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Coming to Know the Local Environment: Children's Experiences in Rautamai Gaunpalika, Nepal

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Coming to Know the Local Environment:
Children's Experiences in Rautamai Gaunpalika, Nepal

by
Elsie Nicole Love

A thesis submitted in partial fulfillment of the
requirements for the degree of

Master of Arts
in
Geography

Thesis Committee:
Barbara Brower, Chair
Alida Cantor
Jeremy Spoon

Portland State University
2022

ABSTRACT

This qualitative research, conducted over three months from late monsoon season into early fall of 2018 with twenty-six children and thirteen adults, explores how children in the hills of Rautamai Gaunpalika, Province 1, Nepal come to know their local environment. Semi-structured interviews with children, their family members, and teachers, and participant observation with children as they worked and played in forests, fields, and streams, suggest that outside of school, children come to know their local environment in the following ways: through participation in and application of knowledge to subsistence practices; through collaborative learning and teaching in mixed-age groups; through relationships with animals, insects, plants, and deities; and through embodied and sensory engagements with place. These interviews, along with participant observation at a school, also suggest that while school environmental learning is quite different, it does, in some ways, connect to children's everyday learning about their environment, and that children draw on school environmental learning in ways they find meaningful. This research adds children's experiences and perspectives to scholarship on human-environment relationships in Nepal and the broader Himalayan region, and contributes to discussions on localizing school learning and connecting school learning to children's everyday environmental knowledge in Nepal and beyond.

DEDICATION

To the children of Rautamai Gaunpalika –
Learning from and alongside you over the years has been a true joy.
You have expanded my world and enriched my life immeasurably.

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First, I must thank the children and communities in Rautamai Gaunpalika, Nepal, who inspired and made this research possible. I am overwhelmed with gratitude towards my host family in Rautamai (I keep them anonymous here, but they know how much I value them) and to all the neighbors who fed me, shared with me, and cared for me as I did field research. Thank you for warmly welcoming me into your worlds. Thank you, too, to the children and communities in Lalitpur and Sindhupalchowk, Nepal, with whom I worked before and after field research, and who also taught me a great deal.

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GLOSSARY

Notes on translation, definitions, and transliteration: The translations and definitions provided here are not comprehensive. Rather, they aim to give a sense of what these words meant in the context in which participants used them, or in the broader Rautamai context. I used a combination Tika B. Karki's (2009) dictionary, Google Translate, help from Nepali friends, and my own understanding of these words and phrases when translating and defining them. When transliterating Nepali words I, for the most part, wrote them as I first learned to transliterate Devanagari script via Watters and Rajbhandary's (1998) Nepali language textbook. However, for the sake of simplicity, I did not use any special symbols (for nasal sounds, for example) or capitalization to distinguish between different Devanagari letters (dha and Dha, for example). In some cases, I inserted an 'n' where a nasalization mark would have been (in *baandar* and *kaancho*, for example), or made other small adjustments to give a better sense of the word's pronunciation. I spelled local terms that I could not cross-check in any dictionaries as I heard them. For tree and plant names that I was unsure of, I relied on Mishra (2012), Panthi (2013), and Mallick's (2020) lists of plants and trees.

Aaphe: self (myself, oneself, yourself, etc., depending on the subject)

Aaru: peach

Aasti: the day before yesterday, but also used to mean a while ago

Aayo: came

Adkindaina: does not stick

Aeri: (spelling guessed) a plant that is toxic to livestock (unsure of English name)

Ahile ko manche: people of now, today's people

Alaichi: black cardamom

Alchhi: lazy, lethargic

Andhaake: (spelling guessed) local name for a particular kind of nocturnal wasp

Baandar: monkey

Baandare: (spelling guessed) a kind of plant that makes seeds that monkeys eat (unsure of English name)

Baari: unirrigated fields

Banmaaraa: literally “forest killer;” *Ageratina adenophora*, Crofton weed, originally from Mexico

Bar: banyan tree

Bazaar: market

Besaar: turmeric

Bhai: younger brother, also used colloquially for a younger boy

Bhanjyaang: hill pass

Bihuli: bride; since brides wear red, some red flowers or birds are called *bihuli phul* or *bihuli charaa*

Chihaan: grave

Chilaaune: *Schima wallichii*, needlewood tree

Chulo: wood burning stove

Chyaaau: mushroom

Daal: lentils

Dalne: maybe *Castanopsis Indica*, Indian chestnut (*dalne katus*), but also might be a local name for a different tree (participants told me that *dalne* and *katus* are different)

Deuraali: sacred place on a hill pass

Deutaa: god

Devi: goddess

Devithaan: goddess place

Dhaaraa: water tap

Dimaag(maa): (in) the mind, brain

Dodhaar, dodhaarmai....: lyrics of a popular song

Doko: large bamboo basket

Dukha: suffering, misery, sorrow, the suffering of repetitive, mundane labor

Dushit: polluted, contaminated, defiled

Eh baabaa: phrase used here to express surprise

Ek santaan, ek biruwaa: (phrase) one child one plant

Gaai: cow

Galiyo: to be tired, weak (past tense)

Gamauro: (spelling guessed) small shrub with small, slightly chalky fruits

Gaunpalika: rural municipality

Gogan: *Saurauia napaulensis*

Goru: ox

Goth: Livestock shed

Hariyo ban, Nepalko dhan: (phrase) green forest, Nepal's wealth

Ho ki hoina: yes or no

Iskus: chayote

Jaat: caste, species, variety

Jam: let's go (informal)

Jana Andolan: People's Movement

Jangali: Wild

Jathaabhaabi: carelessly, randomly, haphazardly

Jeth: Nepali month, mid-May to mid-June

Juseli kira: caterpillar

Jutho: pollution, impure

Kaancho: raw

Kaaphal: *Myrica esculenta*, bayberry

Kabaddi: a running and tagging game

Karaayo, karaayo, eutaa kaan baata

sunyo, eutaa baata udyo: (phrase)

shouted, shouted, listened from one ear, flew out the other

Karaayo karaayo, raat bhari karaayo,

dakshinaa haraayo: (phrase, loose translation) shouted, shouted, shouted all night, and money was lost

Karkalo: taro

Kasto charko ghaam laagyo: what strong sun is felt

Khar: a kind of grass used for thatch

Khet: irrigated rice paddy

Khetaalo: literally laborer or farmer, but here used to refer to collaborative work exchange with neighbors

Khukuri: slightly curved Nepali knife

Kodo: millet

Kutu Ma Kutu: pop song name

Laampuchchhre: long-tailed blue magpie

Latte: amaranth

Lek: mountain, hill region

Lha: gods (Tibetan languages)

Loktantra Andolan: Democracy Movement

Lu / klu: (Tibetan languages) subterranean spirit, water spirit (similar to *naag / naga*)

Malsaanpro: yellow-throated marten

Muluki Ain: civil code

Naag / naga: serpent deity, often associated with water sources

Naag laagchha: (phrase) serpent deity causes a wound to emerge

Naamlo: tumpline, worn across the forehead to lift loads carried on the back

Naashpaati: pear

Niguro: fiddlehead fern (also *nihuro*)

Phul: flower

Pujaa: worship

Rahechha: just found out, surprise new information

Ram: name of a Hindu deity

Rudhibaadi: conservative

Rungnu: to guard or watch

Saaun: Nepali month, mid-July to mid-August

Sal: *Shorea robusta*

Serpo: snake

Shikshaa: education

Sikihaalchhu: to learn (verb) with an ending that means quickly, immediately, with finality, giving the general sense of “just learn” or “learn right away”

Sinkauli: *Cinnamomum tamala*, Indian bay leaf

Sirbandi: decorative headband

Sisnu: stinging nettles

Sital: cool

Suruwaal: pants

Tikaa: mark on the forehead, worn as a
blessing or decoration

Timihaaru kahan chhau: where are you
(plural, informal)

Towa: (spelling guessed) small,
temporary shelter

Uhile ko manche: people of the past

Umriyo: sprouted, came up

Uttis: *Alnus nepalensis*, alder tree

Vyaavahaarik: practical

Yug: era

PART I: INTRODUCING, LOCATING, FRAMING, AND POSITIONING THE RESEARCH

INTRODUCTION

Baandar Rungnu, to Guard Against Monkeys

“Saru! *Timihaaru kahan chhau?*” (Where are you all?) I yell. Cries of “Ooooo Elsie Miss” and the squawks of a bamboo flute drift up with the thick monsoon fog. The cries and squawks lead me jumping down steep terraces, zigzagging through tall corn, and slip-sliding down a forested ravine to the children I am looking for, Saru, Ujjal, Asmita, and Bimal.¹ They greet me by further blasting the flute, strumming a bamboo “guitar,” and cheering.

It is Saturday, and they are spending the whole day off from school in their family’s corn fields, guarding the ripening corn from bands of thieving monkeys.

The children lead me to a small wood, bamboo, and thatch shelter, where Saru coaxes fire out of smoldering embers, blowing through a bamboo tube. She yells down to her grandfather, somewhere in the corn terraces far below, to bring up young, green corn to roast.

Grandfather and the rains return together. Saru and Asmita set to roasting the corn, turning the still-husked cobs around in the coals. Grandfather, perched above the monsoon-wet ground on the shelter’s small platform, returns to a carving project, a new case for his *khukuri* knife. “Grandfather made this flute and ‘guitar,’ too!” Saru boasts.

“Miss, life is like this! What to do? If we don’t sit here, from dawn until dusk, the monkeys will steal all of our corn,” Grandfather says in his always-jovial tone, but shaking his head with a sense of seriousness. “We saw so many monkeys the other day, some carrying babies, but we scared them all off!” Saru adds.

Eventually, the rain lets up. Warmed by the fire and energized by the roasted corn, the kids and I set off towards the lower section of fields they are meant to be guarding.

The children, feet clearly familiar with the terrace path’s twists and turns, with its steep and slippery sections, move with agility. They resemble baby goats, leaping off terrace walls, bouncing between the terrace sides.

¹ All names are pseudonyms. See Table 1 for children’s ages and genders.

Asmita, leading the way, pulls us all off the path to an *aaru* (peach) tree growing out one of the terrace walls. Within a few minutes, all four children are up high in its thin branches, their t-shirts-turned-carrying-pouches stretched tight with the small, fuzzy, green fruits. When they have a built small mountain of fruits on the ground, I ask, “Don’t you want to save some to pick later?” “No! We have school, we won’t be back here until next weekend. By then the black birds will have eaten all the fruit!” Saru responds.

Shirt pouches and my bag heavy with *aaru*, we continue down until we reach a *towa*, a small shelter that the children’s father had built. The *towa*’s covered area is small, just a tiny elevated box with one side open; only two kids can sit in it at a time. But, it has a large platform, which juts out over a lower terrace, supported by a small tree. Saru explains that from the *towa*, which is positioned below all of the cornfields but above the thick jungle, “We can see the monkeys coming from the jungle. They live in the jungle, and come up from there.”

The rain has cleared the fog, and we can see not only jungle, but also layers of hills, neighboring villages, and the winding path of a river in the valley below, its banks bright green with rice paddy. Saru points to a large bolder, off in the distance, and tells me that once she and her friend Anjali found a big snake there.

To the children’s disappointment, no monkeys come. But, they enthusiastically explain what they do when monkeys do come. “We yell!” “We play the flute!” “We throw rocks!” They demonstrate, jumping on the *towa*’s platform, yelling, singing, blasting the flute, banging sticks together, until they fall into a heap laughing.

“What do the monkeys eat, when they can’t eat corn?” I wonder. “They also take soybeans. In the jungle they eat *dalne* (maybe Indian chestnut) seeds. Maybe other things,” Saru thinks out loud.

The hours go by, the kids sometimes making up small games to play together, sometimes wandering off into their own worlds of exploration or imagination.

Asmita catches a “leaf butterfly,” which does indeed just look like a leaf. She holds it up by its wings to examine it, before letting it go.

Saru is on the hunt for flowers. She finds a pink one, which she mashes up to make into play *tikaa*, decorating our foreheads with it. Saru then begins telling me the names of all the flowers and trees she can see. “Mother taught me all this,” she explains.

Afternoon turns to evening and the children pack up their instruments, plastic rain sheets, and what remains of the fuzzy green *aaru*. Saru grabs a biscuit

wrapper from the *towa*, and tucks the plastic into her pants' waistband. "If we throw this it will be 'land pollution,'" she explains, using the English words 'land pollution,' in her otherwise Nepali sentence.

"Yes," I respond, "If we throw plastic it will be here for a very long time. Where did you learn about land pollution?"

"From the book. Today we read about air and water pollution. We are reading about it in science subject."

"Do other people throw plastic here?" I ask.

"Yes. A lot. Because they do not know."

We weave our way up through the steep corn terraces, the kids moving with a bit less of the morning's baby-goat energy. Back at the first shelter a young aunty, her one-year-old son, and her sister Chameli have replaced Grandfather. "I'll stay until dark. Chameli, take *bhai* (little brother) and go with the others," she says, tying the plump toddler onto Chameli's back with a shawl.

We continue up, Chameli bubbling with her usual enthusiasm, eager to test my tree knowledge. I pass her test, successfully identifying *sinkauli*, *kaaphal*, *gogan*, *chilaaune*, and *uttis*. We then come to a very big *kaaphal* (bayberry) tree, which reminds Chameli of a *kaaphal* tree near her friend's house in her home village. "That *kaaphal* tree gives many berries, the most berries." Unfortunately for us, now is not *kaaphal* season.

A bit encumbered by her squirming load, Chameli tells me to pick the wildflowers she wants and I oblige, plucking the big white ones and the pink ones for play *tikaa* from the side of the path.

"Go fast here, there are leeches!" Saru directs us, as we walk down into the damp ravine. At the stream we all pause, just briefly, to rinse our muddy feet. "This stream comes from the spring above the road, near the *jangali* (wild) path that goes up to the top of the hill," Chameli shares. She knows I am trying to learn about local streams and springs, and is always eager to teach.

"What lives in this stream?" I ask.

"Fish!" Bimal answers.

"No, this stream is too small. Frogs and frog babies," Saru corrects. "Fish live in Thulo Khola. And in the stream near Anjali's house."

We continue and soon encounter Kalpana, the mother of some of my companions, cutting fodder from the path side for her cattle. Next to her sits a large bundle of *niguro* (fiddlehead ferns) she has harvested from the ravine to curry for dinner and to sell to neighbors.

"Mmm!" I am excited for dinner.

"Let's go pick *niguro* next Saturday!" Saru suggests.

"Where will we find it?" I ask.

“Damp, cold places,” Saru answers.

Saru, Asmita, and I part ways with Chameli and her small nephew, Ujjal, and Bimal. They take the more direct path home, while Saru has something else in mind. She guides us on a slightly more roundabout route, up to an aunty’s courtyard. The aunty is now living in Gaighat and her flower garden is a tangle of over-grown blossoms. Saru chooses a few of her favorites, carefully digging around the plants’ roots with a stick, then gently uprooting them with her hands. She gives them to Asmita to carry the rest of the way home.

We arrive back home a little before dusk and before Saru’s parents. Saru starts a fire, burning an old plastic bag to get it going. She yells to Asmita to rinse the rice while she carefully replants her flowers in her small garden outside, watering them in.



Figure 1: *Baandar rungnu*



Figure 2: A towa

Thesis Introduction

How do children in the hills of Rautamai *Gaunpalika* (rural municipality), Udayapur District, Province 1, Nepal come to know their local environment? I began my fieldwork exploring this research question in a few settlements and nearby forests, fields, and streams during late monsoon, when many children spend their days off from school guarding fields of ripening corn from rhesus macaque monkeys. Just as *baandar* (monkey) *rungnu* (to guard from) introduced me to some of the ways children come to know their local environment, the vignette above introduces many of the core themes I

found through my research. Saru, Ujjal, Asmita, Bimal, and Chameli show how by participating in subsistence practices they come to know local forests, fields, and streams in ways that are embodied, relational, collaborative, and applied. As the children traveled up and down steep paths, as they climbed up the *aaru* tree's thin branches, and as they drew connections between wet places, leeches, and *niguro*, I noticed how their feet, hands, and bodies held knowledge of the landscape. Through everyday relationships, such as with trees that give berries, monkeys that steal crops, or flowers that make play *tikaa*, children come to understand their local environment in ways that are attentive, intimate, and curiosity-driven. Children's relationships to adults and to each other also shape how they know their local environment. Recall how Saru explained what her mother had taught her about trees and plants, and that she herself taught Bimal what lives in the stream. And, as the children worked together, they not only shared knowledge, but also shared joy and the slower, damper parts of their work. Finally, as Saru demonstrated when she carefully uprooted and replanted flowers, children apply their knowledge; it is not just abstract, stored in their minds, but is enacted through practice. Guarding fields from monkeys showed me that Rautamai children's knowledge of their local environment is multidimensional and developed through participation in everyday subsistence practices, play, and relationships.

I first became curious as to how children in Rautamai come to know their local environment when teaching primary level science classes with a community-supported education project. The children I worked with brought impressive knowledge about forests, fields, and streams to the classroom. And, outside of the classroom, I saw how tightly their and their families' lives were interwoven with the local environment.

Like most Nepalis, residents of Rautamai rely on a suite of livelihood strategies that include subsistence agriculture, livestock raising, and use of forest resources (Central Bureau of Statistics 2011). In terraced fields, gardens, and orchards they grow a variety of grains, vegetables, legumes, herbs, and fruits. For manure, dairy, ploughing, or meat, families raise goats, cattle, water buffaloes, pigs, and chickens. They rely on nearby community-governed forests for fodder to feed some of these animals, as well as for firewood and seasonal wild foods. Springs provide drinking water, while streams provide irrigation. Land- and water-based deities dwell beneath particular trees, in caves, in springs, and at a local pond. With lives intertwined with the local landscape, the ways children and their families think about and interact with the environment have implications for their livelihoods, their spiritual worlds, the environment's health, and their own health. Considering just how important these human-environment relationships are, I wanted to better understand how children learn about their local forests, fields, and streams.

