2014). The computer files, such as audio recordings of interviews, interview transcriptions, emails, scanned copies of official letters, and signed consent forms, have been uploaded and saved securely in the researcher's personal Google Drive account. In addition, the documents, in hard and soft copies, will be available in the next five years for research audit processes or further use by other researchers (RUB, 2014).

Lastly, in the reporting of the research, all the ideas, terms, and terminologies that have been used in this study have been accurately acknowledged to the best of the researcher's knowledge, using the *Citavi* reference editor, a software provided by the University of Education of Heidelberg, Germany.

3.5 Data Collection Methods

Methods are referred to as "instruments" (Cohen et al., 2018, p. 186) or "specific techniques" (Bogdan & Biklen, 2007, p. 186) that researchers use to collect data. According to Cohen, the research design, the intent of the study and the instruments for data collection should be "mutually informing" and "demonstrate cohesion and fitness for purpose" (Cohen et al., 2018, p. 308). The sampling design and procedures, including research sites and informants, and the data collection tools, techniques and procedures are described in this section.

3.5.1 Sampling design and procedures

According to Cohen et al. (2018), there are two sampling theories to choose from: probability and non-probability sampling. Of the two theories, the non-probability sampling design was more suitable for this study. The non-probability theory, typically for a qualitative study, states that not all members of the wider population have a known chance of getting selected (Cohen et al., 2018; Creswell & Creswell, 2018). Since qualitative study aims to gain an in-depth understanding of a phenomenon, it requires only a small number of informants to provide qualitative data. Hence, this theory was apt for using the purposive sampling design to get to the information-rich individuals and select readily available informants.

Conversely, probability sampling theory states that all members of the wide population have a known chance of getting selected through random sampling (Cohen et al., 2018; Creswell & Creswell, 2018). Since this sampling design is typically for quantitative studies wherein a large number of participants from the population is included, it was not a suitable design for this research.

3.5.2 Research sites or selection of schools

Two comparatively similar districts in altitudinal and climatic conditions were selected as research locations, one in the east and the other in the west of Bhutan. These two locations are between 2100 to 2200 metres above sea level, and both regions fall in the temperate climatic zone (see page 67). Therefore, the assumption is that informants will likely experience similar vegetation and nature experience. The red arrows in the map below (Figure 3.1) show the two districts as research sites.

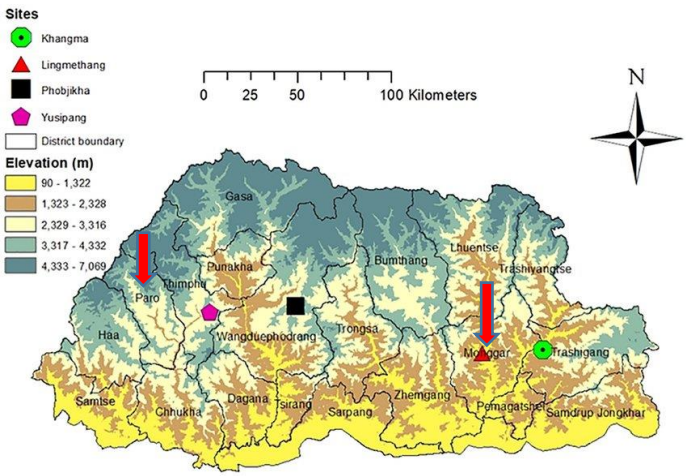


Figure 3.1. *Bhutan map showing the research sites (Source: TK, Ministry of Agriculture, Bhutan: https://doi.org/10.1371)*

The two districts are approximately 527.4 km apart by road and takes about 15.7 hours by car across the mountains and valleys to travel from one point to the other. Thimphu is the capital city of Bhutan, and generally, the level of exposure to modern lifestyle and living standards may depend on the distance from the centre. For example, the western region—where the capital city lies—is more advanced in terms of development and exposure, whereas the eastern region—which is over five hundred kilometres (by road) away from the central city—is less advanced. As a result, children's experiences could vary slightly from region to region.

From each district, two schools, one urban and one rural [total: four schools], were selected as research sites for data collection. As per the Teacher Human Resource Policy 2014, a school is classified as 'urban' if it has all the five necessary amenities: electricity, market, hospital (Basic Health Unit of any grade), telecommunications, and housing (including private housing facilities); and a school is 'rural' if it has four and below of the total basic facilities with a feeder road or farm road (MoE, 2014). The profiles of four schools selected as research sites are given below in the table (Table 3.1). Henceforth, the four participating schools are referred to as School 1, School 2, School 3 and School 4. Additional information on the living standards and practices of each school's community is presented in chapter 4 (see page 120).

Table 3.1 Profile of four participating schools

School 1: Urban school (western Bhutan)	**School 2: Rural setting (western Bhutan)**
School 1 is about 54 kilometres distance by road from Bhutan's capital city, Thimphu. It is a Middle Secondary School with about 800 students and 47 teachers [considered a large school in Bhutan] and classes ranging from pre-primary to grade ten. The school has adequate academic resources, such as a science laboratory, library, information technology labs, and WiFi connections. Since the school is located near the district's main town, thus it has exposure to all modern amenities like shopping malls, supermarkets, nightclubs, transportation, tourist resorts, restaurants, and hospital.	School 2 is about 77 kilometres by road from the capital city, Thimphu, and a two-and-a-half-hour drive from there. It is classified as a 'rural' school since it has less than four basic amenities outlined by the government policy (see above). It is also a Middle Secondary School like school 1, but it provides boarding facilities since the villages are far-flung. It has grades ranging from pre-primary to ten but has only 420 students and 26 teachers, much smaller than school 1. About 200 students are boarders, and the rest walk to school. Boarding facilities are provided to students whose village is more than five kilometres from the school. However, the day scholars also get breakfast and mid-day meals at school. In addition, the Ministry of Education implements the feeding scheme, especially in rural settings, to prevent hunger and malnutrition among children who have to walk long distances to school and to support children from financially disadvantaged backgrounds.
School 3: Urban setting (eastern Bhutan)	**School 4: Rural setting (eastern Bhutan)**
School 3 is an urban school in the eastern region, approximately 460 kilometres by road from the capital city, Thimphu. This school is also a middle secondary school with classes ranging from pre-primary to grade ten. Although it is a large school like school 1 with 936 teachers and 51 teachers, it has comparatively less exposure to modern amenities and lifestyles. It is a day school since most students come from the town area and neighbouring villages. The school has all the academic resources like school 1, such as computers, internet connection, science laboratory and other facilities. Since The school has exposure to modern amenities in a town like internet cafés, nightclubs, restaurants, hotels,	School 4 is a rural school in the eastern region. It is about 508 kilometres by road from the capital city, Thimphu, and is the farthest, most remote, and least developed of all four locations. It is about 65 kilometres by road from the district's main town. It is located in the mountains on a sloped stretch of land, sparsely populated with houses spread across the mountains and valleys. It is a primary school with grades from pre-primary to six. Since the school is the farthest and the most remote, it has the least exposure to modern lifestyles and amenities. The school has only 157 students, of which 51 live on campus as boarders. Meals are served to both boarders and day scholars to prevent malnutrition since it is a rural school

electronic shops, hardware shops, clothing shops, a vegetable market and a referral hospital. However, it is comparatively a much smaller town than the one where School 1 (urban) is located.	where the population's living standard is comparatively low. The school has only basic academic facilities for primary schools, but no computer labs, science laboratories or internet accessibility like schools 1, 2 and 3. Unlike the other schools where the total number of students increases yearly due to population growth, the statistics of the school show the students' total number school keeps dropping

3.5.3 Information-rich informants

This study identified informant-rich participant groups using purposive and convenience sampling to collect rich qualitative data through interviews and open-ended questionnaires. Given the study's intent to understand the nature conservation culture in the primary school, four categories of informants that have a direct stake in primary education were considered: teachers, principals, curriculum specialists and teacher-educators. So long the informants fit the information-rich criteria, i.e., critical, reliable and knowledgeable, and were willing, the individual was eligible. Similarly, using purposive sampling 105 grade six students were identified as potential informants for the open-ended questionnaire. They were the senior most in the primary school with the most school experience and better communication skills than their juniors.

3.6 Data Collection Tools, Techniques and Procedures

A semi-structured interview, an open-ended questionnaire and field notes were employed for data collection. These principles of Bronislaw's participant observation (see page 62) were woven into the tools to enrich the data. In the following sections, the details of how the tools and techniques were employed in this research are illustrated.

3.6.1 Participant observation techniques with interviews and open-ended questionnaire

Participant observation is mainly used by ethnographers to 'get the insiders' perspectives' (emic) so that the data gathered is rich and authentic (Bogdan & Biklen, 2007). In participant observation, the most crucial element is building trust and a close relationship with the informants so that they feel safe and comfortable sharing their perspectives. Hence, in the role of participant-as-observer, the researcher adopted a 'low profile' and friendly approach during the field visit.

Due to the ‘low profile' approach, the researcher found it easier to blend in with the teachers and other staff (Bogdan & Biklen, 2007). In addition, the researcher's prior position as a primary school teacher made it easier to connect with the school environment, teachers and students. Specifically, when the informants felt that the researcher was not an outsider but was someone like them, they opened up. Before the interview, the researcher made it a point to meet the informants and have informal conversations. This extra interaction helped the researcher gain familiarity and build a close relationship with them. Hence, by the time they sat for the interview, it was almost like having a conversation with a friend.

Children are vulnerable by nature—anything can make them anxious. As a participant observer, the researcher reduced their anxiety and gained their trust. This technique is critical in participant observation—winning the trust of the informants. Firstly, the researcher included all the students in the task, although the initial plan was to include only twenty students. Since no one was excluded, everyone looked happy and excited to participate.

The researcher ensured the students were relaxed and comfortable during the open-ended questionnaire session before starting the activity. However, knowing that children can easily get anxious, the researcher carefully guided them through the questions, one at a time. Finally, they were asked to write freely without worrying about their language accuracy or the correctness of their responses. Most importantly, students were informed that their responses would be confidential and that there was no passing or failing.

3.6.2 Semi-structured interview

A semi-structured interview was an appropriate tool for gaining an in-depth understanding of nature conservation education in primary school. Given the study's intent, the structured and unstructured interviews were unsuitable. While a structured interview would have limited the freedom for multi-dimensional responses, an unstructured interview would have given too much freedom for variation (Punch, 2009; Galleta, 2013). Hence, a semi-structured interview provided the perfect balance required for the data collection.

3.6.2.1 Pretesting the interview questions

The semi-structured interview questions were pretested on three teachers of a semi-rural school one month before the data collection. Based on the experience interviewing them, some

changes were incorporated into the interview protocol: one question was re-worded, and the introductory section was revised.

One question was reworded to make it more open-ended. For example, before the revision question 2 read: *Is nature conservation important to you? If so, why do you think it is important? [Probes: Tell me some reasons why this is important to children, especially primary school]*. During the pretest, it was found that the question made the teacher falter slightly before responding since it was a closed question. The question sounded a little intimidating too. The teacher had to decide on a 'Yes' or 'No' before proceeding further. Therefore, the question was reworded to make it inviting and open-ended: *Why do you think nature conservation is important to children? [Probes: Please share why this is important to children, especially of primary school children]*

The other changes were related to the ethnographic approach. The researcher as participant observer intents to build a friendly and a trusting relationship with the informants so they are comfortable, opening up and sharing their genuine perspectives. Therefore, some additional steps were added to the introductory session of the interview protocol (see Appendix 3.11 & 3.12). For example:

> Spend about ten minutes on causal conversation to relax the informant. Talk about anything that is appropriate to the situation. This may serve as a warm-up and a way to developing rapport with the informant.

In addition, it was also found necessary to prepare a separate protocol for different types of informants: teachers, principals, curriculum specialists and teacher educators. Since the questions have to be slightly tweaked to suit their job positions, the interview protocol for each type was prepared accordingly (see Appendix 3.11 for the final version).

Interview questions

The central question was to find out how nature conservation was understood, taught and practised in primary school, and six specific questions covering curriculum, teaching and practices were formulated. The six questions were:

i. *What is nature conservation in your perception?*
ii. *Why do you think nature conservation is important to children?*
iii. *How is nature conservation taught in primary school*
iv. *How do your children practice what you have taught about nature conservation?*
v. *How do the primary schools of Bhutan practise nature conservation?*

vi. *How does the teacher education curriculum prepare the students to teach nature conservation?*

As mentioned earlier, an interview protocol adapted from Galletta's (2013), was developed and used during the interviews. While the essence of the six questions remained the same throughout the interviews, each question was slightly tweaked to suit the informant category. For example, for the principals and teachers, the question had to be specific to their school, not others.
The details of how and why specific questions were asked to different informants (educators) are below.

Question 1 was common to all informants, exploring what they knew about it. For example: *Tell me about nature conservation. In your perception, what does it mean?* This opening question was crucial to determining the scope and depth of exploration (Galletta, 2013, p. 50). Some probes were used to help informants be specific and elaborate on their points (Bogdan & Biklen, 2007). For example: *What do you mean by nature?* Or *could you explain 'nature' in your perception? Please cite some examples of nature*.

Question 2 [Q2] sought to find out why nature conservation education was important for children. *Why do you think nature conservation education is important to children?* [Probes*: Share why this is important to children, especially in primary school]*. Q2 was asked of all the informants. Wherever necessary, they were probed further to elaborate on their points. *Please give me an example to illustrate what you mean by that.* Some informants talked freely uninterrupted about their experiences with children related to teaching, learning, and practices and covered some parts of the following questions (Bogdan & Biklen, 2007).

Question 3 [Q3] was related to school curriculum. *How is nature conservation taught as a curriculum in primary school?* This question was tweaked slightly for different informants. For example, to the teachers, the question was about teaching. *What are your experiences of teaching nature conservation to children?* Some probes were used too. *Tell me about some topics; some teaching strategies you use; some activities you carry out with children; or anything else you do.* To curriculum specialists and teacher educators, Q3 was asked in general since they were not involved in teaching. *How do you think nature conservation is taught in the primary school curriculum? Please share your general or specific observation or understanding of nature conservation education in the primary schools of Bhutan*. However, principals were not asked this question since a principal's job is administrative and not involved in teaching.

Question 4 [Q4] sought to know about children's nature conservation practices. *How do children practise what you have taught in the nature conservation lessons?* Since this question was related to teaching and learning, only teachers were asked.

Question 5 [Q5] sought to understand the nature conservation practices of primary schools. *How do primary schools practice nature conservation?* This question was asked with a slight variation too. With principals and teachers, the question was specific to the school: *How does your school practise nature conservation?* Some probing questions were used: *Tell me about any specific programmes or activities related to nature conservation. How frequently are these activities conducted? How many children participate – the whole school, a few classes, or a small group*?

Q5 was asked in a general manner to curriculum specialists and teacher educators. *How do you see nature conservation in primary schools?* The curriculum specialists, teacher educators, and principals were assumed to have broader and wider perspectives in their job positions.

Q6 was meant only for teacher educators. *How do you prepare the student teachers to teach nature conservation in your module* [i.e., a unit in the course]*?* Some probes were used wherever necessary. *Which curriculum topics are related to nature conservation? How do you connect knowledge to practice? How effective is it?* The researcher listened carefully without interrupting. Towards the end, informants were asked if they had anything to add. *Is there anything you would like to share? Share some concerns or suggestions.* This question allowed the researcher to gain extra information and for the informants to add more points to their earlier ideas. The question was also used to refer back to any points the researcher would like to elaborate on.

Interview informants

Fifteen informants (educators) from four job categories were identified using the purposive sampling technique. They comprised eight science teachers [two each from four schools], four principals [of the four schools], one curriculum specialist [Ministry of Education], and two teacher educators. The reason for picking science teachers was that the science subject was the closest to plant and animal species. Four principals [of the four schools] were identified by default because they were supposed to be "knowledgeable about the activities and operations of the school" (Cohen et al., 2018, p. 199).

At the time of the interview, one of the principals was unavailable. Therefore, using convenience sampling, he was replaced by his assistant principal, who was equally knowledgeable

and willing to participate. One curriculum specialist in the primary science curriculum was purposefully identified as a critical stakeholder because of their role in curriculum development and training for teachers. In addition, two teacher educators teaching primary science in the college were identified using convenience sampling. In the table below (Table 3.2), the profile of the informants is given.

Table 3.2 *Informant Profile*

Informant/ Educator	Gen	School	No. of years in education	Experience in teaching (Subjects)	Region
E1	M	Middle Secondary	26 years +	primary science	Urban (West)
E2	M	Middle Secondary	19 years +	English social studies	Rural (West)
E3	F	Middle Secondary	21 years +	English	Urban (East)
E4	M	Primary School	23 years +	primary science	Rural (East
E5	F	Middle Secondary	30 years +	social studies, primary science	Urban (West)
E6	F	Middle Secondary	21 years +	social studies, primary science	Urban (West)
E7	M	Middle Secondary	11 years +	primary science	Rural (West)
E8	M	Middle Secondary	16 years +	primary science	Rural (West)
E9	M	Middle Secondary	14 years +	chemistry, physics primary science	Rural (West)
E10	F	Middle Secondary	7 years +	primary science	Urban (East)
E11	M	Middle Secondary	6 years +	primary science, English	Rural (East)
E12	F	Middle Secondary	6 years +	primary science	Rural (East)
E13	M	-	24 years +	chemistry, physics primary science	Urban (West)
E14	F	-	23 years +	primary science	Urban (West)
E15	M	-	24 years +	chemistry, physics primary science	

Interviewing techniques and procedures

The interview protocol developed using Galletta's 'Mastering Semi-structured Interview and Beyond' (Galletta, 2013) was used as a guiding framework throughout the interviews. The protocol had four sets of interview questions (see Appendix 3.12) for the four categories of educators: teachers, principals, teacher educators and curriculum specialists.

As explained earlier, the researcher employed participant observation techniques throughout the interviews. As a participant-observer, the researcher intended to get rich quality data by building trust and a close relationship with the informant. Hence, it was important for the researcher to maintain a 'low profile' and friendly approach. The researcher's prior experience as a teacher helped connect with the teachers easily, specifically when the informants were made to feel that the researcher was not an outsider but like one of them who had similar experiences in the school.

Before the interview, the researcher chatted informally, sharing similar experiences and expressing gratitude for their participation. Next, the researcher informed them of the research purpose and the informants' rights to anonymity, confidentiality, or the right to withdraw from participating at any time during the interview. Most consent forms were signed beforehand, but a few informants were asked to sign just before the interview. Further, knowing that language difficulty could be a barrier to getting the "active involvement of the informants in construction of data" (Graham, quoted in Punch, 2009, p.148), informants were given the freedom to use English or *Dzongkha*, both of which are used in schools. While English is the medium of instruction in schools and institutions, *Dzongkha* is the country's national language. To ease their discomfort, the researcher reassured them that they were the experts in the field and that their contribution would significantly benefit this research (Bogdan & Biklen, 2007). Finally, the researcher sought permission to use the digital recording device before switching it on.

The researcher exercised several techniques conscientiously during the interview: listening intently and maintaining eye contact with the informant while indicating with non-verbal cues that she was paying attention to everything the informant was saying. Galletta (2013) asserts that the researcher's non-verbal cues when speaking is critical because they can encourage the informant to share more openly or retract from opening up further. Therefore, the researcher maintained a warm and positive atmosphere while indicating non-verbally that their responses were interesting and worthwhile. This positive vibe kept them going and encouraged them to open up further. The

researcher let the informant speak freely without interrupting and asked further questions only for clarification and elaboration on the points made. The goal was to listen and learn from their perspectives but not to challenge their thoughts (Bogdan & Biklen, 2007; Galletta, 2013; Spradley, 1980). In the wrap-up, the researcher thanked the informants for their time and expressed how valuable the responses were for this research.

Recording interviews: A Sony IC Recorder MP3 device was used to record all interviews.

3.6.3 Open-ended questionnaire

Researchers generally use an open-ended questionnaire to elicit views and opinions from the informants in situations where qualitative data is required, but interviews are not feasible (Bogdan & Biklen, 2007; Cohen et al., 2018). An open-ended questionnaire was the most suitable instrument for collecting open-ended student responses (Cohen et al., 2018). Unlike the highly structured closed questions with response categories provided, the open-ended questions invited rich and diverse responses. Informants could write their own opinion and explain them with examples rather than be limited by "pre-set categories of responses", as in the case of closed questions (Cohen et al., 2018, p. 476). The details of the questions asked and how it was administered, including the pilot testing procedures, have been explained below.

3.6.3.1 Pretesting the open-ended questionnaire

The open-ended questionnaire form was pretested on about fifteen grade six students of a school nearby one month before the data collection. Several changes were made to the questionnaire based on the experience, feedback, and researcher's reflections. The first revision was re-printing the questionnaire in colour. Students' responses showed that the images in black and white prints had affected the clarity of the pictures. For example, *artemisia* was easily mistaken for other similar herbs; the *dung beetle* and the *ladybug* looked quite similar in the 'black and white' images. Therefore, the final prints of the questionnaire were done in colour so that the images looked clearer and more accurate (see Appendix 3.13 & 3.14).

Some phrases or words were added to enhance the clarity of the questions. For example, the phrase 'lives in' was replaced by 'habitat' because the phrase was found to be misleading: Some students had written the name of places instead of the habitat. Similarly, words such as 'wild' and 'of Bhutan' were inserted in Q2 so that students write names of NATIVE and WILD species of

Bhutan, not domesticated or non-native species. Students had even written the names of domestic birds and vegetable plants instead of wild species. Also, species names like *parrots*, which are not found in Bhutan, were listed. Therefore, the adjective 'wild' and the phrase 'of Bhutan' were added to the instruction to make the instruction clearer. In addition, the phrase 'small plants' was added within brackets next to the word 'herb' as a clue.

Q3 was rephrased to make it more inviting. The question, '*Have you heard of nature conservation? Yes or No. If 'Yes,' what do you think it means?'* sounded somewhat intimidating, and it gave students an option not to answer. The revised version was: *You may have heard of 'nature.' What do you think nature conservation means?* The opening statement, *You may have heard of nature conservation*, seemed more inviting than *Have you heard of nature conservation?* In the pretesting, several children opted out by ticking 'No' in the options and left the question unanswered. Lastly, it was found that the students took 45 minutes on average to complete the questionnaire, not 30 minutes as estimated.

3.6.3.2 Questions for Open-ended Questionnaire

In the final version, there are six questions, one to seven (Q1 – Q7). While questions 1 and 2 tested students' knowledge of local wild plants and animals, questions 3 to 7 explored their experiences related to nature conservation education. The details of the questions are explained below.

Q1 tested students' ability to identify some common plants and animals native to Bhutan. Children were provided ten pictures of animal and plant species to identify and write their names, food [only for animals], and habitat in the space provided under each picture. They were expected to write the common names that lay people generally use and not the scientific names at the species level or different species or even at genera (or higher). Figure 3.2 shows an example of the question.

Figure 3.2 *An example of Q1 of Open-ended questionnaire*

Q 1. There are ten pictures of animals and plants given in the boxes below. Identify each and write its name, its food [only for animals], and its habitat [where it is found] in the spaces provided:

Name: Food: Habit:	Name: Food: Habit:

Picture credit: Bhutan Biodiversity Portal

Ten species were selected for identification (see Table 3.3) using a set of criteria: a) The species is wild, not cultivated or raised by people; b) The species is commonly seen by Bhutanese children; c) The species is commonly found in the altitude range of 1500 to 2500 metres [since that is where most of the Bhutanese population live]; d) The species adds to the variety from different classifications [e.g. mammal, bird, insect, worm, tree, and herb]; e) The species is neither too common nor too rare [e.g. 'tiger' may be too easy that even a three-year-old can say its name; similarly, 'warbler,' may be too challenging]. The ten species selected were takin, snow leopard, sparrow, house crow, dung beetle, ladybird, earthworm, artemisia, primula, and rhododendron. Table 3.3 shows the names of ten species and their scientific and local names. The ten species comprised of two mammals, two birds, two insects, one worm, two herbs, and one tree.

While most of the pictures of the species were downloaded from the Bhutan biodiversity portal at http://biodiversity.bt/biodiv/observations, a few, like the earthworm, dung beetle, and artemisia, were photographed by the researcher herself. The reason for limiting to ten numbers of species is that 'ten' was assumed to be a reasonable number—neither too many nor too few—to give substantial data about children's species literacy level.

Table 3.3 *List of species with their scientific and local name*

	Common Name	Scientific name	Local name
1	Snow leopard (species)	*Panthera uncia*	*Gang Zig*
2	Takin	*Budorcas taxicolor*	*Drou gyemtsi*
3	sparrow	*Passer Montanus*	*Bjichu Nyazem*
4	Raven	*Corvus*	*Bjarog*

5	Dung beetle	*Scarabaeus sacer*	*Awa buup*
6	ladybird	*Coccinellidae*	*Thom Buup*
7	Earthworm	*Lumbricina*	*Chenga Buup*
8	Artemisia/Mugwort	*Artemisia indica*	*Khempa /Meringma*
9	Primula	*Primula Denticalata*	*Yiyong meto*
10	Rhododendron	*Rhododendron arboreum*	*Eto Meto*

(Source: Bhutan Biodiversity Portal)

Q2 was an extension of the first question. Children were asked to write from their memory five names of insects, five names of wild trees, five names of wild birds, and five names of herbs. The student informants were instructed to refrain from repeating the species from Q1 because if they did, it would reduce their opportunity to demonstrate how many species they know. A sample of Q2 of the open-ended questionnaire is shown in Figure 3.3.

Figure 3.3 *An example of Q2 of Open-ended Questionnaire*

2. Name some species of plants and animals that are found in Bhutan, but do **NOT REPEAT** the names of species given in question no. 1

a. Name five insects: i) _____

ii) _____

iii) _____

iv) _____

v) _____

Q3 explored students' perceptions of nature conservation. *Have you heard of nature conservation?* Students could tick 'Yes' or 'No.' If the students ticked 'Yes,' they answered the next part of the question: *What does nature conservation mean to you?* Here, students were expected to write their understanding of what nature conservation meant to them.

Q4 inquired about their experience and affinity [closeness] with nature. *Why is nature conservation important to you?* Within brackets, some probes were written, for example: *How are you dependent on plants and animals?* Or *how are they dependent on you?*] The probes were used as prompts to make them respond with more details.

Q5 was related to their classroom experiences: *How do you learn about nature conservation in your school subjects?* This question explored how nature conservation is generally taught in primary school.

Q6 explored children's practices related to nature conservation. *Do you conserve* [preserve] *nature in your school?* Yes or No. *If 'Yes,' describe how you do it*. This question invited students to share their experiences conserving nature in the school. Lastly, Q7 was an opportunity to add a concern or to elaborate on their earlier points: *Write anything else you wish to say about nature conservation*.

3.6.3.3 Informant sampling

105 grade six students [23 from school 1; 32 from school 2; 26 from school 3, and 24 from school 4] participated in the open-ended questionnaire. The reason for identifying grade six students as relevant and information-rich was based on the simple logic that they have more school experience and better communication skills than their juniors, i.e., grades five and below. The reason for including a large number of students was to increase the possibility of gathering richer data with diverse ideas from as many students as possible, not for generalisation.

3.6.3.4 Administering the open-ended questionnaire

As a participant observer, the researcher greeted the students warmly and initiated informal conversations until they looked settled and excited. Before the task, students were informed about the intent of this study and how they could contribute to this important research. In addition, students were informed about their right to withdraw at any time during the task and assured that confidentiality and anonymity would be maintained.

The researcher's presence during the task made a difference. Cohen et al. (2018) explain that if a questionnaire was self-administered, there was a high possibility that students would "wrongly interpret the question and, consequently, answer it inaccurately ... or even [the possibility of doubt] whether it is completed by the intended person" (p. 502). While administering the research task, the researcher's presence prevented students from misinterpreting the questions and assured that the intended student had completed the questionnaire.

Students were guided through the task, one question at a time, giving students enough time to complete it. When the students were informed that the task was not a test; that there was no failing or passing; and that they could skip a question if they could not answer, they carried out their writing task sincerely without copying answers from each other. Copying answers from each other would have reduced the authenticity and diverseness of the responses. The researcher also asked students to elaborate on their points and add examples wherever necessary. Doubts or

questions related to the questionnaire were clarified. On average, the students took around 45 minutes to one hour to complete the task. Finally, the researcher thanked the students for participating and expressed how valuable their contribution was to this research.

3.6.4 Field notes

The researcher becomes a key research instrument in qualitative research. Moreover, the researcher's reflexivity is crucial in ethnography with participant observation (Bogdan & Biklen, 2007; Cohen et al., 2018; Creswell & Creswell, 2018; Spradley, 1980). Hence, the researcher's insights into the study become essential data for analysis in this study. The researcher's field notes (see Appendix 3.16) included thoughts, opinions, introspection, observations, hunches, and impressions of settings, people, or activities.

3.7 Data Analysis Procedures

3.7.1 Analysing semi-structured interview data

3.7.1.1 Developing a Framework

This study developed and used a framework for analytical procedures. Using the ideas from Creswell and Creswell (2018), Gibbs (2007) and Punch (2009), the framework for analysing the semi-structured interview data encompassed steps to data preparation, coding for thematic categories, analytical coding and writing memos(see Appendix 3.17).

3.7.1.2 Data preparation

The audio recordings of the interviews were first sorted and labelled with code numbers so the data files were easily identifiable and accessible during the analysis and post-analysis (Gibbs, 2007). Labelling the files was also useful for maintaining the anonymity of the informants. Each audio file was labelled with a code number per the school and informant type (category). For example, the code S1_U1_P_01 stands for School 1, Urban 1, and Principal 1.

The interview data were then transcribed by two undergraduate students who were on summer vacation at the time. Gibbs (2007) warns of possible transcription errors which can occur while moving the data from the spoken context to the typed transcripts. According to Kvale (1988, as cited in Gibbs, 2007), the dangers are "superficial coding, de-contextualisation, missing what came before and after the respondent's account, and missing what the larger conversation was about" (p. 11). Also, sometimes the transcriber may mishear words or misspell the word, which

can change the meaning of a sentence (Cohen et al., 2018). Therefore, the following precautions and measures were taken to address those issues related to the quality of transcriptions.

i. The transcribers were briefed about the research topic and the context of the interviews so that they understood the context.
ii. The transcribers were familiarised with the format of the transcription. For instance, they were shown how the label code should be typed in the top-left corner to identify the transcripts easily. Secondly, they were shown how the informant's name should be classified as Teacher 1 or Teacher 2 so that the informants were anonymised. Finally, a confidential file—with the informants' real names, school and identification code—has been stored safely with the rest of the research materials. In the later stages, the interview informants were referred to as 'educators' and provided a pseudonym each, i.e., E1, E2, E3 etc.
iii. The transcribers were shown a sample of a completed transcription file. Their attention was drawn to the layout, structure of the text, substituted names, and font style and size (see Figure 3.4).

Figure 3.4 *Layout format for interview transcription* (Author)

File no.: S1_U1_T_01
Interview with Teacher 1 (School 1, urban 1): 14th October 2019 Time: 9.30 a.m.
Interviewer:
Teacher 1:

The transcribers were practically shown what transcribing 'verbatim' meant through demonstration. According to Gibbs (2007), transcribing' verbatim' is typing the interview as a continuous speech by the interviewer and the informant. For example, the transcriber records everything from the verbal tics, such as 'like', 'you know', 'er' 'ummm', and 'sort of', to the repetitious words like, 'I mean ...mmm I mean to say, like, ...' (Gibbs, 2007). Rather than writing only the gist, it is important to capture the feelings of the informants by recording them verbatim. When the transcriber gets the feel of the conversation, it is apparent that the possibility of de-contextualising the text is reduced.

iv. The researcher checked early on how the transcription was going on.
v. The transcribers were asked to perform an accuracy check by listening to the recording again to rectify the errors.

vi. The researcher performed a further accuracy check after the transcribers had completed the work. The following errors were rectified after listening to the interview recordings:

- Spelling errors were rectified. The transcribers had misspelt some words, for instance, 'accept' for 'except', 'quotion' for 'caution'.
- Some local dialects, such as *la, las, zum bay,* and *ani mey* were italicised and retained so that the feel of their free flow of expression was captured in the transcript. Bhutanese people like to mix English with their local dialect. *La* and *las* are honorific words in the local dialect meaning ‘Ok', and for the other local dialects used in the conservation, a translation in English within brackets has been inserted wherever necessary—for example, *zum bay* [similar to], *ana lu* [here].
- Below the interview code and the date, a brief background of the informant's professional experience has been added. In addition, the background provided a context for the perspectives shared by the informant.

Finally, the researcher spaced out the text of 1.5 spacing and created wide margins on the right side before printing them off. The space was beneficial for the researcher in the analysis process to bracket ideas, insert comments within the text, and annotate and write the coding ideas in the wide margin on the right (Cohen et al., 2018; Gibbs, 2007). Then, the transcriptions were printed off for analysis (see Appendix 3.18).

3.7.1.3 Coding for thematic categories

Coding was seen as a major part of the analysis process because it was only through coding that descriptive data were deconstructed and sorted into thematic categories for interpretation and discussion (Bogdan & Biklen, 2007; Punch, 2009). A unit of data can be a sentence or a paragraph of the text data. According to qualitative researchers, coding begins at a descriptive level or low-level inference; and advances to an inferential level or high-order inference as the analytic thinking progresses (Bogdan & Biklen, 2007; Creswell & Creswell, 2018; Gibbs, 2007; Punch, 2009).

The first stage of the process was to get a preliminary list of possible coding categories (Bogdan & Biklen, 2007). Coding is looking for regularities in the data and providing a word or phrase, as a code, that attaches meaning to the units of data (Punch, 2009). The researcher began to read each transcript carefully at least two times to get a sense of what the information was and reflected on its overall meaning. Then, a preliminary list of possible thematic coding categories

was prepared. For example, thematic categories were listed, such as setting or context, the concept of nature, conservation, curriculum, and school activities. The researcher wrote 'memos' about the codes, explaining what the codes represented (Bogdan & Biklen, 2007).

Data units were grouped and bracketed, and each category was assigned a code from the list and written in the margin to the right (Creswell & Creswell, 2018). For instance, code GIS-D was assigned to data units related to general information about the research setting. Code SP-P was assigned to units of data related to school practices from the principal's perspective (see Appendix 3.19 for sample of descriptive coding). The coding categories were revised based on the content of the transcripts. Whenever new ideas from the data emerged—which did not belong to any coding category—new codes were allotted if found to be significant to the topic of study (Bogdan & Biklen, 2007). The researcher continued to write memos (see Appendix 3.20) to record the changes in analytic thinking.

In the next stage, the researcher analysed themes that intersected with the perspectives of multiple informants, each time looking for more insights for further negotiation of meanings. The researcher reread the data to reduce the coding categories to fewer themes by grouping codes related to each other (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Further, codes were modified to make them more analytic. Some coding categories overlapped, and some data belonged to more than one category. Coding categories or themes were modified, removed, or added in this case.

The researcher continued to revise the memos to explain what the codes represented and how they should be applied or indicate the type of texts that should be linked to them. The memos were helpful to the researcher in using the codes across different types of data (Gibbs, 2007). Finally, the researcher rearranged the data into meaningful units to match them with the modified coding categories or thematic groups (Bogdan & Biklen, 2007; Creswell & Creswell, 2018).

3.7.1.4 Presentation of Findings from Interviews

Findings from the interview data are presented in chapter 4 under the heading, 'Educators' Perspectives on Nature Conservation in Primary School.' The themes are presented using rich and thick descriptions of multiple perspectives enhanced by actual words or statements of the informants (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Further, the results were

compared and contrasted with the researcher's field notes and open-ended questionnaires for deeper insights and more significant and extensive meanings (Creswell & Creswell, 2018).

3.7.2 Analysing open-ended questionnaire data

The open-ended questionnaire data was analysed using a framework (Appendix 3.17) developed using ideas from Creswell and Creswell (2018), Gibbs (2007) and Punch (2009). The first part of the analytical procedure framework included criteria, performance scale, sample answers and steps to recording the scores. For the qualitative data, the same analytical procedures developed for the interview were employed, as explained below.