As an educator with experience working in Nepal's government schools, I was also curious as to how children's school learning overlapped with and differed from their everyday, out-of-school environmental learning. In Nepal, formal schooling and extracurricular school activities are among the many forces influencing environmental knowledge change (Spoon 2008, 2014; Sherpa 2012; Gurung 2020). And, just as environmental knowledge changes, so does the environment. While residents of places like Rautamai often hold valuable environmental knowledge developed through long-term engagement with place, recent changes such as road construction, piped water systems, plastic packaged goods, and climate change create new challenges and

opportunities. As Saru demonstrated when she shared her school learning on land pollution, school can expand children's environmental knowledge in response to change and in ways children value. While my research focuses primarily on how children learn in forests, fields, and streams, it also explores some of the ways school learning relates to this everyday learning.

Structure of the Thesis

The remainder of Part I provides context, situates my research in the literature, articulates the core concepts I use to frame my research, and introduces the research and me, the researcher. I first provide very brief introductions to Nepal's physical geography, caste and ethnic groups, political history, and governing system. I then review literature on environmental knowledge in Nepal and the broader Himalayan region and on Nepal's schooling system. Next, I introduce a few core concepts and studies on everyday and environmental learning, and the dynamics between this learning and school learning, from beyond Nepal and the Himalayan region. Then, drawing on the literature to frame my research, I define what I mean by environmental knowledge and learning, and position children's everyday environmental knowledge and learning as their "funds of knowledge" (Moll and González 1994). In the research section, I provide more detailed introductions to Rautamai Gaunpalika and to research participants, describe the ethnographic research methods I used to collect and analyze data, discuss research ethics, and explain my approach to storytelling. I conclude with a discussion of my positionality and relationship to the research.

Part II seeks to answer my research question: How do Rautamai children come to know their local environment? I show how children come to know the local landscape

through participation in and application of knowledge to livelihood practices, through collaborative learning and teaching in mixed-age groups, through relationships with animals, insects, plants, and deities, and through embodied and sensory engagements with place. I structure Part II around these four themes, which emerged through analysis of Rautamai children's out-of-school environmental learning. While I build this chapter around out-of-school learning, within each thematic section I also consider some of the ways schooling articulates with that dimension of children's environmental learning, and some of the ways schooling relates to that layer of children's funds of knowledge. In each thematic section, I put findings in conversation with literature reviewed in Part I. Throughout Part II, I weave in vignettes not just to illustrate key themes and arguments, but also to bring children's worlds to life. I hope that readers are able to feel some of the curiosity that I felt when witnessing some of the encounters, relationships, practices, and ideas that shape how Rautamai children know their local environment.

In Part III, I further connect Rautamai children's environmental learning to the environmental and schooling contexts I introduce in Part I. I also discuss possible future research directions and consider how my findings might be applied. I end with a final vignette, in the forest again with Rautamai children.

CONTEXT

Brief Introduction to Nepal's Physical Geography



Figure 3: Map of Nepal (outlined in white) and Province 1 (outlined in red) (Google Maps 2022)

Rising from just above sea level in the lowland Terai plains and jungles, up through the Churiya and Mahabarat hills to the world's tallest Himalayan peaks, Nepal's physical geography is well known for its varied topography, its many climate and ecological zones, and its earthquakes and environmental challenges (Zurick et al. 2006; Miehe, Pendry and Chaudhary 2015). To get a very basic sense of the small country's ecological and climate diversity, consider that within an area of less than 150,000 square kilometers one finds tropical, subtropical, temperate, subalpine, alpine, and nival vegetation zones (Zurick et al. 2006; Miehe, Pendry and Chaudhary 2015). As the Indian Tectonic Plate continues its slow-motion collision with the Eurasian Tectonic Plate, growing the Himalaya, Nepal and the rest of the region experience frequent and sometimes devastating earthquakes (Zurick et al. 2006; Miehe, Pendry and Chaudhary

2015). Climate change affects Nepal's once more predictable weather systems, causing summer monsoon rains to come early, late, or more erratically and, during other seasons, causing droughts or unusual storms. This, along with land use change, means that landslides, floods, crop failures, and wildfires are not uncommon (ClimateLinks 2017; Rizal 2021a; Rizal 2021b; Rizal 2021c, Rizal 2022). Nepal's physical geography is perhaps as dynamic as it is striking.

Brief Introduction to Nepal's Caste and Ethnic Diversity

Nepal's population of just over 29 million is comprised of members of 126 formally recognized caste and ethnic groups and speakers of 123 formally recognized languages (Central Bureau of Statistics 2021; Ministry of Foreign Affairs N.D.). The ancestors of today's members of these caste and ethnic groups are thought to have migrated to and settled in what is now Nepal from Tibet, southwestern China, and India (Whelpton 2007; Parker 2013). Some ethnic groups, like Magar, Rai, and Tharu, may have formed through the merging and fusion of different groups and may have multiple origins (Whelpton 2007). Initially, groups that migrated from Tibet such as Tamang, Gurung, and Sherpa settled in Nepal's northern mountains or hills, groups that migrated from the east such as Rai and Limbu settled in Nepal's eastern hills, groups that migrated from the west, such as hill Brahmin, Chhetri, and Dalit, settled in Nepal's western and central hills, and groups that migrated from the south, such as Muslim and Madhesi caste Hindu groups, settled in Nepal's southern plains (Whelpton 2007; Parker 2013). These different groups adapted to the terrain, climate, and ecology of the areas in which they settled, and in alignment with their different cultural worldviews and preferences (Whelpton 2007; Parker 2013).

Today, many members of different caste and ethnic groups still live in their ancestral homelands, but political, economic, and other forces have prompted and continue to prompt migration within the country (Whelpton 2007; Parker 2013). For example, after the rise and consolidation of the Nepali state via Gorkhali conquests in the 18th century, some members of Brahmin, Chhetri, Dalit, and other groups migrated farther east; the former two groups' migration was incentivized, in part, by land grants given by the state (Regmi 1976; Whelpton 2007; Parker 2013). More recently, the near eradication of malaria and clearing of jungles in the Terai (beginning in the 1950s), the Maoist insurgency (1996-2006), and the lack of facilities and services in rural areas have prompted many people to migrate to the Terai or to urban areas, at times pushing out or further marginalizing people indigenous or local to those areas (Whelpton 2007; Robertson 2018; Central Bureau of Statistics 2021).

Hill Brahmin, Thakuri, and Chhetri caste groups have historically been and continue to be socially, politically, and economically dominant, while Dalit (previously known as “untouchable;” Dalit means oppressed) and many other ethnic and caste groups have historically been and continue to be—to varying degrees and in different ways—oppressed and marginalized (Whelpton 2007; Folmar 2007, 2013; Lawoti 2010a, 2010b; Nightingale 2011; Campbell 2013; Menuka Karki and Bohara 2014; Kiang, Folmar and Gentry 2020). To give a very basic introduction, Nepal's caste and ethnic hierarchy positions some groups, such as the so-called “high caste” Brahmin and Chhetri groups, as ritually pure, and many other caste and ethnic groups as—again, to varying degrees, and in different ways—ritually impure or ritually polluting (Whelpton 2007; Folmar 2007, 2013; Nightingale 2011). This caste- and ethnicity-based system of difference,

dominance, and oppression was, in the past, codified into law. During the Rana regime (1845-1951) the 1854 *Muluki Ain* (civil code) established an official caste and ethnic hierarchy, with some groups categorized as enslaveable and with different legal standards for different caste and ethnic groups (Höfer 2004; Whelpton 2007; Campbell 2013). The introduction of the 1963 *Muluki Ain* (civil code) during the partyless Panchayat government (1960-1990) made caste- and ethnicity-based discrimination illegal (Whelpton 2007). However, not only did everyday oppression continue, but state policy also continued to privilege hill Brahmin and Chhetri identity, culture, religion, and language, over those of other groups (Whelpton 2007; Lawoti 2005). Since the 1990s, with continued political change and ethnic and Dalit rights activism, there has been movement towards inclusion. Even so, everyday caste- and ethnicity-based oppression and discrimination continues, and caste privilege is still evident in many of Nepal's institutions (Lawoti 2005; Whelpton 2007; Lawoti 2010a, 2010b; Nightingale 2011; Menuka Karki and Bohara 2014; Paswan 2018; Nepali 2019; Harijan 2019; Kiang, Folmar, and Gentry 2020).

Brief Introduction to Nepal's Political History and Current Governing System

Until the mid-18th century, what is today Nepal was made up of small, autonomous territories and kingdoms. The Gorkhali conquests of the 18th century consolidated these into a single kingdom, ruled by Shah monarchs. From the mid 19th century until the mid 20th century, although Nepal remained a monarchy, it was hereditary prime ministers, the Ranas, who ruled the kingdom and kept it closed to foreigners. The 1950s saw revolution against the Ranas, the reestablishment of the monarchy's authority, a brief movement towards democracy, and the opening of Nepal to

outsiders (Whelpton 2007). From 1960-1990, Nepal was governed through a partyless Panchayat system that worked to create a unified national identity around hill Brahmin-Chhetri culture, language, and religion and, often supported by bilateral and multilateral aid organizations, sought to develop Nepal (Whelpton 2007; P. Bhatta 2009a; Skinner and Holland 2009). Pressure from the *Jana Andolan* (People's Movement) of 1990 brought an end to the Panchayat system, and Nepal became a multiparty democracy under constitutional monarchy (Whelpton 2007). With this came an upsurge in advocacy for ethnic groups' rights and in ethnicity-based identity building (Gellner 2007; Whelpton 2007; Shakya 2010; Pradhan 2020). Continued discontent with the monarchy and frustration with the state's inability to meet citizens' needs helped fuel a Maoist insurgency from 1996-2006. Maoist insurgents demanded the abolition of the monarchy and claimed to champion ethnic, Dalit, and gender rights (Lawoti 2010b; Shakya 2010). The years 2006-2008 brought the *Loktantra Andolan* (Democracy Movement), a peace deal with the Maoists (who agreed to join the democratic process), a democratically-elected interim government, and the abolition of Nepal's monarchy (Kantha 2010; Sen 2015). In the wake of the devastating 2015 earthquakes and after many years of negotiation and disagreement, Nepal's 2015 constitution was promulgated, establishing a three-tiered system of government comprised of federal, provincial, and municipal levels (Hutt 2020). Municipality-level elected officials have more access to funding and decision-making power than local-level officials did under previous governing systems, but, in these early stages of decentralization, lack of local capacity and coordination between government tiers have proved challenging (Acharya 2018; Chaudhary 2019).

LITERATURE REVIEW

Subsistence Livelihoods and Environmental Knowledge

Through everyday subsistence, people across Nepal and the Himalayan region develop practical and applied knowledge of their local environment. The specifics of these livelihood practices vary across ecologies, generations, socioeconomic classes, and gender, caste, and ethnic identities. Still, research from across the region has shown that many people hold knowledge of their local environment connected to herding and caring for livestock, growing and tending crops, and collecting resources from places like forests, streams, grasslands, and mountains (Brower 1991; Bauer 2004; Spoon 2008; Nightingale 2010; Campbell 2013; Parker 2013; Dyson 2014, 2015; Govindrajan 2018). For example, as Barbara Brower (1991) working in Khumbu, Nepal, Kenneth Bauer (2004) working in Dolpo, Nepal, Ben Campbell (2013) working in Rasuwa, Nepal and Jane Dyson (2014) working in Kumaon, India all found, as people moved through the landscape with livestock or collecting fodder for livestock, they developed intimate knowledge of the terrain and of different plants connected to their livestock's needs. As a second example, focusing on forest governance in Mugu, Nepal, Andrea Nightingale (2010) has shown how people's knowledge of the local forest ecology and of how the forest had changed over time was connected to their work gathering fodder, bedding for livestock, fruits, and more. And, as a third example, both Radhika Govindrajan (2018) working in Kumaon, India and Campbell (2013) found that by guarding crops from thieving wild animals such as monkeys and boars, people came to intimately know and understand these animals and their tendencies. Peoples' knowledge of and relationship to

their local environment is thus shaped, in part, by the everyday ways they interact closely with it through subsistence livelihood practices.

Most research on environmental knowledge in Nepal and the broader Himalaya focuses on adults. One notable exception is Dyson's (2014, 2015) work with young people in Kumaon, India. Dyson found that through participation in subsistence practices, such as harvesting lichen, herding livestock, and collecting leaves as bedding for livestock, young people came to intimately know local forests. Dyson explored the playful and social dimensions of children's environmental learning and knowing, too. As they worked, children found opportunities for joy, mischief, and social connection in their local environment. In his otherwise adult-focused research, Campbell (2013) briefly discusses children's roles in subsistence practices, describing how they learned to herd livestock by starting with smaller animals, how they cared for baby birds that fell from nests when they cut fodder, and how they came to know the secondary forests where they spent time picking nuts and fruits and collecting fodder. While not academic research, Dorje Dolma's (2018) memoir about her childhood in Dolpo, Nepal highlights some similar themes. Dolma describes how through her work herding livestock in the mountains, she encountered wild animals like snow leopards that threatened her goats and sheep, delighted in tasting wild herbs and finding flowers, and developed memory-layered relationships with the local terrain. Dyson's youth-focused research, Campbell's description of children's learning, and Dolma's memoir all show that young people are actors in and knowledgeable about their local environment, learning through subsistence work and play.

Gender, Caste, Ethnicity and the Environment

In Nepal and the broader Himalayan region, the ways people know and interact with their local environment vary across gender, caste, and ethnic identities (Spoon 2008; Nightingale 2011; Sherpa 2012; Parker 2013; Dyson 2014; Govindrajan 2018). For example, Dyson (2014) found that while boys and girls went to the forest together to graze livestock when young, once they reached adolescence, girls were expected to do other chores instead, since spending time in faraway forests could put their reputations at risk. Dyson also found that boys and girls enacted local forms of masculinity and femininity through their work and play in the forest, and thus engaged with it in different ways. Looking at gender and the environment in Mugu, Nepal, Nightingale (2011) describes how ideas on ritual pollution, such as the view that menstruating bodies could damage crops and pollute water, shaped women's interactions with the local environment, and how these interactions in turn shaped their subjectivities as women. Nightingale also describes how women of all castes and Dalit men worked regularly in the forest, the Dalit men working in dangerous but high wage timber-felling, while Brahmin, Thakuri, and Chhetri men only occasionally worked in the forest. Local relationships with and knowledge of the forest thus varied along gender and caste lines. As a final example, I look to Anne Parker's (2013) work in a heterogenous part of Sankhuwasabha District, Nepal where members of Rai, Limbu, Sherpa, Tamang, Gurung, Dalit, Brahmin, Chhetri, and other caste and ethnic groups all lived. Parker describes how different groups' rituals and ideas of purity were associated with different food and agricultural practices, which shaped people's interactions with the local environment. She also shows how through interaction and negotiation with one another, different groups'

practices changed and evolved. These examples show that gender, caste, and ethnic identities, and the way power shapes these identities, contribute to heterogeneous knowledge of and ways of interacting with the environment.

Animate Landscapes and Relational Ontologies

Across Nepal and the broader Himalayan region, people's knowledge of, perspectives on, interactions with, and relationships to the environment are interwoven with spiritual or religious beliefs, stories, and rituals. Of course, the specifics vary significantly between and within communities that practice and often integrate different forms of Hinduism, Buddhism, Bon, animism, shamanism, and other religious or spiritual practices. To generalize, place-connected spiritual or religious beliefs, stories, and rituals often (but not always) encourage care for, reciprocity with, and a sense of relationality towards different elements of the local environment (Tautscher 2007; Spoon 2008; Fortier 2009; Aggarwal 2010; Skog 2010, 2015; Subba 2010; Lecomte-Tilouine 2011; Campbell 2013; Gagné 2018; Govindrajan 2018; Gurung 2020). In my research, participants told me about local water- and land-based deities, and the beliefs, stories, and rituals associated with them. In the following two paragraphs, I focus on literature on the place-connected spiritual beliefs and practices most similar to those that research participants described to me.

For members of a number of different communities across Nepal and the broader Himalayan region, staying in good relationship with serpent, water, or subterranean deities, such as *naag* or *naga* (Nepali), or *lu* or *klu* (Tibetan languages), is important to protect water sources, rainfall, harvests, and human health (Tautscher 2007; Spoon 2008; Aggarwal 2010; Skog 2010; Campbell 2013; Gurung 2020). Similar across many

communities is the belief that *naag*, *naga*, *lu*, or *klu* live in water sources, and that upsetting these deities through material or ritual pollution can cause springs to dry, delay rainfall, or lead to physical ailments (Tautscher 2007; Skog 2010; Campbell 2013; Gurung 2020). Some people also associate *naag*, *naga*, *lu*, or *klu* with snakes, and sometimes with frogs or fish (Tautscher 2007; Aggarwal 2010; Gurung 2020). For example, Gurung (2020) tells a story a Dolpo research participant shared, in which picnickers slaughtered a sheep and its blood went into a lake. The picnickers then saw a snake, and a few people became sick. The participant telling the story attributed the sickness to the *klu*, upset by blood polluting the lake, and associated the snake with the *klu*. Gurung and others also describe rituals to propitiate *naag*, *naga*, *lu* or *klu*, some more elaborate like the *bstan skor* that restores human-deity relationships and brings rain in Dolpo, and some simpler, like the burning of Tibetan butter to appease upset *lu* in Khumbu (Skog 2010; Gurung 2020). Taken together, this research shows that staying in good, reciprocal relationship with *naag*, *naga*, *lu* or *klu* by avoiding pollution and propitiating them through rituals is seen as important for water, weather, crops, and people, and thus for broader environmental harmony.