3.7.2.1 Data preparation

The open-ended questionnaire data collected, in hard copy, was sorted into four different schools: school 1, school 2, school 3, and school 4. Then, each datum was labelled with a code number so that the data files were easily identifiable and accessible during the analysis process and post-analysis (Gibbs, 2007). For example, the code S1_U1_S_01 was written on the top right corner of the first data. S1 stands for School 1, U1 stands for Urban 1, and S_01 stands for Student 1. This code pattern was used for the rest of the data. The next step was to type the students' responses to questions three, four, five, six and seven on a Microsoft Word file. At the end of each response, the student's code was typed so that they were identifiable. Later, the responses were organised question-wise so that all responses to a particular question were on one page.

3.7.2.2 Analysis of Q1 and Q2 (Students' knowledge of species)

Q1 and Q2 were to find out about students' knowledge of local plants and animals. In the first question, students looked at ten pictures of local plant and animal species and wrote their names, food, and habitat. The following guidelines were applied to evaluate the correctness of their responses:

- Names of animals and plants written in *Dzongkha* (the national language of Bhutan) or their local dialect, besides English, should be accepted. [Students were informed about this rule during the data collection.
- The names of plants and animals can be common names generally used by lay people, not necessarily scientific names at the species level, different species or even at other

genera (or higher order). However, some common names used by laypeople also happen to be at the species level.

- The common name, scientific name and local names of the ten species for students to identify are given in Table 3.3 for evaluation.
- The performance scale in Table 3.4 should be used to rate the school's performance based on their scores.

Table 3.4 *The performance scale*

Scores	Performance level
80% and above	outstanding performance
70 -79.9%	very good performance
60 - 69.9%	good performance
50 - 59.9%	satisfactory performance
49.9% and below	unsuccessful

(*Source: The Wheel of Academic Law, RUB,2021)*

- Given below in Table 3.5 is an example of 'correct' or 'incorrect' species name.

Table 3.5 *Sample of correct and incorrect names of species*

earthworm (*Genus*): Correct answer worm (*Family*): Incorrect answer [It is too general]	crow (*Genus*): Correct answer bird (*Family*): Incorrect answer
dung beetle (*Species*): Correct answer insect (*Class*): Incorrect answer:	Snow leopard (species): } Both are correct. leopard (*Genus*): } Both are correct. mammal (*Class*): Incorrect answer [It is too general]

(Source: Author)

In the biological classification, *Genus* is below *Family* and above *Species*. *Genus* is a group of animals or plants with common characteristics but can be classified further into species level. A species is a group with common characteristics and is capable of breeding.

The researcher used a marking scheme (see Appendix 3.17) with the correct and partially correct answers—to evaluate Q1. In the raw data, students' responses were generally limited to a

word or two. As a result, even one correct word that described the animal food was considered a correct answer, and a word quite close to the answer was accepted as partially correct. For example, to name snow leopard's food, 'small animals' was accepted as the correct answer, while 'meat' was considered partially correct. After evaluation, the total scores were recorded on an Excel sheet, school-wise and item-wise. Students' performance in writing names, food, and habitat of species was analysed separately for comparison within the items and between schools. In addition, data was extracted from the overall record sheet to create specific tables for each item for further analysis.

In Q2, students were asked to write the names of wild plants and animals—five insects, five wild trees, five birds, and five herbs—found in Bhutan. The following set of criteria was applied to award scores:

- Species names written in the local dialect, besides English, are acceptable.
- Only names of wild species are accepted; for example, names of domestic animals, fruit trees or vegetable plants are not accepted since they are not wild.
- Animal and plant names already given in Q1 are not counted or accepted.

Each category was marked out of 5 marks, and individual students' scores for each category were recorded on an Excel sheet. Then, a consolidated score sheet was prepared to understand the overall students' performance school-wise. In addition, smaller score sheets for individual items [i.e., insects, herbs, trees and birds] were tabulated for further analysis and interpretation (see Chapter 5).

3.7.2.3 Presentation of findings from Q1 and Q2

Findings from Q1 and Q2 are presented in chapter 5, under the sub-heading, 'Students' knowledge of local wild species' (see Table 5.3 & 5.8). Although numbers are used to present students' performance, they were only used to gain more insights from the score sheets (Creswell & Creswell, 2018). For example, the most or least known species by students have been presented. In addition, a comparison of students' performance between regions or schools and insights gained have been illustrated. Students' school and item-wise scores have been tabulated in tables and presented along with the write-up.

3.7.2.4 Analysis of Q3 to Q7

This part of the questionnaire was to understand the students' perspectives on nature conservation. For analysing student's responses, the framework used for analysing the interview data was employed (see Appendix 3.17). Coding was seen as a major part of the analysis process because it was only through coding that descriptive data are deconstructed and sorted into thematic categories for interpretation and discussion (Bogdan & Biklen, 2007; Punch, 2009).

Coding for categories was the first step in the process. The researcher read the students' responses to all the questions to prepare a preliminary list of possible coding categories (Bogdan & Biklen, 2007). Although the coding categories from the interview could be used, the researcher was not influenced by them. Instead, the researcher began to read each response carefully at least two times to get a sense of what the information was and reflected on its overall meaning (Punch, 2009). Then, ideas were carefully chunked into brackets, and a word or phrase representing the idea was written in the margin to the right (Creswell & Creswell, 2018).

The coding process continued, incorporating the codes from the interview and looking for more insights or unfamiliar terms or ideas which could be significant. New ideas that emerged from the data were analysed and provided a code if significant to the topic of study (Bogdan & Biklen, 2007). The 'memos' about the codes had to be updated, adding new ones and grouping similar codes (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Accordingly, in the memos, the codes were explained what they represented, how each should be applied, and the type of texts that should be linked to it so that the researcher could use them consistently across data types (Gibbs, 2007). Next, the researcher rearranged the data into meaningful units to match them with the modified coding categories or thematic groups for further interpretation and insights (Bogdan & Biklen, 2007; Creswell & Creswell, 2018).

3.7.2.5 Presentation of findings from Q3 to Q7

Findings from the student responses are presented in thematic categories in Chapter 5, following the structure of the questions asked. The write-up entails a rich and thick description using actual words or statements of the informants, taken from the raw data to illustrate the findings.

3.7.3 Analysing field notes

The researcher's insights and experiences reflected in the field notes were considered essential data. Gibbs (2007) states that writing field notes are a central part of the analysis in ethnography because the researcher is writing about the data collected and is already interpreting the meaning. These interpretations are important since the researcher's feelings and thoughts are contextual in the natural setting. Like the previous data analyses, field notes were analysed using the framework for analytical procedures developed for interview data (see Appendix 3.17).

3.7.3.1 Data preparation

The field notes were typed and formatted to create enough space for the researcher to annotate and write the coding ideas during the analytic process. For instance, spacing one and a half between the text lines and a wide margin on the right side of the sheets were applied before printing the data.

3.7.3.2 Coding for thematic categories

Coding is looking for regularities in the data and providing a code in the form of letters, a word or phrase that attaches meaning to the units of data (Punch, 2009). A unit of data can be a sentence or a paragraph of the text data. Coding categories from the interviews and open-ended questionnaires were used. Still, an attempt was made to read the field notes carefully to spot any unfamiliar terms or ideas which could be significant. Then, data units were chunked into brackets and assigned to the codes, and then a word, phrase, or sentence was also written in the margin to the right of the page so that data made more sense in the second reading. Codes were assigned in alignment with the previously used codes, and searched for more ideas and insights to include in the coding categories. Each time the coding memos were revised to enrich the descriptions of the codes. Finally, the researcher had to be mindful of the seemingly overlapping themes but with the possibility of new insights that must be confirmed from the other two data sources, interviews and open-ended questionnaires.

The descriptive codes were increasingly revised to make them analytical, reflecting the changes in the memos. As mentioned earlier, the memos explained what the code represented, how it should be applied, and the type of text that should be linked to it. The memos were helpful for the researcher to record the analytic thinking and, most importantly, helped apply the codes consistently across the data (Gibbs, 2007). Finally, the researcher rearranged the data into

meaningful units to match them with the modified coding categories or thematic groups (Bogdan & Biklen, 2007; Creswell & Creswell, 2018; Punch, 2009).

3.7.3.3 Presentation of findings

The findings from the field notes are presented in a descriptive write-up organised in thematic categories with relevant details from the data in chapter 4 under the heading ‘Researcher’s Perspectives’ (see page 115).

3.8 Ensuring Research Quality Standards

The quality of research is addressed through the concepts of ‘validity’ and ‘reliability’ of its design, procedures, and findings. According to Bogdan & Biklen (2007), in qualitative research, 'validity' is "the accuracy and comprehensiveness of data", and 'reliability' is the "fitness between what they record as data on what occurs in the setting under study" (p. 40). The qualitative data, being subjective, must have a set of criteria to address the standards of 'validity' and 'reliability.' Hence, this research has adopted Guba and Lincoln's (1985, cited in Cohen et al., 2018) four measures of quality assurance criteria, such as credibility, authenticity, dependability and applicability of the research.

3.8.1 Credibility

Credibility is about how convincing the author is and how accurate and trustworthy the findings are (Bogdan & Biklen, 2007; Cohen et al., 2018). One strategy used in this current study to increase credibility, as Cohen et al. (2018) suggest, is documenting the research procedures understandably and transparently (Cohen et al., 2018; Creswell & Creswell, 2018). Since an ethnographic study is more concerned about the process than the research outcomes, the research procedures undertaken—as they evolved—were documented in detail. For example, the minute details of the research problem, research design, data collection and analysis procedures have been presented in this report.

Another way of ensuring the standard and credibility of the study was the quality of the 'referential materials.' All the literature materials, such as books, research journals and articles, used in the study were taken from authentic and legitimate sources, and the most recent ones. In addition, the researcher used a 'rich and thick description' with multiple perspectives of the informant to make it more convincing and realistic for the readers.

3.8.2 Authenticity

The researcher's level of 'authenticity' or rather 'honesty' has to be highest. According to Cohen et al. (2018), authenticity is “the ability of the researcher to report a situation through the eyes of the participant” (p. 253). This study gathered the ‘insider’s perspectives’ personally by being a participant observer and breaking the role of hierarchy (see page 70). The actual terms or quotations used by multiple informants in the data are presented with the findings to raise its authenticity and accuracy level (Bogdan & Biklen, 2007; Cohen et al., 2018; Creswell & Creswell, 2018; Punch, 2009). Furthermore, a brief description of the community’s living style and the standard has been included in chapter 4 (see page 120). Lastly, the researcher’s honest disclosure of personal and professional background (see page 12) is significant for quality standards since it demonstrates the researcher’s reflexivity.

3.8.3 Dependability

Dependability is about how reliable the findings are and whether they are accurate and accounted for with enough evidence. Cohen et al. (2018) state that dependability is high if the study results are consistent with the data. The question of dependability was addressed firstly by using an ethnographic study design—with reliance on participant observation techniques—effective data collection tools was matched by effective analytical procedures (Bogdan & Biklen, 2007). A complete documentation of the research procedures was carried out and presented in the report for readers to understand how the study reached its conclusions.

Another significant way to ensure the study's dependability is 'respondent validation' or member checking (Cohen et al., 2018; Creswell & Creswell, 2018). Firstly, the interview transcriptions were checked several times to eliminate possible errors, and the final transcripts were emailed back to the individual informants for 'respondent validation' (see Appendix 3.21 & 3.22). In the analytic process, special attention was paid to checking the relevancy and consistency of the thematic codes used across the data by maintaining memos; comparing data with the codes; and also cross-checking with other coding categories from past research (Cohen et al., 2018; Creswell & Creswell, 2018). The final interpretation of data was emailed to four informants from different informant categories for 'member checking,' and comments were invited (Creswell & Creswell, 2018).

3.8.4 Applicability

The applicability or transferability is about whether the study's findings can be applied to other research contexts, settings or groups of people and to what extent. Cohen et al. (2018) state that qualitative research is not easily replicable because one is unique from the rest. Still, it might be applicable if the findings have enough credibility and sufficiently rich details. The applicability of this current research has been enhanced in several ways. Firstly, detailed documentation of research design procedures, data collection and analysis followed before, during and after the research process has been presented for the readers who might find some parts useful in similar situations. Secondly, the ethnographic design has enhanced the study's findings with 'rich and thick descriptions' with multiple perspectives, making it reasonably generalisable to other situations. In addition, the study has presented thick descriptions of the setting as a country, district and community. Therefore, other researchers can apply parts of the research findings to suit their needs. Lastly, the quality of this research has been monitored and assessed by external auditor cum supervisors from Germany who provided a thorough, objective assessment of the research project.

3.9 Chapter Summary

The chapter discussed the research paradigm, research design, and methods used in this study. First, the author explained the term 'research paradigm' as a worldview that guides research to see more clarity regarding thoughts and actions. The social constructivist worldview was argued as being epistemologically the most suitable paradigm for this research, which seeks to explore and understand a phenomenon. Next, the research design was presented with exhaustive descriptions to explain how each approach was employed to fulfil the intent of this research. For example, the ethnographic design with reliance on participant observation as a tool and technique for data collection was discussed.

Subsequently, detailed procedures of how the semi-structured interview, open-ended questionnaire and field notes were employed for data collection were described with justification. The specifications of questions, samplings, techniques, and procedures for each tool have also been meticulously discussed. After that, the analytical procedures for analyses of the three data types were presented one by one. Following that is a comprehensive discussion on the professional ethics upheld by the researcher before, during and after the data collection. Finally, the chapter briefly discusses how this study has addressed the research quality standards.

CHAPTER 4

EDUCATORS' PERSPECTIVES ON NATURE CONSERVATION IN PRIMARY SCHOOL

Analysis and Interpretation

4.1 Introduction

This chapter presents the educators' perspectives on nature conservation education in the Bhutanese primary schools. Two types of data, i.e., interviews and field notes—were used for analysis and interpretation in this section. A semi-structured interview was conducted with fifteen informants comprising eight science teachers, four principals, two teacher educators and one curriculum specialist. In this report, they are referred to as 'educators' to distinguish them easily from the other category of informants, i.e., students. Hence, codes such as E1, E2 and E3 have been used as the educators' pseudonyms to maintain the anonymity of their identification.

Findings from the two data sources are presented in thematic categories with rich and thick descriptions. Quotations from the interviews—verbatim—in phrases, sentences and paragraphs have been used to illustrate the findings, provide evidence and offer readers an in-depth understanding. The educators' perspectives are presented first and then it is followed by the researcher's perspectives.

4.2 Educators' Perspectives

4.2.1 Perception of Nature

The educators generally perceive 'nature' as everything natural around them, not made by humans but formed by itself. E10 defines, "... nature is everything ... which are naturally built ... not made by men ..." (p.1). Similarly, E8 echoes that nature is "... the one that exists [*sic*] naturally around us ..." (E8, p. 1). The quality of 'naturalness' resounded in the educators' responses about 'nature.' For example, E3 explains:

> Uh… actually, when you say nature, something that has to *be its own*. I just consider something that comes out as plant, flowers anything that even the water source which *comes out by itself*, the

> spring water and all these, these are all natural thing that *come by themselves* ... Something which has *come out of itself in place* that could be nature ... (p. 1) [italics added]

Then E3 further argues that planting new trees or herbs is not really 'natural.' For example:

> ... but you can create nature ... and *the ones which we plant is actually adding on* that nature so making it very beautiful to live in or healthy to live in ... basically, it's *something which is there* in the nature which is, which has, *which is already taking place on its own*, according to its time and all but as I said nature has everything that grows ... (p1).

The quality of 'naturalness' about nature is stressed in the above excerpt. For example, the phrases like 'comes out by itself in place,' 'something which is there already taking place on its own,' and 'everything that grows' indicate this. Then, the educators cite some examples of nature. E14 says nature is "flora and fauna" (p.1); E1 says nature includes "... plants and trees, animals, insects uh all these things" (p. 1). E15 includes both "biotic and abiotic" forms (p. 1). E11 echoes that nature is "everything around us … both living and non-living things in nature" (p. 1). In addition, E13 says, "animals we don't see" (p. 1), meaning 'micro-organisms' and E1 adds 'human beings' to the list (p. 1). Some specific examples of nature provided by educators, in addition to plants and animals, include mountains, forests, soil, air, landscape, wind, water, and sunlight (E4, E5, E6, E8, E9, E10 & E11). To sum it up, from the educators' perspective, nature is everything around us, both living and non-living things.

4.2.2 Perception of nature conversation

Educators' perspectives have been sorted into two categories: nature-centred and human-centric perspectives of nature. The nature-centred view of conservation is conserving plants and animals for their intrinsic value. It also includes conserving ecosystems for the survival of plant and animal species. Conversely, the human-centred or anthropocentric view of conservation is conserving plants and animals for human benefit.

Several educators stress on conservation of ecosystems for the survival of plant and animal species—an eco-centred approach. For example, E14 argues:

> I think to uh protect flora and fauna because without this I don't think any living, any organism can survive, we depend in one way or the other uh for human beings, especially for food I think we usually depend on the flora and like many of us even to the fauna ... so I think without this nature intact I think no living organism can survive (p. 2) ... Like I already talked about air, water, soil,

> rocks, all this, you know come together in nature. If these things are not there, I think our flora and fauna cannot survive. (p. 5)

Similarly, for educator E1, nature conservation is protecting trees and plants, planting new trees, and taking care of waste to avoid pollution, which seems eco-centred, too. The educator explains:

> ... taking care of our nature, say for example, what is already existed, not to destroy, not to harm them. If at all we need to cut down any trees and plants, you know, we remember to replace them with new plants, planting new plants. Then another one is wherever there are barren lands so we try to plant, plant plants and trees there to cover up the areas ... Again there are other things, you know, that pollutes the environment, like the waste, particularly, the plastics ... those things also damage the environment, the plants and even the growth of the plants. (p. 1)

E15 echoes similar eco-centric or nature-centric perspectives in the following manner:

> Nature conservation is protecting both biotic and abiotic forms ... It is very important for children to grow up with the idea that it's not you who dominate the earth and it's not you who dominate[s] the whole environment, you are just a component in the whole ecosystem... Your role in the ecosystem, in the environment, is as important as the role of micro-organism because we all balance that ecosystem actually ... therefore when you grow up with that [*sic*] values, I think children realise the importance of, you know, conservation of nature, how important, how delicate the balance is in nature and therefore when the balance is so delicate you do everything to protect the environment to conserve the environment. (p. 2)

The stress on the ecosystems and how each element plays a role in its functioning is indicated in the statement. Furthermore, educators like E2, E8, and E13 stress the need to sustain the co-systems for the survival of human existence. For example, E8 states, "... there won't be any human existence even [if] one of the elements of nature is missing, it will hamper the existence of human" (p. 2).

The rest of the educators have anthropocentric views of nature conservation. For example, E4 and E7 makes choices of trees and plants as per their usefulness. E4 states, "Nature conservation is taking care of everything around us, like taking of plants and trees ... Like, if we talk about here uh [*sic*] maybe fruit trees, oranges uh guava, like that only fruit trees" (p. 1). Similarly, for E7, nature conservation is protecting plants, "such as trees, vegetables, the fruit trees all include[d] in the nature..." and adds that nature is for 'enjoyment: "... nature means the environment that we are enjoy[ing] in our [*sic*] so, nature means something we depend on that thing. Without nature, we cannot stay. So, that means nature for me is all living things that helps especially to us" (p. 1).

Along similar notions, E3 explains nature conservation as taking care of everything we have planted in our surroundings:

> Actually, nature conservation, as per my opinion, would be taking care of whatever within our surrounding. For example, if it's school, whatever plantation we have done and taking care of the planted trees ... if possible, we need to add more, so that we benefit from that ... we reside in this place I think it is our duty to add on and make it valuable so that we benefit from them. (p. 1)

In addition, E3 states that conservation also involves keeping the surroundings clean and using water resources wisely. Educators like E3, E4, and E7 consider nature conservation as protecting plants and animals that are useful to human needs and also focused on sustainability— utilising natural resources wisely. These ideas indicate anthropocentric perspectives.

Evidence indicate that the anthropocentric ideals of the informants are drawn from global and national concerns about sustainability and environmental conservation. For example, E8 considers nature conservation as using natural resources sustainably: "Nature conservation is protecting nature for the survival of human beings ... and using the natural resources in the proper way so that it can last for generations" (p. 1). Similar perspectives of educators are indicated. For example, E9 considers nature conservation as "some sort of careful management of environment ... to utilise the resources wisely" (p. 1). Finally, educator E10 adds, "... we should not be selfish to use in our time; we should save it [natural resources] for future generations too" (p. 5). Hence, the anthropocentric attitude towards nature is implied in the statements—the need to protect nature for human benefit.

Another finding is that the educators generally do not see a difference between the two terms, nature conservation and environmental conservation. Evidence indicates that the informants are oblivious that the two terms originate from different ideologies and have contrasting goals. For example, E11 uses the two terms interchangeably in the excerpt below:

> I just feel that *nature conservation* meaning to the conservation meaning [*sic*] the protecting that *environment*, protecting that nature, so I think that the nature conservation, meaning ... like uh protecting the *environment*, the surroundings so [*sic*] where we stay. So, I think that the nature conservation, meaning, the [*sic*] protecting the *environment*. (p.1).

More evidence from the educators' statements confirms that nature conservation is misunderstood as environmental conservation. For example, E14 stresses sustainability education while discussing nature conservation. Similarly, the topics discussed in light of nature conservation education are directly related to environmental conservation issues, such as 'endangered species,'

‘sustainable agriculture,’ ‘reforestation’, and ‘infrastructure development’. For example, in the excerpt given below, E13 mentions the ‘extraction of minerals’ and its impact to explain environmental sustainability, which is an issue of environmental sustainability—while talking about the importance of nature conservation education:

> ... minerals so that also addresses how the nature conservation so rocks and other minerals that are extracted from certain locations. Then we also talk about *impact when somebody extracts minerals from particular location*, what kind of *impact and hazardous impact and positive*. All that in that particular topic and that talks about the nature conservation. (E13, p. 5) [italics added]

Then, another educator, E14, discusses the ‘water cycle’ in the light of nature conservation education:

> We also talk about water and then water cycle, the importance of water cycle, nature conservation even if one cycle is broken from that water cycle, then the plants, insects and animals they won’t get enough water which they want so the nature would deplete. So that’s also one area where we talk about nature conservation. So, there are couple of topics like these where we teach as well we talk about conservation of nature. (p. 5)

However, the lesson’s intent on minerals and the water cycle addresses environmental issues, not nature conservation education. Hence, the study concludes that nature conservation education is misunderstood as environmental conservation.

Most educators view nature conservation from an anthropocentric perspective, while a few others view it from an eco-centric perspective. Data shows educators are more concerned about the global and local drive for environmental conservation and sustainability education. Evidence also reveals that educators see little or no distinction between nature conservation and environmental conservation, although they are ideologically different with different goals.

4.2.3 Importance of nature conservation to primary school children

The shared thinking among the educators is that nature conservation should be taught to primary school children because they are in their foundational years of learning (E9, E11, E15, E6, E5, E3, and E2). Specifically, the educators' reasons for its importance are related to responsibility, human survival, ecosystems, and nature’s value.

Most educators agree that conservation education is important for children so that they grow up to be responsible adults. E9 states, “it is very important that the pre-primary children ... should have a better understanding of nature conservation. If they do not have the better [*sic*]

understanding from their right age so, later on when ... they become adult[s], it will be difficult on their part to manage the resources" (p. 2). Educators refer to children as our "future generation" (E6), "future of Bhutan" (E14), "future builder" (E12), "future citizens" (E5), and "productive citizens" (E8). For example, E14 asserts, "... they [children] are the *future of Bhutan* and if they really understand why it is very important to conserve I think in *a hundreds* [*sic*] *of years* from now I think these people will be taking care of nature, so [the] knowledge and also the practical experiences for them is very important" (p. 3). Hence, nature conservation education is necessary for children to become responsible future citizens.

Another reason is that it is important for the nation's GNH. E9 justifies, "Firstly, it is one of the pillar [*sic*] of GNH so, which is uh actually holded [*sic*] by the philosophy gross national happiness ..." (p. 2). E8 adds, "...I think it is we may not have the so-called productive citizen or maybe the mindful citizen, let's see something like that" (p. 2). However, environmental conservation is one of the four pillars of GNH, and nature conservation is probably subsumed under the broad umbrella of environmental conservation, like elsewhere across the globe.

Human survival is another important reason for nature conservation education. Firstly, E11 emphasises that children need to understand the 'interdependent relationship' with nature:

> [It is] important for the children to know ... the fact that we are living here is because of Mother Natures, so we are getting everything from the natures [*sic*] that we get for [a] simple thing that we get foods from the nature so we have to teach them that the importance of nature is that we depend on nature so which means umm they should know about the give and take relationship about the importance of nature. (p. 2)

In resonance, E7 highlights that children must know that people depend on nature for their fundamental needs. For example:

> The importance of nature for small kids is uh ... from nature we get many things... For example, the basic things that we get from nature is [are] the fresh air ... For the small kids what we say is, from nature we get all things such as air, water, then food what we eat, the cloth what we wear are all we get from the nature [*sic*]. So that's why the importance of nature is very uh what to say now is very important for us and as a teacher, I always tell my students that we have to preserve [the] environment so that we will enjoy in our life. (p. 2)

While acknowledging that human beings depend on nature for their survival, E8 adds that children should be well aware of the consequences if nature is not taken care of:

> As I have already mentioned about the *consequences, the hazards that we could have because of polluting air* [italics added] and also not taking care of the nature [*sic*]. So, I think it is important that children know how this conservation of nature would lead to happiness in the long run and then how we should be actually living symbiotically with nature you know. (p. 2)

Educators also mention 'balancing the ecosystems' as a reason for nature conservation education. They reason that children should understand ecosystems and the roles each component plays in the ecosystem. For example, E15 explains the importance of balancing the ecosystem in the excerpt below:

> I think yes yes because they should grow up with that value that uh, you know, uh the part of the whole ecosystem. It is very important for children to grow up with the idea that it's not you who dominate the earth and it's not you who dominate[s] the whole environment, you are just a component in the whole ecosystem, and therefore when you grow up with that values, I think children realise the importance of, you know, conservation of nature, how important, how delicate the balance is in nature and therefore when the balance is so delicate you do everything to protect the environment to conserve the environment [*sic*]. (p. 2)

The educator describes nature conservation as a measure to protect the ecosystem. In addition, E8 explains how human survival will be threatened if the eco-chain is broken:

> [I]it's important that they [children] know ... how nature functions because ... I think, there won't be any human existence even one of the element[s] of nature is missing, I think, it will hamper the existence of human, so I think it is important that students learn, the small children learn as they grow up they conserve and protect the nature. (p. 6)

Similarly, E5 further stresses on 'food chain' within the ecosystems and the consequences if the chain is disturbed. For example:

> We remind them what will happen if we destroy their habitat, the food chain will be completely destroyed. If the food chain is destroyed, deer will eat the grass one day they will come to our field and destroy all our crops if there is nothing in the forest. Of course, caterpillar[s] also will start coming to your house and we will explain them, by drawing pictures, [and] diagrams. (p. 2)

Thus, nature conservation education is perceived to be important to maintain the balance in the ecosystems.

Waste management emerges as another reason why nature conservation education is important in the school. Raising the issue, E9 states, "So, now it has become an alarming issue about waste. Good example is the waste problem in the country ... every nook and corner of the

villages and people are face[ing] the waste problem *la*[14]..." (p. 3). According to E9, children should learn how to segregate waste, and then use the 4R strategy of managing waste: "… the knowledge to segregate the waste so, if the children are taught in the schools of course, in our curriculum ... wherever they go, … at least they can impart the knowledges [*sic*] about that, about the waste management" (p. 2). Then, E6 suggests that children should learn to keep their surroundings clean and manage waste skillfully.

Furthermore, educators mention that nature conservation education is important for planting or gardening skills. For example, E4 asserts, "Maybe making a vegetable garden then taking care of plants ..." (p. 2), and E2 echoes the point, "... planting flowers, trees around these uh you know football ground, MPH ... to inculcate a sense of loving and taking care of plants and trees for our benefit and survival" (p. 3). Similarly, E1 suggests that children should learn how to grow many flowers and trees in their surroundings.

Yet another significant reason is that children should learn the values of nature from an early age so that they grow up to appreciate nature and assume responsibility. For example, E3 states, "...it is important to understand right from the very childhood because if they don't understand from that stage ... [or else they] may not appreciate or value ... nature that they have, they see around" (p. 2). Educators, E2 and E6, express similar views. E2 says, "Yes definitely I feel important if we would like to inculcate a sense of protecting and loving nature, we should start right from the early age" (p. 2), and E6 says, "Yes, very important to instil the values from the, right from the start so that they will be you know carry on with the good habits in the future" (p. 2). In addition to loving and appreciating nature, E15 says that children should develop a "... harmonious relation[ship] between nature and humans actually, which is also from the Buddhist perspective, makes the balance in nature more strong *[sic]*" (p. 2).

The conclusion is that educators perceive nature conservation education as important for children to gain knowledge, skills and values of nature. Educators also express that children must grow up to be responsible for the nature, growing plants and flowers, environment, ecosystems, and waste management. However, these activities are anthropocentric—for human benefit—and do not fulfil the nature conservation goal. The nature conservation ideology proposes that nature, especially the wild species, be protected for its intrinsic value—for its own sake (Marco, 2019; Pilgrim & Pretty, 2010). The educators' responses also strongly indicate that nature conservation

[14] A polite form of expression in the national language of Bhutan.

is perceived more from the environmental conservation ideology than nature conservation ideology. Moreover, the reasons for conservation related to human benefits do not align with it since nature conservation is protecting wild plant and animal species for nature's sake, not for human benefit.

4.2.4 Teaching nature conservation

The educators share how lessons on nature conservation are taught in the primary schools. E5 describes a lesson on 'habitat' in the following words:

> Will *explain* the importance of habitat all and then *discussion*, group activity, draw diagrams, question answering, then after that sharing each other's their own experiences [*sic*], and of course, we can *make the posters*, why people are destroying the habitat, what will happen if we destroy the habitat ... of course, *presentation* ... After they have made the posters, they will present in the class, they will share each other's ideas. [Italics added] (p. 2).

The description indicates that the lesson is held inside the classroom when, ideally, it should have been in the natural environment for children to have direct contact with nature. Strategies used by the teacher in the lesson, such as explanation, group discussion, poster design, and presentation—as mentioned in the excerpt—indicate that children are learning about 'nature' but not experiencing real contact with it during the lesson. Another educator describes 'questioning' as a strategy used in the classroom to teach about nature: "[W]we ask some question such as how can you do nature conservation? How will you protect natures? How would you use [resources] wisely? So that the future generation can use and so on" (p. 3). This classroom lesson is focused on environmental sustainability, not nature conservation. The phrase, 'using wisely,' implies that natural resources should sustain.

Educators also describe lessons on germination of seeds in grade six conducted inside the classrooms. E8 illustrates the lesson:

> One of the activities that I have conducted is about ... how nature favors the germination of the seeds. [F]for instance, in some pots we planted the seeds, we kept one in the sunlight, and the other we kept in the darkness and not allow the light to fall in it. So, the students were made to compare which one is growing better. So, in a way they are able to know that the nature all [of] these things are important for the germination of the seeds. [W]we did that practically and the students really enjoyed and from that experiment, they were able to learn that nature is actually very important for the germination of the seeds. (p. 3)

While it is a lesson that requires children to observe how seeds germinate under favourable conditions on a daily basis in their classroom, the lesson can still be extended in a natural environment. E12 describes a similar lesson:

> ... sometimes we provide them project works right madam, about nature. About how to grow like, for example how to grow beans ... They have to observe from day 1 till 7th day so they learn how the plants grow with the help of sunlight, something like that. (p. 2)

While science experiments help provide children with basic scientific knowledge about conditions required for plant growth, nature conservation education is about fostering a connection with nature and this requires real nature contact. Hence, the finding is that the science lessons on nature described in the interview are held inside the classrooms and do not promote a connection with nature.

Then again, some teachers report some occasional outdoor experiences. For example, E5 shares about a field trip to places within the school campus:

> ... once I had taken [children] out and then just showed around the trees. Then luckily there was a few nests ... Maybe it was [an] old nest, destroyed by the thing, so just explained [to] them what happened to this bird; there is no home ... talking about what will happen if [nests are destroyed]. (p. 3)

However, their responses indicate that children need more nature experiences than they are able to provide. E5 suggests some possibilities for nature-based field trips within the school campus and nearby places:

> ... In the school surrounding we will find some trees like habitat, some animals they live in water also some animals they live in the hole, and go like a field trip, we can go to the riverside, we can say do's and don'ts. We remind them what will happen if we destroy their habitat, the food chain will be completely destroyed [*sic*]. (p. 3)

The significance of being in the natural environment while having lessons on plants and animals is reinforced by educator E12 with a narrative:

> ... last time I did the topic pollination ... I took them in and around the flower garden and we saw the flowers, insects are pollinating, transferring their pollen grains to another flowers and we find it is a very nature-based something like that ... Outside means, in the school campus only but around the flower garden. And even they brought the insects inside with the flowers. (p. 3)

When children bring back some specimens like ‘insects with flowers’ from the field trip, it is an opportunity to teach some nature conservation values. For example, children will learn how to

delicately handle the live specimen and how to put them back in their habitat so that they are not displaced. The description of the lesson shows that children enjoy the real experience with nature. Another educator, E8, shares a practical lesson on the lifecycle of the frog:

> I took the whole class outside and let them study ... about the frogs. I wanted them to see the frog and then I tried to relate that the life cycle of the frog and how that frog is important for us. Although it's just a mere creature, it plays a vital role in the ecosystem. We need to consider that it's very important in our ecosystem. I think that helps in sort of conservation of nature. (p. 3-4)

This science lesson is focused on the value of ecosystems and the role each element plays in them. E8's outdoor lesson on the 'life cycle of a frog' observing the pond's ecosystem is an example of teaching in the natural environment. Children not only learn scientific knowledge but connect with nature. However, the educator, E5, who earlier described an outdoor lesson on 'habitat' confesses that taking children frequently on field trips is challenging. The frequency of field trips possible in a semester, the educator says, is "sometimes ... two or three times" (p. 4). E14 and E12 also confirm that most lessons on nature are conducted theoretically inside the classrooms, not in the natural environment. Nonetheless, the educators acknowledge the need for children to have real contact with nature while learning about them. For example, E14 points out:

> I think most of this concept are taught only in classroom and children never get to see how the things are outside and I think there is a mismatch. Actually, most of these topics could be taught instead of keeping them inside the classroom, take them out you know, take them for field visit or field trip and I don't know because as I already mentioned … there are so many other factors like teachers not able to manage a huge group of student[s] and also lack of resources may be so that is questionable … (p. 3)

In consonance, E13 proposes that lessons on nature should happen in the natural environment:

> ... we cannot teach nature by using chalk and chalkboard, by using other means. Rather ... when we take our students to the real site, the impact which they have by seeing that real environment is much more than what somebody teaches in the classroom. So, that's why I'm saying field visit[s] or taking students on site and making them learn is more important as they are and ... schools in Bhutan got [have] ready environments which is just next door you don't have to take very long, very far. (p. 3)

Given the above statements, the educators' idealistic view aligns with the experts' that real experience with nature is critical for nature conservation education. According to Hooykaasa et al. (2019), Chawla (2007), and Hughes et al. (2018), children must have direct and positive

experiences with nature to learn the values of nature and develop an affinity with it. Their past research found that positive childhood experiences with nature correlated to their pro-nature attitude towards nature. Hence, children's positive and direct experience with nature in their formative years is believed to be a significant predictor of pro-nature behaviours in adulthood.

Evidence proves that children have minimal hands-on experience with nature during school lessons on nature. The experience with real nature in school is limited to visiting a flower garden or a vegetable garden to observe 'pollination' or plant flowers and trees, which does not fulfil the goal of nature conservation education. The finding of this study, therefore, is that topics on plants, animals, or community forests are mostly taught theoretically. The opportunities for real contact with nature need to be expanded.

One of the reasons for not having frequent field trips—as the educators point out—is the lack of natural environment on the school campus for children's learning. E5 says, "Most of the time, theory part because we don't have that much surrounding" (p. 3). E14 echoes this point by referring to it as a 'lack of resources' and also cites class size as another reason: "... there are so many other factors like teachers not able to manage a huge group of student[s] and also lack of resources may be so that is questionable ..." (p. 3). In sum, the teachers are not able to provide children direct nature experiences due to a large class size, administrative issues, and lack of natural environment on campus.