Land-based deities, who often have their own names but are known in general as *devi-deutaa*, meaning goddesses and gods, dwell in sacred places across the landscape, including in caves and rocks, on hilltops, and beneath or in groves of trees (Tautscher 2007; Aggarwal 2010; Campbell 2013; Govindrajan 2018).² In some communities, staying in good relationship with these *devi-deutaa* requires giving them the first grains

² Spelling of *deutaa* varies across the region. In Tibetan language communities land-based deities are called *lha*.

from a harvest, or sacrificing blood from animals like roosters or goats (Tautscher 2007; Campbell 2013; Govindrajan 2018). In return, the deities support crop, livestock, and human health (Aggarwal 2010; Campbell 2013; Govindrajan 2018). Working in Kumaon, India, Govindrajan (2018) describes how for some research participants, the intimate and loving act of raising livestock made sacrificing these livestock to the deities a meaningful repayment for all the deities had provided. She also found that the web of relationships connecting humans, deities, livestock, and crops also included some wild animals; some participants said that even leopards are devotees to local *devi-deutaa*, and that like people, they too fast and refrain from hunting during certain times of the year to show their devotion. Also working in Kumaon, India, Safia Aggarwal (2010) describes another dimension of human-deity relationships: there are taboos around cutting trees in the proximity of *devi-deutaa*. Maintaining sacred tree groves can have ecological benefits, such as protecting forests and water sources, but as Aggarwal cautions, we cannot know whether the spiritual beliefs and practices around *devi-deutaa* evolved with ecology in mind. Still, taken together, the literature on *devi-deutaa* indicates that for many people, beliefs and rituals, including sacrifice and taboos around cutting trees, contribute to a sense of reciprocity, and position humans not as dominant over but as participants in a broader web of human-deity-nature relationships.

Power and Environmental Knowledge

In Nepal and the Himalayan region, some of the ways particular environmental perspectives have been privileged and deployed by researchers, governments, or other institutions have reflected and reinforced power dynamics. During the 1970s, for example, Western and Western-trained scientists were convinced that Nepal was headed

towards wide-spread deforestation, erosion, and environmental collapse (Eckholm 1975; Ives and Messerli 1981). Subsistence farmers were painted as ignorant and at fault. This “Theory of Himalayan Environmental Degradation” was later debunked as scientifically inaccurate, and extensively critiqued for ignoring local power dynamics that influence land use, as well as for dismissing farmers’ local knowledge (Blaikie 1985; Ives and Messerli 1989; Brower 1991; Guneratne 2010; Metz 2010; Lewison and Murton 2020). Even after this crisis narrative was largely abandoned in Nepal, India and China’s governments continued to use it to wrest power from upland farmers (Blaikie and Muldavin 2004). This shows that the ways people come to know and think about the environment are not apolitical and can be used to gain or reinforce power.

Research on protected area management, community forest governance, and conservation efforts reveals some similar dynamics, where “expert” environmental knowledge and perspectives have been privileged over local ways of knowing (Brower 1991; Bauer 2004; Nightingale 2005; Sherpa 2012; Campbell 2013; Gurung 2020). National park, conservation, and development workers sometimes position themselves as more knowledgeable than local residents about the environment and what constitutes environmentally friendly behavior, even when they themselves are not local to the area and when their programs are ostensibly participatory (Brower 1993; Campbell 2013; Gurung 2020). A quote from a participant in Gurung’s (2020) research, Dhana Rai, a retired World Wildlife Fund employee who had worked in Shey Phoksundo National Park, Dolpo, illustrates this. Rai shared that the organization’s programming (including the school eco-club, discussed below) aimed, “to teach the locals about the importance of biodiversity and motivate them to contribute to nature conservation” (quoted in Gurung

2020, p.68). Embedded in his statement, and likely in the programming itself, is the assumption the local people do not know how to best interact with their own environment and need to be taught. In her research in Mugu, Nepal, Nightingale (2005) observed that a similar assumption shaped community forestry. First, the state and donor organizations assumed that they needed to teach community forest user groups scientific forestry so that they could manage their local forests. They trained literate community members, who were high caste men. As a result, literate high caste men were able to leverage their roles in community forest user groups to reinforce their own power and positions in local hierarchies. Even though women of all castes and Dalit men did the most work in the forest, the high caste men in power said they needed to make the others “aware.” Other researchers have observed a similar dynamic around place-connected religious and spiritual practices, where those who are literate or have more formal schooling consider some place-based spiritual practices superstitious. Govindrajan (2018) saw this in Kumaon, when a research participant who had had more schooling shamed family members for sacrificing livestock to local deities. Gurung (2020) similarly observed that national park officials viewed Dolpopa practices to propitiate deities as superstitious. Across all of these examples, we see an assumption that outside or expert knowledge on the environment, often associated with literacy, formal schooling, and/or Western science, is more valuable than local knowledge, and that this assumption can be leveraged to reinforce gendered, caste and ethnic, and schooling-related power dynamics.

In response to the ways expert knowledge has been privileged over local ways of knowing, academia, conservation, and development have, in different ways and to varying degrees, turned towards and sought to elevate local knowledge as conservation

oriented (Guneratne 2010). Some researchers caution against an over-correction that could essentialize or romanticize local ways of knowing the environment, whether connected to livelihood or place-based spiritual practices (Aggarwal 2010; Guneratne 2010; Russell 2010; Subba 2010). Aggarwal's (2010) work in Kumaon, India illustrates some challenges that can come with leveraging place-based spiritual practices for conservation. Some communities she worked with placed degraded oak forests under the care of local deities. While taboos against cutting in the deities' forests supported forest regrowth, lower-income villagers had to walk farther away to meet their fodder needs in other forests. This put strain on both already-marginalized villagers and on other forests. Aggarwal also observed how, in some communities, as land-based deities and sacred groves became more popular among pilgrims, as new roads increased accessibility, and as devotees' attention shifted from the forest to new temple complexes, areas around sacred sites suffered environmental degradation. Viewing elements of nature as connected to the sacred, does not, Aggarwal notes, necessarily lead to their conservation. Aggarwal's and others' related findings, along with scholars' warnings against essentialism and romanticism, serve as a reminder that while it is important to pay attention to and to value local ways of knowing the environment, these ways of knowing are not always conservation oriented, and can also be leveraged to reinforce local power dynamics.

Hybrid Environmental Knowledge

While the literature introduced above draws attention to powered dynamics between so-called expert environmental knowledge and local environmental knowledge in some helpful ways, people's environmental knowledge is often hybrid, and the binary

framing of expert or global vs. local can obscure this hybridity (Dove et al. 2009; Sillitoe 2009). In Nepal and the broader Himalayan region, as is true elsewhere, people often blend or simultaneously draw on multiple forms of knowledge and ways of thinking (Rademacher 2005; Dove et al. 2009). For example, in her research on river restoration efforts in Kathmandu, Nepal, Anne Rademacher (2005) found that many organizations associated their work with various combinations of global and local ideas and resources. Spoon's (2011, 2013) work on Sherpa environmental knowledge provides a second example. He expands Turner and Berkes' (2006) concept of "adaptive co-learning"—the theory that people learn about the local environment incrementally through experience over long periods of time, passing this knowledge down, and more quickly through errors or crises—to include learning through knowledge exchange with different kinds of stakeholders. He found that some participants held a combination of local spiritual and livelihood-based knowledge, and knowledge associated with Western science, national park management, and tourism. These two examples show that people can blend or hold multiple ideas simultaneously.

Changing Environmental Knowledge

As mentioned and alluded to above, the ways people know their local environment are not static, but may change. As people adapt to all kinds of change—new livelihood possibilities, outmigration of young people, in-migration of new people, establishment of protected areas and tourism, new systems of governance, deeper market integration, increased access to formal schooling, projects by international and nongovernmental organizations, new forms of extraction and pollution, and more—their knowledge of and relationship to the local environment may change too (Brower 1991;

Bauer 2004; Agrawal 2005; Spoon 2008, 2011, 2013, 2014; Adhikari 2008; Guneratne 2010; Nightingale 2010; Sherpa 2012; Campbell 2013; Parker 2013; Govindrajan 2018; Gagné 2018; Gurung 2020). Some people adapt, blend, abandon, adopt, and/or strategically draw on different ways of knowing their local environment in response to change and to exposure to different kinds of knowledge (Spoon 2008; Sherpa 2012).

Acknowledging that many things influence environmental knowledge change and hybridity, I want to highlight the role of schooling and extracurricular activities, since these are most relevant to my research. Working with Sherpa participants Sagarmatha National Park in Khumbu, Nepal, Spoon (2008) found that, in general, participants who had higher levels of formal schooling had lower levels of local ecological knowledge than participants with little or no schooling, possibly because participants with more schooling had not participated as much in subsistence activities. However, he also found that schooling may align with and reinforce some local perspectives, such as Sherpa spiritual views around not killing wildlife; some people may blend these ideas, along with ideas on hunting encountered through their engagement with tourism and Sagarmatha National Park. Also working with Sherpa communities in Khumbu, Nepal, Pasang Yangjee Sherpa (2012) spoke with a participant who explained that he learned about climate change through programs hosted by schools. Sherpa notes that he also drew on ideas of deforestation and smoke that aligned with the national school curriculum. Phurwa Gurung (2020), reflecting on his own childhood experience participating in a World Wildlife Fund supported eco-club at his school in Dolpo, Nepal, describes how the club introduced him to a new framework of nature conservation. He contrasts club activities—making posters, cleaning villages, and “aimlessly hiking”—with the ways he

engaged with the environment through herding and understood the environment through the animate, relational ontologies of elders' stories (p.55). Taken together, these examples show that through schooling and connected extracurricular activities, people encounter some new ways of thinking and learning about the environment, which may then influence their own understanding of the local environment in different ways. With this in mind, let us turn to literature on Nepal's schooling system.

Brief Introduction to Nepal's Schooling System

Nepal's formal schooling system is relatively young. From 1846-1951, Nepal's hereditary prime ministers, the Ranas, prevented all but elites from accessing schooling for fear that an educated population would threaten their rule (Sharma 1990; Skinner and Holland 2009). In the decades following the end of the Ranas' regime, Nepal's partyless Panchayat government (1960-1990), worked to provide universal and free primary schooling with the aim of supporting the country's development and building a sense of unified national identity (Skinner and Holland 2009). Often supported by bilateral and multilateral aid agencies, Nepal built schools across the country and experimented with different ways to improve access and quality, with mixed results (P. Bhatta 2009a; Skinner and Holland 2009).

Today, government primary and secondary schooling is available across the country, and enrollment has continued to increase and become more equal (P. Bhatta 2009a; Shields and Rappleye 2008). However, the quality of government school education is often low and sometimes held in low regard, driving demand for private schools and, in some communities, contributing to children's outmigration as they move to urban centers or abroad to attend private, boarding, or monastic schools (P. Bhatta

2009a; Shields and Rappleye 2008; Spoon 2008; Childs and Choedup 2019; Craig 2020). While there have been efforts to implement continuous assessment and Nepal's latest curriculum framework (2076 BS) emphasizes skill-based learning, Nepal's school system continues to be exam-oriented. Many teachers teach to exams, and examination scores are taken as the primary marker of students', teachers', and schools' successes (P. Bhatta 2009a; S. D. Bhatta 2009; Kandel 2018). Exam scores reveal that students in private schools fare much better than students in government schools (P. Bhatta 2009a; S. D. Bhatta 2009; Dixit 2076 BS; Nepali Times Editorial 2019).

Nepal's government schooling system has historically been quite centralized. Researchers have found that past efforts to include local bodies and community members have largely amounted to a decentralization of responsibilities, and have not come with the capacity-building, decision-making power, or commitment to equity necessary for effective community- or local-level school management (Shields and Rappleye 2008; P. Bhatta 2009b; Carney, Bista and Agergaard 2009; Kharel 2017; Hamal 2020). Nepal is currently in a period of transition as, following the 2015 promulgation of the Constitution of Nepal, the country decentralizes more authority over and funding for many sectors, including education, to municipalities. It is still too early to know how this large-scale decentralization will shape schooling in Nepal (Pradhan 2020; Sabarwal et al. 2021).

Curricula and Identity

Nepal's government school curricula have promoted various versions of Nepali identity and nationalism. During the nation-building Panchayat period, school curricula presented a version of history, drew on cultural symbols, and used the Nepali language as the medium of instruction in ways that promoted a sense of Nepali-ness that privileged

hill-dwelling, Brahmin and Chhetri caste Hindu identities (Pigg 1992; Ahearn 2004; Caddell 2007; Onta 2009; Skinner and Holland 2009; Carney and Madsen 2009; Weinberg 2013, 2018; Bennike 2016; Pradhan 2020). The curricula also promoted development and modernization, and portrayed rural areas and villages as traditional, needing improvement, and temporally behind urban areas (Pigg 1992; Ahearn 2004; Caddell 2007; Skinner and Holland 2009; Bennike 2016).

With the end of the Panchayat system and restoration of multiparty democracy in 1990, and with pressure from ethnic rights movements, Nepal moved from a nation-building phase into what some have called an ethnicity-building phase (Gellner 2007; Pradhan 2020). Since 1990, communities have had the right to run primary-level schooling in locally-spoken minority languages, and since the mid-2000s, the Ministry of Education has allotted marks to local content and course slots to “local need” subjects at the primary level (Curriculum Development Centre 2007; Upadhyaya 2010; Weinberg 2013; Pradhan 2016, 2020). However, researchers have found that many schools were not given sufficient training or financial support to write local curricula and create materials, and that many parents wanted more English language instruction, rather than local language or local subject classes. Most schools chose to rely on the centrally-produced Nepali medium or increasingly popular English medium curricula and materials, and to fill the local need subject slot with an additional English course (Upadhyaya 2010; Phyak 2011; Kadel 2013; Pradhan 2016; Bhetuwal 2072 BS).³ There have, however, been

³ This aligns with what I have observed in several schools I have worked with in Nepal, before and after conducting this research. Most taught extra English and/or extra Nepali in the local need subject slot. Rautamai Secondary School (pseudonym), where I did this research, had previously used a local subject curriculum that they had written with other local schools. They had since replaced it with extra English,

exceptions, with some private and government schools running through, writing their own textbooks in, and/or offering a local subject course on locally spoken minority languages, or offering courses on the local environment, history, and culture (Pradhan 2020; Wildlife Conservation Nepal 2021a). Nepal's latest curriculum framework (2076 BS) includes a local subject or locally-spoken minority language class for lower grades and as an option for higher grades (S. Ghimire 2018; Curriculum Development Centre 2075a BS).⁴ While all of this demonstrates further movement towards localized and potentially more inclusive curricula, it remains to be seen whether and how different municipalities and schools develop and implement such curricula.

Researchers have looked not just at the ideas embedded in and transmitted through Nepal's curricula and schooling system, but also at how students and teachers have exercised agency by taking up, resisting, and remaking these ideas in their own ways (Skinner and Holland 1996, 2009; Ahearn 2004; Valentin 2005, 2011; Pradhan 2020). For example, in their research in central Nepal in the 1980s and 1990s, Debra Skinner and Dorothy Holland (2009) found that schools became sites for students and teachers to critique the government and to resist and re-envision oppressive caste and gender dynamics. In doing so, Skinner and Holland argue, students positioned themselves as "educated persons" and as superior to uneducated people, thus contributing to new forms of division and hierarchy, even as they resisted old forms. We see some similarities here to the ways expert environmental knowledge has been privileged, as described

saying that it was challenging to teach without a book and extra materials, and that kids needed extra English more.

⁴ As I understand it, this framework is being tested and has yet to be fully implemented. (Pyakurel 2019; B. Ghimire 2020).

above. Working in a squatter settlement in Kathmandu, Nepal in the 1990s, Karen Valentin (2005, 2011) similarly observed that students used schooling to construct identities as educated in order to distance themselves from their underprivileged lives and envision new, modern futures for themselves. Uma Pradhan's (2020) more recent research in a *Nepal Bhasa* (Newari-language) medium school in Kathmandu, Nepal and a *Dangaura Tharu* (Dangaura Tharu-language) medium school in Kapilvastu, Nepal shows how students and teachers worked to re-make ideas of the educated person and Nepali national identity as connected to, rather than as in opposition to, these minority languages and associated ethnic identities. These examples show that students and teachers are not passive recipients of curricula and schooling; they draw on, resist, or remake different ideas embedded in curricula and schooling in ways they find meaningful and useful.

Overview of Nepal's Environment Curriculum

Nepal's national curriculum's natural science and environment content is integrated into other subjects, with most of it in science courses. Through grade five, much of it is integrated into the My Science, Health and Physical Education course.⁵ To show some of what these primary students learn, I have included the table of contents from the English version of the government-published grade four *My Science, Health and Physical Education* textbook as Figure 10. Grade four students learn about plant and animal categories and life processes, relationships among living things and the environment, disasters, weather and seasons, and what is considered a safe and healthy environment (Curriculum Development Centre 2075b BS). From grades six through

⁵ Until I left Nepal in March 2020, grades one through three also had this course. But, the latest curriculum framework (2076 BS) shifts grades one through three to an integrated approach, with no separate subject courses (S. Ghimire 2018; Curriculum Development Centre 2075a BS).

eight, students take a course called Science and Environment. The table of contents of the English version of the government-published grade seven textbook, Figure 11, shows that in addition to learning more about life processes, weather, and climate, grade seven students learn environmental content more explicitly focused on degradation, conservation, and sustainability (Curriculum Development Centre 2016a).⁶ Grade nine and ten students learn about the environment in the Health, Population, Environment course, which, in addition to providing detailed information on each of these three topics, emphasizes the connection between population growth, environmental degradation, and human health. The 2076 BS curriculum framework, however, makes this subject optional, not compulsory. Some working in the public health and environmental sectors, and some teachers, disagree with this decision, arguing that the course covers content all students should learn (Paudel 2018; Pyakurel 2019; Rauniyar 2020). Across grades, there is also some environment-connected content sprinkled into social studies, English, Nepali, and other courses.