One more finding that triangulates with the insights gained from the literature review (see Chapter 2) is that almost all educators have a common misunderstanding about nature conservation i.e., they understand it as environmental conservation. For instance, the following response—a description of a lesson on nature conservation—by E15 illustrates that nature conservation is the same as environmental conservation:

> When we develop science curriculum ... we use this philosophy of Gross National Happiness in which one of the pillars ... is the conservation of nature and the environment, the protection of environment ... it's integrated in a beautiful way like when we conduct certain scientific activities ... there could be instances where you have to dispose the chemicals ... So we make sure that they dispose it properly and ... they... reduce the use of quantity of chemicals which affects the environment actually. (p. 1)

Here, E15 refers to environmental issues such as pollution and the sustainability of natural resources. According to the literature, nature conservation protects biodiversity for its intrinsic value, while environmental conservation protects biodiversity for human recreation, economic

progress and scientific value (Anderson, 2018). Furthermore, E13 explains how the revised curriculum supports nature conservation education by addressing the "current issues and current problems" (p. 7). However, further probing brings to light what the current issues are. E13 cites the issues, "Some of those current issues like air pollution, pollution in the form of water, land pollutions and then materials and then about the plants..." (p. 8). Hence, the revised curriculum has included environmental and sustainability education topics, but generally misunderstood as nature conservation education.

4.2.5 Teaching nature conservation in teacher education

Even in the teacher education curriculum there is no module, unit or topics directly related to nature conservation education. However, the educators say that the topics on animals and plants in their curriculum are related to nature conservation education. For example, E14 states:

> ... we don't have a specific topic like nature conservation, but some components of that, like how to, you know, prevent pollution, in one way of conserving nature ... we talk about plant[s], we talk about animals, classification, adaptation and all those kind[s] of things are there, but not as such nature conservation. (p. 4)

Echoing the point, E13 expresses that they teach the importance of plants and animals, which—in the educators' view—is a pre-requisite for nature conservation activities:

> ... we talk about the elements of plants, parts of plants then finally the importance of plants. So, then if they do not understand the importance of plants, nobody would take ... care of the plants. So, knowing the importance of tree[s] they would take care ... So, that's how the nature conservation is taught in the primary science, especially for the teacher education preparation. (p. 5)

In the above response, E13 points out that children must "understand the importance of plants" to care for them (p. 5). This impression aligns with Hooykaasa et al.'s (2019) statement that species literacy stimulates interest and fosters respect and affinity toward them. Knowledge about species is essential for children to learn in nature conservation education.

The subsequent discussion is on how teacher educators prepare their students to teach nature conservation education in the primary science modules. E13 explains the importance of first-hand experience while learning:

> I don't teach and address those concerns [about nature conservation] in the classroom but I take them outside and make them learn on-site to see, learn and feel and then see the impact on one and other... (p. 5).

Then E13 moves on to describe a lesson on ‘Pollution’:

> ... I take students to the riverside...they would be given a certain area of that plot may be one meter square on that riverside ... and they [students] try to see what insects are available and what kind of *pollutants* are available, all that. So that talks about conservation of nature so then after identifying, for example, like *pollution* if it’s a foreign object pollution then I make them list down the number of *pollutants* and then let them write down the sources from where it would have come. Is it from market or from the farmhouse or so some kind of? Then try to address. (p. 5) [Italics added]

However, the lesson is more focused on environmental sustainability than on nature conservation education.

Evidence shows that the teacher education curriculum supports practical-based or experiential learning. E13 states that on-site learning strategy provides children “get the first-hand information” which is more important for meaning (p. 5). On this point, E13 and E14 refer to 'place-based learning' as a strategy appropriate for nature conservation. E13 describes how the place-based learning strategy can be used:

> We use [the] place-based approach in teaching and learning science ... place based which means, you plan or take students outside and teach the whole lesson there ... So, in the process of learning ... they try and develop that value of taking care of that nature. For example, if we have to study a plant ... First, you try make them study one part of plants, make them look at the leaves, then ask them to draw the leaves, make them understand the shape of the leaf. Then see which leaf has got two parts ... If there is no leaf on the tree what would happen, if we happen to pluck when leaves sprouts out, if you happen to pluck all the leaves, what would happen to plants. So, then the importance of leaves the main food factory of the leaves, so if it comes from the sun rays falling on it and then what and how it prepares food and where it goes ... (p. 10)

Similarly, E14 shares another example of place-based learning or on-site learning:

> So, the topic like this nature conservations, I plan and then take students on-site. For example like, anything talking about river, I take students to the riverside and then make them learn from that riverside so they learn about the insects; they learn about like the pollution of river, water then pollution of land, all that they try and learn from that site. So, they would be given a certain area of that plot may be one meter square on that riverside so by taking that one meter square plot on the riverside and they try to see what insects are available and what kind of pollutants are available, all that ... (p. 5)

Nonetheless, E14 admits that onsite learning or place-based learning is not always practically possible: "sometimes there are certain factors which do not let us do that. So, basically most of the time it [lesson] happens within the classroom" (p. 3).

'Creating Scientific Environment,' according to the teacher educators, is a new feature in the revised curriculum. E14 explains how this topic will benefit the teaching of nature conservation in primary school:

> ... we have one component in our primary science module, 'Creating Scientific Environment.' So there we take care of some nature component, how [to] create a nature shelf ... We are talking basically about the classroom uh we have like uh eco pond, that can be outside, how to create an eco-pond you know then uh how to make aquarium ... we let our student [student teachers] create, and they learn, you know, aquatic ecosystem through that ... So, we have a shelf where you can bring like if you want to teach about cones, we can keep those if you want to teach about succulent plants, we can bring those plants. (p. 5)

The educator discusses creating an eco-pond, aquarium, and nature shelf in the school. E13 justifies the idea as beneficial for children's learning:

> ... every time when they want to teach something ... use that miniature environment which has been created within the classroom to meet those demands for children to realise. I think that but that [*sic*] may not have the actual equal impact which they see, but somehow that also provides the realisation for them to learn about the nature. (p. 3)

However, most of these ideas are promoted theoretically in science lessons. The practical aspect is limited to carrying out these activities as group projects [e.g., creating an aquarium, nature shelf, miniature garden etc.] as part of their assessment requirements.

In summary, evidence suggests that the concept of nature conservation is generally mistaken for environmental conservation education. For instance, the lesson topics assumed to be nature conservation education are related to environmental conservation. Another finding is that environmental conservation is addressed significantly in teacher education curriculum, and nature conservation education is subsumed under it, or believed to be included. Nonetheless, educators claim that the revised curriculum emphasises 'experiential learning' through place-based or on-site learning. If implemented effectively, this strategy will benefit nature conservation education because children can experience real nature in their natural environments.

4.2.6 General school practices

Educators mention the morning social work, nature club activities and social forestry day as standard nature conservation practices across the schools. Firstly, morning social work engages students for fifteen to twenty minutes every morning in cleaning their classrooms and surroundings. Educators E11, E8, E5 and E7 describe the morning social work in the following ways:

> ... every morning we do have five minutes, uh fifteen minutes for social work. During that time the students pick up the papers then some students after the class they ... water the gardens, [and] trees they planted. (E11, p. 3)
>
> … every morning we clean the area, in and around the school. (E8, p. 4)
>
> Every [morning] before assembly they [students] go for social work and they take care ... (E5, p. 5)
>
> ... so, every morning, we have social work time and at that time nature club would make [a] flower garden, bring a beautiful plant and we go around make a flower garden and other than flower garden we have around the school campus there are many trees, so we make a fence around them so to boost them very beautiful. (E7, p. 4)

The activities carried out during the morning social work include cleaning classrooms and surroundings, picking litter, planting flowers, watering, and fencing the gardens. Although the educators perceive them as nature conservation practices, they do not fulfil the nature conservation goal. They are anthropocentric activities solely for human benefit, not nature's sake. Nature conservation is protecting the wild species for its own sake, and for its intrinsic value (Marco, 2019; Pilgrim & Pretty, 2010).

The nature club is another common practice in primary schools, perceived by educators as part of nature conservation practices. Every once a week, there is a club day in schools. For example, E12 states that every Wednesday is a 'club day' in their school (p. 3). The following excerpts from the interviews illustrate what a club day looks like in four primary schools:

> We have a group who is looking after that. That's nature club. We do have [a] nature club and these people are ensuring that the plants and trees already in the school is not damaged. Another one, they also, you know, plant additional plants in the campus. That's how we ensure that the plants and trees and animals are not disturbed and damaged in the school. (E1, p. 4)
>
> … I think [the] nature club, they practice ... they maintain a garden house-wise, maybe competition is also there ... They have a garden that side, class-wise, they have divided the flower gardens ...

> they (nature club) have written some quotation on the stone also [to] preserve the forest; and out of these waste materials like vehicle tyres, they made ... flower pots [and] planted different types of flowers. (E5, p. 5)

> ... nature club would make [a] flower garden, bring a beautiful plant, and we go around make a flower garden and other than flower garden we have around the school campus there are many trees so we make a fence around them so to [*sic*] boost them very beautiful. (E7, p. 4)

> In our school, we have [a] nature club ... the nature club coordinators they [sic] plant the saplings and they give to each student to protect them. So, they take care of it timely they are made to take care of it and protect it [italics added]. (E10, p. 4)

The activities students are engaged in on the club day are more or less the same activities of the morning social work, like flower gardening, planting trees, growing potted flowers, watering plants, and fencing the gardens. However, none of these is nature conservation practices because they are intended for human needs to make the campus clean and physically beautiful, not at all for nature's own sake.

The school activities although related to nature are not beneficial for nature conservation because they are human-centred. More evidence is discovered in the educators' responses to show the human-centredness. For example, E12 describes the human-centred intent of those activities:

> ... we must practice the nature, green school domain something like that. We must plant and we have competition at the end and we must beautify our school that they instruct them to like, they ['they' is referred to instruct us to ... to plant whatever or that to *beautify the surrounding*. (p. 3) [emphasis added]

Similarly, the school greening programme (see page 8) and the nature club converge to develop 'an environmentally green school', which is beneficial for developing an attractive and welcoming environment for children. However, they do not fulfil the nature conservation education goal at all.

Educators express the importance of planting trees and growing flowers as fulfilling the nature conservation drive, but their anthropocentric approach was significantly reflected in their statements. For example, E10 express the importance of fruit trees on campus: "The first and foremost is to convey the message that is important to plant the trees and how to take care of it ... Second one is to have things or fruits from it, its benefits" (p. 5). In consonance, E7 expresses the importance of growing flowers and trees for the beautification of their school campus:

> The main idea of beautification of school is to make our school green and beautiful. So, what makes a green and beautiful is one thing is nature *la* [respectful expression] so trees, flowers, plantation of different trees ... (E7, p. 4)

Additionally, schools encourage children to grow potted flowers to add to the aesthetics and teach them nature's values. E6 indicates this idea in the statement given below:

> ... right from PP to class six, you will ... see flower pots all around the classroom, inside the class, just to tell them how important the flowers are for us. In the science also we have been talking like plants gives us fresh air and so many things, so why not do it practically and then we have potted plants all around the classes ... I think there also we give the values, how important the plants are so we try to, we tell the kids to take turns to water the plants, so I think in that way also we are giving the importance, you know, the taking care of our nature. (p. 4)

While nature-based school activities like planting flowers and trees and caring for them benefit the school and children in many ways, they do not ideologically fulfil the goal of nature conservation. Growing plants and flowers make the campus physically beautiful for human beings rather than for plants and animals. Hence, they are anthropocentric nature-based activities—not nature-centric or for nature's sake.

The third type of school activity educators mention as part of nature conservation practices is 'waste management' programme. For example, in the quotation given below, E6 indicates that drive:

> You know, when I talk about nature, the first thing that comes into my mind is like only the waste around them ... we have one waste management club ... they [students] collect waste from their home, from the roadside but they don't go everywhere looking for it, just wherever they come across, they can pick it up and bring it to school (p. 2) ... we have the club who makes the things out of the wastes, recycle following the 3Rs ... [*sic*] (p. 3).

The aim to reduce 'pollution' caused by non-degradable wastes from homes is the nature club's nature conservation drive in the school. However, these activities are part of the global and local environmental conservation drive to control environmental degradation caused by all types of pollution. In addition, E11 stresses the 'cleaning campaigns' as part of the school's nature conservation practices:

> ... so far, we have done with three times or four times cleaning, cleaning campaign. Sometimes, we create awareness; sometimes we go there, we pick up, with the banner uh we do cleaning campaign … every club members will gather then they will work … according to their plan (p. 5)

Resonating the 'waste management', E12 mentions cleaning campaigns and digging garbage pits to dispose degradable and non-degradable things (p. 3). In addition, E9 mentions that children should learn how to segregate, reduce waste, and recycle. While these activities are necessary and beneficial for maintaining a clean environment, they do not fulfil the goal of nature conservation education. Nature conservation education is about developing children's natural affinity with nature, besides developing their species literacy. Evidence also shows that educators mistake nature conservation for environmental conservation. For example, E7 mixes the two ideologies in the following manner:

> Again, I forgot one thing, there is the environment day, we… students go around the community. We clear up the things which are messy and the unwanted substance such as plastic. We carry out cleaning campaign so from that, another thing is we can do, waste management. If we control the waste management so we can also preserve the nature. One thing, some waste are very dreadful to the nature conservation, so at that time we have campaign such as cleaning campaign on environment day. (p. 4)

The fourth school programme the educators discusses if 'The Social Forestry Day,' which is a national programme in Bhutan initiated to involve the communities in tree plantation. On this day, the students are engaged in tree plantation. For example, E4 describes the day:

> [W]we also have celebration on 2nd June ... this year we have planted around 100 saplings cypress trees and then we have invited [a] forester to say [the] importance of the nature conservation and he was also talking about how to plant the trees, how to pour the water. (p. 1)

Usually, a guest speaker, a forest ranger, is invited from the locality to talk to students about the significance of tree plantation. E11 reveals the purpose of inviting a guest on that special day, "[W]we observe social forestry day so during that time we invite special guest like ranger or forest[er] … [W]we invite them because they know more about planting the trees" (p. 6). In the educators' view, students learn how to plant and care for trees. E7 narrates what the day looks like:

> So, on that day, we give awareness on nature conservation and we recollect what they have learned in the class so we let them to plant more trees and we talk about the nature conservation (...) After that plantation we let them to care [for] their plants, make them their name tags so that it identifies whose plant is it so that they can have their satisfaction of the growth of that plant. (p. 3)

The subsequent responses indicate that the tree plantation fulfilled more of the anthropocentric goals than nature conservation. The tree saplings distributed by the forestry department to the

schools were primarily ornamental and fruit-bearing trees. E7 justifies why they prefer certain tree saplings over others:

> As I said the one thing is the flower and [the] other is *bottlebrush* is to beautify our school and ... *fruit trees* ... give us with fruit [which] we can enjoy. Another thing cypress, we put [plant] *cypress* so that student[s] can understand our national tree ... as cypress trees. Then, another benefit of this cypress is to our school rituals we can use [it] as incense. Other trees we have are *willow tree*[s] so that we get a shade when we feel hot ... (p. 5) [emphasis added]

Tree saplings like the bottle brush, cypress, willow, and fruit trees are preferred due to their 'utility' and aesthetic value. Similarly, E10 prefers cherry plants and other fruit trees for their schools since they are prettier:

> Recently we have planted cherry plants which is given by ARTC, *Wengkhar* [name of place] so we have planted pretty lots of cherry plants. Fruits planted ... makes our surrounding looks beautiful as well as ... It will gives us fruit so, we have planted fruit plant around the campus [*sic*]. (p. 4)

Furthermore, E11 and E9 mentioned the golden hedges and thuja [*thuja orientalis*] as their school's choice. Their statements are quoted below:

> ... uh cypress then broad leaves. Then I don't know names but we receive more and then even we have adopted the hedges, golden hedges from, we are trying to plant golden hedges, we are trying to see whether it ... [will] grow or not because here is a very cold places. (E11, p. 6).

> So, this year we decided to plant those ornamental plants, like [the] thuja plant. (E9, p. 6)

The schools' preferences for particular tree saplings and flowers indicate their plantation goals, benefitting from their aesthetic and utilitarian value. For example, the fruit and ornamental trees are considered more valuable than the others. Hence, they do not fulfil the nature conservation goal.

In conclusion, the school programmes perceived as nature conservation practices do not fulfil the nature conservation goal. The activities are anthropocentric or human-centred in their approach and intention. Nonetheless, learning to maintain a clean environment, manage waste, prevent pollution, use resources wisely, recycle waste and plant trees and flowers are essential in everyday life.

4.2.7 Concerns and suggestions

The educators' first suggestion is to include some nature conservation topics in the school curriculum, indicating that the existing curriculum needs to be revised. For example, E4 suggests:

> [H]how about if the ministry of education include[s] the nature conservation in our curriculum, topic-wise? Just now only [a] few things, only plants ... there is [a] topic forest only [*sic*] that one so if we include I think it'll be better for them to learn more about the nature conservation ... (p. 4).

Since the existing Bhutanese primary school curriculum does not cover nature conservation as a separate topic, the educators think that it might be helpful to include it so that teaching the values of nature is given more focus.

The next suggestion is concerning teaching children the values and a sense of responsibility for conservation. E15 expresses, "My greatest concern is living those values, you know, actually putting it into practice ... we should make sure children grow up with those values" (p. 4). Educators insist that children be given opportunities to have real experience with the phenomenon if they are to learn the values. E13 justifies this point:

> [W]we cannot teach nature by using chalk and chalkboard. Rather ... when we take our students to the real site, the impact [on children] by seeing that real environment is much more than what somebody teaches in the classroom ... (p. 3).

Although the educators are referring to environmental values, which children must learn through real experience, values of nature are no different. E14 echoes the point that real experience with nature is vital to develop an intimate connection:

> ... If it [nature] is shown in the form of images and graphics and videos, they [children] have a feeling but their feeling do[es] not last long. But when they see and learn by themselves, they inculcate that feeling but it lasts longer. So that means they even try and develop intimacy with nature very closely when they see and touch and feel it ... That develops intimacy and that would promote the conservation of nature more than somebody imposing rules and regulations for them not to cut down or not destroy. (p. 7)

In this context, the suggestion is to provide children with opportunities for positive experiences with nature so that the impact lasts longer – the experience of intimacy with nature develops everlasting affinity. Therefore, frequent field trips to the natural environment are essential for nature conservation education. Educators also recognise that Bhutanese children are lucky to have natural forests nearby, readily available. Thus, E13 argues that field trips to a forest nearby are possible:

> ... field visit or taking students on site and making them learn is more important as they are and then many learning institutions like schools in Bhutan got ready environments which is just next door you don't have to take very long, very far ... (p. 3-4)

Field trips to the nearby forests would make a difference in connecting school to real nature and allowing children to develop an affinity with it.

Another suggestion offered by the educators was to develop reading materials for children on 'conservation' themes. For instance, E11 proposes:

> [F]for small children, we need readers related to conserving the environment. So, this is how I feel, how I wish to. So, I am a language teacher by default. So, I wish to have, you know, I wish to have readers related to the conserving the environment in a Bhutanese way ... (p. 9)

Although the educator is referring to environmental conservation themes, the idea of books for children is valuable. Reading materials like storybooks, songs, and rhymes for children with themes on nature, relationship with nature, and nature conservation can be an added resource for nature conservation education. According to Ura (2009), the content of textbooks is crucial in influencing teachers and students to value education. If books are critical in influencing students cognitively and emotionally, developing specified books for nature conservation education is truly valuable.

One more suggestion is to conduct 'awareness programmes' on conservation for the local community people, especially in the rural communities. This suggestion implies that educators consider the idea of nature conservation as modern and that illiterate people need awareness programmes. They are oblivious that indigenous knowledge of conservation is increasingly regarded in conservation science as a possible model (Büscher & Fletcher, 2020; Ducarme & Couvet, 2020). Furthermore, one of the underlying principles in the science curriculum is regarding the communities as "storehouses of knowledge and practices about different aspects of Bhutan's environment, and traditional and cultural values passed down over generations" (p. 16). In the statement below, educator E11 insists that the local people are illiterate and that they need awareness programmes:

> … you know, back in our *remote village*, you know, more of like *people are illiterates*. They don't know. They are not much educated about the [conservation], *they don't know much about conserving* the environment [emphasis added]. (p. 9)

Echoing the same point, E4, E9 and E14 advocate that forest managers know more about forest conservation than the local people. Hence, they suggest that students or the local community

people learn from them, or students could "impart the knowledge" (E9, p. 2) to their community since they "have the power to influence the parents" (E11, p. 9). Conversely, the literature reveals that the indigenous and traditional ways of dealing with nature are possible models for nature conservation (Büscher & Fletcher, 2020). To top it all, Ducarme & Couvet (2020) assert that conservation can succeed more when considering cultural and religious aspects. Therefore, the insight gained from this discussion is that nature conservation education is generally misunderstood as a new concept related to environmental sustainability.

4.3 Researcher's Perspectives: Field notes

4.3.1 Perception of nature conservation

Prior to this research endeavour, the researcher—like most informants of this research—was oblivious to the difference between nature conservation and environmental conservation. Both terms were considered interchangeable and synonymous. To the researcher, nature conservation was protecting plants, animals, forests, rivers, lakes, or mountains—everything around us that was natural. The researcher's perspective was quite similar to the perspectives of educators shared in the interviews. For example, the researcher had also considered the activities such as cleaning campaigns, waste management, flower gardening, growing potted flowers and planting trees on campus as nature-based activities, contributing to the nature conservation goal. This misunderstanding was due to a lack of awareness of the nature conservation ideology different from environmental conservation.

Generally, most Bhutanese people understand conservation in the same way as described above. The concept of 'conservation' is a relatively new one. However, the natural ways of conservation—traditional and cultural—have existed for thousands of years since early human settlement in Bhutan, according to existing literature (Penjore & Rapten, 2005; Siebert & Belsky, 2007). The global environmental conservation movement picked up momentum in all spheres of life in Bhutan, with environmental sustainability strategies incorporated into all institutions, departments, and social sectors. Environmental conservation is one of the four pillars of GNH—Bhutan's developmental philosophy—and is bound to be significant in all areas of life, including education.

However, in the process of this research, perspectives have changed. The two concepts previously thought to be synonymous and intertwined are now understood as different,

ideologically and practically: nature conservation is nature-centred conservation while environmental conservation is human-centred.

4.3.2 Teaching and learning nature conservation

Conservation education—whether nature or environmental conservation—is taught in grades four, five, and six in social studies and science. The primary school's instruction culture seems to have remained more or less the same as it was more than a decade ago when the researcher was a primary school teacher. For example, most lessons on plants and animals are still delivered theoretically with some classroom activities such as drawings, discussions, experiments, and student presentations. Occasionally, students seem to be taken on a short field trip to the surrounding areas, the garden, the pond or the playground. However, these do not look sufficient to develop children's emotional connection with nature or gain scientific knowledge about biodiversity. The educators interviewed also admitted that they could not provide the experience children need with nature as much as they would like to.

In addition, the reasons educators provide for resorting to primarily classroom lessons instead of taking children to the natural site is perhaps due to the highly structured class schedule. For instance, students learn a different subject every forty to fifty minutes, leaving insufficient time for outdoor trips for which children need flexible time. Another reason is the cumbersome administrative procedures, including writing to the principal and parents for official consent. To top it, managing a class of thirty to forty students by a single teacher is chaotic and challenging. However, it might also be useful to study how the schools can regularly use the nearby forests for children's learning. Finally, real experiences with plants and animals in the natural environment while learning about them would foster a love of and connection with nature.

Learners can also visit the small natural areas with wild plants and animals on the school grounds. Biologists called these areas 'small natural features' [SNFs] (Bignal & McCracken, 2000; Poschlod & Braun-Reichert, 2017). Unlike western countries, where school grounds are fully landscaped and developed, Bhutanese school grounds usually have some unused land where wild plants and animals grow wildly. These tiny natural features are ideal for giving children an authentic nature experience and raising their awareness of protecting wild species. The difference between a garden and SNFs is that the former is planted while the latter are wild plants with small animal species. Hence, if the natural environments in the community or around the school campus

are made accessible to the school, teachers can use them consistently to make learning more authentic and hands-on.

During the data collection, miniature gardens, potted plants and an aquarium were noticed inside some classrooms. In one school, students had an improvised aquarium in the classroom with a few small fish in it. In all four schools, students planted flowers in rows around their classrooms. They kept potted flowers and plants in rows along window sills and doorsteps. Students were seen tending to them during social work hours, weeding, fertilising, and watering. Although these activities help acquire plant knowledge and skills for growing plants, they are not part of nature conservation education. Instead, those activities are human-centred and designed for human needs, not for nature. Finally, it is concluded that there is little or no awareness of nature conservation in primary school.

4.3.3 Nature conservation education in teacher education

Nature conservation education is perceived to be covered under environmental conservation topics in the teacher education curriculum. The two terms are generally considered part of one another or originate from the same conservation ideology. During the interaction with the educators, they appeared concerned about climate change, pollution, sustainability, waste management and associated natural disasters. The educators' responses implied they were unaware of the two conservations from different ideologies.

Place-based education, mentioned in the interview, involves taking the learners to explore and experience the natural environment, like the gardens or trees on campus. While learning about plants and animals, students could visit small natural features [SNFs] within the campus and nearby forests. SNFs are unused land areas on college campuses with wild plants and animals growing naturally, and they are ideal for experiencing real nature and using them for nature conservation education. However, using the natural environment regularly or consistently for learning about nature is a culture that still needs to be developed in the Bhutanese schools.

4.3.4 School Practices on nature conservation

School programmes like the nature club, social forestry day, morning social work, flower gardening, and vegetable gardening mentioned by the informants are similar activities across the Bhutanese primary schools. It is a shared culture of the schools to involve students and teachers in

manual work related to campus development and maintenance. For example, students plant trees, hedges, flowers, and grasses to make their school attractive. They also regularly clean the classrooms and surroundings. However, none of these activities fulfils the goal of nature conservation education because the activities are human-centred and have 'utilitarian' values. According to the literature, nature conservation education encompasses two aspects: one, to foster children's emotional connection with nature, and two, to develop children's knowledge about species (Chawla, 2007; Hooykaasa et al., 2029; Hughes et al., 2018).

Over the years planting trees on school campuses has become more prominent due to the Green School initiative by the former education minister, Thakur Singh Powdyel (Yangdon, 2018). The physical greening in all four schools has received much attention and popularity. Data confirms that the nature club leads the 'school beautification' initiatives to enhance the physical greenery of the school by organising activities related to planting trees, flowers, and hedges. Some schools have also created rock gardens. If this trend can be utilised to create an ecological garden in all the schools, nature conservation education will benefit significantly. Children can use the ecological garden to play, learn and connect with nature on a daily basis. Even though an eco-garden is not real nature, it is the closest a school can offer within the campus.

4.4 Chapter Summary

The analysis and interpretation in this chapter are based on the interview data and the researcher's field notes. Data reveals several insights into nature conservation education in primary schools from the educators and the researcher's perspectives. The educators generally have anthropocentric ideals—more human-centred—concerning nature conservation, seemingly drawn from the global drive for environmental sustainability. Findings reveal that environmental conservation issues are addressed prominently in the revised primary and teacher education science curriculum, but nature conservation education is minimally reflected.

Recurrent data reveal that, although ideologically conflicting, educators see little or no distinction between nature and environmental conservation. While environmental conservation has a human-centred or utilitarian approach to conservation, nature conservation has a nature-centred approach. The educators' responses indicate that nature conservation is perceived more from the environmental conservation ideology than nature conservation ideology.

Data shows that lessons on nature or conservation are conducted inside the classrooms, which is why children have minimal direct experience with nature. Another finding is that the school programmes, such as planting trees, growing flowers, fencing, cleaning campaigns and waste management, are perceived as nature conservation practices. However, they are human-centred activities and do not fulfil the nature conservation goal of protecting the wild species for their own sake.

The educators also offer some useful suggestions, although meant for improving environmental conservation education, are useful for improving nature conservation education. The first suggestion is to include a topic or component on nature conservation in the curriculum to make it more significant. Another suggestion is to increase children's opportunities for a real experience with nature through field trips. The third is to develop reading materials based on nature conservation themes for children.

Data also reveal that educators undermine the local community's knowledge of nature conservation. They seem oblivious to how conservation science is increasingly paying attention to the traditional and cultural ways of preservation. Finally, the last section reveals the researcher's perspectives and insights from interacting with the informants on nature conservation, teaching and learning, and school practices.

CHAPTER 5

STUDENTS' PERSPECTIVES ON NATURE CONSERVATION

Analysis and interpretation

5.1 Introduction

This chapter presents the students' perspectives on nature conservation education in primary school. 105 grade six students from four schools participated in the open-ended questionnaire, which sought to understand their knowledge and views of nature conservation education. Specifically, questions one and two tested the students' knowledge of species, and questions three, four, and five sought their perspectives on nature conservation education.

The data analysis and interpretation are presented in two parts: students' knowledge of wild plant and animal species; and students' perspectives on nature conservation education. Although this study is qualitative, using numbers and calculations is unavoidable, especially during data processing. However, using numbers to present findings has been kept to a bare minimum. For example, scores and percentages have been used while reporting students' performance in questions one and two. They are used only to enrich the description quality and discern the shared meanings—not to raise the reliability level or to generalise the findings. Similarly, when the scores are compared between schools and regions, it is only intended to draw insights, not to generalise the results. Tables have been utilised to illustrate students' scores, item-wise and school-wise. Before presenting the data analysis, a succinct information on the four schools' community living standards and practices is provided so that the readers can draw deeper insights in context of their background (see Table 5.1).

Table 5.1 *Living standards and practices of four communities*

Community living standard of School 1
This place is an urban setting in the western region of Bhutan. Many government offices, private and corporate businesses and financial institutions are in the area. Although smaller than Thimphu, Bhutan's capital city, the town is extensive and crowded with many modern buildings in addition to the traditional ones. Everything is available, from clothing stores, grocery shops and gadget stores, to entertainment hubs, cafes, restaurants, tourist resorts and a general hospital. Bhutan's international airport is also located in this area. Transportation facilities are available in abundance, like private cars,

taxis and public buses. The area has excellent connectivity to 4G internet, electricity and television services.

Most parents of students are literate and working in government organizations, private firms, financial institutions and hospitality businesses. About 20 to 30 per cent of the population are farmers who live in the nearby villages. Generally, the farmers are economically well-to-do. Their generate income is from selling farm produce, like grains, fruits and vegetables, to the residents or taking them to the local market. Due to the growing population and rising housing crisis, some farmers have also started earning from rental services.

Community living standard of School 2

This community is in the rural setting of the western region. Below the school, along the highway, is a small town of about eight grocery shops from where people can buy their necessary items; and a few bars where people can hang around. There are no clothing shops, restaurants, internet cafes, or entertainment hubs, so the community is a lot quieter than the first community. This community has a basic health unit for the people and a health assistant providing medical services. However, the patients are referred to a hospital several hours drive away for serious medical issues. People are superstitious, so they like to see astrologers for a spiritual reading about their sickness before they go to the health unit. They carry out spiritual appeasement activities and rituals. If they are still not cured, then they visit the health unit or hospital.

Parents of students are mostly farmers who live in the villages nearby, while a minority are government employees, shopkeepers or local business dealers. Since agriculture is the farmers' primary income source, they grow chilli, potatoes and cabbages at large-scale production and sell them to the local dealers, who then export them to bigger markets in the other districts. In addition, the people make extra income by selling mushrooms (fungi) collected from the nearby forests. Hence, it observed that people still use the forest for collecting leaf litter, firewood and food plants. Leaf litters are for cattle, firewood is for cooking and heating, and food plants are for family consumption. Transportation is not an issue because their villages are near the main highway that leads to the urban districts. Since the people are economically well-to-do, they have household kitchen appliances like rice cookers, water boilers, electric or gas stoves and refrigerators. The area is connected to 3G internet and mobile networks, TV cables and radio, although the connection may be erratic sometimes.

It is a tradition that children help their family as early as five or six years old. Some students said they supported the household by sweeping, fetching water, or looking after younger siblings. During the winter, boys go into the woods to collect food plants, litter materials and dry twigs; and in the summer, some boys carry vegetable loads from the village to the local dealers' camp. They also plough the fields.

Community living standard of School 3

This community is an urban town in eastern Bhutan. However, the town is comparatively smaller than the urban town of the western region—for example, fewer clothing stores, restaurants, cafes, grocery stores and electronic shops. There are four-storeyed buildings too, but fewer. Modern amenities like electricity, 4G internet connection, digital technology, TV, and mobile networks are available. Private cars, taxis and buses are readily available, but not as many as in the western region.

About seventy per cent of students' parents are government employees, shopkeepers and private organization employees, and about thirty per cent are farmers from the surrounding villages. In general, the people are financially self-sufficient. While the employed ones receive salaries or profit from their businesses, farmers earn by selling their farm produce like maize, vegetables and fruits.

The regional referral hospital for the eastern region is located here, so the community has access to standard medical services. However, it needs more human and medical resources to provide services equivalent to the referral hospital in Thimphu, the capital city.

Community living standard of School 4

This community is in one of the remotest areas of eastern Bhutan. Unlike the first, second and third communities, the people live in one-storied houses scattered across the mountains. The roads are narrow, and the transport facility is scarce. People mostly travel on foot from one place to another or walk to the highway for hours to catch public buses. People of the community avail medical services from a Basic Health Unit. However, most people still prefer local healers to modern medicines because they are inherently superstitious. They would rather practice spiritual appeasement rituals than visit the hospital.

The living standard of the community is very low. While some people have just enough, some others are quite poor, sources said. The people grow grains, vegetables and fruits but need more financial support and transportation to reach the markets. Although 3G and mobile services are available, many cannot afford these gadgets. Therefore, exposure to digital technology is minimal. All the households are connected to electricity, but only about fifty per cent of the households have a television screen. While many households may have essential kitchen appliances like rice cookers and water boilers, most still use firewood for cooking. As a tradition, forests continue to be used for collecting food plants, leaf litter and firewood.

Like in any rural culture, children from the age of eight carry out household chores like adults, so parents want their daughters or sons to stay home. People are yet to understand the value of education. For example, parents want their daughters to stay home to look after their sick grandparents and their sons to work at home. Hence, the school faces challenges with dropouts every year.

5.2 Students' Knowledge of Wild Plant and Animal Species

Students' responses to questions one and two provide data on their knowledge about local wild plants and animals. In particular, question one asks students to identify ten pictures of animals or plants—provided in the questionnaire—and to write their names, food, and habitat. Question two asks them to list the names of five insects, five wild trees, five wild birds, and five wild herbs. The analysis and interpretation of data are presented question-wise, followed by a breakdown of specific items. The table below (Table 5.1) shows some details of the participating schools.

Table 5.2 *Details of the participating schools*

Participating schools	Type of school	Region
School 1	urban	western Bhutan
School 2	rural	western Bhutan
School 3	urban	eastern Bhutan
School 4	rural	eastern Bhutan

5.2.1 Naming species, food, and habitat

Question one asks students to look at the pictures of ten wild animal and plant species [see Appendix 3.14], and under each picture, to write its common name [Either the English or local

name], food, and habitat. The overall scores based on their correct and partially correct responses attained by schools 1, 2, 3, and 4 are illustrated in Table 5.3.