⁶ The tables of contents from the grades six through eight are almost identical, with higher grade level books simply providing more detail on the different topics (Curriculum Development Centre 2016b, N.D.).

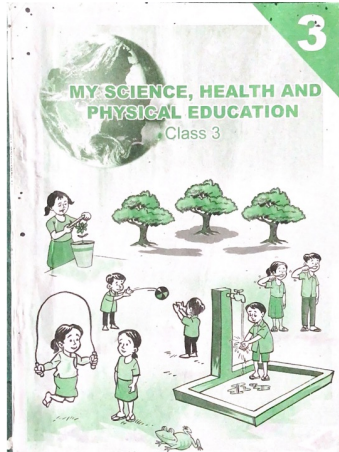


Figure 4: Front cover of the English version of grade three's *My Science, Health and Physical Education* textbook (Curriculum Development Centre 2072a BS)

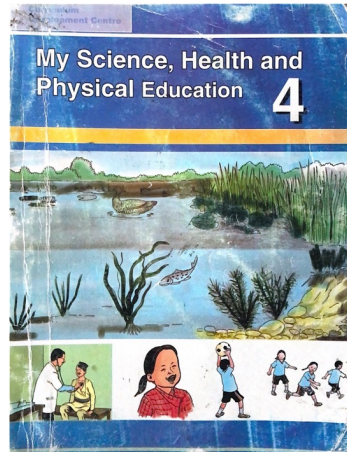


Figure 5: Front cover of the English version of grade four's *My Science, Health and Physical Education* textbook (Curriculum Development Centre 2075b BS)

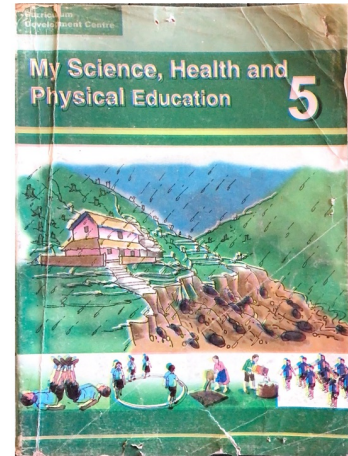


Figure 6: Front cover of the English version of grade five's *My Science, Health and Physical Education* textbook (Curriculum Development Centre 2075c BS)



Figure 7: Front cover of the Nepali version of grade six's *Science and Environment* textbook (Curriculum Development Centre 2071a BS)

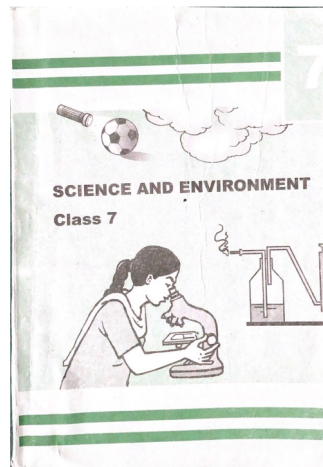


Figure 8: Front cover of the English version of grade seven's *Science and Environment* textbook (Curriculum Development Centre 2016a)



Figure 9: Front cover of the Nepali version of grade eight's *Science and Environment* textbook (Curriculum Development Centre 2072b BS)

Table of Content		
Lesson	Title	Page
Part 1 Science		
Lesson 1	Vertebrate and Invertebrate Animals	1
Lesson 2	Oviparous and Viviparous Animals	4
Lesson 3	Terrestrial Animals and their Characteristics	10
Lesson 4	Aquatic animals and their Characteristics	14
Lesson 5	Life Process	16
Lesson 6	Stages of Development of Plants	19
Lesson 7	Terrestrial Plants and their Characteristics	24
Lesson 8	Aquatic Plants	30
Lesson 9	Interrelationship between Living Things and Environment	34
Lesson 10	Natural Disaster	41
Lesson 11	Matter	47
Lesson 12	Energy	52
Lesson 13	Weather	58
Lesson 14	Seasons	62
Lesson 15	The Earth	69
Lesson 16	Solar System	74
Lesson 17	Means of Communication and their Importance	76
Lesson 18	Some of our Local Technologies	81
Part 2 Health and Physical Education		
Lesson 1	Our Body	86
Lesson 2	Cleaning Body Parts	88
Lesson 3	Environment	91
Lesson 4	Safe Environment and Healthy Life	94
Lesson 5	Our Food	97
Lesson 6	Nutritious Food	100
Lesson 7	Diseases	102
Lesson 8	Communicable Diseases	104
Lesson 9	Non-communicable Diseases	109
Lesson 10	Safety against Accident	112
Lesson 11	First Aid	114
Lesson 12	Health Service and Facilities	117
Lesson 13	Smoking, Alcohol and Drugs	122
Part 3 Physical Education		
Lesson 1	Locomotor Skills	125
Lesson 2	Running	127
Lesson 3	Different types of Jumping	130
Lesson 4	Throwing	133
Lesson 5	Non-locomotor Skills	134
Lesson 6	Drill	137
Lesson 7	Physical Training	141
Lesson 8	Fun Games	147
Lesson 9	Our Games	148
Lesson 10	Story Based Games	149
Lesson 11	Trapping and Kicking the Ball	152
Lesson 12	Dribbling Game	154
Lesson 13	Turning upside Down	155
Lesson 14	Balancing	156

Figure 10: Table of Contents of the English version of grade four's *My Science, Health and Physical Education* textbook (Curriculum Development Centre 2075b BS)

Content

SN	Topics	Page number
Physics		
1.	Measurement	1
2.	Force and Motion	13
3.	Simple Machine	23
4.	Pressure	30
5.	Energy, Work and Power	34
6.	Heat	40
7.	Light	47
8.	Sound	53
9.	Magnet	58
10.	Electricity	63
Chemistry		
11.	Matter	72
12.	Mixture	78
13.	Metal and Nonmetal	86
14.	Some useful chemicals	92
Biology		
15.	Living beings	95
16.	Cell and Tissue	113
17.	Life Process	121
Geology & Astronomy		
18.	Structure of the Earth	128
19.	Weather and climate	135
20.	Earth and Space	144
Environmental science		
21.	Environment and its Balance	152
22.	Environmental Degradation and its Conservation	165
23.	Environment and Sustainable Development	179

Figure 11: Table of Contents of the English version of Grade seven's *Science and Environment* textbook (Curriculum Development Centre 2016a)

As researchers have found, Nepal's education policies and curricula, including environment-connected curricula, have reflected global development and environmental discourses popular at the time of writing (Chhetri 2005; Caddell 2007). This is in part because Nepal-based and international non-governmental organizations have helped write some environment-connected curricula, and such organizations' priorities generally align with global discourses and priorities (Chhetri 2005; Caddell 2007). For example, the International Union for the Conservation of Nature and the United Nations Population Fund helped write the curriculum for the ninth and tenth grade Health, Population, Environment course, and Wildlife Conservation Nepal works with other organizations and the Government of Nepal to write new environmental curricula (Caddell 2007; Wildlife Conservation Nepal 2021b). In the explicitly environment-focused sections of the government-published textbooks one sees an emphasis on sustainable development, environmental cleanliness, deforestation and afforestation, overpopulation, disasters, protected areas, interdependence, and environmental balance (Curriculum Development Centre 2016a, 2016b, 2075c BS, N.D.).

While environmental curricula and textbooks have come from the center and are, with a few exceptions, the same in most government schools across the country, there are activities in the textbooks that invite students to draw connections between their school learning and their local environment. For example, in the grade four *My Science, Health and Physical Education* textbook's sections on animals and plants, there are activities that instruct students to find, observe, list, categorize, draw, describe, and/or consider relationships between animals and plants near their homes (Curriculum Development Centre 2075b BS). Such activities invite children to draw on their existing knowledge of

their local environment and to apply some of the textbook's science frameworks, categories, and practices at home. The following activity from grade six's *Science and Environment* textbook's "Environment and Sustainable Development" chapter is another example.

Activity 2: What do the people carry from the forest? Find it by discussing with the people in your neighborhood. What type of effects will be seen in the forest when the population goes on increasing? What is to be done for the conservation of the forest? Write a short description to the answers of these questions. (Curriculum Development Centre 2016b, p.193)

This example shows how the textbook invites students to both learn from community members about local forest use, and to also apply the broader discourses of overpopulation and conservation to local forests. However, the exam-based system and information-heavy science curriculum generally incentivize exam preparation, often via lecture, over these kinds of activities (Koirala 2021).

Beyond Nepal and the Broader Himalayan Region: Key Concepts and Studies

I now supplement the Nepal- and Himalayan region-focused literature discussed above by introducing a few additional concepts and studies on everyday and environmental learning relevant to my research. This is by no means an exhaustive review; across the learning sciences, environmental and educational psychology, children's geography, environmental and educational anthropology, Indigenous studies, and more, the literature on everyday and environmental learning is diverse and vast. This section simply brings in the ideas most helpful in framing my research.

Learning Through Participation

In communities across the world, children learn culturally relevant knowledge and practices by observing, participating in, and contributing to the same everyday activities

as adults (Rogoff 1990; Lave and Wegner 1991; Zarger 2002; Sarangapani 2003; Paradise and Rogoff 2009; Anderson 2012; Dyson 2014; Bruyere, Trimarco, and Lemungsi 2016; Baines and Zarger 2017). Scholars have called this learning, or some aspects of it, legitimate peripheral participation, situated learning, and learning by observing and pitching in (Lave and Wegner 1991; Paradise and Rogoff 2009). This learning through participation is often mixed with play, but is in general purposeful and contributes to family or community life (Zarger 2002; Dyson 2014; Baines and Zarger 2017). For example, in her research with Q'eqchi' Maya participants in Belize, Rebecca Zarger (2002) found that children developed knowledge about and skills connected to their local environment by participating in subsistence activities like fishing, foraging wild foods, collecting firewood, and farming. As Zarger and others have observed, sometimes this learning is guided by or done in collaboration with adults, like parents or grandparents, and sometimes it is guided by or done in collaboration with other children, like siblings or cousins (Maynard 2004; Zarger 2002; Paradise and Rogoff 2009; Dyson 2014). This learning is generally embodied and contextual, rather than abstract (Sarangapani 2003; Baines and Zarger 2017). And, as Paradise and Rogoff (2009) point out, this everyday learning is sometimes taken for granted or viewed as less complex than school learning, reflecting a school-centric bias.

Learning Through Relationships with Place

Many scholars who work with and/or identify as members of North American Indigenous communities have posited and/or shown through research that children learn through relationships with place (Cajete 2000; Kawagley 2006; Bates 2009; Bang et al. 2014; Medin and Bang 2014; Simpson 2014; Tuck, McKenzie, and McCoy 2014; Marin

and Bang 2018). These scholars note that in many North American Indigenous communities, as children move through, interpret, and build stories about the landscape, they both form relationships with the land and cultivate or deepen relational ways of knowing the land (Cajete 2000; Kawagley 2006; Bates 2009; Medin and Bang 2014; Marin and Bang 2018). In some Indigenous ontologies, the land, water, animals, plants, and beyond are positioned as teachers (Bang et al. 2014; Simpson 2014). In an article that works to re-center Indigenous cosmologies and resist settler colonial relations to land in teaching and learning environments, Bang et al. (2014) write, “Places produce and teach particular ways of thinking about and being in the world. They tell us the way things are, even when they operate pedagogically beneath a conscious level” (p.44). Michi Saagiig Nishnaabeg scholar Leanne Betasamosake Simpson (2014) draws on Nishnaabeg stories to illuminate “land as pedagogy.” She gives her own telling of a traditional story of a young girl, Kwezens, who goes out into the bush in early spring, and who learns from a red squirrel how to suck maple sugar water from trees. Stories like this one, Simpson writes, serve as theory in Nishnaabeg ontologies. Children first understand the literal meaning of these stories, and slowly understand more layers of meaning embedded in them. Together, direct encounters with place and stories about what it means to be in relationship with place inform how children know their local environment, and how they understand their position in it.

Dynamics Between Everyday Learning and School Learning

Useful for considering the relationship between everyday, out-of-school learning and formal school learning is Luis C. Moll and Norma González’s (1994) theory, funds of knowledge. Moll and González developed this theory based on their work with

Mexican and Mexican American students and communities in Arizona. As they define it, funds of knowledge are, “historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (p.133). Funds of knowledge, along with other resource pedagogies, emerged in resistance to deficit thinking about minoritized students in the US, reframing the cultural practices, knowledge, and skills of these students and their communities as strengths, rather than as problems or hinderances to school learning (Paris 2012). Deficit discourses, as Bang et al. (2012) explain, “operate to control the scope of what constitutes an acceptable explanation, argument, or analysis; what ‘smart’ looks and sounds like; whose narratives and experiences are valued and for what purposes...” (p.303). Moll, González, and many other researchers have demonstrated that when teachers move away from deficit thinking, and instead recognize, value, and build on children’s funds of knowledge in the classroom, this supports children’s learning (González, Moll, and Amanti, 2005). We can thus consider the learning through participation and from the land described above as children’s funds of knowledge and as a resource, rather than a deficit in the classroom.

Research that explores the impact of integrating local environmental knowledge, learning practices, and perspectives into formal or extracurricular learning programs further demonstrates the value of treating children’s funds of knowledge as strengths (Bang and Medin 2010; Reyes-Garcia et al. 2010; Aikenhead and Michell 2011; Bang et al. 2012, Cruz-Garcia and Howard 2013; Medin and Bang 2014; Baines and Zarger 2017; Bang, Marin, and Medin 2018). Some of this research has been design-based, where researchers worked with community members, teachers, and others to create and pilot

environmental learning programs. For example, Kristina Baines and Rebecca Zarger (2017) describe collaborative work in Belize to develop a program that teaches curriculum standards through content connected to Mopan and Q'eqchi' Maya students' everyday knowledge. They worked with local stakeholders to design lessons on local plants, oral histories, Maya lifeways (past and present), and environment-wellbeing connections, and worked with teachers to integrate these lessons into formal schooling. They argue that Maya communities' traditional ecological knowledge has been devalued by the post-colonial formal schooling system, and that this program helps reframe this knowledge as legitimate and important. As a second example, through their collaborative design-based research with North American Indigenous young people and community members, Douglas Medin and Megan Bang (2014), found that participants in community-based natural science camps, which were designed to support children's relational epistemologies, came to identify more closely with science. In their introduction to this work, reviewing relevant literature they write,

There is substantial evidence.....supporting the idea that children come to school with knowledge, orientations, values, and practices that are relevant to science learning and that reflect their own cultures. When these orientations are supported, students are more engaged, identify with, and are more successful with science than when these orientations are ignored or discouraged. (p.5)

Medin, Bang, and others thus go beyond funds of knowledge's emphasis on knowledge and skills; they emphasize that children's diverse epistemological orientations towards the natural environment are valuable and, when recognized in formal settings, can support student success (Bang et al. 2012, Medin and Bang 2014). Taken together, these examples show that including children's local knowledge, skills, and perspectives on the

environment in formal setting can support their learning and their identities as capable and knowledgeable, can help legitimize local ways of knowing in systems that have devalued them, and can make space for diversity of environmental epistemologies.

On the other hand, some researchers have argued that local environmental knowledge and ways of learning should be kept out of formal schooling or, if integrated, this should be done with significant caution (Sarangapani 2003; Bates 2009; McCarter and Gavin 2011). For example, Peter Bates (2009) writes that his work with Inuit communities in Nunavut, Canada shows that local environmental knowledge must be learned in context, through direct interaction with the land. Taking this knowledge out of context and bringing it into school, he cautions, could distort it. Working with the Baiga, an Indigenous group in central India, Padma Sarangapani (2003) came to a similar conclusion. She contrasts the ways Baiga children learned in school, through memorization and taught in Hindi by non-local teachers, with the ways they learned outside of school, through experience and motivated by their own interest. Outside of school they learned about plants, healing, and magic in context and in embodied ways. Sarangapani argues that this knowledge is not compatible with the memorization and exam-oriented Indian schooling system, and that integrating it would be harmful. As a third example, Joe McCarter and Michael Gavin (2011), working in Vanuatu, explored different stakeholders' views on integrating local environmental knowledge into formal schooling. They found that while some were enthusiastic, there was significant variability in participants' perspectives. Some expressed concerns that this knowledge would be taught inappropriately or by the wrong people, or would be taken out of context. Others worried that dominant groups' knowledge would be privileged over other groups'

knowledge. These examples all demonstrate that while children bring environment-connected funds of knowledge to the classroom, formally integrating this knowledge into schooling can cause harm.

I end this section by introducing one last study, which considers South Indian children's environmental subjectivity as shaped by a complex interaction of many dimensions of their lives, both in and out of school (de Hoop 2017). In this research, Evelien de Hoop (2017) draws on Arun Agrawal's (2005) idea of environmental subjectivity. Agrawal (2005) defines environmental subjects as,

...those who thus care about the environment. More precisely, the environment constitutes for them a conceptual category that organizes some of their thinking; it is also a domain in the conscious relation to which they perform some of their actions. The practices and thoughts of environmental subjects as I define the term, may not always lead to environmental conservation. But they are often undertaken in relation to the environment. (p.164-165)

De Hoop (2017) conceptualizes children's environmental subjectivities as having three dimensions: affective, practice-based, and knowledge-based. As she describes these different dimensions, she shows how many different aspects of children's lives interact to shape their environmental subjectivities. Sometimes children articulated and identified with environmental values they had learned in school, but could not realistically put into practice. For example, some children explained that it is important to always throw plastic waste in dustbins, yet, in reality, they often threw plastic waste on the ground to avoid attracting dangerous monkeys. De Hoop also observed that some children drew connections between the more global environmental problems they studied in school and their own lived realities, connecting, for example, global deforestation to the decrease in local rainfall and crop failures. Some children also associated knowledge on "proper"

environmental behavior with schooling, explaining, for example, that those who cut down local trees do not know trees' importance for human health because of lack of education. De Hoop noted that this, as well as children's expressed desires to visit the faraway scenic natural spots they saw in music videos, created a contradiction: children associated being knowledgeable about the environment with being educated and modern, and viewed a more elite, higher-consumption lifestyle as a way to connect to nature. We see some similarities here to research from Nepal and the Himalayan region on expert environmental knowledge, and on ideas about what it means to be an educated person. Overall, de Hoop's research shows that children's environmental subjectivities are emergent and fluid, and shaped by complex interactions between many different aspects of their lives.

FRAMING AND POSITIONING

My research fits into the heterogenous subfield of children's geographies and contributes children's experiences and perspectives to the often adult-focused literature on environmental knowledge in Nepal and the broader Himalayan region. Scholars across the subfield of children's geographies draw on theory from geography and beyond, but all share the stance that children are important social actors and that the diverse, everyday ways children engage with and come to understand their environment, and the ways they shape and are shaped by their environment, matter and are worthy of attention (Holloway and Valentine 2000; Aitken 2018). I share this stance, and draw on theory from the diverse bodies of literature reviewed above to frame my exploration of Rautamai children's geographies.

In my research, I focus on how children come to know the local forests, fields, and streams where they spend time. When writing about my own research, I often use environment as shorthand for these places. I do not seek to evaluate the accuracy, sustainability, or conservation value of children's environmental knowledge, or to romanticize their local ways of knowing, but rather to illuminate the everyday practices and ideas that shape this knowing. Drawing on the literature reviewed above on environmental knowledge and on environmental learning, I view children's participation in everyday livelihood practices, their interactions with adults, other children, and the environment itself, their engagement with spiritual beliefs, rituals, and stories, and their encounters with environmental ideas and practices at school as all influencing environmental knowledge. Thus, like de Hoop (2017), I view children's environmental

knowledge formation as complex and influenced by the dynamic interaction of many aspects of children's lives.

Again drawing on the literature, I view environmental knowledge as changing, as heterogeneous and connected to gender, caste, and ethnic identities, and as influenced by power dynamics around expert or school-derived environmental knowledge. However, my research gives more attention to children's everyday learning than to the ways these bigger-picture trajectories, influences, and dynamics articulate with this learning. While I do share some research participants' views on changing environmental knowledge, I do so as these comments fit into conversations around other themes. I do not focus explicitly or in depth on participants' perspectives on change, or attempt to measure knowledge change between generations. The relationship between gender, caste, and ethnic identities and environmental knowledge is also beyond the scope of my research. While I recognize that these identities and related power dynamics are important, I did not want to open up potentially sensitive conversations with children, or inadvertently reinforce ideas of difference, superiority, or marginality. However, my research does show that at the individual level, participants' perspectives and experiences vary and are heterogeneous. Finally, while I recognize that school learning promotes particular ways of knowing the environment often associated with expert knowledge and modernity, I do not analyze the environmental discourses promoted through schooling. Rather, I explore a few select areas where school learning overlaps with or differs from children's everyday environmental learning in ways that participants found particularly salient. Following research on schooling in Nepal, I view children and teachers as exercising agency, and as making meaning from school environmental knowledge in their own ways.

Throughout this thesis, I position Rautamai children's everyday environmental knowledge, skills, practices, and perspectives, and the ways they are developed, as their funds of knowledge. I frame these as strengths, rather than as deficits, that teachers can potentially connect to and expand on in the classroom. I consider some ways school learning already connects to these funds of knowledge, and where there are opportunities for it to do more. However, taking into account the care required to effectively integrate local environmental knowledge into formal school curricula, the potential pitfalls, and the dynamics around local subject classes in Nepal, I do not take a position on whether or not schools in Rautamai Gaunpalika should teach local environmental knowledge through a local subject class. Rather, quite briefly in Part III and in more detail in Appendix D, I consider some simple ways that teachers might frame and treat children's and communities' environmental knowledge as a strength through their everyday practices, whether teaching the national curriculum or local subject classes.

THE RESEARCH

I did my field research on how children come to know their local environment in Rautamai Gaunpalika, an ecologically, ethnically, and linguistically diverse rural municipality in Udayapur District, Province 1, Nepal. I used an ethnographic case study approach, working with a small number of children, their family members, and teachers, in order to gain a deep and textured understanding of the everyday ways children come to know their local environment (LeCompte and Schensul 1999a). I spent a little under three months doing fieldwork, from late summer through mid fall of 2018. This is thus a cross-sectional study, looking at children's environmental learning at a particular moment in time (LeCompte and Schensul 1999a).

Prior to the research period, I had spent time in Rautamai. I first visited in 2015, and then returned to contribute to a community-supported education project (at a small private institution, not connected to the school where I did research) for five months in 2016. I again visited in 2017. Over time, I developed rapport and relationships with children, families, and teachers in nearby government schools. I decided to conduct research in Rautamai Gaunpalika because of my experience there and because I felt confident I could maintain long-term, reciprocal relationships with research participants.

In this section, I provide more detailed introductions to Rautamai Gaunpalika, Rautamai Secondary School (pseudonym), and research participants. Then, I explain my data collection methods, research ethics, and approach to analysis and storytelling. In the following section, I provide a more detailed introduction to myself and how my positionality affects the research.

Rautamai Gaunpalika's Physical Geography

With an elevation ranging from just under 300 meters above sea level in the Sun Koshi river valley to about 2,300 meters above sea level on its highest ridges, Rautamai Gaunpalika's approximately 204 square kilometers of hilly and varied terrain has many microclimates (Milan Karki 2019; Google Earth Pro 2020). Differences in elevation, precipitation, sun exposure, wind, fog, stream and spring access, soil type, historical land use, and other factors shape forests and shrubland, and condition agriculture (Miehe, Pendry and Chaudhary 2015). To paint a very general picture, on lower slopes and in river valleys, one can find wet rice cultivation, banana and mango trees, and *sal* (*Shorea robusta*) forests, while mid-slope or on higher hills, finger millet and corn cultivation, citrus orchards, and forests of pine, alder, needlewood, rhododendron, and other species take over. Participants I worked with spend most of their time in Rautamai's steep hills and small stream valleys, between about 1,200 and 1,800 meters above sea level, in the subtropical vegetation zone. All live within a few hours' walking distance of Rauta Pokhari, a pond and important pilgrimage site that sits at about 1,800 meters above sea level.



Figure 12: Map of Rautamai Gaunpalika, outlined in red (Google Maps 2022)



Figure 13: Map of Rautamai Gaunpalika in 3D view, looking north (Google Maps 2022)



Figure 14: Looking south towards Rauta Pokhari in 3D view. This view gives a sense of the terrain where I did research. (Google Maps 2022)

Seasons and Agriculture

Rautamai experiences a summer monsoon, usually between mid-June and mid-September. In the parts of Rautamai where I worked, during monsoon season people plant and transplant rice and finger millet, often collaborating with neighbors through a work exchange system they call *khetaalo*. They are then kept busy tending to these crops and to corn, soybeans, and other vegetables. During late monsoon they begin harvesting corn. Once monsoon has tapered off in October, the weather is clear, sunny, and dry. People harvest monsoon crops and plant winter crops like mustard, potatoes, and cabbage. During late winter and early spring, winds pick up and there are scattered storms. Lightning threatens the dry landscape, occasionally sparking fires. During this season some water sources dry up, and some residents have to walk farther or wait longer for water. Pre-monsoon rains in late spring bring relief, people begin planting corn, and the cycle continues. I have been present in Rautamai for all seasons, but conducted this

research from late monsoon into mid fall. My research thus looks at how children are learning and participating during one of the busier agricultural seasons.

Livelihoods

The subsistence agriculture described above is a key livelihood strategy for the people I worked with in Rautamai Gaunpalika, but it is not the only way they make a living. Most people combine agriculture with raising livestock such as goats, cattle, water buffaloes, pigs, or chickens. Some sell agricultural products like produce, Indian bay leaves, or black cardamom to bigger markets in Gaighat (Udayapur's district headquarters) or beyond. Some people run small shops or tea stalls, work as blacksmiths, or teach in local schools. Some take temporary work as day laborers. For example, while I was doing research, many of my neighbors were excavating and breaking stones for construction. All families I worked with also rely on money earned in Nepal's bigger towns or cities, or abroad. They all either had at least one family member working elsewhere at the time of research, or had at least one family member who was back home between contracts. As is true across Nepal, remittances are an important source of cash for families reliant on agropastoralism and other subsistence strategies (Central Bureau of Statistics 2011; Thapa and Acharya 2017).

Home Construction

Many Rautamai Gaunpalika residents rely directly on the local landscape for most of the materials they use to build and keep up their homes. At the time of the 2011 census, most Rautamai homes were made from materials found locally. Most people lived in homes with a mud-bonded (53%) or a wooden pillar (43%) foundation, with mud-bonded (73%) or bamboo (15%) walls, and with a thatch (76%) or slate (12%) roof

(Milan Karki 2019). This largely aligns with what I observed. Most people I know in Rautamai live in, build, and re-build houses from stones, mud, wood, and bamboo. But, between my first trip to Rautamai in 2015 and my most recent trip in 2019, I have noticed some changes. A few families are able to afford or have received government funding to build small cement homes. And, many people are replacing thatch roofs with corrugated galvanized iron (CGI) roofs. I imagine the 2021 census data will reflect these changes.

In 1988, an earthquake affected many Rautamai residents' homes. As some community members explained, prior to the earthquake they built homes using stones and mud plaster on both the ground and upper levels. After the earthquake, they began building homes using stones and mud plaster on the ground level only, and using bamboo or wood, often with mud plaster for insulation, on the upper level. This made the upper level lighter and the house more earthquake safe. I asked one research participant, Jharana and Kabita's mother, whether they had been given any instructions from the government or an organization on making homes more earthquake safe. She laughed and said, "No, people died and we learned ourselves." This, along with the changes described in the previous paragraph, shows that Rautamai residents adapt their approach to home building in response to challenges and to available materials.



Figure 15: Examples of typical houses in the part of Rautamai Gaunpalika where I did research. The ground floor of the house on the left is constructed from stone and mud plaster, and the upper floor is made of bamboo. The roof is thatch. On the right, the house is made from wood, with a CGI roof. Both homes have a wooden frame. Note these are not the homes of research participants. Late fall, 2018.

Fuel and Electricity

In addition to relying on the local environment for many house construction needs, nearly all Rautamai residents rely on it for fuel, and some partially rely on it for electricity, as well. At the time of the 2011 census almost all Rautamai residents, over 98%, relied on wood for cooking (Milan Karki 2019). This aligns with what I observed; all research participants burned firewood to cook their food. Participants I worked with also rely on the sun for electricity, using small solar panels for lighting and to charge small electronics like mobile phones and flashlights. A few research participants said that a government program had supported them in purchasing small solar panels. Like most

communities in Rautamai Gaunpalika, the communities I worked in had no access to grid electricity at the time of research (Milan Karki 2019).



Figure 16: Example of a cooking fire. Alcohol is being distilled. Spring, 2016.



Figure 17: Example of another cooking fire. A person is preparing to make *sel roti* (fried rice-flour donut-like treats). Summer, 2017.



Figure 18: Example of a solar panel. Most families I worked with had a small solar panel like the one pictured. Note that this is not the home of a research participant. Winter, 2016.

Roads and Transportation

The communities I worked with had varied and changing access to roads and to bus transportation. About two decades ago (participants gave varying estimates), community members contributed labor to help build a main, dirt road linking Gaighat, Udayapur’s district headquarters, with a small *bazaar* (market) below Rauta Pokhari. What had been a full day’s walk down to Gaighat—longer coming up, especially if carrying a load—became no more than a two-hour walk plus a half-day bus trip from communities in my research area. This road also increased community members’ access to healthcare and other facilities, and made it easier for them to sell agricultural products and to purchase foods like rice. Now, daily buses (when not interrupted by monsoon mud or landslides) run between a local *bazaar* and Gaighat.



Figure 19: Bus passengers help pull a stuck bus from the monsoon mud. Fall, 2018.



Figure 20: Small landslide from a newly-cut road. Fall, 2018.

Today, rapid road building, fueled in part by development money distributed to municipalities with recent government decentralization, is further changing access and the landscape. Bulldozers are busy carving dirt roads into steep hillsides, connecting

more villages to the main dirt road and destabilizing slopes. Observing this process, research participants (children and adults) noted how road digging causes tree cutting and landslides. While some participants said that only necessary roads should be dug and that they should be measured carefully, most are grateful, overall, for the ways roads have increased their access to bigger towns, facilities, markets, and goods.

Caste, Ethnicity, Language, and Religion

People from many different caste and ethnic groups call Rautamai Gaunpalika's varied geography home. As I draw on 2011 census data to paint a general picture of Rautamai Gaunpalika's ethnic, caste, linguistic, and religious diversity, I want to note that census data often obscure hybridity and multiplicity. Some people may be of mixed ethnic or caste identity, many people speak multiple languages at home, and most seem to practice animism and shamanism alongside or integrated with other religious practices. The 2011 census data is also outdated, and the complete 2021 census data is not yet available.

At the time of the 2011 census, Rautamai Gaunpalika's population of about 23,500 was roughly 27% Magar, 22% Chhetri, 20% Rai, 11% Tamang, 4% Kami, 4% Sarki, 2% Damai/Dholi, 2% Newar, 2% Thakuri, and 5% from "other" caste and ethnic groups (Milan Karki 2019). The settlements in which I did research were home to Magar, Dalit (Kami, Sarki, etc.), and Brahmin-Chhetri people. The smallest settlement was home to just one group, but the other two settlements were mixed.

As of the 2011 census, Nepali was the most common language spoken at home. It was identified as such by about 43% of Rautamai Gaunpalika residents. Eastern Magar was the second most common, spoken at home by about 26% of residents, followed by

Chamling, spoken by about 12% of residents, Tamang, spoken by about 10% of residents, and Rai, spoken by about 5% of residents. A small percentage of residents also identified other languages as their home language (Milan Karki 2019). All families I worked with spoke Nepali at home, and a few spoke Eastern Magar at home as well. Some children I worked with who live in Eastern Magar-speaking families speak the language, too, while others understand Eastern Magar but respond in Nepali.

As of 2011, about 59% of Rautamai Gaunpalika residents identified as Hindu, 25% as Buddhist, 12% as Kirat, 3% as Christian, and 1% as Prakriti (Central Bureau of Statistics 2011). Most people in the part of Rautamai in which I worked practiced Hinduism, animism, and shamanism. However, I did not ask research participants which religious category they identified with. I did ask about local land- and water-based deities, whom are often worshiped by people who identify with a few of the above-listed religious categories.

Schooling in Rautamai

At the time of the 2011 census, 60 schools served Rautamai Gaunpalika communities with an average of 87 students in each (Milan Karki 2019). About 60% of the population identified as fully literate (able to both read and write) (Milan Karki 2019). Most adult participants I worked with—children’s parents, aunts, uncles, or grandparents—had attended little or no school. Grandparents had not attended school, as there were no locally-accessible schools when they were young. Some, however, had attended adult literacy classes. Some children’s parents had attended a few years of primary school. A few children’s parents had attended school through the secondary or higher secondary level. One parent explained that when he was young, he could only

study through grade eight locally, and then had to move to Gaighat to study, which was expensive. Accessible schooling is quite new to the Rautamai communities I worked with. Many adults seemed happy that children today have opportunities that they themselves had missed.

Rautamai Secondary School

The school I worked with, “Rautamai Secondary School” (pseudonym), is a government pre-kindergarten through grade ten school. Class sizes ranged from about ten to forty students, each class serving one grade level. After finishing grade ten, Rautamai Secondary School students who continue their studies move on to other government schools in the area. Most students are Magar, Dalit, or Brahmin-Chhetri. I selected this as research site because the school leadership and teachers were supportive and enthusiastic about participating, and because I already had relationships with some students.

Research Participants

I interviewed and did participant observation with nine children, all ages ten to fifteen, and did participant observation with many additional children, ages one to fifteen (Bernard 2011; Schensul and LeCompte 2013). See Table 1 for the names (pseudonyms), ages, and genders of all children who participated in interviews, and of most children in the participant-observation group. (All children named in this thesis or who play a significant role in vignettes appear in Table 1. Other children who appear only briefly in vignettes and are not named are not included in the table.) I do not attach ethnic or caste names to particular participants to help maintain their anonymity. Of the participants interviewed, six are Magar, two are Dalit, and one is Brahmin-Chhetri. Most of the additional children I observed are also Magar. This thesis has a bias towards’

Magar children’s experiences in part because I was living in a predominantly Magar settlement.