Table 5.3 *The overall performance scores of four schools for ten species*

		Total no. of Students	Correct answers: School 1 (23 students)	Correct answers: School 2 (32 students)	Correct answers: School 3 (26 students)	Correct answers: School 4 (24 students)	Total no. of correct answers	Partially correct answers: School 1	Partially correct answers: School 2	Partially correct answers: School 3	Partially correct answers: School 4	Total partially correct answers
1	Snow Leopard	105	13	12	7	12	44	9	21	13	5	48
	Food	105	5	6	6	2	19	18	24	14	15	71
	Habitat	105	6	4	3	2	15	9	5	5	7	26
2	Takin	105	22	34	20	22	98	0	0	3	0	3
	Food	105	4	6	8	5	23	14	27	15	14	70
	Habitat	105	12	18	18	4	52	6	5	1	7	19
3	Sparrow	105	18	21	17	15	71	0	0	0	3	3
	Food	105	21	22	18	3	64	2	4	3	3	12
	Habitat	105	0	2	0	0	2	6	11	5	7	29
4	Crow/Raven	105	16	19	19	13	67	0	0	0	0	0
	Food	105	17	16	16	10	59	2	1	3	3	9
	Habitat	105	11	5	8	6	30	0	4	2	5	11
5	Dung Beetles	105	1	6	10	2	19	21	4	2	7	34
	Food	105	0	5	5	4	14	0	0	0	0	0
	Habitat	105	4	2	3	2	11	1	0	0	0	1
6	Ladybird	105	20	29	18	17	84	1	0	0	3	4
	Food	105	3	3	5	1	12	0	0	1	1	2
	Habitat	105	9	8	13	6	36	2	6	1	3	12
7	Earthworm	105	19	27	19	13	78	3	0	2	0	5
	Food	105	0	0	0	0	0	0	1	0	1	2
	Habitat	105	6	17	11	9	43	2	2	1	0	5
8	Artemesia	105	17	30	12	12	71	0	0	0	0	0
	Habitat	105	2	2	0	1	5	6	11	14	2	33
9	Primrose	105	0	0	0	0	0	1	7	0	0	8
	Habitat	105	0	1	0	0	1	3	2	0	1	6
10	Rhododendron	105	11	25	15	5	56	4	0	0	3	7
	Habitat	105	7	18	11	0	36	0	1	1	2	4
	Grand Total	2835	244	338	262	166	1010	110	136	86	92	424
			Overall Percentage (Correct answers): 35.6%									

The overall percentage score of students' performance in Q1 is 35.6 per cent, indicating a 'poor' level of knowledge (Table 3.4). Then, the scores for each of the three items, namely species, food, and habitat, of all ten individual species are tabulated to draw further insights. Finally, school-wise, students' performance scores provide more insights into students' knowledge of species.

5.2.1.1 Names of species

Students' knowledge of ten species' names is at a 'satisfactory level' with a score of 56 per cent (see Table 5.4). Data on individual schools show that school 2 scored 63.4 per cent, school 1 scored 59.6 per cent, followed by schools 3 and 4 with 52.7 and 46.3 per cent, respectively. The data reveals that the two western region schools have performed better than the two eastern region

schools. However, no difference has been found between students of rural and urban settings, except that school 4, the remotest place, has the least knowledge with 46.3 per cent. The table below (Table 5.4) shows the total scores attained by the schools for correct and partially correct names of species.

Table 5.4 *School-wise scores for NAMES of species*

		Total no. of Students	Correct answers: School 1: Urban	Correct answers: School 3: Rural (22	Correct answers: School 2: Urban	Correct answers: School 4: Rural (24	Total no. of correct answers	Partially correct answers: School 1:	Partially correct answers: School 2:	Partially correct answers: School 3	Partially correct answers: School	Total partially correct answers	Total: Correct &
1	Snow Leopard	105	13	12	7	12	44	9	21	13	5	48	92
2	Takin	105	22	34	20	22	98	0	0	3	0	3	101
3	Sparrow	105	18	21	17	15	71	0	0	0	3	3	74
4	Crow/Raven	105	16	19	19	13	67	0	0	0	0	0	67
5	Dung Beetles	105	1	6	10	2	19	21	4	2	7	34	53
6	Ladybird	105	20	29	18	17	84	1	0	0	3	4	88
7	Earthworm	105	19	27	19	13	78	3	0	2	0	5	83
8	Artemisia	105	17	30	12	12	71	0	0	0	0	0	71
9	Primrose	105	0	0	0	0	0	1	7	0	0	8	8
10	Rhododendron	105	11	25	15	5	56	4	0	0	3	7	63
	Total		137	203	137	111	588	39	32	20	21	112	700
	Total score (No. of students X 10 items)		230	320	260	240	1050						1050
	Percentage		59.6	63.4	52.7	46.3	56					10.7	66.7
	Percentage (Correct answers): 56%						Percentage (Partially correct answers): 10.7%						
	Overall percentage: 66.7%												

While more than fifty per cent of the total number of students [N105] could name the takin, ladybug, earthworm, sparrow, Artemisia, common crow, and rhododendron correctly, not a single student could name the ‘primrose.' Interestingly, students identified the snow leopard more at the genus level 'leopard' than the commonly used name 'snow leopard,’ its species name. Similarly,

more students are able to identify the dung beetle at the genus level, 'beetle', than at its species level, i.e., the dung beetle.

5.2.1.2 Food

Students' knowledge of the 'Food' of seven species is doubly lower than their knowledge of species names. The total score for correct answers is only 26 per cent, but after adding the partially correct answer score, it rose to 48.6 per cent. Either way, the scores point to an 'unsuccessful' performance level. All four schools receive extremely low percentage scores. For example, school 3 scored 31.9 per cent, the highest; school 1 scored 31.1 per cent; school 2 scored 25.9 per cent, and school 4 scored just 14.9 per cent. The scores show that schools 1, 2, and 3 have performed almost equally poorly, but school 4 has performed much lower. Scores also show that students of the two urban schools know more about 'species food' than students of the two rural schools. The table below (Table 5.5) shows the students' total scores for knowledge of 'food.'

Table 5.5 *School-wise scores for FOOD of species*

	Names	Total no. of Students	Correct answers: School 1: Urban (23 stds)	Correct answers: School 2: Rural (32 stds)	Correct answers: School 3: Urban (26 stds)	Correct answers: School 4: Rural (24 stds)	Total no. of correct answers	Partially correct answers: School 1:	Partially correct answers: School 2: Rural	Partially correct answers: School 3 Urban	Partially correct answers: School 4:Rural	Total partially correct	Total: Correct & Partially correct answers
1	Snow Leopard	105	5	6	6	2	19	18	24	14	15	71	90
2	Takin	105	4	6	8	5	23	14	27	15	14	70	93
3	Sparrow	105	21	22	18	3	64	2	4	3	3	12	76
4	Crow/Raven	105	17	16	16	10	59	2	1	3	3	9	68
5	Dung Beetles	105	0	5	5	4	14	0	0	0	0	0	14
6	Ladybug	105	3	3	5	1	12	0	0	1	1	2	14
7	Earthworm	105	0	0	0	0	0	0	1	0	1	2	2
	Total	735	50	58	58	25	191	36	57	36	37	166	357
	Grand total (No of students X 7 items)		161	224	182	168	735						735
	Percentage		31.1	25.9	31.9	14.9	26.0					22.6	48.6
	Percentage (Correct answers): 26%						Percentage (Partially correct answers): 22.6 %						
	Overall percentage: 48.6%												

Further analyses of the individual scores bring to light two things. One, more students seem to know bird's food than other animals on the list. For example, 64 students (out of 105) and 59 students got the correct answer, 'seeds' for sparrow and raven, respectively. Only 23 students could correctly write the takin's food and only 19 could correctly write snow leopard's food. Two, although students know the species' name, they seem unaware of what the species feed on. For example, the ladybug was identified by 84 students—the second highest—but only 12 knew its food, i.e., aphids. Another example is the earthworm, identified correctly by 78 students, but none could mention its food. In conclusion, while students' knowledge of species names is 'Good,' their knowledge of species-food is at an 'unsuccessful' performance level with only a 26 per cent score (see Table 5.5).

5.2.1.3 Habitat

The students' knowledge of the 'habitats' of the ten species is poorer than their knowledge of 'Food.' For instance, only 22 per cent of students got correct answers; upon adding the number of partially correct answers, the score rose to 35.9 percent, which is still at the 'unsuccessful' performance level (see Table 5.6). Schools 1, 2, and 3 received almost equal scores, between 24 and 25 per cent, but school 4 received only 12.5 per cent. Consistent with the earlier finding, the two urban schools have more knowledge than their counterparts in the rural schools of the same district. Of the four schools, school 4—in the remotest area—is found to have the least knowledge of species, whether it is species name, food, or habitat. The table below (Table 5.6) shows the total scores for the 'habitat' of the ten species.

Table 5.6 School-wise scores for *HABITAT*

	Names	Total no. of Students	Correct answers: School 1: Urban	Correct answers: School 2: Rural	Correct answers: School 3: Urban	Correct answers: School 4: Rural	Total no. of correct answers	Partially correct answers: School 1:	Partially correct answers: School 2:	Partially correct answers: School 3	Partially correct answers: School	Total partially correct answers	Grand total: Correct & Partially correct
1	Snow Leopard	105	6	4	3	2	15	9	5	5	7	26	41
2	Takin	105	12	18	18	4	52	6	5	1	7	19	71
3	Sparrow	105	0	2	0	0	2	6	11	5	7	29	31
4	Crow/Raven	105	11	5	8	6	30	0	4	2	5	11	41
5	Dung Beetles	105	4	2	3	2	11	1	0	0	0	1	12
6	Ladybug	105	9	8	13	6	36	2	6	1	3	12	48
7	Earthworm	105	6	17	11	9	43	2	2	1	0	5	48
8	Artemisia	105	2	2	0	1	5	6	11	14	2	33	38

9	Primrose	105	0	1	0	0	1	3	2	0	1	6	7
10	Rhododendron	105	7	18	11	0	36	0	1	1	2	4	40
	Total		57	77	67	30	231	35	47	30	34	146	377
	Grand total scores (No of students X 7 items)		230	320	260	240	1050					1050	1050
	Percentage		24.8	24.1	25.8	12.5	22.0					13.9	35.9
	Percentage (Correct answers):					22%	Percentage (Partially correct answers): 13.9%						
	Overall percentage: **35.9%**												

5.2.1.4 A Summary of findings from Q1

Overall, the students' knowledge of the ten species provided in the questionnaire is under-average. For example, the knowledge of species names is at a 'satisfactory' level, and the knowledge of food and habitat is worse, both of which are at an 'unsatisfactory' level. For example, the table below (Table 5.7) illustrates the overall school-wise performance in the knowledge of ten species.

One insight drawn from the data is that students could name the species whose images appear in their curriculum textbooks, like takin, raven, and ladybugs. However, they could not name the less common ones like the primrose or Artemesia. Hence, the finding is that curriculum textbooks or local knowledge makes a difference in students' level of species awareness. Intentional lessons with direct experiences of local plants and animals will be beneficial to developing students' knowledge of species.

Table 5.7 *A Summary of school-wise scores for ten species*

Names	Total no. of Students	Total no. of expected scores (Total no Stds X	Total no. of correct answers	Total no. of partially correct	Percentage: Correct answers	Percentage: Partially Correct answers	Total Percentage
School 1: Urban (western region)	23	621	244	110	39.3%	17.7%	57.0%
School 2: Rural (western region)	32	864	388	136	44.9%	15.7%	60.6%
School 3: Urban (eastern Region)	26	702	262	86	37.3%	12.3%	49.6%
School 4: Rural (eastern Region)	24	648	166	92	25.6%	14.2%	39.8%

Although no difference is found in students' knowledge between the urban and rural schools, some difference is noticed between the western and eastern regions. For example, data indicate that students of the western region performed better than those of the eastern region. Between the two eastern schools, school 4—which is the farthest and the remotest of all—performed much lower. School 4 performed the poorest of the four schools participating in this research. One possible reason for its poor performance may be a lack of exposure to media and other educational facilities. School 4 is the farthest of the four schools from the capital city by distance (see page 67).

5.2.2 Names of wild species

Q2 asks students to write the names of five insects, five wild trees, five wild birds, and five wild herbs from their memory. The students' overall performance in this task is 'unsatisfactory' with an overall score of 37 per cent (see Table 5.8). Of the four categories of wild species, students received the highest score for insects, with 65.1 per cent, which is at a 'good' performance level. However, the scores for the other three are 'unsatisfactory.' For example, wild birds received 48.6 per cent, wild trees 26.1 per cent, and wild herbs 8 per cent. The table below (Table 5.8) illustrates the performance scores and percentages of the four schools.

Table 5.8 *The overall performance result of four schools for listing wild species*

School	Total no. of students	Total expected score (total no. of students	Total expected score for each type (Total	Insects: Marks scored	Wild trees: Marks scored	Wild birds: Marks scored	Wild herbs: Marks scored	Total scores: (4 types of Species)	Total: Percentage
School 1: Urban (western region)	23	460	115	103	38	61	8	210	45.7%
School 2: Rural (western region)	32	640	160	88	48	68	6	210	32.8%
School 3: Urban (eastern Region)	26	520	130	84	23	77	17	201	38.7%
School 4: Rural (eastern Region)	24	480	120	67	28	49	11	155	32.3%
Grand total scores		2100	525	342	137	255	42	776	
Percentage				**65.1%**	**26.1%**	**48.6%**	**8%**		
			Overall percentage: **37%**						

The scores for individual schools indicate ‘unsatisfactory’ performance by all four schools. For example, school 1 scored 45.7 per cent, school 3 scored 38.7 per cent, and schools 2 and 4 scored 32.7 per cent and 32.3 per cent, respectively. Hence, the finding is that students’ knowledge of wild species is very low.

5.2.2.1 Names of Insects

Students' overall performance in listing the names of insects receives the highest score of 65.1 per cent, which is at a ‘very good’ level. Raw data reveals that a maximum number of students could name at least three insects or more. Specifically, school 1 scored 89.6 per cent, an ‘outstanding performance’; school 3 scored 64.6 per cent, a ‘good performance’; School 4 scored 55.8 per cent, and school 2 scored 55 per cent, both at a ‘satisfactory’ level (see Table 5.9). Further comparison of scores shows that the two schools of the western region have performed better than those of the eastern region, consistent with the earlier results. Within the same region, more students from the urban school know more names of insects than students from the rural school. The school-wise scores are given below in the table (Table 5.9).

Table 5.9 *School-wise scores for listing names of insects*

School	Total no. students	Total expected score (No. of students X 5)	Marks scored	Percentage
School 1: Urban (western region)	23	115	103	**89.6%**
School 2: Rural (western region)	32	160	88	**55.0%**
School 3: Urban (eastern Region)	26	130	84	**64.6%**
School 4: Rural (eastern Region)	24	120	67	**55.8%**
Grand total scores		525	342	
Overall Percentage	**65.1%**			

Some specific details of students’ knowledge of insects—that the raw data reveals—are insightful too. The most common names of insects that students listed are grasshoppers, dragonflies, butterflies, bees, caterpillars, houseflies, spiders, ants, and mosquitoes. Other insects include moths, aphids, millipedes, cockroaches, and wasps. One possible reason why students know more insects than other animals is that they have more direct experience with these tiny creatures in their houses, on the walls, and in the gardens. This indicates that direct experience with species is necessary for children to develop their knowledge about them.

5.*2.2.2 Names of wild birds*

The students' overall performance in listing the wild birds is 'unsuccessful' with 48.6 per cent, 17.5 per cent lower than the scores for 'insects.' Specifically, school 3 scored 59.2 per cent; school 1 scored 53 per cent scores, both at 'satisfactory level'; while schools 2 and 4 received 42.5 per cent and 40.8 per cent, respectively, both at 'unsuccessful' level. The table below illustrates the school-wise scores.

Table 5.10 *School-wise scores for listing names of wild birds*

School	Total no. students	Total expected score	Marks scored	Percentage
School 1: Urban (western region)	23	115	61	**53.0%**
School 2: Rural (western region)	32	160	68	**42.5%**
School 3: Urban (eastern Region)	26	130	77	**59.2%**
School 4: Rural (eastern Region)	24	120	49	**40.8%**
Grand total scores	525	137	255	
Overall Percentage	**48.6%**			

Within the same region, the two urban schools know more wild birds than their rural counterparts. Some common names of wild birds that students listed include peacock [available in the southern belt of Bhutan], eagle, owl, parrot, crow, pigeon, black-necked crane, vulture, and wildfowl. In most cultures, the names of birds feature in folk tales, songs and paintings because they are physically pretty. Hence, the insight gained is that the knowledge of species can be developed through local funds of knowledge like stories, songs and art. For example, two Bhutanese folk songs that are popularly sung and danced to are *bja dhi la thrung thrung karmo* [15]and *maja yang mo gawala*[16]. The former glorifies the beauty of the black-necked crane and the latter celebrates the beauty of the peacock. Raw data shows that most students have written the names of these two birds.

5.2.2.3 Names of wild trees

Listing the names of wild trees is doubly a poorer performance than listing the wild birds. The overall score of the four schools is 26.1 per cent, which is extremely poor. Specifically, school

[15] a popular Bhutanese folksong about the black-necked crane
[16] a popular Bhutanese folksong about the peacock

1 scored 33 per cent, school 2 scored 30 per cent, school 4 scored 23.3 per cent, and school 3 scored 17.7 per cent. Further analysis shows that students of the two western region schools scored higher than students of the two eastern schools. The table below (Table 5.11) illustrates school-wise scores.

Table 5.11 *School-wise scores for listing names of wild trees*

School	Total no. students	Total expected score	Marks scored	Percentage
School 1: Urban (western region)	23	115	38	**33.0%**
School 2: Rural (western region)	32	160	48	**30.0%**
School 3: Urban (eastern Region)	26	130	23	**17.7%**
School 4: Rural (eastern Region)	24	120	28	**23.3%**
Grand total scores		525	137	
Overall Percentage	**26.1%**			

Some of the familiar local names [*Dzongkha]* of wild trees students have listed are *sisi shing* [17], *tshenden shing*[18], *tongphu shing* [19], and *changma shing* [20]. The cypress is the most familiar tree to all the students due to its importance in their culture. Firstly, the cypress tree Bhutan's national tree; secondly, its name appears in the first line of the national anthem; and thirdly, its leaves and branches are used for incense burning during Buddhist rituals; and lastly, its name appears frequently in the curriculum texts. Due to its usefulness for incense burning, cypress trees are intentionally planted around their houses. The *changma shing*, the willows, are popularly planted for campus greening in schools and around residential houses. Although these trees are domesticated because of their usefulness, they also grow in the wild.

Conversely, *sisi shing,* the oak is known mainly to the students living in rural villages but less known to children raised in urban settings. The reason is that the children who live in the rural villages collect them as firewood for cooking and heating. It was also found that many students listed some fruit trees, such as apple trees, orange trees, mango trees, etc., for which no scores

[17] oak tree
[18] cypress
[19] pine tree
[20] willow tree

were awarded. Lastly, an insight gained from this data is that local culture can be a significant source of learning about local species.

5.2.2.4 Names of wild herbs

The 'wild herbs' appears to be the most challenging since the overall score shows only 8 per cent. Of the four species categories, students know the least about wild herbs. The total number of expected answers was 525 [105 X5=525], but only 42 correct answers were received. School 3 scored 13.1 per cent; school 4 scored 9.2 per cent; school 1 scored 7 per cent; school 2 scored only 3.8 per cent. The table below (Table 5.12) illustrates school-wise scores for wild herbs.

Table 5.12 *School-wise scores for listing names of wild herbs*

School	Total no. of Students	Total expected score	Marks scored	Percentage
School 1: Urban (western region)	23	115	8	7.0%
School 2: Rural (western region)	32	160	6	3.8%
School 3: Urban (eastern Region)	26	130	17	13.1%
School 4: Rural (eastern Region)	24	120	11	9.2%
Grand total scores		525	42	
Overall Percentage	8%			

Raw data shows that students know only a few names of wild herbs, like marijuana, ferns, nettles, and blue poppy. Students are familiar with marijuana because these plants are known for their drug properties and grow in abundance in their surroundings. The schools engage the students to uproot them from their campuses to prevent substance abuse. Fiddleheads are familiar because they are commonly eaten as vegetables collected from the forests and sold in the market in abundance in the spring. Nettle plants or *zocha*[21] are familiar too because livestock farmers use them as animal feed. The blue poppy is familiar because it is the national flower of Bhutan. Its image frequently appears in media and curriculum textbooks. Lastly, the insight gained from the analysis of data is consistent with the earlier ones. One way to develop children's knowledge of species is by frequent and repeated real experiences with them. The more children have direct experience with the species, the more they know and connect with them.

[21] stinging nettles

5.2.2.5 Summary of findings from Q2

Q 2 tested students' knowledge of five categories of wild species, specifically five insects, five wild trees, five wild birds, and five wild herbs. The data analysis shows that the overall students' knowledge of wild species is very poor, with a score of just 37 percent. Within the four categories, students' knowledge of insects is the highest but their knowledge of wild trees, wild birds, and wild herbs is 'unsatisfactory.' Further analysis reveals that students of the two urban schools have more knowledge of wild species than their counterparts in the rural schools. Comparatively, the two schools of the western region have scored more than the eastern region. One possible reason for this may be attributed to the level of exposure—the western region has more access to media, the internet and other facilities for learning than the eastern region (see page 120).

The following insights are gained from the data analysis. Students can also name the species they are familiar with through formal curriculum or local stories, songs and art. In addition, students can name species they are familiar with through direct experience in their everyday life. Therefore, the conclusion is that curriculum textbooks, media, local culture, stories, songs and art are useful ways to enhance students' knowledge of wild species. Furthermore, direct experience with species is necessary for children to develop their knowledge about them.

5.3 Students' Perspectives on Nature Conservation

The analysis and interpretation of the data are presented thematically and descriptively using multiple perspectives. Students' code numbers have been used to substitute their real names when quoting their statements to illustrate the themes. In addition, the grammar and spelling errors in the written responses have been kept as it is to maintain authenticity.

5.3.1 Perception on nature conservation

Students perceive nature conservation as protecting the environment because 'nature' means 'environment' and vice versa. For example, S91 states, "I think nature conservation means to protect the environment" (p. 3). Similarly, S14 explains what environmental conservation means: "I think nature conservation means to keep our envirouts [environment] clean and to make out nature probelty [properly]" (p. 3). Managing waste at home, school, or in the community is perceived as a major practice of nature conservation (S16, S14, S53, S54, S11, S6). Students

express that conserving the environment means keeping the areas clean, preventing pollution, and managing waste, within their surroundings and house. For example, S54 states, “Nature conservation mens [means] we take care of our waste and clean our house and take care our water take care our country ...” (p. 3). Echoing the same point, S6 asserts:

> Nature conservation means what are happening in our world. Nature is to solve our future [problems]. It means we have to save our world, Don’t throw west [waste] anywere [anywhere] we have to make our school, house, town clean” (p. 3).

While asserting that nature conservation is keeping the environment clean, the student—in the statement above—implies some environmental concerns and claims that “we have to save our world” and “solve our future [problem].” S71 states, “Keep our house clean and outer one [surroundings] also … to save our country” (p. 3).

Nature conservation also protects the forest (S8, S5, S16, S11, S79, S10). According to S5, “nature conservation means the people who care of all plants and animals which are living in the forest.” Further, S5 adds, “... when any of the bad people who are cutting trees and harming animals their [there] the forest affair [officer] will put them in prison ...” (p. 2). S10 also expresses concerns about the depleting forest resources: “we bhutenese people have to protect the trees because people are cutting trees and becoming less that’s why we have to protect the trees" (p. 3). This idea relates to the environmental conservation ideology wherein human beings are perceived as enemies of nature, a Western concept of nature conservation.

Nature conservation protects plants and animals in the surroundings and community (S57, S25, S49, S25). Nature conservation means "not harm[ing] the nature plants" (S57, p. 3), "planting more trees in the environment" (S60, p. 3), and protecting the "trees and plants surrounding our school and house" (S49, p. 3). Furthermore, their following statements indicate preferences for beneficial and exotic species. For instance, S25 adds, "... For example, we have green plants, special trees which give us oxygen, important animals and beautiful flowers like [the] blue poppy" (p. 3). The blue poppy is the national flower of Bhutan, and probably 'special trees' are referred to as beautiful trees. Similarly, more statements reveal that anthropocentric experiences influence students’ perceptions. For example, gardening is also considered nature conservation: “like a garden putting flowers, vegetables, and putting plants ...” and also “take[ing] care of our animals and plants” (S51p. 3). These statements evidence that students understand nature conservation as

protecting plants, planting trees and growing flowers. However, they are human-centred activities for people's benefit, not for nature's sake.

The influence of environmental conservation education in grade four, five, and six social studies and science curriculums is evident. In their responses, students use multiple ideas possibly derived from lessons taught in chapters titled 'Saving the forest,' 'Living things and their environment' and 'Natural hazards and disasters;' to them, all those ideas represent nature conservation. The three statements given below indicate this finding:

> I think that nature conservation means like preserving the nature growing plants and doing afforestation and reforestation for example: climate change and global warming is a huge disaster in our planet so to prevent this we could stop company's producing pollunated gasses and decreasing the number of plastic littered around our surrounding [*sic*]. (S76, p. 3)

> Nature conservation means protecting trees, animals, environments, and national parks. For example: not cutting down the trees, not hunting the animals, picking up of paper. (S79, p. 3)

> I think nature conservation or protecting means we *throw west* [wastes] *pollute air* and sun is getting bigger we *pollute* our air plant are not able to grow well. *Plants and forest* are getting distory [destroyed] and people lake [like] us children eat junks and *throw the plastic*. People who fire the forest [set forest on fire] and to let people stop doing this things and letting people save nature. (S16, p. 3)

In this context, nature conservation is protecting everything related to environmental sustainability. Students are more aware of the environmental conservation values, not nature conservation. The ideas of afforestation, reforestation, climate change, global warming, ecosystems, sustainability, pollution, waste management, and national parks are probably drawn from their social studies and science lessons.

Lastly, students perceive nature conservation as similar to environmental conservation. Nature conservation, to the students, is everything about environmental conservation, from preventing pollution to saving the forest to protecting the ecosystem. Students also project the values of environmental conservation more significantly than nature conservation. Data indicates that the students are not familiar with the nature conservation ideology.

5.3.2 Importance of nature conservation

Students perceive nature conservation as important mainly because nature provides the basic needs for human survival. For example, S9 states, "All human[s] depend on plants and animals

because plants give us food to eat, water to drink, oxygen to breathe" (p. 4). Echoing the same reason, S10 warns of consequences if nature is not conserved: "If there are no trees and plants we will not get air and oxygen, if there is no air and oxygen we will die" (p. 4). Then another student, S55, reasons why trees should be protected: "If you cut trees, we do not get the fresh air" (p. 4). Students also claim that people need trees for timber and fuel, which are part of basic human needs. For example, S12 states, "... trees give us wood to build houses" (p. 4), and S103 states, "... we get firewood from nature" (p. 4).

Some emotional affinity with nature is inferred from students' responses. Nature must be conserved for the intrinsic and interdependent relationship they share. According to S5, nature is like a mother:

> Nature is the feel [*sic*] that we [e]specially feel with our mother. It also gives us many things like from forest – we can get trees to build [a] house and some plants which are also used to make mediciances [medicines]. (p. 5)

Supporting the same view, S75 writes, "we should protect and preserve our nature because it is like our mother who gives us resources and shelter to protect from rain and wind" (p. 5).

Another reason for conserving nature—according to students—is that animals and plants are useful to them for food, medicines and services (S44, S14, S79, S23). Firstly, students say that animals give them food, such as milk, eggs and meat (S79 & S23). In addition, they also say that animals "help us to carry our load" (S14 & S18); and to "plough the field" (S41, p. 4). Plants are useful as food and medicines, too. S25 and S57 write that they get nutritious food like *Sangay Shamu* [22][matsutake] from the forest (p. 4*). Sangay Shamu* is the local name for matsutake mushrooms found in the forests, especially in the temperate regions of Bhutan. Also, plants and animals can be used as medicines: "we make medicines from them" (S68, p. 4). For example, S90 states, "Some plants like Yaso Gempo are used as medicine" (p. 4). *Yatsa Gempo*[23] is a local name for cordyceps, a medicinal mushroom found in the highlands of Bhutan.

Students points out that nature conservation is important to maintain the ecosystem balance (S3, S8, S39, S55, S13, S76). According to S3, "if there are no plants and animals, the food chain will break" (p. 4). S76 explains this point further:

[22] Matsutake (local mushroom)
[23] Local cordyceps found in the highlands of Bhutan

> Without nature, there will be no balance [in] the eco-system ... if there is less number of plants, then insects will have no food and will extinct. (p. 4)

While students indicate the importance of balancing the ecosystems in their responses, they also consider human beings a part of the ecosystem. S23 explains:

> Plants, animals and we [human beings] depend on each other because plant gives us food, animals give us dairy products and we give them carbon dioxide. (p. 4)

As much as humans depend on plants and animals for survival, they are equally dependent on humans, which is why the ecosystem must be protected. S54 writes, "if there is no tree and also if there is no water, and many people are die, and if there is no plant we do not have enough to eat" (p. 4). Hence, evidence shows that students have human-centred perceptions of nature conservation. Students perceive nature conservation is important for their basic survival and other human-centred needs.

5.3.3 Learning about nature conservation

Students reports that they learn about nature conservation in science and social studies. In response to the question about what they learned in nature conservation, students listed topics covered in their lessons. The table below (Table 5.13) shows some examples of topics listed by students perceived as lessons on nature conservation.

Table 5.13 *Topics on nature conservation listed by students*

Topics	Informant
where to dump the waste how to pick the waste how to water the plants how to put seeds how they grow we learn habitat	S4 (p.4)
how to save the living thing in nature where does the plants, animals and birds are found how and why to preserve nature, etc.	S8 (p. 4)
we should plant the tree protect from forest fire we should not cut trees	S81 (p. 4)

We learn to protect nature by not cutting trees, not killing animals and not making fire on forest	S12 (p. 4)

A quick analysis of the topics shows that they are learning about waste management, growing and caring for plants and animals, habitats, importance of nature, and protecting the forest (S23, S34, S35, S42, S86, S105). Students also mention that they learn these lessons in science and social studies. For example, S8 states, "Usually we learn about nature in social studies" (p. 4), and S12 echoes, "And we learn it in science and social studies (S12, p.4). This information is consistent with the findings from the literature review of this study (see page 48) that science and social studies cover topics related to plants, animals and conservation in the Bhutanese primary school curriculum.

Data shows that lessons on nature-based learning are mostly taught or learned theoretically. For example, S54 states, "First sir reads and explains to us, and then we write note[s] on nature conservation and after 8th period we go home and revise" (p. 4). Another student, S40, expresses a similar experience:

> ... teachers explaining everything about nature. And they gave us question[s] and if we didn't know the answer, we went to [the] library and search[ed] for [the] answer[s] (p. 4).

Students' responses confirm that students learn about nature in a classroom. The following responses of students illustrate how a lesson on nature and nature conservation is taught:

> We learn about nature conservation in subjects SS [social studies]. Sir teach [*sic*] us very good ... with example and Sir wrote the topic about nature conservation. (S56, p. 4).

> ... We learn about it by giving examples and sharing our knowledge about it. And we talk about nature's importance and discuss how to preserve it like planting more plants and trees. (S76, p. 4)

> We learn about nature conservation in school subject[s] by class test and teacher asking question about nature conservation. (S71, p. 4).

> We learn about nature conservation in detail and our subject teacher told us to protect nature thing like trees, small plant[s] and animals and to do activity like planting tree[s] and protect[ing] small animals. (S74, p. 4).

> We learn about nature conservation in our school subjects by example teachers are teaching and we learn by reading. (S59, p. 4).

Students' multiple responses reveal that lessons on nature are mostly taught indoors as theory lessons instead of experiencing real nature. The instructional strategies like teacher's explanation, discussion, sharing, question-answers, class tests, and reading would be more impactful if they were used while students were experiencing real nature. Students also mention that they create posters to advocate the rules (do's and don'ts) for environmental conservation as part of their classroom activities. S16 shares, "They told us how to save nature we wrote on [the] poster ... to save nature" (p. 4). The poster messages are intended for environmental conservation education to spread public conservation awareness. As per the students' responses, some common messages which they write on the placards or posters are: 'don't cut down trees,' 'don't throw waste,' 'don't harm animals and habitats,' and 'put out picnic fires' (S87, S3, S63, S105, S46).

Although lessons are mainly classroom-based, some students report outdoor lessons too. S66 reports, "We learn about nature conservation in our school subject by going outside and knowing about the plants, habitat, features, and about there [their] body parts" (p. 4). Another student writes, "We do activities by going outside and find the answer for our questions" (S83). Finally, real experience with nature while seeking answers to questions about plants and animals is more effective than learning inside the classroom.

In consistence with educators' perspectives, students perceive environmental conservation education as nature conservation. For instance, the curriculum content students listed as nature conservation topics directly relate to environmental conservation. Another finding is that students get little or no real experience with nature while learning about them because most of the lessons on nature are conducted inside the classroom.

5.3.4 School practices on nature conservation

Students' responses from the four schools show that in general their perceptions are closely similar. For instance, daily school activities like cleaning the surroundings, managing waste, and growing flowers and hedges are common. Other practices like mass cleaning campaigns, club activities, and social forestry day are also similar.

As noticed earlier, students' responses indicate three common practices related to nature conservation across the four schools: i) planting trees and flowers; ii) keeping the surroundings clean; iii) celebrating Social Forestry Day (S15, S12, S76, S82, S98). For instance, S15 states, "Yes. I conserve nature by planting new plants in our school and by watering the plants. I conserve

nature by not throwing waste and putting a sing [sign] board saying that don't throw waste (p. 5). The student highlight planting, caring for plants, keeping the area clean, and advocating for a clean environment. S76 states, "We preserve nature in our school by planting trees and plants. Doing more number of mass cleaning and watering our school garden (p. 5). Then, adding to it, S82 says, "... do fencing around the small plant, not cutting trees, not littering the surroundings, picking up the waste that is harmful to our environment (p. 5). The specific details of the three school practices are elaborated.

Firstly, there is the practice of tree plantation and flower gardening. Students report that they plant trees, flowers, and hedges and care for them. In addition, S8 states, "Yes, we plant trees, plants, flowers all around the school campus" (p. 5). S13 echoes, "We conserve nature we plant more trees and plants" (p. 5). Similarly, the others share that they take care by "watering the plants" (S15, S39, S60, and S66), "manuring" (S85), and "fencing the plants and not letting animals destroy [them]" (S34). Tree plantation usually happens once a year, on June 2nd, celebrated as 'National Social Forestry Day' across Bhutan, but flower gardening happens daily. However, the activities related to planting new trees, flowers and hedges do not fulfil the nature conservation goal because they are centred on human interest, not nature's interest. Conversely, nature conservation protects wild plant and animal species for their own sake (Chawla, 2007; Hooykaasa et al., 2019; Hughes et al., 2018).

The second practice is the drive to maintain a clean environment by managing waste. Students flag the significance of keeping a clean physical environment as nature conservation. They claim that they always clean their surroundings and manage their waste to preserve nature (S17, S80, S82, S13, S103, S71). For example, S82 claims that they are "not littering the surroundings, [and] picking up waste..." (p. 5). Similarly, S103 writes that they are "picking the plastics, paper and bottles" (p. 5), and S17 writes that they are "throwing garbage in a proper place" (p. 5). Furthermore, students advocate 'waste management' practices by putting up sign boards in public areas to keep the environment clean (S84, S15, S75). Like the educators interviewed, students also perceive the practices of cleaning campaigns and waste management as nature conservation practices. However, the activities are more focused on environmental sustainability than on nature conservation. While environmental conservation has a broader and wider focus, primarily 'utilitarian' in nature, nature conservation focuses on protecting wild plant and animal species for nature's sake (see page 42).

The third practice is the annual tree plantation programme, Social Forestry Day, observed on June 2nd. According to S75, "We conserve nature in our school by planting trees on June 2nd … Plant more flowers. Keep our Bhutan clean" (p. 5). Students also mention planting trees on 'Scouts Day', another school's annual programme. The following students' responses indicate that they consider 'tree plantation' significant to nature conservation. S65 states:

> ... we plant tree[s] around our school campus, and water the plant every day and we do that on scout day, and in plating day [Social Forestry Day]. (p. 5)

Similarly, S74 stresses the 'tree plantation' as a successful programme:

> We scout member[s] plant[ed] around 200 plant[s] near our school garden, near football ground. We can see the plant grown a little near our 1st school gate. And it was on Saturday we scout member plant[ed]. (p. 5)

S64 echoes the same experience but stresses the 'conservation' aspect:

> We conserve nature in our school by planting trees, watering, keeping our trees safe, and let[ting] it grow big. We also plant individual trees in the surroundings and also plant grass. We do it every year. (p. 5)

The shared culture of this research's four participating primary schools is evident. While students' responses on the school practices are closely similar, they are from different schools and locations of the country. Students' responses, like the educators', indicated that only selected groups of students, either club members or senior students, participate in the tree-plantation programmes. The primary intention of planting trees on campus is to beautify the school, which is a human-centric drive; therefore, it is not for nature conservation.