Name (pseudonym)	Gender	Age Range	Interview Participant
Chameli’s nephew	M	1-3	No
Bimal	M	4-6	No
Sani	F	4-6	No
Asmita	F	7-9	No
Devika	F	7-9	No
Chameli	F	7-9	No
Ujjal	M	7-9	No
Rabin	M	10-12	No
Saru	F	10-12	No
Sital	F	10-12	No
Simran	F	10-12	No
Sabina	F	10-12	No
Suraj	M	10-12	No
Nabin	M	10-12	No
Sarala	F	10-12	No
Kopila	F	10-12	No
Sandip	M	10-12	Yes
Binita	F	10-12	Yes
Bikas	M	10-12	Yes
Anita	F	10-12	Yes
Himal	M	10-12	Yes
Kabita	F	10-12	Yes
Muna	F	13-15	Yes
Jiten	M	13-15	Yes
Jharana	F	13-15	Yes
Anita’s Sister	F	13-15	No
Total: 26	Participants: M:10, F:16		9 interview participants
	Interview: M:4, F:5		

Table 1: Children who participated in the research

I selected child participants through convenience sampling (Schensul and LeCompte 2013). I already had relationships with a few of the children I worked with. Others I got to know at Rautamai Secondary School. Once children learned about my research, some invited me to visit their homes for interviews and participant observation. I only went home with children who invited me. I identify as a woman, so girls were, in

general, more eager to spend time with me than boys were. This contributed to a bias in my research towards girls' experiences.

When I visited children for interviews, I also interviewed some of their adult relatives. I tried to interview the oldest family members who lived in the same home as the children or nearby, and who were interested in participating. Table 2 lists the ten family members I interviewed, identified by their relation to children who participated in interviews. Table 2 also shows participants' genders and ages. Of these adult participants, six are Magar, three are Dalit, and one is Brahmin-Chhetri. Three are male, and seven are female. The bias towards Magar and female perspectives is here, too.

Relational title / Connection to Child	Gender	Age Range
Bikas's Mother	F	30-39
Muna's Mother	F	30-39
Jiten's Mother	F	40-49
Kabita and Jharana's Father	M	40-49
Kabita and Jharana's Mother	F	40-49
Muna and Sandip's Grandmother	F	50-59
Binita's Grandmother, (Suraj's Great Aunt)	F	50-59
Anita's Grandmother	F	60-69
Muna's Grandfather	M	60-69
Binita's Grandfather, (Suraj's Great Uncle)	M	60-69
Total: 10	F: 7, M: 3	

Table 2: Children's older relatives who participated in the research

As I spent time at Rautamai Secondary School, I got to know three teachers who teach some environment-connected content. I was able to do some participant observation in their classes and to interview them. See Table 3 for their names (pseudonyms), genders and ages. Of the three teachers, one is Magar, one is Brahmin-Chhetri, and one belongs to a caste group from Nepal's Terai. Two of the teachers, Nirav Sir and Reshma Ma'am, are local to the area. Both grew up cutting fodder and firewood, and while Reshma Ma'am

still does so, Nirav Sir says his other family members now do these chores. Prakash Sir is from the Terai, but has taught in Rautamai for many years, and shared that he occasionally collects firewood from the forest. I note this to show that the teachers, too, engage with the local environment in some of the same ways children and their families do.

Name (pseudonym)	Gender	Age Range
Reshma Ma'am	F	30-39
Nirav Sir	M	30-39
Prakash Sir	M	40-49

Table 3: Teachers who participated in the research

Research Methods

My two primary research methods were semi-structured interviews and participant observation (Bernard 2011; Schensul and LeCompte 2013). During semi-structured interviews, I asked participants about local forests and water sources. I asked what they do in these places, how children learn about them, whether any local deities dwell in or near them, and how they have changed and may change in the future. See Appendices A and B for the full lists of questions, but keep in mind that since interviews were semi-structured, I did not ask all participants each question, and often followed interesting threads that emerged. Throughout the research period, I also learned more appropriate local terminology and which questions were confusing or redundant; I adjusted accordingly.

I conducted all semi-structured interviews myself in Nepali and audio recorded them using an application on my phone (Schensul and LeCompte 2013). While I could understand nearly everything children said during interviews, at times I struggled to understand and process some of what older adult participants said in the moment. I made

my best efforts to ask clarifying questions, but certainly missed opportunities to ask good follow-up questions. Some adults, some of whom speak Eastern Magar as their first language, occasionally struggled to understand my accented and likely strange-to-them Nepali. When this happened, younger adults or children stepped in to help make my questions clear. I am sure that some of my questions were not understood as I intended, nor did I understand everything participants shared as they intended. However, doing interviews independently, rather than with a research assistant or translator present, allowed for more flexibility and intimacy.

The semi-structured interviews were initially intended to be one-on-one interviews, but some became small group interviews, with multiple children or multiple older family members participating together. The exchanges between participants often yielded interesting insights. Sometimes, though, children wanted to ask their grandparents for answers (about deities, for example), and grandparents wanted to ask the children some questions (about children's school learning, for example). When this happened, I often encouraged participants to share whatever they themselves knew or thought, and assured them that I had already asked or would soon ask their older or younger family members, too.

Some older participants initially told me that I should not interview them because they "do not know anything" or "are not educated." I or their children then explained what the interview was about, assuring them that they know a lot about the interview topics. I expressed that I was interested in their experiences and views, and that they knew many things that I did not. Once we got started, these participants were often quite

enthusiastic to share. And, sometimes these interviews provided opportunities for their younger family members to listen in, learn, and ask follow-up questions as well.

As mentioned, I audio-recorded all interviews. After finishing fieldwork, I transcribed all of these interviews in Nepali. For the most part, I was able to transcribe the children's interviews independently. I relied on Khem Raj Pradhan's assistance in transcribing most adults' interviews (Schensul and LeCompte 2013).⁷ He also helped me make sense of and translate some of the most confusing parts. However, I left most of the interview transcripts in Nepali, and only fully translated the quotes I use in this thesis. When translating, if unsure of a word, I used Google Translate and/or Tika B. Karki's (2009) dictionary, or asked Nepali friends. Translation of complex, context-specific ideas is messy, and I am sure I made mistakes in my attempts. Some concepts are hard to translate across languages and between cultures, even for people proficient in both Nepali and English. Khem struggled to fully understand and translate some phrases elder participants used, even though Nepali is his primary language. However, I take responsibility for all transcription and translation errors.

When I visited the children for interviews, I also did participant observation with them, their family members, and neighbors (Schensul and LeCompte 2013). If the children lived farther away from my host family, I usually stayed for a few days, sleeping over. If the children lived closer, I visited during the day for a few days in a row or a few days over the course of my fieldwork period. Many afternoons and weekend days when I was not visiting interview participants, I did participant observation with the children

⁷ Khem Raj Pradhan did not have access to research participants' identifying information, and was briefed on ethics and confidentiality before assisting with transcription and translation.

living in the same settlement that I lived in. While doing participant observation, I occasionally took very short notes, especially if I wanted to remember a quote or specific piece of information. I also took photos of plants or scenes to help remember details. As soon as possible after participant observation, I wrote out detailed fieldnotes by hand (Schensul and LeCompte 2013). I later typed these up in a more readable form. The vignettes I share in this thesis are more polished versions of these typed fieldnotes. Most quotes in vignettes are reconstructions of conversations as I remembered them when first writing out fieldnotes by hand. Unlike interview quotes, most quotes from participant observation, shared through vignettes, are approximations, and are not exact.

I also did participant observation at Rautamai Secondary School (Schensul and LeCompte 2013). I went to school with children, observed school routines, and sat in on teachers' classes. Sometimes children shared their textbooks with me so I could better follow along with the class. I took handwritten notes while observing class, and later typed these up with more details (Schensul and LeCompte 2013). Vignettes from school used in this thesis are more polished versions of these fieldnotes. While I tried my best to write down what teachers and students said as I heard it during class, class was often fast-moving, and quotes in these vignettes are approximations.

Sometimes I also taught classes, like English (some grades did not have an English teacher for a few months because of a teacher shortage), or facilitated drawing activities and conversations on the environment. As part of my research, I had seventh graders draw their local forests and water sources, and had ninth graders draw and describe how they thought the local environment looked in the past and how they imagine it might look in the future. However, I decided not to include these drawings as data in

this thesis, in part, because I am not including a section focused explicitly on environmental change. I do include a few of children's drawings, not as data, but as illustrations.

Ethics

All participants gave informed consent to participate in interviews, participant observation, and/or in-class activities, and all children's adult family members gave informed consent for their children to participate (Bernard 2011; Schensul and LeCompte 2013; Ravitch and Carl 2021). See Appendix C for informed consent and permission scripts. When doing interviews or participant observation, I read these scripts to participants and, when applicable, their adult family members. They, and their adult family members if applicable, then signed or marked the consent forms. When working with children at school, I gave them the informed consent scripts to bring home and discuss with their adult family members and then return with signatures. Whenever possible, consent was attained prior to beginning the interview, participant observation, or activity. But, as mentioned above, sometimes interviews turned into group interviews. When new participants joined an interview or a participant observation activity partway through, I verbally checked in with them and then shared the full consent script. If I were to do this research again, I would use a verbal informed consent process with all research participants, and would not use the paper forms. These forms seemed to make participants, especially those who are not literate, uncomfortable. They also seemed to reinforce the misconception that I was looking for answers associated with expert or school knowledge.

Since I worked with children, I decided to keep all participants, their village names, and school anonymous (Ravitch and Carl 2021). When a village, field, hill, stream, or local deity's name is mentioned in this thesis, I either replace it with a generic term or leave it out. The exception is when sharing stories about Rautamai Devi and Rauta Pokhari; I include real place names in these well known stories.

While doing research, I tried to demonstrate appreciation in locally acceptable ways (Ravitch and Carl 2021). The first time I visited children's homes, whether for the day or overnight, I brought a few kinds of nuts as a small gift. Bringing a small food item to one's host, especially when that host is preparing food, is common practice. I also often brought picture books, colored pencils, or games with me, for the children to enjoy. At the school, I demonstrated appreciation by stepping in and teaching students when there were not enough teachers. I also gave the school some Nepali-language picture books and simple learning games.

As mentioned above, I selected Rautamai as a research site because I felt confident in my ability to stay in long term relationship with Rautamai communities. I have been back to visit once since completing the research, during the Dashain holidays of 2019. Once the Covid-19 pandemic eases and travel is safe and ethical, I plan to return to Rautamai and to Rautamai Secondary School to share my research findings (Smith 2012). If school leadership and teachers are interested, I hope to work with teachers and community members to brainstorm and try out some small, everyday ways to apply some of my research findings in the classroom, or to share other simple teaching practices I have learned through trainings and work in other Nepali government schools.

Analysis

I analyzed the interview transcripts and fieldnotes from participant observation using an iterative, inductive approach. (LeCompte and Schensul 1999b; Ravitch and Carl 2021). I began by coding data by hand, printing multiple copies of interview transcripts and typed fieldnotes and then noting key themes in the margins and moving color-coded sticky notes around. I soon recognized that my data could tell many different stories, and that I needed to focus on just a few of these. For example, even though children's elder family members and teachers shared fascinating perspectives, stories, and experiences, I decided that I wanted to center children's perspectives, stories, and experiences. Similarly, even though I collected a lot of data at Rautamai Secondary School and initially planned to analyze all of the environmental content in the school textbooks, I decided to focus on children's learning in forests, fields, and streams.

Once I had made these decisions, I focused on further coding key themes in the children's interview transcripts and in participant observation fieldnotes from forests, fields, and streams (LeCompte and Schensul 1999b; Ravitch and Carl 2021). I did this step of the analysis on my laptop, moving different passages from interviews and fieldnotes around in separate, thematic documents. I then worked to cluster some of these themes together (LeCompte and Schensul 1999b; Ravitch and Carl 2021). In distilling and clustering data from children's experiences, four core themes emerged: learning through participation in subsistence work, learning through collaboration, learning through relationships and relational frameworks, and learning through embodied and sensory engagement with place.

After these core themes emerged, I pulled in data from adults' interviews, from participant observation at school, and from textbooks around these same themes, putting them in conversation. Thus, to be quite clear, even though I do discuss school learning, this thesis is structured around ideas that emerged from analysis of children's out-of-school learning. I also want to note that students in Rautamai Secondary School used the Nepali language version of the government-published textbooks, but for the sake of simplicity, in this thesis I use the English language versions of these texts. The content and illustrations are the same in both versions.

Storytelling

There are many different ways I might have layered stories and quotes together. The themes and ideas I discuss in this thesis overlap, show up together, and sometimes contradict each other. While the overall patterns that emerged through my analysis seemed clear, some subthemes—like joy and *dukha* (suffering, here through repetitive labor), for example—show up across all major themes. When this was the case, I had to decide which thematic section to situate discussion of that subtheme in. I made some of these decisions, and decisions about which vignettes and quotes best illustrated each theme, based, in part, on what made sense from a storytelling perspective. Recognizing that many themes and subthemes show up together in vignettes, I also made the choice to share a number of long vignettes. While I have edited and shortened all vignettes from their original fieldnote form for length and clarity, I do not distill vignettes to just one core theme. I let them illustrate multiple themes at once in an attempt to leave space for multiplicity and complexity. This, I hope, gives a fuller picture of children's experiences, and shows the different themes' relationships to each other.

My decision to include many long vignettes in this thesis was also inspired, in part, by other scholars' rich storytelling through ethnographic writing. Reading Sienna Craig's (2020) *The Ends of Kindship: Connecting Himalayan Lives between Nepal and New York*, Radhika Govindrajan's (2018) *Animal Intimacies: Interspecies Relatedness in India's Central Himalayas*, and Karine Gagné's (2018) *Caring for Glaciers: Land, Animals, and Humanity in the Himalayas* showed me how ethnographic storytelling can help express and create space for multiplicity, affect, and complexity. Like these scholars, I include myself in the storytelling, too; I was, at the time of research, part of the story. For more on my influence and role, see the researcher section below.

I have made a narrative choice to use the present tense in vignettes, and often when interpreting and discussing the research. Of course, my research took place at a particular moment in time. Children continue growing up and environmental knowledge continues to change. By using present tense, I do not intend to present children's stories or views as static or unchanging. Rather, I aim to bring their experiences and perspectives, as they were during late monsoon into fall, 2018, to life.

THE RESEARCHER

My work in education, my relationships to participants, my identities as a white, highly-educated, American woman, and my academic training all influence the research in multiple ways (Smith 2012; Schensul and LeCompte 2013; Ravitch and Carl 2021). Prior to beginning this research, I taught grades two through six English and grade nine Health, Population, and Environment in government school in Lalitpur, Nepal, and taught pre-kindergarten through grade four science classes through a community-supported education project in Rautamai Gaunpalika. I also worked in nature and garden education with elementary students in the US. After completing research for this thesis but prior to analyzing and writing up my findings, I taught grade four My Science, Health, and Physical Education and grades five through eight English in a government school in Sindhupalchowk, Nepal, and then led outdoor environmental education programs for pre-school through grade six students in the US. My experiences working in government schools in Nepal, working with children in Rautamai, and working in nature, garden, outdoor, and environmental education in the US influenced the questions I asked, the ways I interacted with participants, and how I interpreted the data. I come to this project not just as a geography master's student, but also as someone in relationship with people in Rautamai, and as an educator passionate about teaching through culturally sustaining pedagogies (Paris 2012; Schensul and LeCompte 2013; Ravitch and Carl 2021).

My experiences and identities also influenced how research participants interacted with me (Schensul and LeCompte 2013; Ravitch and Carl 2021). I had previously taught some of the children I did participant observation with and one of the children I interviewed through the community-supported education project. And, at Rautamai

Secondary School, I substitute taught all children I interviewed. Some children and their family members may have viewed me as a teacher looking for school answers, and as someone connected to locally powerful institutions. (Most participants called me Elsie Miss or just Miss, although some elders called me *Naani*, an affectionate term for a child.) My identities as a white, highly-educated American, likely reinforced such views. Together, these identities contributed to an uneven power dynamic between myself and research participants (Ravitch and Carl 2021). I worked to push against this power dynamic by following ethical research protocols (described above and in Appendix C), by reminding participants that there were no right or wrong answers, by assuring participants that I valued their perspectives, and by emphasizing that they knew many things that I did not. A bit of self-deprecation and humor helped with this, too. I also found that participant observation provided an opportunity to flip roles with children; they became teachers and I became the student. My role as a learner seemed to help push against some power differences, and served as as a research tool; by seeing what I did not know and teaching me, children identified and shared their own knowledge.

My background, identities, and academic training limit my ability to understand and to tell children's, their family members', and their teachers' stories (Ravitch and Carl 2021). I try my best to center children's own voices and to bring their experiences as I witnessed them to life. As mentioned above, I also try to write in a way that leaves space for multiplicity, for children's, their family members', and their teachers' diverse experiences to coexist. Yet, participants' experiences in this thesis are, inevitably, filtered through my lens, and the lenses of academia that I employ.

Many of the academic lenses I use come from Global North scholars, and are thus connected to broader legacies of colonialism and extractive research (Smith 2012; Smith, Tuck, and Yang 2019; Lewison and Murton 2020). I admire ethnographic writing that draws on locally salient theory and that, in so doing, resists efforts to fit Global South participants' experiences into Global North academic frames. For example, Craig (2020) frames her work using the Tibetan concept and practice of *khora*, and Govindrajan (2018) frames her work using Kumaoni understandings of relatedness. However, I do not understand Rautamai participants' worldviews well enough, and do not have the skills as a researcher or a writer, to take such an approach myself. This is thus another limitation of my thesis.



Figure 21: The author. Photo taken by a research participant.



Figure 22: The author at a shelter near cornfields. Photo taken by a friend.