In summary, the finding is that students of the four schools have similar perceptions of nature conservation. For example, planting trees and flowers, maintaining a clean environment, and planting trees on social forestry day are perceived as nature conservation practices. However, these practices do not support the ideology of nature conservation, which protects wild plant and animal species for their intrinsic value. Neither does it support nature conservation education because the goal of nature conservation education is to develop children's connection with nature, not developing gardening skills. Hence, while the school practices fulfil the goal of maintaining a physically green and clean campus, they do not relate to the nature conservation ideology.

5.3.5 Concerns and suggestions

One of the concerns the students raise is the need to protect Bhutan's rich biodiversity (S49, S86, S8, S22, S25). S8 argues why it is a concern:

> I think that nature conservation is something that all the students should know and preserve nature for [the] future. Because I think Bhutan is full of nature and also developments and many changes are going around us that make our work easy etc. but the nature who helped us in olden days are becoming less so we should preserve. (p. 5)

The phrases "Bhutan is full of nature" and "the nature who helped us in the olden days" evidence that students care about their country's rich biodiversity. S22 adds, "I wish to say that nature conservation is good for our environment and it is very important for Bhutan because we need to make Bhutan green" (p. 5).

More significantly, students raise concerns about environmental issues, like deforestation, sustainability of forest resources, pollution and waste management (S49, S86, S8, S22, S25). For example, S87 advocates using forest resources sustainably:

> Yes, I wish to say about nature conservation because in many place[s] the people are used to deforestation and to make their houses and do use as firewood. And I have to say that we have to reduce to destroyed to the natural conservation. (p. 5)

Students' suggestions include the 'do's and the don'ts' of environmental sustainability. Some examples include, 'do not hunt or kill animals' (S12, S17, S78, S82, S98); 'do not throw papers and plastics around the surroundings' (S53, S71, S82, S98, S99); 'plant more trees' (S82, S98, S104, S99, S85, S78, S68); 'save water' (S1, S53, S54, S82); 'do not cut down more trees (S103, S91, S88, S85); 'avoid shifting cultivation' (S88, S86, S85); and 'do not destroy small plants' (S60). Lastly, students' concerns and suggestions are more about how to conserve the environment and take care of plants and animals that are useful to them. For example, students suggest planting trees and plants, cleaning the surroundings, and managing waste. Thus, the finding is that the environmental conservation ideology is significantly the dominant ideology for conservation in the Bhutanese schools.

5.4 Chapter Summary

The students' overall knowledge of species is 'unsatisfactory,' with average scores of 37.6 per cent and 37 per cent attained in questions one and two, respectively. Data shows that curriculum textbooks or local knowledge make a difference in students' species knowledge.

Therefore, this study concludes that curriculum textbooks, media, local culture, stories, songs and art are useful ways to enhancing students' knowledge of wild species. Furthermore, direct experience with species is necessary for children to develop their knowledge about them.

Students perceive nature conservation as protecting the environment because 'nature' means 'environment' to them and vice versa. In their view, nature conservation is everything related to environmental sustainability, from afforestation, reforestation, climate change and global warming to national parks. Students seem unaware of the ideology of nature conservation. As a result, they perceive that nature conservation is important for human survival, ecosystem balance, and other anthropocentric needs.

The students mention that they study nature conservation in science and social studies. According to them, the topics covered are waste management, growing plants, caring for plants and animals, habitats, importance of nature, and protecting forests. Data from students' responses reveal that lessons on nature are mostly taught theoretically; hence, students get little or no real experience with nature while learning about them.

Another finding is that students perceive environmental conservation education as nature conservation. Planting trees and flowers, maintaining a clean environment, and planting trees on social forestry day are considered nature conservation practices. However, they are environmental conservation activities carried out to fulfil human-centred goals, not nature-centred. Students also express their concerns over the need to protect Bhutan's rich biodiversity, and the need to plant more trees, conduct gardening, clean surroundings, and manage waste. Hence, students are more aware of environmental conservation than nature conservation in schools.

CHAPTER 6

DISCUSSION AND IMPLICATIONS

6.1 Introduction

This chapter interprets and discusses the study's findings and implications for key stakeholders. It also discusses some limitations of the study and attempts to provide some directions for future research. The study gathered the perspectives of 15 educators and 105 grade six students to determine how nature conservation education was understood, taught and practised in four primary schools in Bhutan. Through a semi-structured interview with the educators and an open-ended questionnaire with the students, 'meanings' were co-constructed, allowing the themes to emerge in the process. The idea of constructivism not only enables open interaction with the informants but allows the researchers to use their prior experiences to modify and negotiate meaning with multiple interpretations (Bogdan & Biklen, 2007; Cohen, Manion, & Morrison, 2018; Creswell & Creswell, 2018; Punch, 2009). This report presents a "holistic picture" of nature conservation education in the four target schools (Creswell & Creswell, 2018, p. 205).

6.2 Discussion of Key Findings

The central research question was: *How is nature conservation education understood, taught, and practised in the primary school of Bhutan?* Qualitative data was collected from four primary schools, two rural and two urban locations, using semi-structured interviews for educators and open-ended questionnaires for students. Specific questions were asked to explore the informants' perspectives on nature conservation education, including school curriculum, teaching-learning, and practices. The key findings discussed below encompass the existing strengths, inconsistencies, or concerns about nature conservation education in primary school.

6.2.1 Unique features of Bhutan that support nature conservation

Bhutan is well known in the international community as one of the world's biological diversity hotspots and eco-regions (NBC, 2022). The heavily forested land area with its pristine and untouched nature is what every Bhutanese pride in. While the rest of the world has artificial forests, Bhutan is one of the rare places with pristine natural forests. Most of the forests in Bhutan are untouched and beyond the reach of human beings because of their wilderness; however, the

wilderness runs into the valleys where the human settlement areas are located. In other words, villages and towns are located amidst forests or close to the forests where people draw their daily subsistence. Furthermore, to the advantage of children's learning, schools in Bhutan are mostly located near the forest or have a forest close by, as some educators stated in this research. This feature will enable the school curriculum to connect with the natural forest more easily.

Another feature that sets Bhutan apart from the rest of the word is its geographical location. As a result of being in the Himalayas, its altitude varies from 160 to 7000 metres above sea level despite its minute land size of just 38 394 square kilometres (page 2). As a result, its climatic conditions also vary from sub-tropical to alpine cold. This altitudinal and climatic variation is advantageous for the survival of diverse biological species – the richness of flora and fauna (Banerjee & Bandopadhyay, 2016). No wonder the Tibetans in the middle ages referred to Bhutan as *Lho Jong Men Jong*[24], the southern country of medicinal herbs (Tshedwang, 1994). These typical biological and geographical features give Bhutan an edge over the rest of the world in nature conservation.

The existing traditional agriculture and farming practices in most communities of Bhutan are another advantage. Although the European nations also have a history of traditional agriculture as early as thousands of years ago, it is a thing of the past. Most developed countries, like Europe, America, and Australia, have modern farming systems aimed at intensifying farming for mass commercial production, which invites the massive use of synthetic fertilisers, pesticides, and heavy machinery (Bignal & McCracken, 2000). To this end, the European Union are making concerted efforts to incentivise some farmers to practise traditional agriculture as one of the nature conservation measures (Hupke, 2023).

Conserving traditional agricultural practices is challenging, given the mounting pressure against the backdrop of intensified farming and economic prospects. In contrast, Bhutan does not have that level of pressure. Most people living in rural and semi-rural communities practise traditional agriculture. These people's livelihood depends solely on subsistence farming and forest use (Penjore & Rapten, 2005; Siebert & Belsky, 2007). Although some modern farming methods and techniques have seeped into the farming system, heavy farm machinery use and mass

[24] The southern land of medicinal herbs referring to Bhutan

commercial cultivation projects have limited scope because of their topographical features. Farmlands are primarily terraced for wet farming to hold water on the gradual slopes, and other farms usually are scattered in smaller plots across the mountains or valleys. Therefore, heavy machinery, such as tractors, has no place in Bhutan's mountainous terrains. As such, traditional farming systems have more reasons to exist. To this end, Bhutanese children have abundant sources of traditional and cultural knowledge about nature. Children can quickly learn the values of nature and how to preserve them from the local community and visit the nearby forests for real experience.

Another feature is the Bhutanese way of life that is deeply influenced by Buddhism, socially and politically. The government's GNH philosophy chooses people's spiritual benefit over materialistic benefit. Similarly, people generally refrain from wanting to be rich because everything is immaterial except the soul of the person that lives on. People are part of nature and live harmoniously with all forms of nature. For them, nature is formed due to 'collective good karma,' but not received as a 'gift' from God like in other religions (see page 18). The mountains, hills, trees, cliffs, and lakes are abodes of the deities that protect the dharma. Therefore, the Bhutanese people respect, revere, and protect these areas (Ura, 2001). Buddhism believes in 'consequent sameness' (Harvey, 2012) and absolutely no sense of superiority over other beings. The belief that a living creature might have been their parents in a previous lifetime generates respect and compassion for all sentient beings. Furthermore, spiritual practices influenced by religion make the Bhutanese way of life favourable for nature conservation.

Thus, this study regards Bhutan's geographical location and the Bhutanese ways of life influenced by Buddhism as significantly advantageous to nature conservation. Hence, nature conservation education should be pursued from this vantage point. Moreover, Ducarme and Couvet (2020) and Pilgrim and Pretty (2010) argue that nature conservation must include cultural preservation because nature and culture cannot be separated. The school curriculum on nature conservation should include preserving culture and traditions related to nature.

6.2.2 Misunderstanding of concepts

The informants generally could not distinguish between the two terms, nature conservation and environmental conservation. For example, the educators and students involved in this study used the two terms interchangeably in their responses. They seemed unaware that the two terms

originate from two different ideologies or that they have different goals. Therefore, before discussing the findings in this regard, it is beneficial to understand the ideologies from the experts' views. Below the box (Figure 6.1) presents the differences between the two conservation ideologies and their goals are briefly explained (see page 42 for more information).

> *Nature* is everything that is naturally 'growing' and 'evolving' through time and space. They 'begin to exist' and 'cease to exist' in natural order (Collingwood, 1960).
>
> *Nature conservation* conserves wild plant and animal species for their intrinsic value. Nature-centred conservation is derived from the naturalist ideology, which begins with an intrinsic relationship with nature. Therefore, nature conservation aims to maintain biodiversity by protecting wild species and their habitats (Baden-Württemberg State, 2022; Hupke, 2023; Marco, 2019; Pilgrim & Pretty, 2010).
>
> *Environmental conservation* conserves natural resources, including plants and animals, to sustain human lives, recreation, and economic progress. The human-nature relationship is external, and the value of species is often calculated in terms of monetary value in the human world (Anderson, 2018a). Therefore, environmentalists use the utilitarian approach to conserving and managing natural resource use (Anderson, 2018; Runte, 2010).

Figure 6.1 *Differences between nature conservation and environmental conservation*

This research revealed some underlying paradoxes in the informants' responses regarding nature and nature conservation. While nature was perceived as something naturally formed, nature conservation involves human intervention. For instance, E3 described 'nature' as something that is "one its own ... [like] plants, flowers ... anything which comes out by itself, the spring water ... taking place on its own according to its time ..." (p. 1). This definition of 'nature' is similar to Collingwood's (1960), who describes nature as things that 'begin to exist' and 'cease to exist' in the natural order. The quality of 'naturalness' is felt.

However, the same informants did not consider the quality of 'naturalness' in nature conservation. There is a conflict between naturalness and artificiality. For example, the informants describe nature conservation as protecting the environment by planting trees, making flower gardens, and managing waste. If human beings decide *what*, *where*, and *how* to plant trees, then the feature of naturalness is violated. Simply put, the garden fruit trees did not grow on their own

course; instead, they were planted for human needs. In this view, there is a contradiction in the informants' perception of nature and nature conservation.

The second concern is about the misunderstanding of the two 'conservation' terms, nature conservation and environmental conservation. Evidence shows that the informants do not know the distinction between the two terms. Hence, they use the two terms interchangeably. For example, one educator said, "I just feel that nature conservation meaning ... like uh protecting the environment, the surrounding where we stay" (E11, p. 1). Similarly, one student said, "I think nature conservation means to keep our envirouts [environment] clean and to make out nature probelty [properly]" (S13, p. 3). To both the informants, there is no distinction—nature conservation means environmental conservation and vice versa.

Nature conservation was almost everything from 'protecting plants and animals' (E13, S57, S25) to 'planting trees and making gardens' (E1, E4, E7, S5, S60, S51), from 'keeping the surroundings clean' to 'managing wastes' (E15, E3, E6, S16, S14, S53), and from 'preventing pollution' (E6, E2, E9, S76, S16) to 'using natural resources wisely' (E3, E13, E9, S98, S87, S12). Furthermore, the threat of climate change (E14, E9, S76, S16), global warming (E9, E1, S76, S16) and other natural disasters '(E4, E1, E6, S76) were expressed as concerns related to nature conservation. However, as mentioned earlier, nature conservation is distinct from environmental conservation in terms of its ideology: while nature conservation is nature-centred, environmental conservation is human-centred (Hupke, 2023; Marco, 2019; Pilgrim & Pretty, 2010). Given that ideologies form the basis for a person's way of thinking and action, it is imperative for educators and students to clearly understand the ideologies of nature conservation and environmental conservation so that their goals are fulfilled accordingly.

6.2.3 Insights into the primary school curriculum

Conservation education in the primary curriculum is explicitly included in two subjects, social studies and science. Three significant findings related to curriculum contents, teaching and learning, and school practices are discussed below to provide valuable insights into nature conservation education in Bhutan.

6.2.3.1 Western perspective versus Bhutanese perspective

As discussed earlier in the literature review, nature and culture are so intertwined that they are simply inseparable. Coincidentally, the Bhutanese traditions and culture deeply influenced by

Buddhism favour nature conservation. For instance, the intrinsic relationship with nature is vital in Buddhist practices and conservation. In addition, the GNH philosophies that uphold the Buddhist precepts are incorporated into the school curriculum for all grade levels. The excerpt from the teacher's manual explains why the school curriculum should be consistent with Bhutanese values and principles:

> GNH values in science lessons
>
> His Majesty the Fourth King, in [the] late 1970s, envisioned a specific Bhutanese path to development in pursuit of values that were consonant with Bhutan's culture, institutions and spiritual values rather than values that were defined by factors external to Bhutanese society and culture. It called for a shift of attention away from development in purely material terms to an emphasis on development in terms of an objective which ensures the spiritual and physical wellbeing of its citizens. (DCRD, 2012, p. 15)

The science curriculum framework and teacher's guidebooks also state that "curriculum is designed underpinning the principles of GNH as an approach to science teaching" and that the communities are regarded as "storehouses of traditional knowledge and practices" (DCPD, 2022, p. 16).

However, findings from this study revealed that perspectives and values in the curriculum textbooks conflict with the traditional and cultural Bhutanese values of 'nature.' The Western perspective of nature conservation, mainly influenced by Christianity, is projected in the science textbooks of grades four, five and six, not Bhutanese perspectives as the nation envisions. First, humans are presented as enemies of the forest and that they are destructive. As a result, the 'forest' has to be protected against human beings. Second, the idea of 'protected areas' or 'community forests' is the best strategy to control human activities and manage the forest resources. The details of the value conflicts are discussed and illustrated with examples in Chapter 2 (see page 51).

Firstly, human beings are portrayed as 'enemies' of the forest. The grade five science text states that protected areas are necessary to check on people's bad habits—to stop hunting, exploitation, and degradation of forests. In addition, the teacher's manual suggests an activity reinforcing the perspective that humans are enemies of forests. For example, the learning activity asks students to sit in groups and discuss why and how people destroy the forest and find out ways to protect the forest (REC, 2018, p. 41). After that, as an outcome, students are expected to develop rules and regulations for protecting forests against the people. This school of thought does not

align with the Bhutanese perspectives of nature and how Bhutanese have lived harmoniously with nature through generations. Rinzin et al. (2009), in their survey of 210 local communities, revealed that many Bhutanese local communities see forests as "an important source of food" and a "source of spiritual health" but "not as something to be exploited" (p. 195). Their study also found that the community people traditionally respect and preserve the sacred forest. Unlike the Western perspectives that consider nature an external resource, Bhutanese people generally have an intrinsic relationship with nature.

The second value conflict is the idea of 'protected areas' considered the best strategy for nature conservation. While the idea contradicts the Buddhist perspective of nature, it is increasingly becoming a globally ongoing conservation dispute, i.e., 'people versus parks' is trending among conservationists (Büscher & Fletcher, 2020). In the textbooks, the 'protected areas' such as national parks, sanctuaries, reserves and biological corridors are claimed to be the best method of saving nature (REC, 2020). However, this is another Christian value—that humans are inherently sinners and destructive by nature. Protected areas are fundamentally a capitalistic drive for nature-human dichotomy–the separation of humans and nature (Büscher & Fletcher, 2020). American conservationists, the pioneers of the national park ideas, perceive humans as 'intruders' and enemies of nature. They are serving God if the people—believed to be sinners, greedy and destructive—are kept away from the pristine forest where God lives (Emon et al., 2015; Gill, 2006). The unpleasant attitude towards human beings is implied in textbooks while discussing the 'forest' or the 'environment.'

The community forest system is introduced in the textbook as the best way to manage forest resources and protect them against human activities. As Bhutan's 'middle path' strategy for conservation, it is believed that this is not as restrictive as the 'national parks' and allows the forest for community use. On the contrary, the traditional practices regarding accessibility and use of the forests have been affected. The concern is about how the 'forest' is discussed in the textbooks of grades four, five and six.

Some ideas in the textbooks that indicate the American park management system are: i) humans are destructive; ii) the rules and regulations must be followed, and violators punished; iii) forest resources must be managed; iv) forest managers are the key custodians; iv) more forests must be designated as protected areas. Unfortunately, these ideas significantly do not align with the traditional Buddhist culture of living in harmony with nature (Rinzin et al., 2009; Siebert

& Belsky, 2007). From the Buddhist perspective, the relationship with nature is ‘intrinsic,’ not ‘extrinsic,’ as the textbooks portray. Bhutan is a country that is strongly influenced by the Buddhist traditions since the 9th century and the people have practised the indigenous traditions of harmonious living with nature since the early settlement that dates back to the neolithic age (Phuntsho, 2013; Savada & Harris, 1993).

Literature reveals that the early settlers of eastern, western and northern Bhutan lived harmoniously with nature for centuries practising agriculture, cultivating crops, raising animals or doing both. The forests were traditionally used for their daily subsistence and their interaction and connection with nature were spiritually and ecologically sound and healthy. This tradition continues across the farming communities of Bhutan. According to Penjore and Rapten (2005), modern forestry legislation restricts free access to people for fear of exploitation or excessive anthropocentric activities (Penjore & Rapten, 2005; Rinzin et al., 2009). Limiting the accessibility of forests to people indicates that Bhutan is increasingly imbibing the external values of 'human-nature' separation. Even to an outsider, the Western idea of protected areas is irrelevant to the Bhutanese context. For example, Seeland (1998) states that the Western idea of protected areas is irrelevant to Bhutan because it already has a culture of predominantly self-sustained rural communities traditionally interacting with the forests. More protected lands for preservation means 'more restrictions', which only takes people farther away from nature. Therefore, Bhutanese children should learn the values of nature from the perspectives of Buddhism, not Western perspectives.

The naturalist’s ideology of nature conservation is also a Western perspective but similar to the Buddhists’ views of nature. According to the Buddhist philosophy, nothing can exist independently "because all things come into being as a result of or depending upon, other causes and conditions” (Dalai Lama, 2018, p. 43). Hence, in Buddhism, humans are part of nature and enjoy an intrinsic human-nature relationship that is interdependent and harmonious. Naturalists enjoy being amidst nature and have a sense of oneness and empathy for other creatures. They also enjoy an intrinsic relationship with nature. However, the curriculum texts seem to advocate the Christian perspectives of humans versus nature. Knowing that attitudes and values are formed in the foundational age of children, the primary science curriculum must align, as His Majesty the Fourth King has envisioned, with “values that are consonant with Bhutan’s culture, institutions

and spiritual values, rather than values that are defined by external to Bhutanese society and culture" (DCRD, 2012, p. 15).

6.2.3.2 School: A place for children's learning about nature

This research shows confusion about the school's role in nature conservation education. While the informants—educators and students—perceive that they are practising nature conservation in the school, the confusion is whether children should be involved in conservation efforts. According to experts, the school's role is to provide opportunities for children to develop an emotional connection with nature, besides developing their species knowledge (Chawla, 2007; Hooykaasa et al., 2019; Pilgrim & Pretty, 2010). Nature conservation is protecting wild plant and animal species of the forests, in the wild areas, which is beyond the scope of children.

However, educators and students in this research perceived that students are practising nature conservation by planting trees, growing flowers and cleaning the surroundings. Firstly, those activities are not nature conservation practices. Instead, the school's focus should be on nature conservation education. In nature conservation education, two aspects are essential: to develop children's knowledge about species and to develop children's emotional affinity with nature (Chawla, 2007). Children's formative years are crucial for developing an emotional connection with nature, besides developing the cognitive and behavioural aspects, so that they take positive conservation actions in the future as adults (Chawla, 2007; Hughes et al., 2018). Chawla (2007) states that there is abundant evidence from past research to prove that positive nature experiences in childhood and adolescence are linked to pro-nature behaviours in adulthood. Enjoyment of nature, empathy for creatures, a sense of oneness and a sense of responsibility towards nature are pro-nature behaviours (Chawla, 2007). To this end, the primary school curricula should focus on developing children's emotional connection with nature and their species literacy skills (Pilgrim & Pretty, 2010) and leave the 'biodiversity conservation efforts' for adults.

The school curriculum should provide ample opportunities for children to experience nature in their immediate surroundings and nearby wildlife, connect with nature, learn about nature and engage in pro-nature activities. Furthermore, knowing that Bhutanese children generally have experience with the natural world due to Buddhist traditions and culture, the school has only to reinforce the inherent affinity with nature.

6.2.3.3 Limited nature experience in children's learning process

Findings show that children have limited opportunities for authentic interaction with nature while studying about it. Most topics about plants and animals, food and habitats are conducted inside the classrooms as theory lessons instead of learning outdoors in the natural world. For instance, one educator revealed, "I think most of these concepts are taught only in the classroom, and children never get to see how the things are outside, and I think there is a mismatch" (E14, p. 3). Students also confirmed this claim: "First Sir reads and explains to us, and then we write note[s] on nature conservation and after 8th period we go home and revise" (S54, p. 4). Another student from a different school shared the same experience: "... teachers explaining everything about nature. And they gave us question[s], and if we didn't know the answer, we went to [the] library and search[ed] for [the] answer[s]" (S40, p. 4). Consequently, this situation widens the gap between the 'school' and the 'natural world.'

Although the informants—educators and students—claim that they engage children in nature-based activities, those activities do not develop children's affinity with real nature. For example, planting trees, flowers, vegetables, and hedges is anthropocentric. The trees, flowers and herbs found on the school campus are planted and managed by people—they are like nature but not real nature. Real nature is in the forest, out in the wild, where self-willed nature lies. Children must experience real nature to develop an affinity with it (Hughes et al., 2018).

One more point of contention is that a sense of responsibility for protecting the forest cannot be taught by discussing and framing rules and regulations for people to follow as currently practised in the four target schools in this research. It is undoubtedly ineffective to teach the beauty of nature while sitting in the classroom and writing notes about it. One has to be emotionally attached to the phenomenon to feel a sense of responsibility towards it. Behaviour change theory suggests that "positive or negative emotions can be an important factor in determining behaviour" (Hughes et al., 2018, p. 12). Therefore, children must develop an emotional connection with nature to demonstrate pro-nature behaviours in their adult life and support conservation efforts.

Direct positive nature experience—according to Hooykaasa et al. (2019), Hughes et al. (2018) and Chawla (2007)—is critical for children to develop a connection with nature. Developing children's intrinsic relationship with nature, in addition to species literacy skills, is the most crucial determinant of pro-nature behaviours and conservation efforts in their adulthood. E13 argued on this point, "… we cannot teach nature by using chalk and chalkboard … Rather when

we take our students to the real site, the impact which they have by seeing that real environment is much more than what somebody teaches in the classroom" (p. 3). While the educators cited some challenges in taking their students outdoors for nature experiences, two things have to be considered by the school. The first is the dire need to provide real positive experiences with nature while learning about nature. The second one is to create natural environments on campus, like eco-gardens—not for aesthetic purposes but for children's experience with real nature.

Nonetheless, the good news is that Bhutanese children can easily access the forests nearby and get the real experiences they need. As E13 proposed, "... schools in Bhutan got [have] ready environments which is just next door you don't have to take very long, very far" (p. 3). Furthermore, since the science curriculum already regards the community and local environment as a "context for more effective learning and constructing knowledge" (DCPD, 2022, p. 16), the school should make the best use of the natural environment for children's experiential learning. Given the above arguments, the school must provide opportunities for children's direct experiences with real nature (Hughes et al., 2018).

6.2.4 School greening is *not* nature conservation

Nature means plants and animals growing on their account or 'begin to exist' naturally (Collingwood, 1960). Real nature is also described as self-willed nature. They are not 'planted' or 'created' by people like flower gardens or vegetable gardens. However, the educators and students' responses revealed that they are unaware of the differences between nature and environmental conservation ideologies. To the informants, the two terms are synonymous and interchangeable. As a result, the school's physical greening activities, such as flower gardening and tree plantation, were misunderstood by the informants as nature conservation practices. Nature conservation protects wild plants and animals for their sake, not for people's benefit.

The concept of 'Green School for Green Bhutan,' pioneered by Thakur Singh Powdyel, the former Education Minister, promotes physical greenery—one of the seven school greeneries. While the goal is to create a school campus that is 'naturally or environmentally green' to make the campus attractive and inviting, it also provides opportunities for children to connect with nature (Yangdon, 2018, p. 25). The informants' statements indicated that the school greening activities, like planting trees, flowers and hedges, are part of their nature conservation efforts. However, they do not fulfil the nature conservation goal because they are human-centred activities.

6.3 Implications for Ministry of Education (MoE) and Teacher Education Colleges

Findings from the present study on nature conservation education have implications for two critical stakeholders of primary education: the Ministry of Education and teacher-education Colleges. The present study identified some gaps and inconsistencies in the curriculum that could affect the quality of nature conservation education. Firstly, the educators' lack of knowledge about nature conservation is a concern because the quality of nature conservation education depends on teachers' knowledge and competencies. This study proves that educators and students cannot distinguish nature conservation from environmental conservation. They were unaware that the two 'conservation' ideologies originate from different perspectives of nature. As a result, the educators and students in the study perceived all human-centred activities like planting, sowing, growing or raising animals at home and school as nature conservation practices. The main concern here is about getting the ideologies right. If the goal of nature conservation education is to be achieved, it is crucial for educators first to understand the ideology and its goals.

Secondly, topics on 'nature' and 'conservation' in the curriculum documents were found to be strongly influenced by Western ideologies, which fundamentally contradict the Buddhist perspectives. Notably, the concept of human-nature separation, human versus nature conflict, human-centric approach, and external relationship with nature has been strongly implied in the science and social studies textbooks of grades four, five and six. The argument is that Bhutanese children should learn the Buddhist perspectives of nature instead of the Christian-influenced Western perspectives. Bhutan is a country strongly influenced by Buddhist tradition and values, such as interdependence, compassion and harmonious living with nature. The general Bhutanese traditional spiritual practices and dietary habits contribute to nature conservation too. To this end, the curriculum contents should be aligned to the "values that are consonant with Bhutan's culture, institutions and spiritual values" (DCRD, 2012, p. 15) and rectify the external values that may be detrimental to the spiritual wellbeing of the Bhutanese people.

Thirdly, evidence points to confusion about the school's role in nature conservation education. The confusion is between school as a place for 'learning' or 'practising' conservation activities. Data showed that the confusion impacted the focus of school lessons and activities

related to nature conservation. Therefore, the confusion must be sorted out, and educators must create a shared understanding of nature conservation.

Fourthly, although the curriculum guidelines suggest that children should experience real nature, the findings of this research indicate otherwise. Children with little or no experience with nature in their formative years are less likely to demonstrate pro-nature behaviours in adulthood (Chawla, 2007; Hughes et al., 2018). According to the informants, one of the reasons for this lapse is the lack of access to learning spaces in the natural environment where children can experience wild nature. Therefore, the school must find ways to provide children with experiences if children are to grow up as pro-nature citizens who will support nature conservation efforts and practise pro-nature behaviours. Given the above concerns, the Ministry of Education and Teacher Education Colleges should take appropriate measures to address the issues.

6.3.1 Professional development programmes for teachers

Substantial evidence from this study shows a general lack of knowledge of nature conservation among the educators interviewed. As field practitioners, teachers should understand its ideology and conservation goal to support children's learning accordingly. Nature conservation education seems to be subsumed under the broad spectrum of environmental conservation education. Without clarity in the teachers' minds, the conservation education's goals and objectives will likely experience confusion. In this sense, the success of nature conservation education depends on the teachers' knowledge and competencies. Therefore, in collaboration with Teacher Education colleges, the Ministry of Education should explore possibilities of professional development workshops on nature conservation for teachers.

The capacity building will impact the teachers' knowledge and attitude towards nature conservation education. It will also profoundly impact their relationship with nature and their responsibility to teach children this value. The knowledge and skills learned from this will have rippling effects on the other teachers across primary schools. In time, schools will find more meaning in creating more natural environments on campus for children's learning.

6.3.2 Reviewing of curriculum on nature conservation education

A review of the primary school curriculum, especially science and social studies of grades four, five and six, is recommended to fill in the gaps and to fix the inconsistencies identified. For this, the MoE and the teacher education colleges should collaborate to organise a comprehensive

and participatory review programme wherein all relevant stakeholders of primary education can partake. Since there are issues of cultural value conflicts, it may be necessary for the review team to begin with a shared vision for nature conservation education. For example, the vision could be to foster the traditional and spiritual connection with nature besides developing their species literacy. The Buddhist values of compassion, interdependence, empathy, responsibility and care for all sentient beings must be nurtured through positive and real experiences with nature.

In particular, some gaps that need to be addressed in the curriculum review are related to values, concepts and learning experiences, especially in the primary science and social studies curriculum. A significant conflict identified is between traditional Bhutanese values and Western values: intrinsic versus extrinsic relationship with nature. The intrinsic relationship with nature that Bhutanese people enjoy must replace the Western perspective that antagonises people and position them as enemies of the forest. The Buddhist values, such as respect and reverence, interdependence, care, compassion and responsibility for all sentient beings, must be embedded and reinforced in the student textbooks.

In doing so, the contents of the textbooks related to nature and its content should be revised to sort the internal values from external values so that the Bhutanese cultural and spiritual values of nature stand out. The review team must align with His Majesty the fourth king's vision of the late 1970s for Bhutanese society. That is, "not to pursue values that are defined by factors external to the Bhutanese society and culture, but at the same time, to be open enough to incorporate external ideas that are good for the spiritual and physical wellbeing of the Bhutanese people" (DCRD, 2012, p. 15).

Data from this study revealed that nature conservation and environmental conservation are misconstrued as the same thing. If the nature conservation ideology can also be presented alongside environmental conservation, children will better understand nature conservation and develop pro-nature behaviours for nature's intrinsic value, not only for human-centred needs.

For children's learning experiences, direct experiences with real nature through strategies like field-based learning, place-based learning or free-play in a natural environment should be emphasised as a mandatory approach to teaching about nature. Eco-gardens, eco-ponds and community forests are infrastructures that schools can provide as learning spaces for children to connect with nature and learn about them. To this end, if these facilities are recommended in the

curriculum document, the MoE may support the schools' initiatives to create these natural environments for children's learning within the school campus or in the community. The community forest should also be easily accessible for children to play and learn about nature. Furthermore, the Bhutanese religious culture of visiting Buddhist monasteries—located in the deep forests or high mountains amidst nature—can also be incorporated into curricular or extra-curricular activities. Visiting a monastery and experiencing wild nature simultaneously can have multiple benefits for children in their cognitive, affective and physical development.

However, the success of the curriculum review may be achieved only by having a shared vision of nature education among the stakeholders and their participation, especially the curriculum specialists, teachers, principals and teacher educators. Consequently, the teacher education curriculum should be aligned with the primary school curriculum and the changes brought into effect for the success of nature conservation education.

6.3.3 Accessibility to natural environments on campus or nearby

This task directly impacts the MoE to create enabling conditions through policies, infrastructure or resource materials. Limited nature experience emerged as a concern for nature conservation education in primary school. While literature instructs that direct and positive experience with nature is critical for children to develop an intrinsic relationship, this research reveals that children need more direct engagement with nature while learning about it. Data revealed that lessons on plants and animals that require nature experience are mostly taught inside the classroom rather than outdoors in the natural environment. Regardless of the reasons, schools must provide opportunities for direct engagement with nature lest children never develop a connection with nature. For this to happen, the MoE should pursue it as a matter of concern with the schools and create enabling conditions for easy access to natural environments. The following are some measures to overcome the current challenges related to accessibility.

Creating an eco-garden and an eco-pond on the school campuses would fetch immense benefits for children's science and nature conservation education. These two strategies, namely 'Nature Garden' and 'Eco-pond,' are recommended in the existing primary science curriculum as part of the drive to create a science-friendly environment (REC, 2018). Eco-garden is a widely used infrastructure internationally in primary and secondary schools as the best way to connect children with nature so that they develop pro-nature and pro-environmental behaviours in their

formative years (Cheang et al., 2017). According to Cheang, primary schools in the USA have used eco-gardens for educational purposes in the past two decades. They found it to be highly effective in developing children's eco-centric attitudes. Eco-garden is a tiny land where wild native plants are grown to harbour various animals, including insects, birds and small mammals (REC, 2018a). As suggested in the science teacher's manual, a small patch of land in the corner of the campus, probably lying unutilised, can be identified for this purpose.

Eco-gardens are different from conventional flower gardens, which are objectively for campus beautification of a school campus. Although eco-gardens are human-made, they are the closest copy of a natural environment where nature can form on its account. The idea of eco-gardens emphasises biodiversity and naturalness so that children can observe, learn and carry out projects on wild plants and animals in their ecological settings. It is also a place where children can play and have fun during their free time.

Similarly, as the primary science curriculum recommends, an eco-pond is another beneficial natural learning environment where children can experience an ecosystem in water. For example, the school could use a natural pond if available; otherwise, they could construct a new one on the school campus near the eco-garden or wherever convenient. Once the construction with the required depth, shape and size of the pond is complete, have sufficient water and porous materials "to provide substrate for the plants to grow and animals to feed" (REC, 2018, p. 7). Thus, the eco-pond forms another ecological system for children to experience the co-existence of nature and the value of interdependence.

A natural environment such as an eco-garden and eco-pond as part of the school infrastructure will provide children ample opportunities to experience wild nature. While children should be allowed to play freely in the natural environment during recess, they can use the facility to learn various nature-based topics more meaningfully. When the facility is easily accessible, the frequency of its usage will increase exponentially. This facility probably will substitute the off-campus field trips, which teachers expressed as challenging to manage. Nonetheless, the benefits of an eco-garden or eco-pond can only be fully realised once the teachers and students have the exact expectations of the activities. The learning outcomes of nature conservation education while using the eco-garden or the eco-pond should cover three aspects, cognitive, affective and behaviour – knowledge about plant and animal species, the intrinsic value of nature, and responsibility.

Another possible strategy to create more natural environments is the 'shifting of human-centric gardening to eco-centric gardening' at school. Findings from this research show that the four primary schools engaged students regularly in nature-based activities like flower gardening and planting trees and hedges. Students were observed keenly working in their flower gardens, weeding, fertilising or watering during recess and morning social work hours. Harping on these existing good practices of 'school greening initiatives,' the concept of eco-gardening can be integrated and converted into ecologically friendly gardens. This can be easily done if the school shifts their focus from 'campus aesthetics' to 'ecological benefit.' This shift will keep the gardens chemical free by insisting on using organic fertilisers. One significant impact on the ecology when the soil is chemical free is that the animal species that feed, nest and hide will probably start inhabiting these ecosystems, namely the flower plants, herbs, hedges or trees (Poschlod & Braun-Reichert, 2017). When favourable conditions, such as food and habitat, animal species arrive on their account, taking refuge in the newly created habitats. This way, more natural features are added to the school campus as children's learning resources for nature conservation and life science education. Both the goals are simultaneously fulfilled – campus aesthetics and children's learning.