PART II: COMING TO KNOW THE LOCAL ENVIRONMENT

PART II INTRODUCTION

Weeding *Khet*

“Shhhh, this way!” Anita whispers, guiding me and her two neighbors down a steep, slippery *khar* (thatch grass) slope. It is not even 7:00 AM, and we are sneaking a dip in the big stream below their village before beginning work.

The sun reaches the place in the stream where the water pools waist-deep just after we do. Jumping, splashing, giggling we feel the stream’s cool water, the current’s gentle tug, the early morning sun’s warmth.

“Time to go,” says Anita, the oldest of the three girls. The rest of us are reluctant, lying in the sun on the rocks. But, Anita and I have rice to eat and then rice paddy to weed. So, back up to the village we go, using our hands to help pull ourselves up the *khar*-covered slope.

After reviving the fire, re-heating the *daal*, and sharing the morning’s rice with me, Anita leads me along a steep and winding path through bamboo and forest groves and across open *khar* slopes. As we dip into ravines we cross small streams and Anita samples their water. “We have so much water here!” she exclaims. “These streams never dry.”

Balancing on irrigation canal edges, we follow the water to the *khet* (rice paddy). “This water comes from the stream we swam in,” Anita tells me. “Really? How does it come up?” I ask, wondering if there is a pump system I somehow missed. We are well above the big stream.

“It comes from up. Up the stream. Higher than where we swam. From up towards Maathigaun.”

“Ohhhh.” I am impressed by Anita’s knowledge of the local hydrology. Just as other children know which spring their *dhaaraa* (outdoor public tap) water comes from, she knows the long route this water takes to reach their *khet*.

We soon reach *khet*, some paddies with still, transparent water, and others all murky. Anita’s mother and sister must have just weeded this murky paddy. Jumping down from terrace to terrace, we find Anita’s sister and mother calf-deep in mud, rice plants, and water. We kick off our flip-flops, pull and tuck and roll our *suruwaal* (pants) until they are above our knees, and join Anita’s sister and mother pulling weeds and rogue rice plants from the murky bottom, creating space for the clustered rice plants to keep growing.

Anita's sister shows me what to do, but my hands find that it is much harder than it looks to identify the unwanted plants by touch in the muck. All three of my companions work quickly, throwing the unwanted plants out onto terrace sides or using their feet to squish the ripped-out weeds deep into the mud where, they explain, the weeds will die. My mind understands what I am meant to be doing, but my body just cannot do it with the speed or accuracy of Anita's mother, Anita's sister, or even little Anita.

Time crawls. "*Galiyo*" ([my body is] tired), "*kasto charko ghaam laagyo*" (what strong sun is felt), and "*alchhi laagyo*" ([I] feel lazy), are common refrains.

We meet all kinds of creatures as we weed: water beetles, dragonfly nymphs, tadpoles, even a crab carrying eggs. Dragonflies dip and hover above the paddy. I am in awe of the life in this collaborative, human- and nature-made wetland.

After a few hours, Anita is feeling very *alchhi*. She is slowing down, taking breaks, sitting on the side of the terrace more often. "The sun is hot," she states, before splashing back into the mucky water. She gets back in rhythm with her mother and sister. Anita's mother moves through a bigger section, Anita's sister the next biggest, and then Anita the smallest, on the edge. Each work at the speed of their own hands, yet in sync, in a line. I am told to stay to the other edge, where I will not get in the way of their coordinated motion.

Finally, Anita's mother decides the sun has gotten too hot and we have weeded enough fields for the day. We walk slowly back towards home, splashing in the irrigation canals and streams along the way.

Back in the village, Anita wants to show me something. She leads me to a big *bar* (banyan) tree, and tells me a deity dwells here, beneath it.

"*Aaphe umriyo*" ([the deity] "sprouted," appeared on its own), she says. "Take off your shoes. Here you cannot pollute, you cannot make it dirty."

She shows me the stones and bells tucked at the base of the tree. "We do *pujaa* (worship) here."

"*Alchhi laagyo*," Anita states, putting down her sickle and leaning back on the *khar* slope, a different section of the same *khar* slope we had slid down that morning to the stream. She has come to cut *khar* as fodder for her goats.

I pick up her sickle—we had only found one to bring—and take a turn. I grab a bunch of *khar* with my left hand, tugging it tight, and pull the sickle against it with my right hand. I have cut fodder before, but am frustrated to discover that despite my bit of experience and bigger body, the *khar* does not cut as easily for me as it does for Anita.

Way below and across the big stream we can see some of Anita’s neighbors bringing their own livestock back from grazing in the forest.
“You have to graze over there, across,” Anita explains. “Or, on your own *khar*.”
“Whose *khar* is this?”
“Everyone’s. In monsoon we can cut it for fodder. But not in dry season. We need to cut fodder from the forest in dry season.”
“What happens if the goats graze this *khar*?”
“We have to pay a fine.” As she says this, she takes the sickle from me, and her hands are back to it, cutting bunches of *khar* off the steep slope.

Anita and I have delivered the fodder to the goats, and it is long-past time for me to start walking home. I will be walking in the dark. Still, I return with Anita to her home to thank her family for hosting me. In a burst of pride and a final attempt to get me to stay yet another night, Anita tells her grandmother, “Miss says our village is the best, better than other villages. It is a beautiful place, a nice place, right Miss?”

“It is a very nice place! I will come back again,” I say, checking my headlamp battery and eyeing the steep, uphill, jungle climb ahead of me.



Figure 23: Swimming spot



Figure 24: Khet



Figure 25: On the path



Figure 26: Stream, *khet*, and jungle

As my day spent learning with Anita shows, kids come to know their local environment through participation in subsistence livelihood practices. Anita and the other kids we meet in this chapter learn about forests, fields, and streams through everyday chores such as collecting fodder, grazing livestock, and gathering firewood, and through more seasonal tasks such as weeding rice paddy, foraging for fiddleheads, cutting cornstalks, and harvesting nettles. Through participation, they come to understand local systems and rules that guide engagement with forests and fields, just as Anita knew the rules around grazing and fodder collection. Working alongside older family members and other children, kids also learn in collaborative, mixed-age groups. Older or more experienced participants often model tasks and share knowledge with younger or less-experienced participants. In the above vignette, I was the least experienced participant, and Anita, her older sister, and mother all modeled skills for me in the rice paddy. Yet, even with their guidance, my hands did not know what to do in the way theirs did. It is through repetition and practice, and through everyday and seasonal ways of moving through the landscape, that children's hands, feet, and bodies come to know their local

environment. Through work, movement, and daily life, kids also develop relationships with animals, insects, plants, and deities, and encounter different ideas of what it means to be in good relationship with place. We got a glimpse of this above, when Anita explained how to be in good relationship with a local deity. Children's knowledge of the local environment is thus formed through participation in and application of knowledge to subsistence practices, collaborative learning and teaching in mixed-age groups, embodied and sensory engagements with the landscape, and relationships with place. I build this chapter around these four themes, further illustrating them with vignettes and interview quotes.

While I focus primarily on children's learning in forests, fields, and streams, in each thematic section I also consider some of the ways school knowledge and learning processes overlap with and differ from children's everyday environmental knowledge and learning. I found that kids draw some connections between their livelihood-connected knowledge and their school learning, and textbooks and teachers articulate some ideas similar to those that already guide children's livelihood-connected relationships with the environment. Some kids also integrate new ideas they learn at school into their understandings of their local environment. The ways kids learn at school, however, are often quite different from the participatory, collaborative, embodied, and relational ways they learn outside of school. They spend significant time listening to lectures, reading, writing, and memorizing. Still, teachers work to integrate some movement into their instruction, and during unstructured time kids work together on projects and older students instruct younger students. Weaving in vignettes from school, interview quotes

on school learning, and excerpts from textbooks, I begin a conversation on the relationship between in-school and out-of-school environmental learning.

PARTICIPATION IN AND APPLICATION OF KNOWLEDGE TO SUBSISTENCE LIVELIHOODS

Cutting Fodder

“Does Chameli know how to cut fodder?” I ask her grandmother, having never seen her do so.

“No, but not knowing how she went anyway. Maybe she will cut her hand,” her grandmother answers. “Simran does not know how to cut fodder either, she cuts only a little and very slowly.”

“Saru, do you know how to cut fodder?” I ask.

“No.”

“Yes, she does. But she is *alchhi*,” her mother counters.

With that, Saru sets off alone to her family’s cowshed, way out near their far cornfields. Saru’s mother had cut a big bundle of fodder and loaded it onto her back for her to deliver to their cows.

I go up into thick fog, looking for Chameli and Simran in the direction their grandmother had pointed. After walking through some scattered trees and scrambling up some monsoon-washed gullies, I find them in a tangle of grass towards the top of the hill. They have cut a big bundle of ground fodder (grass) abundant during monsoon and much easier to cut than tree fodder (leaves). Simran is struggling to tie small bunches of it together with rope she has just rolled from longer grasses.

Chameli, not helping, is focused on a cocoon she found on a long blade of grass. It is white, yellow, and black striped, the cocoon of the caterpillars she has been finding and showing me all week. She carefully drapes the blade of grass on plants growing out of the overgrown terrace side.

“Do you know how to cut fodder?” I ask Chameli.

“Yes! I know how to cut ground fodder, but not tree fodder.”

“How did you learn, did Simran teach you?”

“No, I learned myself! But I don’t know how to carry a load.”

It takes Simran a while to tie the bundle all together, even after Chameli comes to help, and then longer still to lift the bundle using a *naamlo*, a strap that goes across the forehead, without grass escaping. Eventually, with Chameli and my help, she is standing and we are all moving through the fog, crossing a deep rut carved by monsoon rain on a bridge made of a few bamboo pieces nailed together.

We get closer to home and Simran turns off to deliver the grass to the oxen in their *goth* (livestock shed). Chameli climbs the *bihuli phul* (bride flower) tree, swings on its branches, and does a few flips.

The girls and I were supposed to then go scare monkeys from the cornfields. But, upon arriving home, we learn that their grandfather has already gone.

I was still keen on going, as I had told Saru I would meet her there after she delivered her fodder load. But, Saru's mother tells me not to. "This fog is too thick. It is scary. You can't see anywhere in the jungle. This is bad weather."

So, there Simran, Chameli, and I sit, watching the fog roll across the courtyards, into and through the open-air homes, mixing with the woodfire smoke.



Figure 27: Cocoon



Figure 28: Bundling fodder together



Figure 29: Pulling it tight



Figure 30: Carrying fodder

Introduction: Participation in and Application of Knowledge to Subsistence Livelihoods

In the above vignette, we get a glimpse of what it is like for Simran and Chameli to cut fodder, a chore that brings many kids to forests, fallow fields, or other tangles of grass regularly. In this section, I focus on the three most common outdoor tasks kids participate in, collecting fodder, grazing livestock, and cutting firewood, to show how kids learn about their local environment through participation, and how they apply this learning to their subsistence livelihood practices. Through these tasks, kids learn about local trees and plants and come to understand the local systems and rules that govern their interactions with them. In this section, I also consider some of the ways adult family members, teachers, and textbooks contribute to children's understanding of what they should and should not do in forests and fields.

What Do You Do in the Forest?

Muna: Usually I have to cut firewood. I have to cut fodder for the cows. I bring the cows and goats to the jungle to graze.

Sandip: In the forest I graze the cows. I cut firewood. I cut fodder. I go with friends.

Binita: It is important to cut fodder, it is important to cut firewood. I cut fodder, I cut firewood, I collect leaf litter [for bedding for livestock]. Sometimes while delivering a load of fodder I play.

Nearly all kids I interviewed responded to the question, "What do you do in the forest?" with some version of the above: cut fodder, graze livestock, and cut firewood. Even though they do other things in the forest too, these everyday or weekly tasks bring them to the forest or grazing land most often. Depending on the type and amount of livestock a children's family has and who else in the family is around to do these tasks,

they might do a particular task more or less often. For all families I spent time with though, children's participation in these tasks is key to keeping the rural household going.

Learning About Plants and Trees

By cutting fodder and grazing livestock, children develop knowledge of different kinds of plants and trees, especially in relation to their livestock's needs. Many can recite a list of the trees they climb and collect leaves from for winter fodder. They know which kinds their livestock like, and know the sections of forest where these trees are most abundant. This knowledge was seen, by many, to be obvious. During interviews, when I asked, "How do you learn about plants and trees?" at first, kids were often unsure how to answer. Further prompting by emphasizing that I do not know many of the plants and trees that they do, or providing examples, elicited answers such as:

Jiten: By going to the forest to cut fodder.

Sandip: I just learn (*sikihaalchhu*) trees' names when I go to the jungle, I ask Mommy and aunties, Mommy and Daddy say. When I graze livestock, when I am in the field, I just learn. I learn a lot.

Bikas: While doing work I learn which plants are which.

Kids like Sandip "just learn" by doing work in the forest and fields, and by asking their parents. They begin going with their older family members to the jungle and fields at a young age, and build this understanding through childhood. By the time they are pre-teens or teenagers like Jiten, Sandip, or Bikas, some of this knowledge seems obvious to them.

Children also become familiar with plants that livestock cannot eat. One afternoon I was sitting with Muna and some other students, up on a hill. A neighbor's goats were grazing nearby, unsupervised. Suddenly, Muna and another student got up, grabbed

sticks, and started herding the goats away from the tangle of plants they were grazing on. I thought, at first, that maybe the plants were important for something. But, as Muna explained, “That plant will make them sick.” At the time, I did not ask her the name of the plant. But, some weeks later, Binita and her sister Sani taught me about a plant that makes livestock sick.

Binita: If you cut *aeri* fodder, cows and buffalos will die.

Elsie: What kind of fodder?

Binita: *Aeri*.

Sani: It is up there, on the hill above our house, should I show you?

Binita: That is not necessary, it is raining. If they eat *aeri* they die. I went to the house across and Uncle, umm, our goat kid had eaten *aeri*, and vomited and nearly died. And that is how I found out.

By observing their goat kid’s sickness and learning from her uncle, Binita came to know that *aeri* is dangerous to livestock, and not to cut it. This example, along with the quotes about learning by working, cutting fodder, grazing livestock, and going to the jungle with older family members, shows that some of children’s knowledge of local wild-growing plants and trees is shaped by and applied to the work they do to care for livestock.

Ground Fodder, Tree Fodder, and Crop Leftovers

Through participation, children also come to understand the systems that guide local use, and how these shift with the seasons. As Anita demonstrated in Part II’s introductory vignette, kids know to cut ground fodder during monsoon when green grasses are abundant, and to cut tree fodder during the winter dry season when grass is brown and sparse. I later learned from Binita that this tree fodder is sometimes combined with dry crop leftovers. The following short vignette from a weekend spent cutting cornstalks with Binita, Devika, Sani, and their family illustrates how kids participate in saving crop leftovers.

Once we finish cutting the cornstalks from a big field and grandmother finishes bundling them, we carry them down to a *chilaaune* (needlewood) tree, growing between terraces. It has a tall bamboo post for storing cornstalks next to it. Binita's uncle is high in the tree already, and Devika soon joins, positioning herself a bit below him. Devika's grandfather passes each big bundle of stalks up to her, and she then hands them up to her uncle, who layers them together on the bamboo post, high off the ground.

"Why are they putting them up there?" I ask.

"On the ground they rot, up there they don't rot. The leaves are fodder for winter. Then we have to cut less tree fodder. In winter, we don't do work, we just bring one-two loads of tree fodder," Binita tells me.

As Binita's explanation shows, through participation kids come to understand how making use of all parts of crop plants can save them work, especially during seasons when fodder resources are scarcer. Participating in saving fodder for winter, and harvesting both ground fodder and tree fodder, contributes to children's understandings of how local plants change with the seasons and how this, in turn, affects their own livestock care work.

Where Can Livestock Graze?

Sometimes in addition to and sometimes instead of collecting fodder, many kids take livestock out to graze, either alone or with family members or neighbors. They herd livestock along paths bordering crop fields, using sticks and commands to keep them from stopping to snack, to fallow fields or the forest. As Anita explained to me, it is okay for livestock to graze in some places, like the forest across the stream or on one's own *khar* slope, but not okay for livestock to graze on communal *khar* grass. It is also not okay, of course, for livestock to graze on crops, as the following vignette from an afternoon with Muna demonstrates.

Muna, her grandfather, and I herd their six or seven *gaai-goru* (cows and oxen) along the narrow path above their home, up to a fallow hilltop terrace.

“You have so many!” I comment. They have more *gaai-goru* than most families I have spent time with.

“We are going to sell some soon,” Muna tells me.

Once we get to the top of the hill, Muna’s grandfather takes half of the animals to a nearby field and leaves her with the other half. They keep Muna busy with her stick; she works to keep them out of a neighbor’s soybean fields.

“These flowers are beautiful. Hold them here, I’ll click a photo.” Muna poses me holding pink wildflowers and uses my phone to capture the scene from a few different angles. By the time she is done, the *gaai-goru* are making their way back to the soybean field. She shouts at them, and moves swiftly to turn them back around.

“Do you ever bring them to the jungle?” I ask, thinking it must be tiring to graze them up in this patchwork of fallow and crop-filled fields.

“Sometimes, on days without school. Grandfather can’t do it alone, we have so many and it is hard to keep them from eating neighbors’ crops on the way. I have to leave him to make rice soon.”

To reach the jungle from their *goth*, one would have to navigate farther through the maze of crop fields. This would be no small feat with six or so hungry *gaai-goru*.

After half-an-hour, Muna herds her half of the animals over to the fallow terrace farther from fields with crops where her grandfather is grazing the other half. We leave them there with her grandfather, and go down to start the rice.