The last proposal for enabling natural environments for children's real nature experience is using the community forests. If specific spaces in the community forest are designated as learning spaces for children, teachers will find it easier to bring their children for free play or science projects. This would allow children to visit the nearby forests, play freely, and carry out learning activities related to species. In this regard, the MoE must collaborate with the Department of Forestry to sort out measures to designate or create some learning spaces in the forests. The two key agents may have to conduct a feasibility study on how some areas in the forest can be designated as learning spaces for school children. These important tasks should be executed to fulfil the goal of fostering children's intrinsic connection with nature and learning about it in context. Children should have many memories made in the forest with their teacher as a role model who loves nature.

6.3.4 Creating resource materials for children's learning

One of the study's findings is that children's knowledge of local plants and animals was relatively poor. So, science teachers must put in extra effort to develop children's species literacy. At least, children should know the names of plants and animals in one's immediate surroundings.

Hooykaasa et al. (2019) assert that species literacy stimulates interest and fosters respect and affinity towards them. Knowing the species name is the starting point to stoke interest, value and affinity. Conservation starts with 'knowing and conserving' the native species rather than learning about saving endangered or charismatic species of a distant land. After all, native species are part of the tradition and culture, giving a person a sense of belongingness which is essential for intrinsic connection with the nature around us (Pilgrim & Pretty, 2010).

One effective way to make local species familiar to children is through attractive and simple-to-read books. The first essential material to be developed is an encyclopedia of native plants and animals of Bhutan using the knowledge and expertise of the National Biodiversity Centre under the Ministry of Agriculture and Forestry. If the encyclopedias are specially designed for children, they will use them while exploring the natural world. The second type of material that might be useful is supplementary readers, both fiction and non-fiction. Children's picture books can cover themes such as empathy for all living creatures, care and respect for nature, a sense of oneness, and joy of being with nature. Children can learn that all species have intrinsic value through stories, rhymes and songs. Stereotypical ideas that propose one species as more valuable or beautiful than the other can be corrected through stories. To this end, the Ministry of Education should initiate a writing project to develop resource materials for teachers and students.

6.3.5 Implication for teachers

Teachers play a central role in children's formative years, and their influence can have a lasting impact. Chawla (2007) asserts that teachers are one of the most influential figures in a child's life, and what they do together "through processes of joint attention to the surrounding world" (p. 158) is found to impact their later life significantly. Therefore, what teachers do with primary school children is critical to their learning about nature and its intrinsic values. The following are some valuable ideas taken from Chawla's (2007) publication on 'Childhood Experiences Associated with Care for the natural World', which teachers can incorporate into their teaching.

i. Free play in nature

Active and free play in the natural world in childhood leaves deep impressions. Nature is like a wonderland that lends infinite affordances for children's learning, knowledge, skills and values. Free play allows children to initiate their learning and continue engagement because of the

immediate rewards, reinforcement, motivation and stimulation they receive from the nature around them. For example, children's curiosity, creativity, pleasure and keenness will increase since no two leaves of the same tree are the same, no two birds or crickets sing the same song or no two rotten logs have the same instillation of insects (Chawla, 2007). Thus, teachers should provide children opportunities for free play in the natural world by taking them to places with natural features, like eco-gardens or nearby forests.

ii. Doing things together

Doing things together in nature with children and paying attention to the same thing can foster a special bond with nature and the others in the group. Ecological psychology considers 'Joint Attention' a significant strategy for developing children's connection with nature (Chawla, 2007). Paying attention to the same thing as the teacher not only creates a positive and lasting memory for children but fosters values of nature by observing the teacher's example. Children learn the same values if the teacher demonstrates appreciation, respect and care for nature while being together. Teachers also demonstrate the pleasure of being out in nature and immense fascination with the details of the phenomenon they are jointly paying attention to. Teachers can also use the Bhutanese religious culture of visiting Buddhist monasteries, which are best known to be located in the deep forests or high mountains amidst nature, as opportunities for nature-based activities. In this way, children will be able to experience nature frequently, know more and develop an unconditional affinity with it.

iii. Enhancing the Nature Club Activities

Nature clubs are popular in the primary schools of Bhutan. Some project-based activities related to nature or hiking and camping may be the most memorable engagement with nature. For most people, activities with friends or classmates form some of the best memories of adolescence and youth. Meeting at one place at a particular time, planning, dividing roles, and then executing the plan to meet the desired goal can be equally exciting and motivating for them.

In schools, nature club students seem engaged in planting and growing trees, flowers and hedges. However, if the approach can be shifted from human to eco-centredness, students can experience more of nature. For example, the nature club can carry out joint projects, such as creating eco-gardens, eco-ponds and small natural learning spaces, so lessons on nature can

become more meaningful. In addition, the clubs can also work on restoring or creating new habitats on campus for creatures that feed, nest and hide. The outcomes of these nature-based activities by the nature club will contribute greatly to children's learning about nature and foster children's connection with nature.

6.4 Limitations of the Study

Like all research, the findings of this study have to be considered in light of some limitations. Firstly, the methodological limitation lies in the ethnographic design that relied on participant observation. Although this research has benefitted from its merits, especially in gathering the 'insider's perspectives,' the downside is that data analyses depended mainly on the researcher's world views and how she interpreted them. In this view, the researcher may not have been able to capture completely what the participants wanted to convey or have misunderstood their responses in some parts. To reduce the impact, multiple perspectives were collected from people working in different positions in primary education. In addition, a brief researcher's background has been provided in chapter 1 for the readers to infer the findings in context.

The next limitation is related to sampling. Eight science teachers (out of 15 informants) were identified as 'rich informants' for the study based on the justification that science was the closest subject to nature education. However, including teachers from other disciplines would have added to the richness of the data. For example, subjects like social studies covered conservation topics as social responsibilities. Nevertheless, it was also found that some science teachers were also teaching social studies at the time or had previously taught other subjects. If teachers of other disciplines were intentionally included, the study would have gained new insights into how teachers generally perceived nature conservation education.

Finally, the researcher's limited background knowledge of nature conservation may have been weak. The researcher neither has any formal education or training in nature conservation education nor any experience in teaching science or nature-based education. As a result, the researcher may have missed out some crucial details in the research process, which otherwise would have benefitted the readers.

6.5. Scope for Future Research

Several potential areas for future research have been identified based on the implications and limitations of this study. Since this study gathered perspectives of only science teachers, future research could include general teachers to get a more comprehensive view of how Bhutanese teachers perceive nature conservation education. The findings may help widen the awareness of nature conservation education among school teachers and their responsibility towards it.

Joint future research by the Ministry of Education and the Department of Forestry is necessary to study the feasibility of creating learning spaces for children in the nearby forest. This research is one of many tasks that must be undertaken to foster children's intrinsic connection with nature and learn about nature in context. Moreover, closing the gap between the school and the forest is urgent before it widens further.

Some claims made in this study about most Bhutanese traditions and cultural practices being pro-nature need to be backed by research data. Therefore, future research exploring the widely practised religious, cultural and spiritual traditions supporting nature conservation will be beneficial. The findings will add to the body of knowledge on pro-nature traditional and cultural practices and can enrich the content of school curriculum textbooks.

6.6 Chapter Summary

The first part was a discussion of major themes related to the findings from this study. Bhutan's unique features of being heavily forested, traditional farming practices, and rich culture and spiritual practices were discussed as favourable for nature conservation education. Findings showed that the educators and students in this study could not distinguish between nature conservation and environmental conservation. Another gap and inconsistencies identified was the value conflicts in the science and social studies textbooks of grades four, five and six. External values that regard nature and humans as separate entities, nature as an external resource for human use and protected areas as the best strategy for nature conservation have been discussed as contrary to Bhutanese tradition, cultural and spiritual values. Gaps related to children’s limited experience with nature and the role of school in nature conservation education were discussed.

The implications for the Ministry of Education and teacher education colleges have been explicitly described, and some measures have been suggested for subsequent implementation. For

example, professional development training for teachers, creating natural environments like eco-gardens, eco-ponds and developing resource materials are suggested. In addition, using the community forest for children's free play and focused learning was recommended. Some strategies were also suggested for teachers of primary school. Teachers were encouraged to provide free play opportunities, do things together in nature and carry out eco-centred gardening activities.

Some study limitations related to methodology, sampling and researcher's knowledge background were discussed, along with measures taken to reduce the impact on the study's outcomes. Lastly, some potential areas for future research based on the study's limitations were presented.

CHAPTER 7

CLOSING THE GAP

This study aimed to understand how nature conservation was perceived, taught and practised in four primary schools in Bhutan. Many insights are drawn from the educators' and students' responses that will benefit nature conservation education. One positive vibe reverberating across informants is the common belief that nature conservation education is essential for children. However, nature conservation is generally misunderstood as environmental conservation or vice versa. Findings reveal that educators and students in this research use the two conservation terms interchangeably and synonymously. Therefore, this study has persistently differentiated between the two conservation ideologies so that nature conservation education is acknowledged as equally important but with a different goal. According to the literature, nature conservation conserves wild plant and animal species for their intrinsic value, whereas environmental conservation conserves and manages natural resources for human benefit. While both ideologies transpire into value education, their fundamental values contradict each other. For instance, for naturalists, all species have intrinsic value, whereas, for environmentalists, one species can be more valuable than the other depending on its economic or utility value.

Another insight gained from this study is about the school's role in nature conservation education. Findings from this study show that there is a lack of clarity as to what roles the school must play in nature conservation education. Since the goal is to develop children's connection with nature and their awareness of wild species, the school should focus only on providing real nature experiences. If children must grow up to love and appreciate nature lifelong, they must develop an emotional affinity with it in their formative years. Children must also understand that every species is unique and has intrinsic ecological value. For instance, a mosquito is as valuable as a butterfly since it is food for singing birds or spiders. Every flower, irrespective of its physical beauty, is essential for a set of insects dependent on it. The school must provide children with real experiences in the natural world to understand nature's values and wonders. However, expecting young children to conserve wildlife is too far-fetched because that is adults' work. Thus, formative schooling should focus on fostering an intrinsic relationship with nature by teaching them the

Buddhist values of compassion, empathy, interdependence, respect and responsibility for all sentient beings.

The need to provide real nature experiences emerge in this research as critical to developing children's affinity with nature. Real nature can be described simply as self-willed nature that comes by itself, like the forest. Bhutan is lucky to have mountains covered with real nature that run into all the valleys making forests easily accessible to people. The school should use the facility to their advantage. Although the schools have trees, flowers and hedges planted in their surroundings, they are unnatural because people designed them. Therefore, frequent field trips, hiking or excursions to the nearby forests for free play or focused lessons would allow children to love, appreciate and connect with real nature.

The rich culture and traditions deeply influenced by Buddhism also benefit nature conservation. As a Buddhist country, the nation upholds the Bhutanese traditions and cultural values by infusing them into the school curriculum. The traditional value of *tha damtshig,* genuine trust and commitment to others, and *ley gyu-drey,* the truth of action and consequence, often referred to as *karma* are core values that evoke compassion, empathy, respect and care for all sentient beings. However, findings show that Western values of nature conservation have seeped into the textbooks, conflicting with cultural and spiritual values. Bhutanese people influenced by Buddhism perceives nature differently from the other religious cultures, and their rich cultural and spiritual values have enabled them to live harmoniously with nature for thousands of years. Hence, some external values may be relevant and valuable, but others may be unsuitable for the Bhutanese society. Educators must be careful about which values to foster in children, especially in their formative years.

Finally, it is essential to know that nature conservation education is the responsibility of all teachers, not only those teaching science and social studies. Teachers of all disciplines must teach children the values of nature and help them connect with nature. Childhood experiences in the wild nature can create magical memories for a lifetime connection with nature. Nature conservation education that fosters love, respect and care for nature will enable the Bhutanese society to continue living harmoniously with nature, as the nation envisions.

REFERENCES

Allison, E. (2017). Spirits and nature: The intertwining of sacred cosmologies and environmental conservation in Bhutan. *Journal for the Study of Religion, Nature and Culture*, *11*(2), 197–226. Doi: 10.1558/jsrnc.18805

Anderson, V. (Ed.) (2018). *Debating nature's value: The concept of 'natural capital'*. Cham, Switzerland: Palgrave Macmillan.

Baden-Württemberg State. (2022). Nature Conservation. Available from https://um.baden-wuerttemberg.de/en/topics/nature-conservation

Balint, L., & Jones, A. (2019). *Natural Capital and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Cambridge, UK: Palgrave Pivot Cham.

Banerjee, A., & Bandopadhyay, R. (2016). Biodiversity hotspot of Bhutan and its sustainability. *Current Science, 110*(4), 521. doi:10.18520/cs/v110/i4/521-528

Bignal, E. M., & McCracken, D. I. (2000). The nature conservation value of European traditional farming systems, *Vol. 8*(No. 2), pp. 149–171. doi: 10.1139/a00-009

Bogdan, R., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods* (5th ed.). Boston Mass: Pearson A & B.

Büscher, B., & Fletcher, R. (2020). *The conservation revolution: Radical ideas for saving nature beyond the anthropocene.* London, New York: Verso.

Casetta, E., Silva, J. M. d., & Vecchi, D. (2019). *From assessing to conserving biodiversity: Conceptual and practical challenges*. *History, philosophy and theory of the life sciences: Vol. 24*. Cham, Switzerland: SpringerOpen.

Chawla, L. (2007). Childhood Experiences Associated with Care for the Natural World: A Theoretical Framework for Empirical Results. *Children, Youth and Environments*, *17*(4), 144–170. Available from http://www.jstor.org

Cheang, C. C., Winnie So, W. M., Zhan, Y., & Tsoi, K. H. (2017). Education for sustainability using a campus eco-garden as a learning environment. *International Journal of Sustainability in Higher Education, 18*(2), 242–262. Available from www.emeraldinsight.com

Choskyi, J. (V.) (1988). Symbolism of animals in Buddhism. *Buddhist Himalaya*, *Vol. 1*(No. 1). Available from http://ccbs.ntu.edu.tw

Christenhusz, M. J. M., & Byng, J. W. (2016). The number of known plants species in the world and its annual increase. *Phytotaxa*, *261*(3), 201. doi: 10.11646/phytotaxa.261.3.1

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed). London, New York: Routledge

Collingwood, R. G. (1960). *The idea of nature*. New York: Oxford University Press, Incorporated.

Costea, G., Pusch, M. T., Bănăduc, D., Cosmoiu, D., & Curtean-Bănăduc, A. (2021). A review of hydropower plants in Romania: Distribution, current knowledge, and their effects on fish in headwater streams. *Renewable and sustainable energy reviews*, *145*(3), 111003. doi: 10.1016/j.rser.2021.111003

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed). Los Angeles: SAGE.

Dalai Lama (2018). *An introduction to Buddhism* (T. Jinpa, Trans.). *Core teachings of the Dalai Lama*. Boulder: Shambhala.

Darwin, C., & Huxley, J. (2014). *The origin of species: 150th anniversary edition*. New York: Signet Classic.

DCPD (Ed.) (2022). *Science curriculum framework classes PP-XII*. Department of Curriculum and Professional Development (DCPD). Thimphu, Bhutan: DCRD, MoE.

DCRD (2012). *Teacher's manual: Class four science*. Department of curriculum and development. Thimphu, Bhutan: DCRD, MoE.

Dorji, J. (2000). The Lhopus of western Bhutan. *The Tibet journal, Vol. 25*(No. 2), pp. 52-59. Available from https://www.jstor.org/stable/43302438

Ducarme, F., & Couvet, D. (2020). What does 'nature' mean? *Palgrave Communications, 6*(1), 194. doi: 10.1057/s41599-020-0390-y

Eco Canada. (2021). *Conservation biologists*. Available from https://eco.ca/career-profiles/conservation-biologist

Edmond, C. (2022). *70 new species discovered in 2021*. Available from https://www.weforum.org

Emon, A. M., Levering, M., & Novak, D. (2015). *Natural law: A Jewish, Christian, and Islamic trialogue*. Oxford: Oxford Univ. Press.

Evans, D. (1997). *A history of nature conservation in Britain* (Second edition). London: Routledge.

Galletta, A. (2013). *Mastering the semi-structured interview and Beyond*. New York: University Press.

Gibbs, G. R. (2007). Analyzing qualitative data. *The SAGE qualitative research kit*, (6). Los Angeles: Sage Publications.

Gill, R. (2006). *A textbook of Christian ethics* (3rd). T&T Clark International. Available from https://b-ok.asia/book

Gish, D. A., & Klinghard, D. (2017). *Thomas Jefferson and the science of republican government: A political biography of notes on the state of Virginia* (1st ed.). New York, etc.: Cambridge University Press.

GNHC. (2022): History of GNH. *GNH Centre of Bhutan*. Available from www.gnhcentrebhutan.org

GRF. (2016). Europe. *Global religious futures*. Available from www.globalreligiousfutures.org/regions/europe

GreenFacts. (2022). Biodiversity and human wellbeing. *Green Facts (2001-2022).* Available at https://www.greenfacts.org

Harvey, P. (2012). *An introduction to Buddhism: Teachings, history and practices* (2nd ed.). Cambridge: Cambridge University Press.

Hooykaasa et al. (2019). Identification skills in biodiversity professionals and laypeople: A gap in species literacy. *Biological conservation, 241*. doi: 10.1016/j.biocon.2019.108202

Hughes, J., Richardson, M. & Lumber, R. (2018). Evaluating connection to nature and the relationship with conservation behaviour in children. *Journal for Nature Conservation,* 45 (4), pp. 11–19. DOI: 10.1016/j.jnc.2018.07.004.

Hupke, K-D. (2023). *Nature Conservation*. Heidelberg, Germany: Springer.

Johnson, L. K. (1992). The Buddhist perception of nature: Implications for forest conservation in Thailand. *The trumpeter: The journal of ecosophy, Vol 9 No 1 (1992)* (1), 65–69. Available from http://trumpeter.athabascau.ca

Letro, L., & Wangchuk, S. (2016). Monpa, the early settlers of Bhutan in Jigme Singye Wangchuck national park and conservation strategy. *European online journal of natural and social sciences, Vol.5*(No.4), 988–995. Available from https://www.researchgate.net

Lockie, S., &Ransan-Cooper, H. (2015). Biodiversity and sustainable development, in Redcliff, M. and Srpingett, D. (eds). *The Routledge International Handbook of Sustainable Development*. Routledge: London.

Losos, J. (2014). What is evolution? *Pp. 3-9 in* Losos, J.B., D.A. Baum, D.J. Futuyma, H.E. Hoekstra, R.E. Lenski, A.J. Moore, C.L. Peichel, D. Schluter and M.C. Whitlock, eds. *The Princeton guide to evolution*. Princeton, NJ: Princeton University Press.

Lower, R., & Watson, R. (2022). *How many national parks are there?* Available from https://www.nationalparks.org

Marco, S. D. (2019). Integrating ecology and evolutionary theory: A game changer for biodiversity conservation? In *From assessing to conserving biodiversity,* Vol. 24, pp. 317–374). doi:10.1007/978-3-030-10991-2

Mason, D. S. (2019). *A concise history of modern Europe: Liberty, equality, solidarity* (4th ed.). Lanham: Rowman & Littlefield.

Meinard, Y., Coq, S., & Schmid, B. (2019). The vagueness of biodiversity and its implications in conservation practice, in E. Casetta et al. (eds), From *Assessing to conservation biodiversity, history, philosophy and theory of the life science*s 24, Vol. 24, pp. 353–374. doi: 10.1007/978-3-030-10991-2

Meine, C. (2013). Conservation Movement, Historical. In *Levin S.A. (ed.) Encyclopedia of biodiversity* (2nd ed.). Vol. 2, pp. 278-288. Waltham, MA: Academic Press. doi:10.1016/B978-0-12-384719-5.00029-0

Melis et al. (2021). Species identification skills in teacher education students: the role of attitude, context and experience. *International journal of science education, 43*(11), 1709–1725. doi: 0.1080/09500693.2021.1928326

MoE. (2021). Education policy guidelines and instructions. Thimphu, Bhutan: Ministry of Education. Available from http://www.education.gov.bt

MoE. (2020). 34th Education policy guidelines and instructions. *Ministry of Education*. Thimphu, Bhutan. Available online at http://www.education.gov.bt

MoE. (2014). Education blue print 2014-2024. Thimphu, Bhutan: Ministry of Education. Available from http://www.education.gov.bt

MOFA. (2022): Bhutan and the UN. *Ministry of foreign affairs of Bhutan*. Available from https://www.mfa.gov.bt.

Morgan, S. (2022). Ecosystem. *National Geographic Society*: *Encyclopedia*. Available from https://www.nationalgeographic.org

NAB. (2022). Constitution of Bhutan. *National assembly of Bhutan*. Available from https://www.nab.gov.bt.

National Biodiversity Centre. (2022). Species Diversity of Bhutan. Available from https://nbc.gov.bt

NBC. (2022): Species Diversity of Bhutan. *National biodiversity of Bhutan*. Thimphu, Bhutan: Ministry of agriculture and forestry. Available from https://nbc.gov.bt/species-diversity/.

NPO. (2023). Fritz Haber: The Nobel Prize in Chemistry 1918. *Nobel Prize Outreach*. Available from https://www.nobelprize.org/

Norbu, C., & Floyd, C. (2004): Changing Soil Fertility Management in Bhutan: Effects on Practices, Nutrient Status and Sustainability. In *Journal of Bhutan Studies* 10 (6), pp. 49–68. Available online at https://www.bhutanstudies.org.bt.

NSB. (2021): Statistical Yearbook of Bhutan 2021. *Royal government of Bhutan*. Thimphu, Bhutan: National Statistics Bureau.

Norbu et al. (2019). A provisional physiographic zonation of Bhutan. *Journal of Bhutan studies*, *1*(1), 54–87. Retrieved from https://www.bhutanstudies.org.bt

Penjore, D., & Rapten, P. (2005). Trends of forestry policy concerning local participation in Bhutan. *Environmental science*, 21–27. Retrieved from https://www.semanticscholar.org

Phuntsho, K. (2013). *The history of Bhutan*. London: Haus.

Phuntsho, K. (2020). On the Two Ways of Learning in Bhutan. *Journal of Bhutan Studies*, Vol *2* (2), 96–126. Available from https://www.bhutanstudies.org.bt

Pilgrim, S., & Pretty, J. N. (2010). *Nature and culture: Rebuilding lost connections* (1st ed.). Earthscan London: Routledge.

Poschlod, P., & Braun-Reichert, R. (2017). Small natural features with large ecological roles in ancient agricultural landscapes of central Europe - history, value, status, and conservation. *Biological conservation*, *211*(2), 60–68. doi: 10.1016/j.biocon.2016.12.016

Punch, K. F. (2009). *Introduction to research methods in education*. London: Sage thousand oaks.

REC. (Ed.) (2018). *Science: Teacher's Manual Class Four*. Paro, Bhutan: Royal Education Council (REC).

REC. (Ed.) (2020). *Science Class IV*. Paro, Bhutan: Royal Education Council (REC).

REC. (Ed.) (2018). *Social Studies Class IV Manual*. Paro, Bhutan: Royal Education Council (REC).

REC. (Ed.) (2019). *Social Studies Class IV*. Paro, Bhutan: Royal Education Council (REC).

REC. (Ed.) (2020). *Social Studies Class V*. Paro, Bhutan: Royal Education Council (REC).

Rennie, F., & Mason, R. (2008). *Bhutan: Ways of knowing*. Charlotte, North Carolina: Information Age Publishing.

Reydon, T. (2019). Are Species Good Units for Biodiversity Studies and Conservation Efforts? *History, philosophy and theory of the life sciences*, Vol 24, pp. 169-189. Cham, Switzerland: SpringerOpen.

RGOB. (2008). *The Constitution of the Kingdom of Bhutan*. Thimphu: Royal Government of Bhutan. Available online at https://www.nab.gov.bt

Rosalino, L. M., & Rosalino, C. (2012). Nature conservation from a junior high school perspective. *Journal for Nature Conservation*, 20 (3), pp. 153–161. doi: 10.1016/j.jnc.2012.01.001.

Rinzin et al. (2009). Nature conservation and human well-being in Bhutan. *The journal of environment & development*, Vol. 18 (No. 2). 177–202. doi: 10.1177/1070496509334294

Robinson, R. A., & Sutherland, W. J. (2002). Post-war changes in arable farming and biodiversity in Great Britain. *Journal of applied ecology*, *39*(1), 157–176. doi: 10.1046/j.1365-2664.2002.00695

RSPN. (2006). *Buddhism and the environment*. Thimphu, Bhutan: Royal society for protection of nature (RSPN). Retrieved from https://www.rspnbhutan.org

RSPN. (2022). *Flora and fauna of Bhutan*. Thimphu, Bhutan: Royal society for protection of nature (RSPN). Retrieved from https://www.rspnbhutan.org

Runte, A. (2010). *National parks - the American experience*. US: Taylor Trade Publishing.

Sangeetha et al. (2019). Biodiversity and conservation: Characterization and utilization of plants, microbes and natural resources for sustainable development and ecosystem management. *Current research in ethnomusicology: Outstanding dissertations*. Toronto: Apple Academic Press.

Savada, A. M., & Harris, G. L. (1993). *Nepal and Bhutan: Country studies* (3rd ed.). *DA pam: 550-35*. Wahington D.C.: Federal Research Division Library of Congress.

Seeland, K. (1998). The national park management regime in Bhutan: Historical background and current problems. *Worldviews: Global religions, culture, and ecology*, *Vol. 2*(No. 2), pp. 139-154. doi: 10.1163/156853598x00145

Sharma, B. D. (2005). *Lhops (Doya) of Bhutan: An ethnographic account*. New Delhi: Akansha Publishing House.

Siebert, S. F., & Belsky, J. M. (2007). Reflections on conservation education and practice in Bhutan. *Journal of Bhutan studies*, Vol. 16 (No. 16), 83-112. Retrieved from https://www.bhutanstudies.org.bt

Škrobonja et al. (2015). Domestic animals as symbols and attributes in Christian iconography: some examples from Croatian sacral art. *Veterinární Medicína*, *46*(No. 4), 101–107. doi:10.17221/7863.

Spence, M. D. (1999). *Dispossessing the wilderness: Indian removal, national parks, and the preservationist ideal*. New York: Oxford University Press.

Spielmann et al. (2013). *Integration of nature protection in forest policy in Baden-Württemberg (Germany): Integrate country report*. Freiburg: Eficent-oef.

Spradley, J. P. (1980). *Participant observation*. New York: Holt, Rinehart and Winston.

Tshedwang, S. P. (1994). *History of Bhutan*. Thimphu, Bhutan: National Library.

Ura et al. (2012). *A short guide to gross national happiness index*. Thimphu, Bhutan: The centre for Bhutan studies.

Ura, K. (2001). Deities and environment: A four-part series. *Kuensel: Bhutan's National Newspaper*. Retrieved from https://lib.icimod.org

Ura, K. (2009). *A proposal for GNH value education in schools*. Thimphu: Gross National Happiness Commission.

U.S. Department of Agriculture. (2022). *Wilderness*. Retrieved from https://www.fs.usda.gov/managing-land/wilderness

US Department of Interior. (2006). *Management Policies 2006: The Guide to Managing a Park System.*

Wangchhuk, L. (2008). *Facts about Bhutan: The land of the thunder dragon*. Thimphu: Absolute Bhutan Books.

Wangyal, T. (2001). Ensuring social sustainability: Can Bhutan's education system ensure intergenerational transmission of values? *Journal of Bhutan Studies,* 3 (1), pp. 106–131. Available from www.bhutanstudies.org.bt

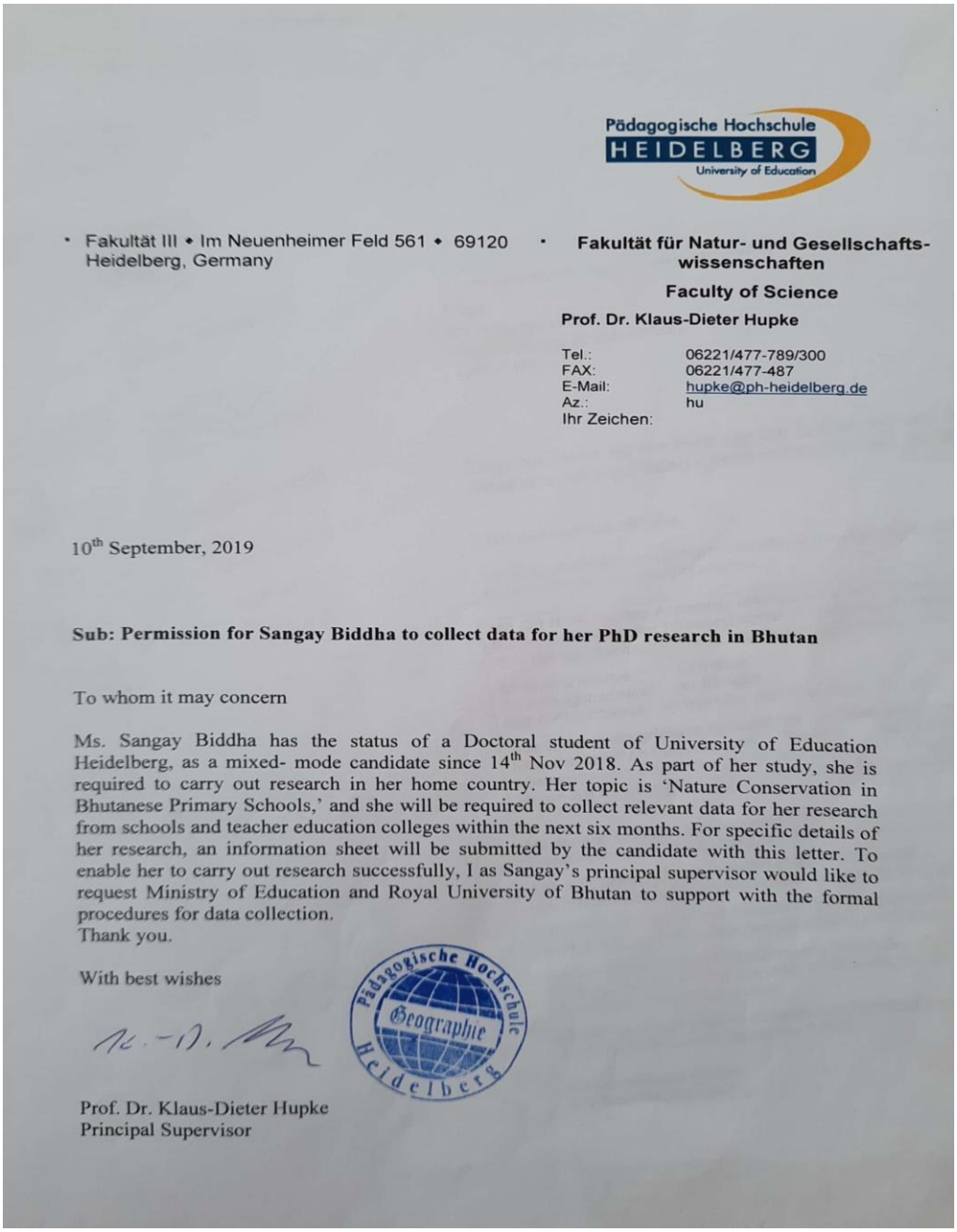
Wang, S. W., Lassoie, J. P., & Curtis, P. D. (2006). Farmer attitudes towards conservation in Jigme Singye Wangchuck national park, Bhutan. *Environmental Conservation, 33*(2), 148–156. doi:10.1017/S0376892906002931

Whittock, M. J. (2019). *Mayflower lives: Pilgrims in a new world and the early American experience*. New York: Pegasus Books.

Yangdon. (2018). *Do knowledge, motivation, efficacy, and implementation affect the impact of spiritual greenery activities?* (Dissertation). University of New England, Armidale

APPENDICES

Appendix 3.1 Approval from Heidelberg University of Heidelberg, Germany



Pädagogische Hochschule
HEIDELBERG
University of Education

• Fakultät III • Im Neuenheimer Feld 561 • 69120 Heidelberg, Germany •

Fakultät für Natur- und Gesellschafts-wissenschaften

Faculty of Science

Prof. Dr. Klaus-Dieter Hupke

Tel.: 06221/477-789/300
FAX: 06221/477-487
E-Mail: hupke@ph-heidelberg.de
Az.: hu
Ihr Zeichen:

10th September, 2019

Sub: Permission for Sangay Biddha to collect data for her PhD research in Bhutan

To whom it may concern

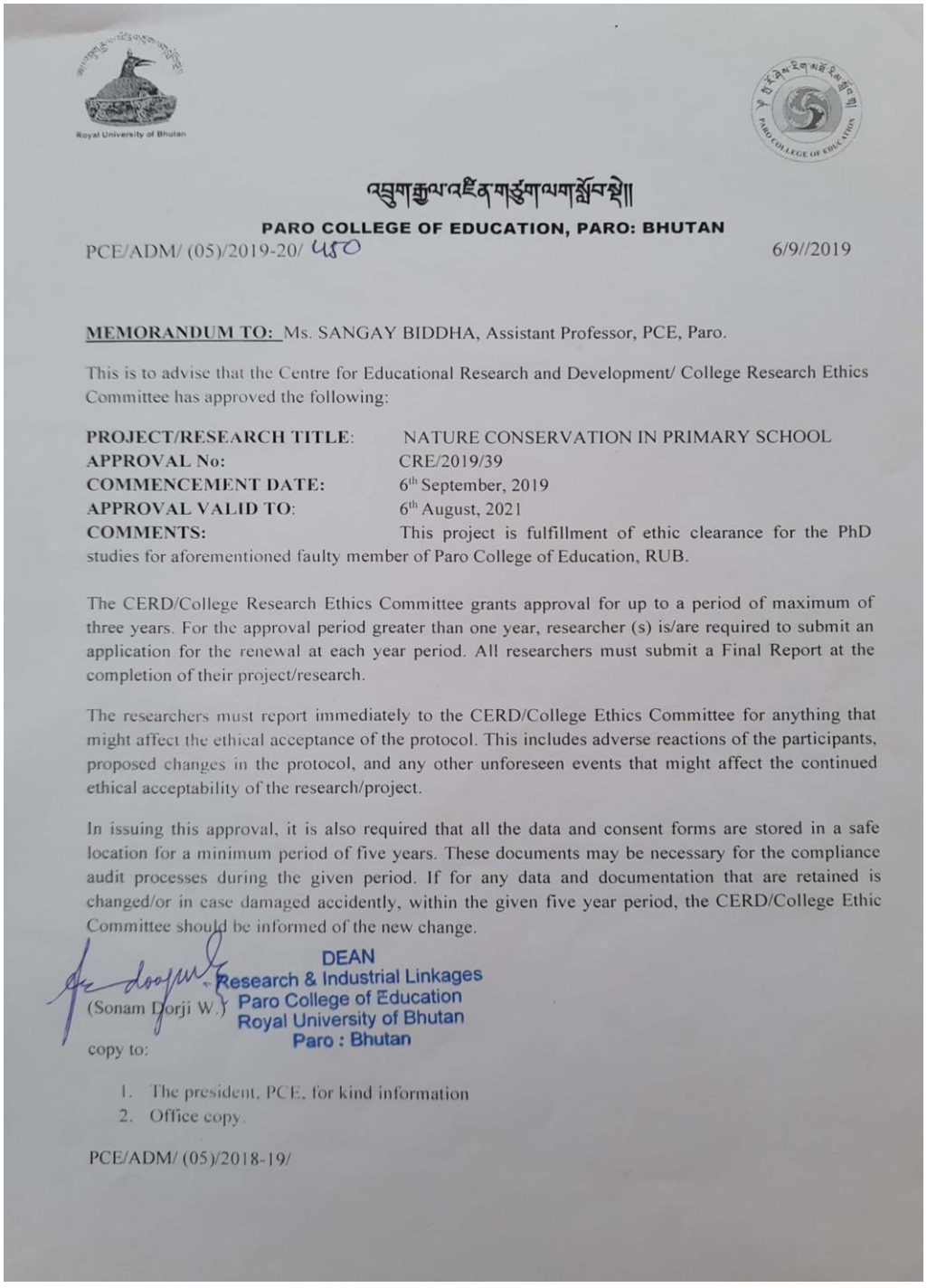
Ms. Sangay Biddha has the status of a Doctoral student of University of Education Heidelberg, as a mixed- mode candidate since 14th Nov 2018. As part of her study, she is required to carry out research in her home country. Her topic is 'Nature Conservation in Bhutanese Primary Schools,' and she will be required to collect relevant data for her research from schools and teacher education colleges within the next six months. For specific details of her research, an information sheet will be submitted by the candidate with this letter. To enable her to carry out research successfully, I as Sangay's principal supervisor would like to request Ministry of Education and Royal University of Bhutan to support with the formal procedures for data collection.
Thank you.

With best wishes

Pädagogische Hochschule Geographie Heidelberg

Prof. Dr. Klaus-Dieter Hupke
Principal Supervisor

Appendix 3.2 Ethics Clearance Letter from Paro College of Education



Royal University of Bhutan

འབྲུག་རྒྱལ་ཡོངས་ཀྱི་གཙུག་ལག་སློབ་གྲྭ།

PARO COLLEGE OF EDUCATION, PARO: BHUTAN

PCE/ADM/ (05)/2019-20/ 450 6/9//2019

MEMORANDUM TO: Ms. SANGAY BIDDHA, Assistant Professor, PCE, Paro.

This is to advise that the Centre for Educational Research and Development/ College Research Ethics Committee has approved the following:

PROJECT/RESEARCH TITLE: NATURE CONSERVATION IN PRIMARY SCHOOL
APPROVAL No: CRE/2019/39
COMMENCEMENT DATE: 6th September, 2019
APPROVAL VALID TO: 6th August, 2021
COMMENTS: This project is fulfillment of ethic clearance for the PhD studies for aforementioned faulty member of Paro College of Education, RUB.

The CERD/College Research Ethics Committee grants approval for up to a period of maximum of three years. For the approval period greater than one year, researcher (s) is/are required to submit an application for the renewal at each year period. All researchers must submit a Final Report at the completion of their project/research.

The researchers must report immediately to the CERD/College Ethics Committee for anything that might affect the ethical acceptance of the protocol. This includes adverse reactions of the participants, proposed changes in the protocol, and any other unforeseen events that might affect the continued ethical acceptability of the research/project.

In issuing this approval, it is also required that all the data and consent forms are stored in a safe location for a minimum period of five years. These documents may be necessary for the compliance audit processes during the given period. If for any data and documentation that are retained is changed/or in case damaged accidently, within the given five year period, the CERD/College Ethic Committee should be informed of the new change.

(Sonam Dorji W.)
DEAN
Research & Industrial Linkages
Paro College of Education
Royal University of Bhutan
Paro : Bhutan

copy to:

1. The president, PCE, for kind information
2. Office copy.

PCE/ADM/ (05)/2018-19/

Appendix 3.3 Central Research Questions: Initial and revised

1. Initial Research Questions

Central question: *How do the school curriculum and practices in primary school impact the attitude and behaviour of the children concerning nature conservation in Bhutan?*

Sub-questions:

1) How is nature conservation explored in the primary school curriculum of Bhutan?
2) How do the primary school children think about the importance of nature conservation in Bhutan?
3) What do the primary school teachers think about the importance of nature conservation in Bhutan?
4) How does the teacher education curriculum prepare the student teachers to teach nature conservation in primary schools? (Tentative)
5) How does a primary school in Bhutan typically practice nature conservation?

2. Revised Research Questions

Central question: *How is nature conservation education understood, taught and practised in the primary schools of Bhutan?*

Sub-questions

1) How do the informants perceive nature conservation education?
2) How does the primary school curriculum address nature conservation education?
3) How is nature conservation taught and learned in primary school?
4) How does the school practise nature conservation?
5) How does the teacher-education curriculum prepare student teachers to teach nature conservation in primary school?

Reasons for the changes made in the key questions and sub-questions

Central questions

The central research question, formulated initially, helped provide some directions for a general research framework. The focus became clearer as the research evolved and the design took shape (Spradley, 1980). When it first began, the central research question was:

> *How do the school curriculum and practices in the primary school impact children's knowledge, attitude and behaviour in relation to nature conservation in Bhutan?*

This question was found to be narrow, concerning only curriculum and co-curricular practices related to nature conservation that impacted the children's knowledge, attitude and behaviours. It was clear from past research that school experience was only a small part of the child's overall experience. Hence, the central question was revised to make it broader:

> *How is nature conservation understood, taught and practised in the primary schools of Bhutan*?

The revised central question increased the scope of getting multiple perspectives of all stakeholders related to won perceptions of nature conservation, curriculum and practices.

Sub-questions

The five sub-questions were revised in terms of focus, content and language. It was then reorganised from general to specific questions and thematically instead of allotting one question for each informant-participant group. Before the revision, question one was specific to the curriculum:

> *How is nature conservation explored in the primary school curriculum of Bhutan?*

This question was important for all the informants associated with curriculum and teaching-learning; thus, this question was retained but with some revision:

> *How does the primary school curriculum address nature conservation education?*

Before this question is asked, it is important to know the informants' perceptions of nature conservation. Hence, one question was added:

> *How do the informants perceive nature conservation education?*

This was a general question that could be asked to all categories of informants.

Questions two and three in the initial set of questions focused on students and teachers, respectively, asking them about the importance of nature conservation in Bhutan:

How do the primary school children think about the importance of nature conservation in Bhutan?

What do the primary school teachers think about the importance of nature conservation in Bhutan?

These two questions were removed since the revised question, 'How do the informants perceive nature conservation education?' would cover this. Instead, they were used as probing questions under it.

Since questions one, two and three of the 'old version sub-questions' have been reformulated or removed, questions two, three and four of the revised one explore aspects of school curriculum and practices. They now read as:

Q2. How does the primary school curriculum address nature conservation education?

Q3. How is nature conservation taught and learned in primary school?

Q4. How does the school practice nature conservation?

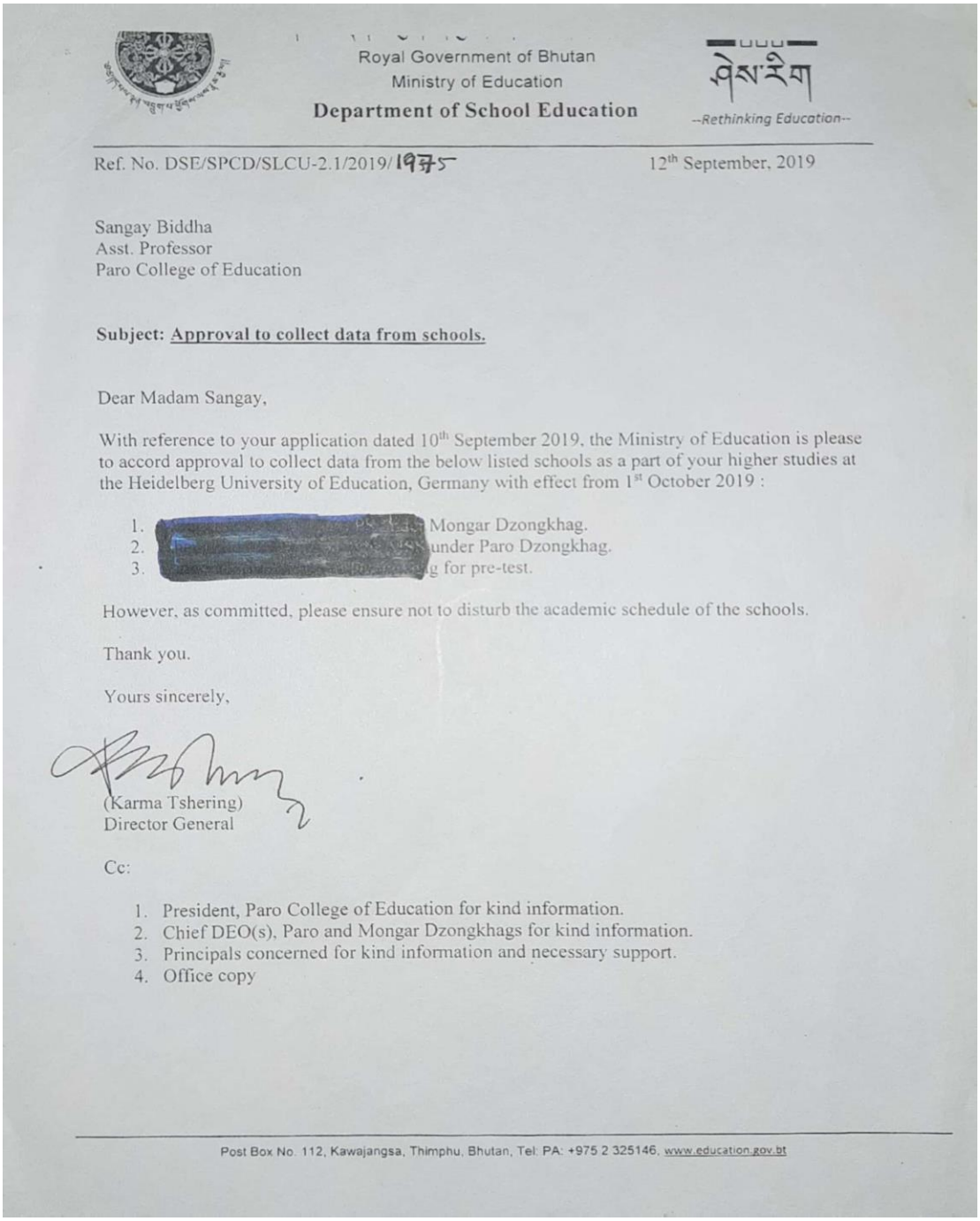
Lastly, question 4 of the old version was focused on teacher preparedness at teacher-education colleges. It read as:

How does the teacher-education curriculum prepare the student-teachers to teach nature conservation in primary schools?

Initially, this was a tentative question because the researcher was doubtful whether it would be beneficial or not to rope in the teacher education sector. Their participation would add to the rich data, but it could also broaden the research focus, making the research work unmanageable. However, this question was retained because teacher education has a key stake in primary school education.

In summary, the central research questions and the sub-questions evolved during the research process into a set of questions that facilitated the collection of rich data. While the revised central question provided a broad and realistic focus for the research, the revised sub-questions provided good scope for the researcher to explore the essential aspects of nature conservation in primary schools. In particular, the revised central question focused on the perceptions of informants related to nature conservation in primary schools; and based on it, the four sub-questions furthered the probe into various essential aspects related to it, such as the general perspectives on nature conservation in primary schools; curriculum and teaching-learning; co-curricular activities; and teacher preparedness of the teacher-education colleges.

Appendix 3.4 Approval from Ministry of Education, Bhutan



Royal Government of Bhutan
Ministry of Education
Department of School Education

--Rethinking Education--

Ref. No. DSE/SPCD/SLCU-2.1/2019/1975 12th September, 2019

Sangay Biddha
Asst. Professor
Paro College of Education

Subject: Approval to collect data from schools.

Dear Madam Sangay,

With reference to your application dated 10th September 2019, the Ministry of Education is please to accord approval to collect data from the below listed schools as a part of your higher studies at the Heidelberg University of Education, Germany with effect from 1st October 2019 :

1. [redacted] Mongar Dzongkhag.
2. [redacted] under Paro Dzongkhag.
3. [redacted] g for pre-test.

However, as committed, please ensure not to disturb the academic schedule of the schools.

Thank you.

Yours sincerely,

(Karma Tshering)
Director General

Cc:

1. President, Paro College of Education for kind information.
2. Chief DEO(s), Paro and Mongar Dzongkhags for kind information.
3. Principals concerned for kind information and necessary support.
4. Office copy

Post Box No. 112, Kawajangsa, Thimphu, Bhutan, Tel: PA: +975 2 325146, www.education.gov.bt

Appendix 3.5 Emails to Chief District Education Officers

Date: 19 September, 2019

Respected Sirs (Chief DEOs),
Good morning, la.
This email is related to the email attachment you may have received on 13th September from the Ministry of Education. I would like to further seek further permission from you to collect data for my research from the schools mentioned in the approval letter of the MoE dated 12th September.

My research is to explore nature conservation in the Primary Schools of Bhutan, for which I have purposively chosen two schools each under Paro and Mongar Dzongkhags. They are [redacted].
Although the main purpose is to collect research data, I believe that this is going to be a wonderful opportunity for me, for having been a teacher for three decades, to visit schools, interact with teachers and be a part of the community. This is going to add to my teaching experience.

During my data collection, I will be mindful not to disturb any school schedule, and will make sure all ethical procedures are followed.

In view of the above context, I would like to request you (Chief DEOs) to support me by giving a 'go ahead' signal to the principals, who are also copied in this email.
Thank you very much for your support.

Sincerely yours,

Sangay Biddha
Paro College of Education

Appendix 3.6 Research Information Sheet

Research Information
for
Data Collection

University of Education
Czernyring 22/11
D-69115 Heidelberg
Germany

Introduction
I am currently working as a Resident Researcher at University of Education, Heidelberg. In collaboration with Prof. Dr. Klaus-Dieter Hupke, I am carrying out a research project on nature conservation in the primary schools of Bhutan.

Research Project
Nature Conservation in Bhutanese Primary Schools

Aim of the research
The research aim is to explore how curriculum and practices impact knowledge, attitude and behavior of children in relation to nature conservation in the primary schools of Bhutan.

Participation
Participation in this study is completely voluntary. The decision to participate or not is entirely his/her will. Even during the activity, he/she is allowed to discontinue or withdraw at any time, and their right to do so will be respected.

Data Collection
An open-ended Questionnaire, which will take about 45 minutes, will be administered to the students of class VI, and a semi-structured interview will be conducted with the teachers, principals, curriculum officers and two teacher educators. The questions will not be of sensitive nature: rather they are general. Each one seeks to understand the participants' perspectives and listen to their rich experiences. The data collected will significantly help in making this research meaningful.

Confidentiality
The responses collected will remain confidential, and identities safeguarded at all times. No individual's names will be used in any publication. Even when reporting the results of this study, all names will be replaced by pseudonyms. However, if they agree, I would like to quote some of their interesting responses

in the study report and future journals or articles. This will also be done in a way that the participants are not identifiable.

Storage of Information

The data gathered, which are in hard copies, from you (students) will be stored in a locked cabinet in my office at Paro College of Education. I, Sangay Biddha, the researcher, will be responsible for the data collected, therefore, it will be kept strictly confidential, as required by research ethics. Only the research team - I and my supervisor - will have access to the data.

Disposal of information

All the data collected in this research will be kept for a minimum of five years after the successful submission of my study report. Then, all data will be disposed of by shredding hardcopy materials.

Contact Details

Feel free to contact me with any questions about this research via email at sangaybiddha.pce@rub.edu.bt or by phone on **+ 975 17686061.** You may also contact my supervisor, Prof. Dr. Klaus-Dieter Hupke at hupke@ph-heidelberg.de or phone # 06221/447-789

Complaints

Should you have any complaints about how this research is conducted, please contact the person whose details are provided below:

Mr. Sonam Dorji W
Dean of Research and Industrial Linkages
Paro College of Education.
Bhutan
Email: sonamdorji@rub.edu.bt
Phone # 97517648771

I would also like to mention that separate information sheets and consent forms have been prepared for the different target participants.

Thank you very much, la.

Sangay Biddha
(Researcher)
Paro College of Education
Bhutan

Appendix 3.7 Letter to Parents for Student Participation

University of Education

The Parents
Primary School

Sub: Parents'/Guardian's Permission for Students' Participation

Dear Parents/Guardians,

I work as a lecturer at Paro College of Education, and I am carrying out research on the topic 'Nature Conservation' in the primary schools of Bhutan. In this line, I would like to invite your child to participate in one of the activities.

The activity is to answer some questions in written form, which will take only about 45 minutes. Once children are seated in a room, they will be guided through the process step by step. The questions are rather easy, so I am sure your child will enjoy participating. I will also make sure that their normal class sessions are not affected by this activity.

The school authorities have been informed about this, but for your child to be a part of this, your permission as a parent is very important. Therefore, I would like to seek your permission. You may also note that participation is completely voluntary. If you agree to let your child participate, kindly sign the consent form attached to this letter.

Lastly, thank you for taking out time to read this letter. Your child's contribution to this research project will be highly valued and appreciated.

Thank you very much.

Best regards

Sincerely,

Sangay Biddha
(Researcher)
Contact # 17686061

Appendix 3.8 Consent Form for Parent Approval

Czernying 22/11
D-69115 Heidelberg
Germany

University of Heidelberg

Research Project

Nature conservation in Bhutanese primary schools

Dear Parent/s,

Please tick 'Yes' or 'No' and sign after reading the content.

I have read the information contained in the Information Sheet for Student-participants.	Yes/No
I allow my son/daughter _____to participate in the open-ended questionnaire, realizing that he/she may withdraw at any time.	Yes/No
I agree that the research data gathered for the study may be published using a pseudonym.	Yes/No

……. ……..

Parent's name and signature date

……. …….

Researcher date

Appendix 3.9 Student's Consent Form

Pädagogische Hochschule HEIDELBERG University of Education

University of Education

Czernyring 22/11
D-69115 Heidelberg
Germany

Research Project

Nature conservation in Bhutanese primary school

Dear Student,

Read the following statements and please tick 'Yes' or 'No' against each before signing at the end.

I have read the information sheet on this research and understood that there is no risk involved in the participation.	Yes/No
I have read the letter asking for permission from my parents to let me participate in this research.	Yes/No
My parents have signed on the consent form, and they have agreed to let me participate in this research activity.	Yes/No
I agree to participate in this research, knowing that I can withdraw at any time without consequence.	Yes/No
I have understood what kind of activity I will be involved in.	Yes/No

……... ……..

Student's name & signature: Date

…….. ..……

Researcher Date

Appendix 3.10 Consent Form for Semi-structured Interviews

Pädagogische Hochschule HEIDELBERG University of Education

Czernyring 22/11
D-69115 Heidelberg
Germany

University of Education

Research Project

Nature Conservation in Bhutanese Primary Schools

Dear Participant,

Please tick 'Yes' or 'No' against each sentence and sign if you agree with them all and provide your signature.

I have read the information contained in the Research Information Sheet.	Yes/No
I agree to participate in the semi-structured interview, and I am aware that I can withdraw at any time, if I like.	Yes/No
I agree that the research data gathered for the study may be published using a pseudonym.	Yes/No
I agree to the interview having my voice recorded and transcribed	Yes/No

……... ……..

Participant's name & signature: Date

…….. ..……

Researcher Date

Appendix 3.11 Draft Semi-structured Interview Protocol

Introductory Section

Exchange some Greetings and ask some informal friendly questions to make the informant feel comfortable and at ease, while settling down for the interview.

Tell a little bit about yourself, and ask the informant to tell you a little bit about himself or herself [including how long he/she has been working in that place). This may serve as a warm-up as well as a way to building rapport with the informant.

Thank the informant for agreeing to take part in this semi-structured interview.

Mention the purpose of this research:

This research aims to explore how the curriculum and practices in the primary schools impact the knowledge, attitude and behavior of children in relation to nature conservation in Bhutan.

Let the informant sign the consent form, and highlight on the rights of the informant:

Please understand that participation is completely voluntary. You are allowed to withdraw from the interview at any point of time or refuse to answer a particular question, as you wish, and your right to do so will be respected. Not participating in this study will not have any consequences whatsoever, and neither should you provide any explanation.

Acknowledge the informant's rich experiences that will be of immense value to the research and express your genuine interest to listen to all the stories.

Ask the informant for permission to use a recording device. If consent is given, switch it on.

Questions

1. Tell me about nature conservation. In your perception, what does it mean?

   This is a general question related to nature conservation, but it is here where the stage is set for further explorations in the subsequent questions. Create space for the interviewee to share his/her thoughts on 'nature conservation', as determined by him/her; probe further if ideas are not clear by asking him/her to clarify or give examples to make his/her ideas understood.

   Maintain eye contact with the informant, and indicate with non-verbal cues that you are paying attention to everything the interviewee is saying [This should be maintained at all times during the interview]. This will make him/her feel respected and want to share more openly.

2. Is nature conservation important to children? If so, why do you think it is important?

   [Probes: Tell me some reasons why this is important to children, especially primary school (6 to 12 years old).]

3. *Listen carefully while taking notes of terms or ideas that emerge from the responses. Continue to probe for clarity - asking for examples and explanations to their ideas and terms. Exploring meanings of their ideas*

as it relates to their narratives; always making sure the 'research topic is adequately explored' (Galletta, 2013).

4. Let us move our conversation to teaching and learning. What are your experiences of teaching nature conservation to children?

   [Probes: Tell me about some strategies you use; some activities you carry with children or anything else you do; how do you connect the knowledge to practice? Share some examples of practical lessons on nature conservation]

   Listen carefully and with interest while using probes to remain on topic or related to the research question [which is, classroom experiences related to nature conservation]. At the same time, pick on interesting points that emerge and ask for more information and clarify meanings, as it relates to their experience. This may add value to the data.

5. How do children practice what you have taught about nature conservation?

   [Probes: Share your observation on children's behavior related to your lessons on nature conservation.]

   This question is related to the behavior aspect of nature conservation. Listen to the responses, using probes wherever necessary, and asking for elaboration, and to hear more of the informant's experience. If any unexpected ideas emerge, ask the informant to elaborate on it with examples, if possible.

6. How does your school practice nature conservation?

   [Probe: Tell me about any specific programme or activities for nature conservation. What is the frequency of the activity or programme? Is it weekly? Monthly? Once/twice a year? What is the participation like – whole school, few classes or only a group?]

   This question is also related to the behavior aspect of nature conservation. Listen to the responses, using probes wherever necessary, and asking for elaboration to hear more of the informant's experience. If any unexpected ideas emerge, ask the interviewee to elaborate on it with examples, if possible.

7. Is there anything you would like to share? [concerns or suggestions related to nature conservation in the primary school; or want to elaborate on any point from the discussion.]

   This is an opportunity for the researcher to gain extra information from the informant that may add value to the research. It is also a chance to refer back to any points that researcher would like elaboration.

Appendix 3.12 Semi-structured Interview Protocol (Final)

Guided by the ideas of Anne Galleta (2013)

Interview with Primary School Teachers

Introductory Section

Exchange greetings and ask some informal friendly questions to make the informant feel comfortable and at ease, while settling down for the interview.

Spend about ten minutes on casual conservation to relax the informant. Talk about anything that is appropriate to the situation This may serve as a warm-up as well as a way to building rapport with the informant.

Thank the informant for agreeing to take part in this semi-structured interview.

Mention the purpose of this research:

This research aims to explore how the curriculum and practices in the primary schools impact the knowledge, attitude and behavior of children in relation to nature conservation in Bhutan. The informant is an expert in his/her field with rich practical experiences, which is going to benefit this research. Acknowledge this, and express appreciation for willing to share their narratives. In addition, express that school experience is only one of the factors that contributes to children's development of knowledge and attitude.

Let the informant sign the consent form, and highlight on the rights of the informant:

Please understand that participation is completely voluntary. You are allowed to withdraw from the interview at any point of time or refuse to answer a particular question, as you wish, and your right to do so will be respected. Not participating in this study will not have any consequences whatsoever, and neither should you provide any explanation.

Acknowledge the informant's rich experiences that will be of immense value to the research and express your genuine interest to listen to all the stories.

Ask the informant for permission to use a recording device. If consent is given, switch it on.

Questions

1. Tell me about nature conservation. In your perception, what does it mean?

   This is a general question related to nature conservation, but it is here where the stage is set for further explorations in the subsequent questions. Create space for the interviewee

to share his/her thoughts on 'nature conservation', as determined by him/her; probe further if ideas are not clear by asking him/her to clarify or give examples.

Maintain eye contact with the informant, and indicate with non-verbal cues that you are paying attention to everything the informant is saying [This should be maintained at all times during the interview]. This will make him/her feel respected and want to share more openly.

2. Why do you think nature conservation important to children? [Probes: Please share why this is important to children, especially of primary school (6 to 12 years old).]

   Listen carefully while taking notes of terms or ideas that emerge from the responses. Continue to probe for clarity - asking for examples and explanations to their ideas and terms. Exploring meanings of their ideas as it relates to their narratives,'

   Always making sure the 'research topic is adequately explored' (Galletta, 2013).

3. Let us move our conversation to teaching and learning. What are your experiences of teaching nature conservation to children?

   [Probes: Tell me about some strategies you use; some activities you carry with children or anything else you do; how do you connect the knowledge to practice? Share some examples of practical lessons on nature conservation]

   Listen carefully and with interest while using probes to remain on topic or related to the research question [which is, classroom experiences related to nature conservation]. At the same time, pick on interesting points that emerge and ask for more information and clarify meanings, as it relates to their experience. This may add value to the data.

4. How do children practice what you have taught about nature conservation?

   [Probes: Share your observation on children's behavior related to your lessons on nature conservation.]

   This question is related to the behavior aspect of nature conservation. Listen to the responses, using probes wherever necessary, and asking for elaboration, and to hear more of the informant's experience. If any unexpected ideas emerge, ask the informant to elaborate on it with examples, if possible.

5. How does your school practice nature conservation?

   [Probe: Tell me about any specific programme or activities for nature conservation. What is the frequency of the activity or programme? Is it weekly? Monthly? Once/twice a year? What is the participation like – the whole school, few classes or only a group?]

   This question is also related to the behavior aspect of nature conservation. Listen to the responses, using probes wherever necessary, and asking for elaboration to hear more of the informant's experience. If any unexpected ideas emerge, ask the interviewee to elaborate on it with examples, if possible.

6. Is there anything you would like to share? [concerns or suggestions related to nature conservation in the primary school; or want to elaborate on any point from the discussion.]

   This is an opportunity for the researcher to gain extra information from the informant that may add value to the research. It is also a chance to refer back to any points that researcher would like elaboration.

Wrap Up

Thank the informant for his/her time and express how useful the information is going to this research. Ask if he/she has any questions or anything to share about the interview experience. Inform that there may be a subsequent contact if there is a need for more information or to perform member checking.

Interview with Principals (Primary School)

Introductory

Exchange greetings and ask some informal friendly questions to make the informant feel comfortable and at ease, while settling down for the interview.

Spend about ten minutes on casual conservation to relax the informant. Talk about anything that is appropriate to the situation. This may serve as a warm-up as well as a way to building rapport with the informant.

Thank the informant for agreeing to take part in this semi-structured interview, despite his/her busy schedule.

Mention the purpose of this research:

This research aims to explore how the curriculum and practices in the primary schools impact the knowledge, attitude and behavior of children in relation to nature conservation in Bhutan.

The informant is an expert in his/her field with rich practical experiences, which is going to benefit this research. Acknowledge this, and express appreciation for willing to share their narratives. In addition, express that school experience is only one of the factors that contributes to children's development of knowledge and attitude.

Let the informant sign the consent form, and highlight on the rights of the informant: *Please understand that participation is completely voluntary. You are allowed to withdraw from the interview at any point of time or refuse to answer a particular question, as you wish, and your right to do so will be respected. Not participating in this study will not have any consequences whatsoever, and neither should you provide any explanation.*

Acknowledge the informant's rich experiences that will be of immense value to this research, and express your genuine interest to listen to all the stories.

Ask the informant for permission to use a recording device. If consent is given, switch it on.

Questions

1. Tell me about nature conservation. In your perception, what does it mean?

   This is a general question related to nature conservation, but it is here where the stage is set for further explorations in the subsequent questions. Create space for the interviewee to share his/her thoughts on 'nature conservation', as determined by him/her; probe further if ideas are not clear by asking him/her to clarify or give examples.

   Maintain eye contact with the informant, and indicate with non-verbal cues that you are paying attention to everything the informant is saying [This should be maintained at all times during the interview]. This will make him/her feel respected and want to share more openly.

2. How do you see nature conservation in primary school? [Probes: Talk about its importance to primary school children (6 – 12-year-old) – cite some reasons with examples; also, share any general or specific observations on nature conservation across primary schools in Bhutan]

This is quite a general and open question, to which the informant can relate many experiences if he/she has worked in different schools over the years, as a teacher or as a principal. So, this question will explore what nature conservation is in the primary schools of Bhutan, in general. Listen carefully while taking notes of terms or ideas that emerge from the responses. Continue to probe for clarity - asking for examples and explanations to their ideas and terms. Exploring meanings of their ideas as it relates to their narratives,' and always making sure the 'research topic is adequately explored' (Galletta, 2013).

3. How is nature conservation practised in your school?

   [Probe: Tell me about any specific programme or activities for nature conservation. What is the frequency of the activity or programme? Is it weekly? Monthly? Once/twice a year? What is the participation like – whole school, a few classes or only a group?]

This question is also related to the behavior aspect of nature conservation. Listen to the responses, using probes wherever necessary, and asking for elaboration to hear more of the informant's experience. If any unexpected ideas emerge, ask the informant to elaborate on it with examples, if possible.

4. Is there anything you would like to share? [Some concerns or suggestions related to nature conservation in primary schools; or any points of discussion that requires elaboration.]

This is an opportunity for the researcher to gain extra information from the informant that may add value to the research. It is also a chance to refer back to any points that researcher would like elaboration on.

Wrap Up

Thank the informant for his/her time and express how useful the information is going to be for this research.

Ask if he/she has any questions or anything to share about the interview experience. Inform that there may be a subsequent contact if there is a need for more information or to perform member checking.

Interview with Curriculum Specialist and Teacher educator

Introductory

Exchange greetings and ask some informal friendly questions to make the informant feel comfortable and at ease, while settling down for the interview.

Spend about ten minutes on casual conservation to relax the informant. Talk about anything that is appropriate to the situation This may serve as a warm-up as well as a way to building rapport with the informant.

Thank the informant for agreeing to take part in this semi-structured interview, despite his/her busy schedule.

Mention the purpose of this research:

This research aims to explore how the curriculum and practices in the primary schools impact the knowledge, attitude and behavior of children in relation to nature conservation in Bhutan.

The informant is an expert in his/her field with rich practical experiences, which is going to benefit this research. Acknowledge this, and express appreciation for willing to share their narratives.

Let the informant sign the consent form, and highlight on the rights of the informant:

Please understand that participation is completely voluntary. You are allowed to withdraw from the interview at any point of time or refuse to answer a particular question, as you wish, and your right to do so will be respected. Not participating in this study will not have any consequences whatsoever, and neither should you provide any explanation.

Acknowledge the informant's rich experiences that will be of immense value to this research, and express your genuine interest to listen to all the stories.

Ask the informant for permission to use a recording device. If consent is given, switch it on.

Questions

1. Tell me about nature conservation. In your perception, what does it mean?

   This is a general question related to nature conservation, but it is here where the stage is set for further explorations in the subsequent questions. Create space for the interviewee to share his/her thoughts on 'nature conservation', as determined by

him/her; probe further if ideas are not clear by asking him/her to clarify or give examples.

Maintain eye contact with the informant, and indicate with non-verbal cues that you are paying attention to everything the informant is saying [This should be maintained at all times during the interview]. This will make him/her feel respected and want to share more openly.

2. How do you see nature conservation in the primary school curriculum? [Why do you think it is important for primary school children? How is nature conservation taught in the primary school curriculum? Share your general or specific observation or your understanding of nature conservation in the primary schools in Bhutan.]

   This question is related to the school curriculum. Since the informant is responsible for the development of primary school curriculum, he/she can relate to many experiences, and concerns or issues related to nature conservation or future plans, if any, but let the narratives emerge from the informant.

   Listen carefully while taking notes of terms or ideas that emerge from the responses. Continue to probe for clarity - asking for examples and explanations to their ideas and terms. Exploring meanings of their ideas as it relates to their narratives,' and always making sure the 'research topic is adequately explored' (Galletta, 2013).

3. How do you prepare student teachers to teach nature conservation in your module? [What are the curriculum topics related to nature conservation? How do you connect the knowledge to practice? How effective is it? Some general or personal thoughts; concerns, suggestions or way forward etc.] **[This question is only for teacher educators]**

   This question intends to explore the informant's experiences of training pre-service primary teachers for nature conservation. Listen carefully while taking notes of terms or ideas that emerge from the responses. Continue to probe for clarity - asking for examples and explanations to their ideas and terms. If any expected ideas emerge that is of benefit to the study, ask the informant to elaborate it with examples.

4. Is there anything you would like to share? Share some concerns or suggestions related to nature conservation; or refer to any points from the discussion for elaboration, if

required.

This is an opportunity for the researcher to gain extra information from the informant that may add value to the research. It is also a chance to refer back to any points that researcher would like elaboration on.

Wrap Up

Thank the informant for his/her time and express how useful the information is going to be for this research.

Ask if he/she has any questions or anything to share about the interview experience.

Inform that there may be a subsequent contact if there is a need for more information or to perform member checking.

Appendix 3.13 Draft Open-ended Questionnaire (For Pre-testing)

Open-ended Questionnaire for Students

Dear Student,

As a part of my PhD study at University of Education, Heidelberg, I am carrying out research to explore the nature conservation in the Bhutanese primary schools. Thank you for volunteering to participate in this activity. The questions are open-ended, so you can freely write the responses as you wish, in either English or *Dzongkha* [whichever language you are most comfortable with]. There are seven questions, which may take about 30-40 minutes to answer them all. Your responses will greatly help this research with invaluable information, and I assure you that your identity will remain confidential. Here you go!

Gender: ☐ Male ☐ Female ☐ Others

1. There are ten pictures of animals and plants given in the boxes below. Identify each and write its name, what food it eats [only for animals], and its habitat in the spaces provided:

1 	2 
Name: Food: Lives in:	Name: Food: Lives in:

3 	4 
Name: Food: Lives in:	Name: Food: Lives in:
5 	6 
Name: Food: Lives in:	Name: Food: Lives in:
7 	8 
Name: Food: Lives in:	Name: Grows in:

9 	10 
Name: Grows in:	Name: Grows in:

2. Name some species of plants and animals, but you may **NOT REPEAT** the names of species gives in question no. 1

    b. Name five insects:

    c. Name five wild trees:

    d. Name five wild birds:

    e. Name of five herbs:

3. Have you heard of nature conservation? (Please tick 'Yes' or 'No')

    Yes ☐ No ☐

    If 'Yes,' what does nature conservation mean to you?

4. Why is nature conservation important to you? [How are you dependent on plants and animals? How are they dependent on you?]

5. How do you learn about nature conservation in your school subjects?

6. Do you conserve [preserve] nature in your school? (Tick 'Yes' or 'No')

    Yes ☐ No ☐

    If 'Yes' describe how you do it.

7. Write anything else you wish to say about nature conservation.

Picture Credit: Bhutan biodiversity Portal @ http://biodiversity.bt/biodiv/observations

Appendix 3.14 Open-ended Questionnaire (Final version)

Open-ended Questionnaire for Students

Dear Student,

I am carrying out research to explore the nature conservation in the Bhutanese primary schools. Thank you for volunteering to participate in this activity. The questions are open-ended, so you can freely write the responses as you wish, in either English or *Dzongkha* [whichever language you are most comfortable with]. There are seven questions, which may take about 45 minutes to answer. Your responses will greatly help this research with invaluable information, and I assure you that your identity will remain confidential. Here you go!

Gender: ☐ Male ☐ Female ☐ Others

1. There are ten pictures of animals and plants given in the boxes below. Identify each and write its name, its food [only for animals], and its habitat [where it is found] in the spaces provided:

1 	2 
Name: Food: Habitat:	Name: Food: Habitat:

3 	4 
Name: Food: Habitat:	Name: Food: Habitat:
5 	6 
Name: Food: Habitat:	Name: Food: Habitat:
7 	8 
Name: Food:	Name: Habitat:

Habitat:	
9 	10 
Name: Habitat:	Name: Habitat:

2. Name some species of plants and animals that are found in Bhutan, but do **NOT REPEAT** the names of species given in question no. 1

   f. Name five insects:

   g. Name five wild trees:

   h. Name five wild birds:

   i. Name of five wild herbs (small plants):

3. You may have heard of 'nature'. What do you think nature conservation means?
4. Why is nature conservation important to you? [How are you dependent on plants and animals? How are they dependent on you?]
5. How do you learn about nature conservation in your school subjects?
6. Do you conserve [preserve] nature in your school? (Tick 'Yes' or 'No')

   Yes ☐ No ☐

   If 'Yes' describe how you do it.

7. Write anything else you wish to say about nature conservation.

Picture Credit: Bhutan biodiversity Portal @ http://biodiversity.bt/biodiv/observations

Appendix 3.15 A Sample of Open-ended Questionnaire (Completed by a Student)

Q_S4_R2_St_98

Open-ended Questionnaire for Students

Dear Student,
I am carrying out a research to explore the nature conservation in the Bhutanese primary schools. Thank you for volunteering to participate in this activity. The questions are open-ended, so you can freely write the responses as you wish, in either English or *Dzongkha* [whichever language you are most comfortable with]. There are seven questions, which may take about 45 minutes to answer. Your responses will greatly help this research with invaluable information, and I assure you that your identity will remain confidential. Here you go!

Gender: ☐ Male ☑ Female

1. There are ten pictures of animals and plants given in the boxes below. Identify each and write its name, its food [only for animals], and its habitat [where it is found] in the spaces provided:

1

Name: Snow Lapeard
Food: meat
Habitat: ~~to~~ forSat

2

Name: Takin
Food: Plants
Habitat: Montains

3

Name: ~~Speade~~ Sparro
Food: insects
Habitat: forsect

4

Name: Crow
Food: insects
Habitat: forsect.

1

5 	6 
Name: Grasshopper Food: insects Habitat: sands	Name: Ladybird Food: small insects. Habitat: Land and Plants.
7 	8 
Name: Earth worm Food: Habitat: Land	Name: Habitat:
9 	10 
Name: Habitat:	Name: Rodidendras Habitat: laya and Haa

2

2. Name some species of plants and animals that are found in Bhutan, but do **NOT REPEAT** the names of species given in question no. 1

a. Name five insects: i) Earth warm
ii) bees
iii) Batterfly
iv) Ant
v) ladeybaird

3

b. Name five wild trees: i) Blue-Pain
ii) Chire-Pain
iii) ~~Oak~~ oak
iv) _____
v) _____

3

c. Name five wild birds: i) ~~C~~crow
ii) ~~Para~~ Pegeon
iii) ~~Ravan~~ raven
iv) Sperro
v) Eagle

3

d. Name of five wild herbs (small plants):

i) lemon grass.
ii) Khaki weed.
iii) _____
iv) _____
v) _____

2

3. You may have heard of 'nature'. What do you think nature conservation means?

Nature conservation means the habitat and we get food. ~~from~~ ~~Nature~~ and everythings.
Ex: forsect,
~~Rest~~ water.
and animals home.

4. Why is nature conservation important to you? [How are you dependent on plants and animals? How are they dependent on you?]

Nature conservation is important to us, because from nature we get food and ~~Shelter~~ silter and ect...and some animals lives in forsect and some live in Vilgage. Nature is very helpful to us and Livining things.

5. How do you learn about nature conservation in your school subjects?

We learn about nature conservation in your school subjects, we Learn. How to save our nature and animals. And we Learn How to make our powers and everythings. we also learn about animals names.

6. Do you conserve [preserve] nature in your school? (Tick 'Yes' or 'No')

Yes ☑ No ☐

If 'Yes' describe how you do it.

1. We can conserve nature in ~~your~~ our school by planting the trees and flowers ~~ect~~ etc...
2. We ~~save~~ clean the sorrding beause to keep our ~~nature~~ ~~clearess~~ clearess.
3. In every year we plants the trees.

7. Write anything else you wish to say about nature conservation.

~~We can~~ My wish is we can plants more trees. and keep Nature full of trees.

clean the sorrding everyday and keep clean.

We can care our animals also ~~and~~ by not killing.

Thank you for your responses.

Picture Credit: Bhutan biodiversity Portal @ http://biodiversity.bt/biodiv/observations

Appendix 3.16 A Sample of Researcher's Field notes

No. 5

15th October 2019

The second interview was a short one. Teacher 2 said she was teaching Science for the first time, and mentioned that it had only been six months teaching Science in grade five. Of course, just as she mentioned she did not have much to share, except her concerns about waste management and a clean environment, which she thought was about nature conservation activities. Nature conservation and environmental conservation are understood as the same thing. This was the same thinking I had before this research project. Nature conservation was confused with environmental conservation. These two concepts were considered the same.

Waste management and keeping the environment clean, in addition to protecting plants and animals, is understood as 'nature conservation' by the informant, like I used to understand. When asked what nature conservation was, she expressed that nature conservation was maintaining a clean environment by not littering with waste. Waste such as plastics affect animals and plants and human beings at large, she said. Waste management is understood as nature conservation, more than conservation of plants and animals. As the conversation progressed, it was clear that the informant's central idea of nature conservation was waste management and keeping the environment clean. For example, she said that in teaching learning, it was important to teach the values of keeping a clean environment, to learn the good habits of maintaining a waste free environment from a very young age. Then she talked about teaching conserving trees, preventing forest fires, but when asked about how students practiced it, the informant bounced back to collecting waste and bringing them to the disposal area.

From my experience of teaching in the primary school for many years, I know that schools run extracurricular activities and one of them is running small clubs. One of the clubs has been the 'Nature Club.' Students, usually of grade IV and above, would be the club members, and they usually looked after the beautification of the school campus. Their activities included planting trees, making flower gardens or creating rock gardens in the campus. I asked some teachers in this school if they still had the practice of running nature clubs. They said they had. I met the nature club coordinator, and expressed my interest in knowing what they were doing as a club, what their objectives were. They took me to a small plot of land where they had planted

some flowers, and told me how they had altered a slope into a flat land to make it convenient for planting. I also asked if I could look at the action plan for the club activities.

I read the club's aims and objectives in their written document. They were to:

1) create fun leaning experience aimed at kindling a life- long love of nature;
2) provide knowledge on nature's endless wonder through an engaging blend of stories, hands on exploration, Sensory activities, nature walk and more; and
3) teach skills to help individuals to identify and solve environmental problems.

The first two objectives, 'kindling a life-long love for nature' and 'providing knowledge on nature's endless wonder' are related to values of nature conservation and the third one is related to environmental conservation. However, the activities that were conducted and were on the action plan were more focused on school campus beautification. For example, activities for the students included developing school areas for flower gardening, collecting manure from the nearby forest, planting flowers and trees (School greening programme, they call it). There were some activities planned such as 'solo hour in nature' for 20-30 minutes of meditation in a nearby forest and visiting a botanical garden, and these were, probably, to fulfil the objectives of developing love for nature. Still, my understanding from the activities conducted during the year, the focus is more on school beautification.

Actually, I am aware that the idea of a 'nature club' came from a non-governmental organization called 'Royal Society for protection of nature' (RSPN). This organization was started in 1987 to promote environmental education, sustainability and also deals with issues related to climate change. Therefore, the 'nature club' is also a blend of the two conservations, but I understand that it was more concerned with the environmental conservation and sustainability of livelihood, and not really nature conservation for its own sake.

Appendix 3.17 A Framework for Analytical Procedures

Adapted from Creswell & Creswell (2018), Gibbs (2007) and Punch (2009)

1. Procedures for analysing interview data

1.1 Data preparation

1.1.1 The researcher sorts out and labels individual data with code numbers so that they are easily identifiable and their anonymity is maintained.

1.1.2 The researcher transcribes the audio recordings of the interviews. If the researcher is hiring a transcriber, the following steps should be taken into account:

- Ensure that the transcriber is briefed about the research topic and the context of the interviews so that they listen to the audios in context.
- The transcribers should be practically shown what transcribing 'verbatim' means through demonstration. For example, the transcriber records everything from the verbal tics, such as 'like', 'you know', 'er' 'ummm', and 'sort of', to the repetitious words like, 'I mean ...mmm I mean to say, like, ...' (Gibbs, 2007). Rather than writing only the gist, it is important to capture the feelings of the informants by recording them verbatim. When the transcriber gets the feel of the conversation, it is apparent that the possibility of de-contextualising the text is reduced.
- It might also be helpful to provide the transcriber a sample so that he/she can follow the same format and style.
- The researcher should monitor consistently how the transcription is going on.
- Upon completing each file, the transcribers should be asked to perform an accuracy check by listening to the recording again to rectify the errors.

1.1.3 The research must also double check the transcripts for accuracy by listening to the audio recordings and running through the transcripts to eliminate the remaining errors.

1.1.4 The researcher labels each interview transcript with an identification code and saves the file securely.

1.1.5 Each transcript should then be formatted for analysis: line numbers, margins and line line spacing. Gibbs (2007) suggests three ways of formatting the texts:

- *Line numbers*. Numbering the lines are helpful for cross-referencing.

- *Margins*. Leaving wide margins on the sheets is for the researcher to annotate and coding ideas. Most people leave a wide margin on the right.
- *Line spacing*. Double-space the text (or use space and a half). This leaves room for underlining, comments and circling the text.

1.1.6 A confidential file with the informants' real names, school and identification code must be maintained for future reference.

1.1.7 Finally, the researcher prints off the transcripts for analysis.

1.2 Coding for thematic categories

Coding is a major part of the analysis process because it was only through coding that descriptive data are deconstructed and sorted into thematic categories for interpretation and discussion (Bogdan & Biklen, 2007; Punch, 2009). Coding is looking for regularities in the data and providing a word or phrase, as a code, that attaches meaning to the units of data (Punch, 2009). A unit of data can be a sentence or a paragraph of the text data. According to qualitative researchers, coding begins at a descriptive level or low-level inference; and advances to an inferential level or high-order inference as the analytic thinking progresses (Bogdan & Biklen, 2007; Creswell & Creswell, 2018; Gibbs, 2007; Punch, 2009).

1.2.1 The researcher prepares a list of possible coding categories.

1.2.2 The researcher reads each transcript carefully at least two times to get a sense of what the information is and reflect on its overall meaning. Then, a preliminary list of possible thematic coding categories is prepared.

1.2.3 The researcher maintains a memo about codes, explaining what the codes represent. Creswell & Creswell (2018) suggests that data units can be grouped and bracketed, and a code assigned to each category from the list. For instance, the code SC-T can be assigned to data units related to school curriculum shared by a teacher –SC indicating 'school curriculum' and T indicating 'Teacher.'

1.2.4 The coding categories should be continually revised based on the content of the transcripts. For example, whenever new ideas emerge from the data, new codes are assigned.

1.2.5 While coding begins at a descriptive level, it should gradually be revised to a more analytical level (Bogdan & Biklen, 2007). For example:

Descriptive codes: ‘Dancing’, ‘Indoor bowling’, ‘Dances at works club’

*Ana*lytical codes: ‘Loss of physical co-ordination’, ‘Togetherness’, ‘Resignation’

(Gibbs, 2007, p. 44)

1.2.6 The researcher continues to write memos to record the changes in analytic thinking.

1.2.7 Next, the researcher begins to analyse themes that intersect with multiple perspectives of informants, each time looking for more insights for further negotiation of meanings.

1.2.8 The researcher rereads the data to reduce the coding categories to fewer themes by grouping codes related to each other (Bogdan & Biklen, 2007; Creswell & Creswell, 2018). Codes should continue to be modified to make them more analytical in nature.

1.2.9 The memos continue to be revised to explain what the codes represent and how they should be applied across different types of data (Gibbs, 2007).

1.2.10 Finally, the researcher rearranges the data into meaningful units to match them with the modified coding categories or thematic groups for interpretation.

2. Procedures for analysing Fieldnotes

2.1 Data preparation

2.1.1 The researcher types the field notes as they were written or scribbled in their dairy book during the data collection.

2.1.2 The text is formatted as suggested by Gibbs (2007) in 1.1.5: Lines spaced out by one and a half and a wide margin left on the right for the researcher to annotate and provide codes.

2.1.3 The formatted field notes are then printed off for analysis.

2.2 Coding for thematic categories

2.2.1 The researcher reads the text, looking for thematic categories. While the procedures followed are similar to the interview’s, they might vary slightly in the process. Using the existing coding list from the interview data analysis, the researcher reads the text for additional insights.

2.2.2 The data units are chunked into brackets and assigned to the codes, and then a word, phrase, or sentence written in the margin to the right of the page. Codes may be synced with the existing codes or new codes assigned, as convenient and necessary.

2.2.3 The memos are revised regularly to enrich the descriptions of the codes.

2.2.4 Themes should begin to take shape with more evidence from the other two data sources, the interview and the open-ended questionnaires.

3 Procedures for analysing the open-ended questionnaire data

2.3 Data Preparation

2.3.1 The researcher sorts out data into categories: Schools 1, 2, 3 and 4.

2.3.2 The researcher then labels individual data, on the front page of the form, with a code so that they are easily identifiable and accessible. For example, SUS_01 for the questionnaire form completed by school 1, urban school and student no. 1.

2.3.3 Type the students' qualitative responses on a Microsoft Word file with their individual codes so that it is easily identifiable. The researcher should then group the responses into question categories. For example, all the students' responses to question 3 can be grouped together and so on.

2.3.4 Follow the same steps as in 1.1.5 for formatting by line spacing and keeping a margin on the right for the research to annotate and write the codes.

3.2 Marking scheme for Q1 & Q2 of the open-ended questionnaire

3.2.1 In Q1 the students are asked to look at ten pictures of local plant and animal species and write their names, food, and habitat. The marking scheme for assessing students' responses to Q1 is given below:

- Names of animals and plants written in *Dzongkha* (the national language of Bhutan) or their local dialect, besides English, should be accepted.
- The names of plants and animals can be common names generally used by lay people, not necessarily scientific names at the species level, different species or even at other genera (or higher order). However, some common names used by laypeople also happen to be at the species level.
- The common name, scientific name and local names of the ten species for students to identify are given below in the table:

	Common Name	Scientific name	Local name
1	Snow leopard (species)	*Panthera uncia*	*Gang Zig*
2	Takin	*Budorcas taxicolor*	*Drou gyemtsi*

3	sparrow	*Passer Montanus*	*Bjichu Nyazem*
4	Raven	*Corvus*	*Bjarog*
5	Dung beetle	*Scarabaeus sacer*	*Awa buup*
6	ladybird	*Coccinellidae*	*Thom Buup*
7	Earthworm	*Lumbricina*	*Chenga Buup*
8	Artemisia/Mugwort	*Artemisia indica*	*Khempa /Meringma*
9	Primula	*Primula Denticalata*	*Yiyong meto*
10	Rhododendron	*Rhododendron arboreum*	*Eto Meto*

- The performance scale given below may be used to rate the school's performance based on their scores.

Scores	Performance level
80% and above	outstanding performance
70 -79.9%	very good performance
60 - 69.9%	good performance
50 - 59.9%	satisfactory performance
49.9% and below	unsuccessful

(*Source: The Wheel of Academic Law, RUB,2021)*

- A sample of correct and incorrect names of species is given below for reference while evaluating the students' answers.

earthworm (*Genus*): Correct answer worm (*Family*): Incorrect answer) [It is too general]	crow (*Genus*): Correct answer bird (*Family*): Incorrect answer
dung beetle (*Species*): Correct answer insect (*Class*): Incorrect answer:	Snow leopard (species): } Both are correct. leopard (*Genus*): } Both are correct. mammal (*Class*): Incorrect answer [It is too general]

(Source: Author)

Note: In the biological classification, Genus is below Family and above Species. Genus is a group of animals or plants with common characteristics but can be classified further into species level. A species is a group with common characteristics and is capable of breeding.

- After evaluation, the total scores should be recorded on an Excel sheet, school-wise and item-wise.

- The scores for Q1 are then analysed to gain more insights.

3.2.2 In Q2, students were asked to write the names of wild plants and animals—five insects, five wild trees, five birds, and five herbs—found in Bhutan. The following guidelines may be applied to evaluate students' performance:

- Species names written in the local dialect, besides English, are acceptable.
- Only names of wild species are accepted; for example, names of domestic animals, fruit trees or vegetable plants are not accepted since they are not wild.
- Animal and plant names already given in Q1 are not counted or accepted.
- Each category may be awarded 5 marks – total: 20 marks
- Individual students' scores for each category should be recorded on an Excel sheet. A consolidated score sheet is then prepared to understand the overall picture of students' performance school-wise for analysis.

3.3 Analysing the qualitative data (Q3 to Q7) of the Open-ended questionnaire

This part of the questionnaire is to understand the students' perspectives on nature conservation.

3.3.1 The same procedures cited in 1.2 and 2.2 of this Framework for analytical procedures may be used.

3.3.2 Continue coding and sorting them into thematic categories for further analysis and interpretation. Although the coding categories and themes from the interview and the field notes data are used, the researcher searches for new themes and insights in the data.

3.3.3 The memos are updated consistently too.

3.3.4 Finally, data is organized thematically with evidence for further analysis and meaning-making.

Appendix 3.18 A Sample Interview Transcript

Interview with teacher 4 16th October 2019 Time: 10.30 am

Interviewer: As I have already mentioned, it's about nature conservation. The first question as you have expected is what is nature conservation to you? What do you think nature conservation is to you?

Teacher 4: Uh ,….when you say nature conservation, protecting the nature of course. And then not destroying the nature because it's important for us, for the human beings, for survival of human beings so you got to really protect it. Protecting that not destroying the nature and then using the resources in the nature in the proper way so that it can last, not only, that can not only benefit us the present generation but also the future generation that is what I perceive as…….

Interviewer: Okay, umm… so you said nature conservation is protecting, to protect it against destruction. What is nature? What all are included in nature according to you? What are you protecting?

Teacher 4: okay madam, when you say nature, whatever we see around us is considered as nature, not man made things but the one that is natural that exists naturally around us like okay the forest, the rocks, rivers, the air. These are all nature so we got to really protect and then protect these things. Even the not just the forest, even the water bodies, the air, the rocks so, we got to preserve all these things. So that is what I think, perceive it as a nature conservation.

Interviewer: You mentioned protecting air, can you elaborate on how to protect air and how do you protect air? And why?

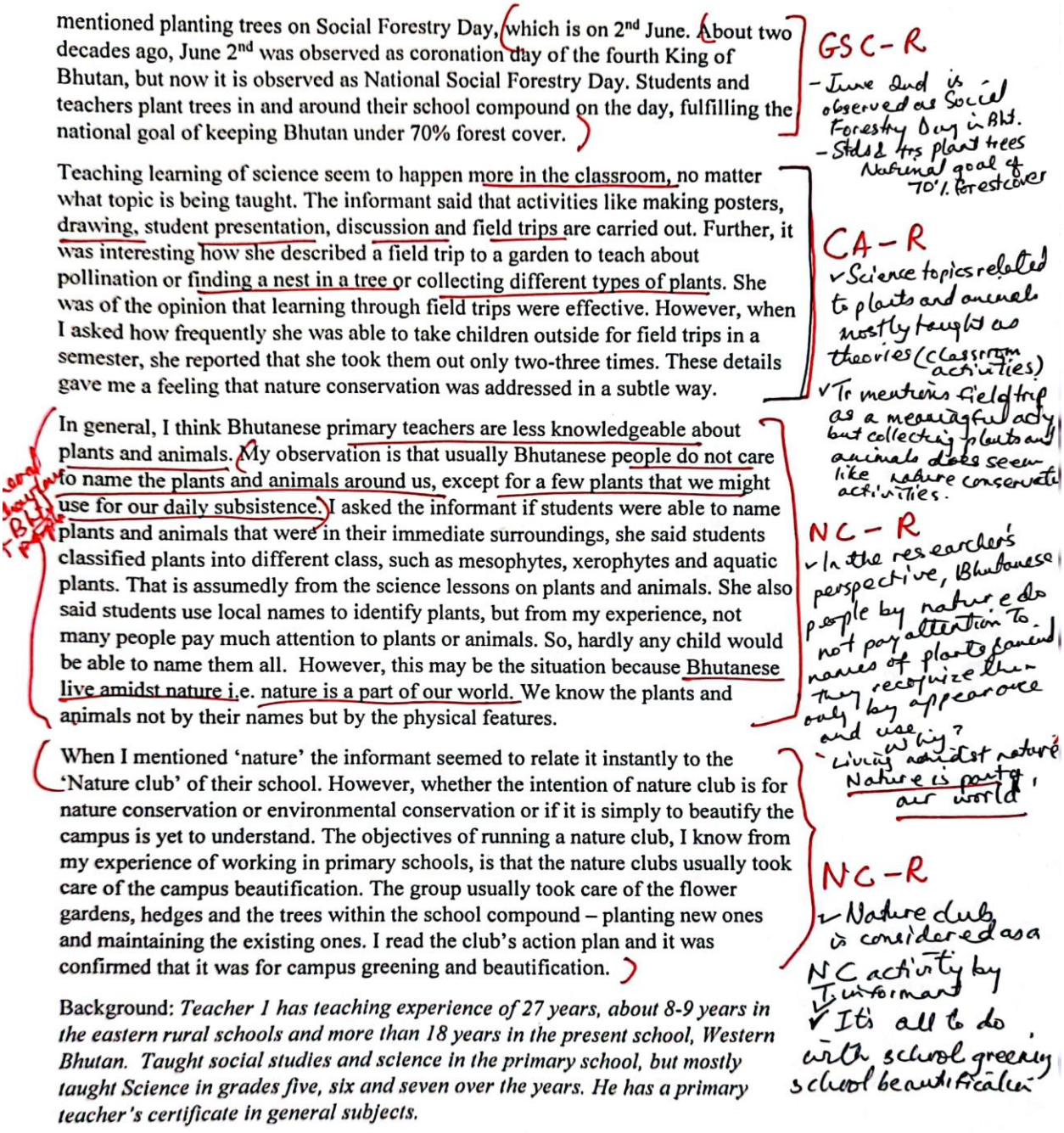
Teacher 4: When I say protecting air, I am talking about the air pollution. Air pollution is one thing that is really hampering us and it's going to hamper the future generation too. When you say air pollution we got to, when I say protect air, we have to make sure the air is clean, we maintain the air clean. If the air is polluted, for instance like carbon dioxide. There are many air pollutants and air pollutants leads to not just human health hazard but also the causes global warming which in turn would have many consequences, impact and then moreover that the global warning impact like uhh… the change in the climate change. Then it would also lead to like uhh… melting of ice cap and snow and many other consequences

because of that increase in volume of water which would of course lead to…. the… I mean flooding and then the those regions in the coastal areas, those regions the lands will be submerged with the water and they'll have a lot of problems because of global warming like there will be change in erratic weather, change in rainfall pattern I think. This is what the research says. Change in weather and also the pattern of rainfall and moreover because of increase in temperature, it's likely that there will be more multiplications of the germs that would cause disease and then which would also lead to new diseases. So these are, we have lot of implications because of if we do not protect our, let's say, we do not keep our air clean and keep on polluting it so you have lots of problems. Despite the direct hazards like some of gases are very, you know toxic which would lead to our health hazard so despite that we have many other problems, we really need to protect that air.

Interviewer: At your own individual level, how would you protect, like you have mentioned a series of hazards and consequences, yeah? So at your own individual level, personal level, what would mean protecting nature? How would you on a daily basis … for example, what would be some of the things you would do?

Teacher 4: Now simple thing as throwing of plastics and all these things. Like, plastic is polymers and it has a lot of toxic chemicals in it despite that polymer. So these toxic things will not only leech to the soil, when you dump it in the nature like that, that toxic things will not leech into soil and water but it will also get into the air. Some of these toxic things will get into the air and that will have health impact and many other impacts, so at my level, at a personal level we could even use a proper place where we can dump the such toxic materials like plastics and all these things and then the even uhh… like spray and all those things, these are of course good for us. It smells good but these are not good for the ozone and all those things. It has contain some of the CFC which would, I mean deplete the ozone layer. So I think you got to minimize this thing and use some natural thing, instead of using all these chemical substances and like papers and all those things, these are the simple things we can do back at the home. Papers and all instead of burning, we can collect if possible and I think we can recycle and we can use, I mean, we can make use I mean we can make other type of things using other type of paper and these are the things.

Appendix 3.19 A Sample of Descriptive and Thematic Coding



mentioned planting trees on Social Forestry Day, which is on 2nd June. About two decades ago, June 2nd was observed as coronation day of the fourth King of Bhutan, but now it is observed as National Social Forestry Day. Students and teachers plant trees in and around their school compound on the day, fulfilling the national goal of keeping Bhutan under 70% forest cover.

GSC-R
- June 2nd is observed as Social Forestry Day in Bhu.
- Stds & trs plant trees Natural goal of 70% forestcover

Teaching learning of science seem to happen more in the classroom, no matter what topic is being taught. The informant said that activities like making posters, drawing, student presentation, discussion and field trips are carried out. Further, it was interesting how she described a field trip to a garden to teach about pollination or finding a nest in a tree or collecting different types of plants. She was of the opinion that learning through field trips were effective. However, when I asked how frequently she was able to take children outside for field trips in a semester, she reported that she took them out only two-three times. These details gave me a feeling that nature conservation was addressed in a subtle way.

CA-R
✓ Science topics related to plants and animals mostly taught as theories (classroom activities)
✓ Tr mentions field trip as a meaningful activity but collecting plants and animals does seem like nature conservation activities.

In general, I think Bhutanese primary teachers are less knowledgeable about plants and animals. My observation is that usually Bhutanese people do not care to name the plants and animals around us, except for a few plants that we might use for our daily subsistence. I asked the informant if students were able to name plants and animals that were in their immediate surroundings, she said students classified plants into different class, such as mesophytes, xerophytes and aquatic plants. That is assumedly from the science lessons on plants and animals. She also said students use local names to identify plants, but from my experience, not many people pay much attention to plants or animals. So, hardly any child would be able to name them all. However, this may be the situation because Bhutanese live amidst nature i.e. nature is a part of our world. We know the plants and animals not by their names but by the physical features.

NC-R
✓ In the researcher's perspective, Bhutanese people by nature do not pay attention to names of plants & animals they recognize them only by appearance and use. Why?
- Living amidst nature
Nature is part of our world.

When I mentioned 'nature' the informant seemed to relate it instantly to the 'Nature club' of their school. However, whether the intention of nature club is for nature conservation or environmental conservation or if it is simply to beautify the campus is yet to understand. The objectives of running a nature club, I know from my experience of working in primary schools, is that the nature clubs usually took care of the campus beautification. The group usually took care of the flower gardens, hedges and the trees within the school compound – planting new ones and maintaining the existing ones. I read the club's action plan and it was confirmed that it was for campus greening and beautification.

NC-R
✓ Nature club is considered as a NC activity by T, informant
✓ It's all to do with school greening & school beautification

Background: *Teacher 1 has teaching experience of 27 years, about 8-9 years in the eastern rural schools and more than 18 years in the present school, Western Bhutan. Taught social studies and science in the primary school, but mostly taught Science in grades five, six and seven over the years. He has a primary teacher's certificate in general subjects.*

5

Appendix 3.20 Memos

Coding Categories

GIS: General Information on Setting; D: Documents; I: Informants; R: Researcher; P: Principal; T: Teacher; Std: Student; TE: Teacher educator; CS: Curriculum Specialist; GSP: General School Practices; N: Nature; NC: Nature Conservation; SP: School Practices; CP: Curriculum for Primary; TEC: Teacher-education Curriculum; NCS: Nature conservation Strategies; RS: Research Strategies

	Categories	**Codes**
1	**Setting: General Information about Setting (GIS)**	
	Official documents	**GIS-D**
	Informants' perspectives	**GIS-I**
	Researcher's perspectives	**GIS-R**
2.	**General School Practices of Bhutanese Schools**	
	Principal's perspectives	**GSP-P**
	Teacher's perspectives	**GSP-T**
	Student's perspectives	**GSP-S**
	Teacher educator's perspectives	**GSP-TE**
	Curriculum specialist's perspectives	**GSP-CS**
	Researcher's perspectives	**GSP-R**
3.	**i) What is nature?**	
	Principal's perspectives	**N - P**
	Teacher's perspectives	**N - T**
	Student's perspectives	**N - S**
	Teacher educator's perspectives	**N - T**
	Curriculum specialist's perspectives	**N - CS**
	Researcher's perspectives	**N - R**

	ii) General Perspectives on nature conservation	
	Principal's perspectives	**NC-P**
	Teacher's perspectives	**NC-T**
	Student's perspectives	**NC-S**
	Teacher educator's perspectives	**NC-TE**
	Curriculum specialist's perspectives	**NC-CS**
	Researcher's perspectives	**NC-R**
	iii) Importance of NC Education to children	
	Principles's perspectives	**NCC-P**
	Teacher's perspectives	**NCC-T**
	Student's perspectives	**NCC-S**
	Teacher educator's perspectives	**NCC-TE**
	Curriculum specialist's perspectives	**NCC-CS**
	Researcher's perspectives	**NCC-R**
4.	**School Practices of Nature Conservation**	
	Principal's view	**SP-P**
	Teacher's view	**SP-T**
	Student's view	**SP-T**
	Teacher-educator's view	**SP-TE**
	Curriculum specialist's view	**SP-CS**
	Researcher's view	**SP-R**
5.	**Curriculum Activities (CA)**	
	Principal's view	**CA-P**
	Teacher's view	**CA-T**
	Student's view	**CA-Std**
	Teacher-educator's view	**CA-TE**
	Curriculum specialist's view	**CA-CS**
	Researcher's view	**CA-R**
6.	**Teacher-education Curriculum &Practices**	
	Teacher-educator's views	**TEC-TE**
	Researcher's views	**TEC-R**

7.	**Suggestions for Nature conservation**	
	Principal's perspectives	**NCS-P**
	Teacher's perspectives	**NCS-T**
	Student's perspectives	**NCS-Std**
	Teacher educator's perspectives	**NCS-TE**
	Curriculum specialist's perspectives	**NCS-CS**
	Researcher's perspectives	**NCS-R**
8.	**Research Strategies**	**RS-R**

Memos for Coding Categories

1. **Setting/Context: General Information about Setting (GIS)**

The data units in this category provide general information about the setting or the research context. Three sources of data are considered in this category, i.e. i) data from official documents, such as school policy documents, students' handbooks or statistics; ii) data from informants' perspectives; and iii) data from the researcher's field notes. The coding will be as follows:

GIS-D (General information from official Documents)

GIS-I **(**General information from Informants)

GIS-R **(**General information from Researcher's fieldnotes)

2. **General School Practices (GSP) of Bhutanese primary schools**

Units of data that relate to the general school practices of the Bhutanese primary schools are coded in this category. Several practices in the schools may be common mainly because of the standard government policies they follow and also the new initiatives of the education department that have to be implemented in schools across the country. Those informants who have worked in various schools in the country share about them in the interview. Some examples, among others, are school greenery programme, running the nature club, flower gardens, social forestry day, and community cleaning campaigns. The specific codes in this category are as follows:

GSP-P (Principal's perspectives)

GSP-T (Teacher's perspectives)

GSP-S (Student's perspectives)

GSP-TE (Teacher educator's perspectives)

GSP-SC (Curriculum specialist's perspectives)

GSP-R (Researcher's perspectives)

3 Perspectives on nature conservation (NC)

This category has three parts: i) perspectives on what nature is, ii) general perspectives on nature conservation, and iii) perspectives on why nature conservation is important to primary school children.

i) Data units that define or state what nature is in their perception are included in this sub-category. The following codes are used:

N - P (Nature conservation - Principal's perspectives)

N - T (Nature conservation - Teacher's perspectives)

N - S (Nature conservation - Student's perspectives)

N - TE (Nature conservation - Teacher educator's perspectives**)**

N - CS (Nature conservation - Curriculum specialist's perspectives)

N - R (Nature conservation - Researcher's perspectives)

ii) Data units related to the general perspectives on 'nature conservation' are included in this sub-category. The data may describe, explain, or define 'nature conservation.' The following are the specific codes in this sub-category:

NC-P (Nature conservation - Principal's perspectives)

NC-T (Nature conservation - Teacher's perspectives)

NC-S (Nature conservation - Student's perspectives)

NC-TE (Nature conservation - Teacher educator's perspectives**)**

NC-CS (Nature conservation - Curriculum specialist's perspectives)

NC-R (Nature conservation - Researcher's perspectives)

iii) Units of data related to perspectives on why nature conservation education is important for primary school children are included in this sub-category. The following codes are used:

NCC-P (Nature conservation - Principal's perspectives)

NCC-T (Nature conservation - Teacher's perspectives)

NC-S (Nature conservation - Student's perspectives)

NC-TE (Nature conservation - Teacher educator's perspectives**)**

NC-CS (Nature conservation - Curriculum specialist's perspectives)

NC-R (Nature conservation - Researcher's perspectives)

3. **School Practices of Nature Conservation**

Units of data that relate to the programmes or events related to nature conservation carried out in the four selected schools from the informants' perspectives are coded in this category. The school practices include programmes or activities conducted daily, weekly, monthly, quarterly or annually or once in a few years. The following are the specific codes in this category.

SP-P (School Practices – Principal's views)

SP-T (School Practices – Teacher's views)

SP-S (School Practices – Student's views)

SP-TE (School Practices – Teacher-educator's views)

SP-CS (School Practices – Curriculum Specialist's views)

SP-R (School Practices - Researcher's views)

4. **Curriculum for Primary (CP)**

Data from multiple viewpoints related to school curriculum on nature conservation, content, teaching and learning strategies or activities are coded in this category. For example, curriculum topics, current classroom practices, and impact of lessons on practices, and the like. The specific codes used are as follows:

CP-P (Principal's view)

CP-T (Teacher's view)

CP-S (Student's view)

CP-TE (Teacher-educator's view)

CP-CS (Curriculum specialist's view)

CP-R (Researcher's view)

5. **Teacher Education Curriculum & Practices**

This data category includes all data on how the pre-service teachers are oriented and trained to teach nature conservation. For example, the data units may be about the module

content, teaching-learning activities or other practices related to nature conservation education. The specific codes used are as follows:

TEC-TE (Teacher-education Curriculum - Teacher educators' perspectives)

TEC-R (Teacher-education Curriculum - Researcher's Perspectives)

6. **Suggestions for Nature Conservation (NCS)**

Informants may have expressed concerns about nature conservation and offered suggestions for nature conservation education and practices for primary school. These units of data have the following specific codes:

NCS-P **(**Principal's perspectives)

NCS-T **(**Teacher's perspectives)

NCS-S **(**Student's perspectives)

NCS-TE **(**Teacher educator's perspectives)

NCS-CS **(**Curriculum specialist's perspectives)

NCS-R **(**Researcher's perspectives)

7. **Research Strategies**

Data units that refer to research approaches, strategies or techniques are coded in this category. The specific code/s are as follows:

RS-R **(**Research Strategy – Researcher's experience)

Appendix 3.21 Respondent Validation: Email sent to informants

13th March 2021

Dear Sir/Madam,

Firstly, thank you so much for participating in my research project on 'Nature conservation in the primary schools of Bhutan' as an interviewee, and supporting me unwaveringly during my pleasant visit to your special school. The knowledge and experiences you have willingly shared with me is immensely valuable for this research, which may have an impact on primary education in the future.

One of the several techniques to level up the validity of the research is 'respondent validation.' This means, the respondent goes through the transcription and validates it. Of course, you cannot remember what you said word for word of the interview but you may pick up any nonsensical interpretations – the kind of things you couldn't have possibly said. And kindly know that the process of transcription is understood as a form of translation from one medium to another, and inevitably involves some interpretations, therefore, it is possible there are some errors committed during the transcription process. So, all you have to do is to see if I have got it right.

Although I had wished to carry this out in early 2020, the global pandemic had slowed down everything and the year went by without much relief from this crisis. Anyway, here I am, again, requesting you to spare a few minutes of your time. Just flick back the file with or without the changes. Also, for your information, I have added some background information of the respondent (without the name and location being mentioned) which I thought might add value to the research analysis. If you can check it – add or delete information – it will be great.

Thank you very much for your support, la.

Yours sincerely,

Sangay Biddha
Paro College of Education

Appendix 3.22 Dates of Respondent Validation by Informants

Dates of emails sent and responses received from Informants

Email sent by Researcher for Validation	Validated by informants
Email sent on 24th March 2021	Validated between 24th and 27th March 2021
Email resent on 9th June 2021	Validated between 9th and 16th June 2021