As this afternoon with Muna illustrates, when grazing livestock, children’s movement through fields and forests shapes and is shaped by their understanding of local use systems. Time spent with other kids grazing goats and cattle taught me that while general rules apply everywhere—do not let livestock graze on people’s crops, for example—the specifics of each child’s grazing practices vary, depending on the type and amount of livestock they have, the family members around to help, and the particular mosaic of fallow fields, crop fields, and forest near their home and *goth*. They each develop knowledge specific and applicable to their own surroundings.



Figure 31: Me with flowers



Figure 32: Muna's photo of flowers and cattle

Do Not Cut *Kaancho* or Carelessly

Some children also engage with and learn about the forest by gathering firewood. All families I spent time with cook over fire and need a lot of firewood. In interviews nearly all children, their older family members, and teachers articulated some version of the following rules that govern firewood collection: do not cut *kaancho* (raw, green) wood, and do not cut carelessly, randomly (*jathaabhaabi*). The following short vignette from an afternoon spent with Nabin, Bikas, and their family shows how this can look in practice.

Nabin, Bikas, their younger sister, younger brother and I have just arrived home from school. Nabin and Bikas are inside at the *chulo* (woodburning stove), steaming soybeans while their mother sits outside, weaving straw into a rope. “This will be a *naamlo*,” their mother notes, pointing to the frayed tumpine it is to replace.

Nabin and Bikas soon join us outside with the steamed soybeans. As we snack, an eagle flies over us. The boys throw something in its direction and shout, and then put their chicks inside. One chick died recently, they tell me, and they do not want to lose any more.

Once we have eaten our afterschool snack, the kids' mother instructs the two older boys to cut firewood and the younger boy to cut fodder. As Nabin, Bikas and I head uphill, *khukuri* knives and *doko* baskets in tow, she yells up, "Cut small-small pieces of firewood!"

We make our way up the same path we had just traveled down from school, but turn off trail into a patch of forest that has small trees and bushes, many of which are already dry or dead-looking.

"What happened here?" I ask the boys.

"Fire burned it," they answer. "*Aasti ni*" (a while ago).

For about an hour they move back and forth across the steep slope looking for dry branches, hacking them with their *khukuri* knives.

"*Kaancho rahechha*" (oh, I discovered it's raw), Bikas mutters, after cutting into a branch that is still green on the inside. He leaves it there, noting that they should only cut dry wood.

"Why?" I encourage him to say a little more.

"*Kaancho* firewood does not burn well. It makes it smokey. And the tree is still growing."

The clouds light a faint pink as the boys both fill their *doko* baskets. Time to head home.

Nabin and Bikas intentionally selected a patch of forest with dead and dry wood, demonstrating the relationship between their knowledge of different sections of forest and their work meeting their family's firewood needs. In leaving the small green tree to keep growing and instead collecting dry and already-dead branches, Bikas and Nabin also demonstrate how, even as they work into the evening after a full day of school, they act in alignment with local forest guidelines around firewood collection.

In Bikas's explanation of why he left the green wood, he focused more on the immediate reason: it will burn smokey. However, during interviews, some children

considered potential longer-term effects, sharing that if people cut *kaancho* firewood or too much fodder from the forest, they would need to walk farther to find wood and fodder. Anita's grandmother explained how they teach children this: "We tell the children what to do, 'do this, do that, keep this plant there.' The plants must grow up so that when they themselves are grown up, they will have something to cut. While doing work they won't have to suffer to cut." And, as Kabita explained, when cutting firewood and fodder from the forest, "We only meet the needs of our own family. Don't deforest." For children like Bikas, Nabin, and Kabita, taking just enough and only cutting dry wood are not simply abstract rules; they are practices that children enact with their current and future resource needs in mind.



Figure 33: Collecting firewood



Figure 34: Carrying firewood in a doko

Forest Governance

Some children demonstrated understanding of how the formal local forest governing system works, too. One afternoon, I spoke with Muna after she had returned from a morning spent cutting firewood with aunties and cousins. She told me,

When I'm in the jungle [I think], 'If I cut this tree will people yell or?' Big, big trees, *kaancho* trees, it is forbidden to cut them. It is okay to cut dry trees.... People can't cut big trees because of the law. If you do there is a fine.... The forest is everyone's. It is a community forest. Now, no

matter who goes to cut, people can't say 'you can't cut here,' because it is everyone's. The forest chairman made this rule, the forest's big person. 'Like captain' (Eng.). It just started. Before people from outside made rules. People from near Gaighat. Now it is a person from here.

As Muna walks me through her thought process when she cuts firewood, she focuses both on the repercussions for breaking the rules (as Anita also did in the introductory vignette), and on communal ownership of the forest. While not obvious when reading the above quote, when she explained to me that the forest is everyone's, her voice and face exhibited a sense of pride and belonging. Other children expressed appreciation for how the new forest governing system keeps outsiders, such as largescale pine sap harvesters, out. As actors in the forests themselves, some children understand the rules of the local formal forest governing system, and how these impact their relationship with the forest.

Do Not Start Forest Fires

In addition to the above guidelines around collecting resources from the forest, there is one other rule that nearly all children, their family members, and their teachers named: do not start forest fires. Some simply said, "don't start fires," while others, like Kabita, gave more specific guidelines: "Don't start forest fires. Don't throw cigarette butts carelessly. Cooking oil, diesel, we need to put these where little children can't find them." Kabita articulates awareness of how fires accidentally start, and suggests prevention measures. Other children, too, cited cigarette butts as a likely cause of a recent forest fire.

Children in Rautamai interact with fire from a young age, and thus have direct experience with it. Children often tend to cooking fires, and encounter fire when people burn crop residue and use the ash as fertilizer, or burn fallow fields so that new grass will

sprout for livestock grazing. Recognizing that children interact with fire, Binita's grandfather emphasized the importance of teaching children to be mindful.

We teach kids, we say 'don't neglect fires.' Look, our roof is *khar*. If our house catches fire, the house is finished. If the forest catches fire, the forest is finished. And that is a reason landslides can go. The reason water dries is also that. There is a fire and the jungle is destroyed. Water sources also dry, fodder and firewood become scarce.

In addition to emphasizing the importance of teaching children to be mindful of fire, Binita's grandfather draws connections between forest fires, safety, broader ecological impacts, and subsistence practices in the forest.

A few children drew similar connections between forest fires, safety, or their livelihood practices in the forest, as the following quotes show.

Anita: After a forest fire all the trees and leaves are burned and it is all thin.

Muna: In *Jeth* there was a fire here, on the path to school. Below the school, well from the school a little this way, on the road to Talogaun. The forest was thin after, the fodder and firewood were ruined, trees were ruined and because of this it became thin. Trees and plants all died.

Sandip: After there is a fire the forest is bad, it is really black. The fire makes the trees black. And again because of collecting sap from pine trees, when fire burns it ruins even more trees. That sap, that gum, when that sap burns even more is finished. It burns towards the house. Near our house it burns. The sap burns easily, and it burns a lot.

With fires burning sections of local jungles during the dry season every few years, children experience and observe some of the effects of forest fires. We also see that some children view burned forest, burned fodder and firewood resources, as bad. Some children, like Sandip, also consider how fire burns differently through different sections

of forest; in the quote above, he draws connections between large-scale pine sap harvest in a local forest and the way fire moved through it.⁸

As children interact with burned areas, they also watch plants start to regrow, as the following exchange between Kabita and Jharana shows.

Kabita: After forest fires, trees die.

Jharana: The small ones die.

Kabita: After a few years it looks green.

Jharana: The small plants sprout. They sprout on their own.

Kabita: Small, small plants sprout. New ones.

Children's understanding of fire thus seems to be shaped by their observations, and by their direct experience with its immediate and long-term effects on their safety, the forest, and their fodder and firewood collection practices.

Connections to School Learning

As the vignettes and quotes in this section show, children develop applied knowledge of forests and fallow fields through participation. Some vignettes and quotes also show how older family members, whether siblings, parents, aunts and uncles, or grandparents, play important roles in guiding this in-context learning. When asked how they learn about the forest, though, some children mentioned other sources as well: teachers and books. Below, I begin to consider some of the ways participants connected in-school learning to the forest rules and guidelines they learn through work.

⁸ A few adults said that until recently, an outside company had harvested sap from a local forest. They explained that they did not know what the company did with the sap and that they did not benefit from the arrangement. They told me that this pine sap collection damaged the trees, making them vulnerable or die. They told me that with new local governance, this extraction has now stopped.

School Learning as Reinforcing or Expanding Everyday Learning

In interviews, some children said that they learn the same things at home and at school. In both places, they learn not to cut trees or plants randomly, and not to start fires. The following three quotes, one of which is an exchange, show some of the ways children think about their school and home learning.

Himal: I learn about the forest by talking to my grandmother and grandfather. They teach me good work. Don't cut trees and plants. Don't dig roads. At school I also learn not to cut trees and don't dig roads. It is the same.

Jiten: At school and at home I learn not to cut plants and trees.

Jharana: I learn by reading the book.

Kabita: Sometimes, and older people teach us.

Elsie: Is what you learn at home and at school about forests the same or different?

Jharana: It is the same.

Some children see some of the ideas they learn in both places as the same. They see the guidelines they follow when cutting fodder or firewood, or otherwise engaging with the forest, as in alignment with what they learn in school. This learning might be mutually reinforcing.

Looking at the "Environment Conservation" chapter in grade five's science textbook, Figure 35, we see messages on preventing forest fires and not over-cutting plants and trees. The textbook passage mentions that humans meet their needs for fodder, firewood, and medicinal plants in the forest, and should prevent fires in order to continue meeting their own needs (Curriculum Development Centre 2071b BS). This is similar to what some children told me. However, the passage differs from what most children said, in that it also emphasizes the importance of the forest as wild animal habitat and the

importance of environmental conservation (Curriculum Development Centre 2071b BS). Some children expressed appreciation for some animals and birds that live in the forest, and a few told me that they thought wild animals might have moved elsewhere because the forest has become thin or because of fires, but they did not explicitly cite wild animals as a reason they follow forest guidelines.

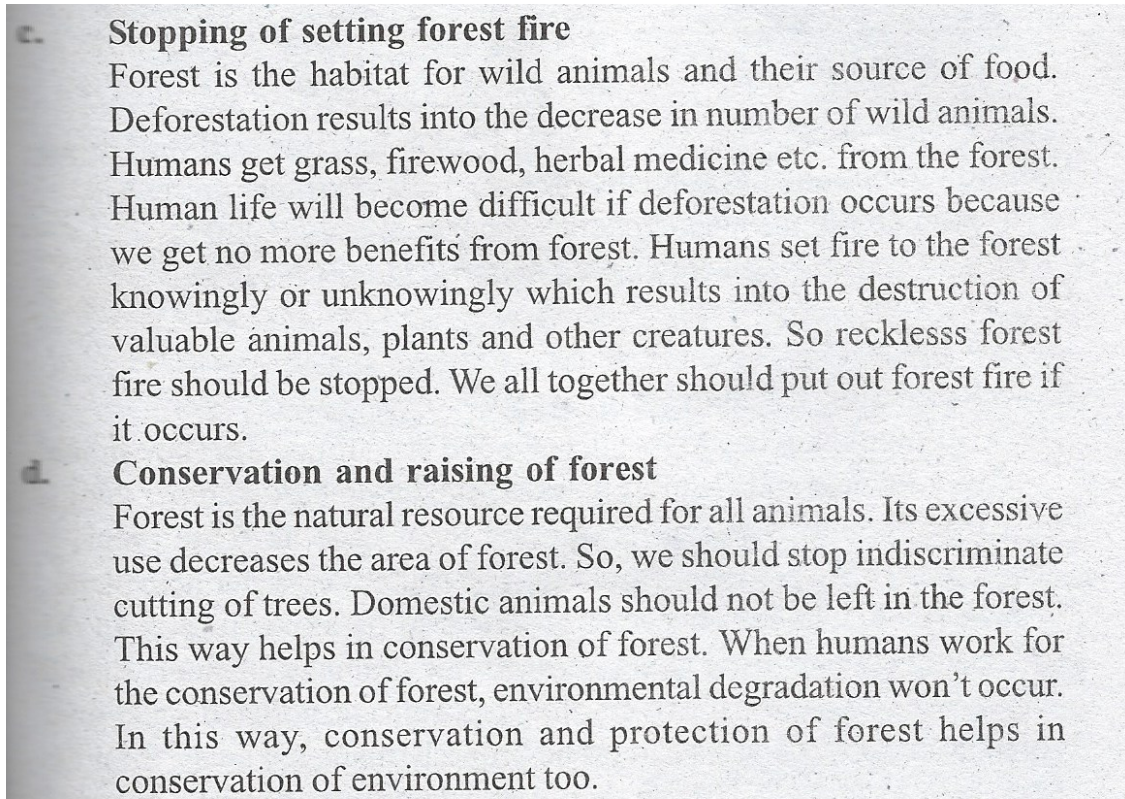


Figure 35: Excerpt from grade five's *My Science, Health, and Physical Education* textbook (Curriculum Development Centre 2071b BS, p.33)

Jharana and Kabita's father, who is literate and has looked through his daughters' textbooks, explained that both the book and parents play a role in teaching children.

About the jungle, look, we teach them don't light forest fires, don't play with fire, and don't cut down everywhere randomly.... Now, they also learn from the book. I've discovered it is printed in the book. But we also must tell them ourselves.

The book learning, he states, does not replace adults' role in teaching children at home. Adult family members still play an important role in teaching children how to do proper work in the forest, even when the message is similar.

Some children, like the four quoted below, also seemed to see school learning as expanding their understanding of why it is important not to over-cut in the forest.

Muna: We read about the jungle in science. And the jungle, don't cut it a lot, if you cut the jungle, water can't be absorbed. And because of that, don't cut the forest a lot. We need carbon dioxide [oxygen] to breathe, to take in breath.

Kabita: If people deforest, floods and landslides will come.... At school I learn, don't deforest, and don't start fires. In places that have been deforested we need to reforest.

Jiten: At school, we learn that floods and landslides will come.

Sandip: I learn at school, by reading. At school I read and learn not to cut the forest, not to cut trees and plants, from them breath comes towards us, we also send breath towards them.

As these quotes show, some children connect their in-school learning about the relationship between deforestation, landslides and floods, and about gas exchange, to the guidelines they follow in the forest. It seems that this dimension of their environmental learning is shaped not only by work in the forest, but may also be reinforced or expanded through in-school learning.

Reforestation

Above, Kabita also mentioned reforestation. She was not the only one. In interviews, when explaining what to do in the jungle, some other children also said it is important to reforest. When asked whether they plant trees, though, they all said no, trees sprout by themselves. A few parents and grandparents said they have planted fodder trees

in their *baari* (unirrigated fields), one said that she cuts back trees and plants that are not useful so the more useful ones can grow, another mentioned the possibility of reforesting destroyed forests, and a few described places where bushes and trees have sprouted and filled in abandoned terraces. But, none mentioned any on-going reforestation work in local forests or on grazing lands. Where does this idea, that children saw as important, come from then? Some children said that they learn this in school, from their textbooks and teachers. See the following illustration and excerpt from the “Environment Conservation” chapter of grade five’s science textbook.

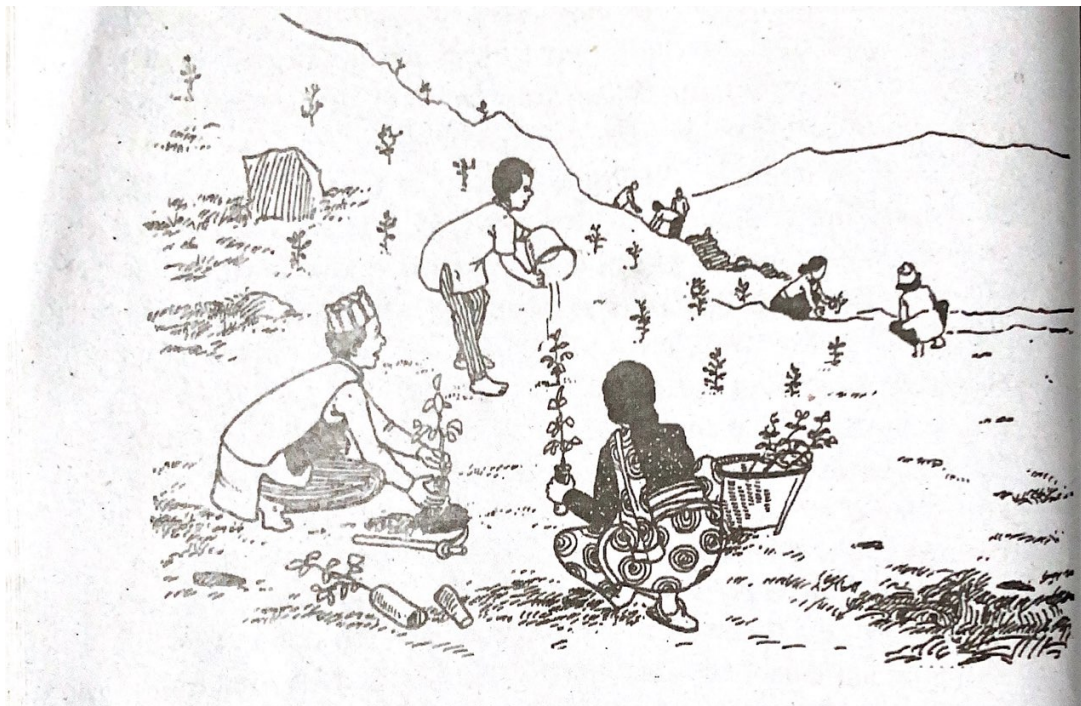


Figure 36: Illustration from grade five’s *My Science, Health and Physical Education* textbook (Curriculum Development Centre 2071b BS, p.34)

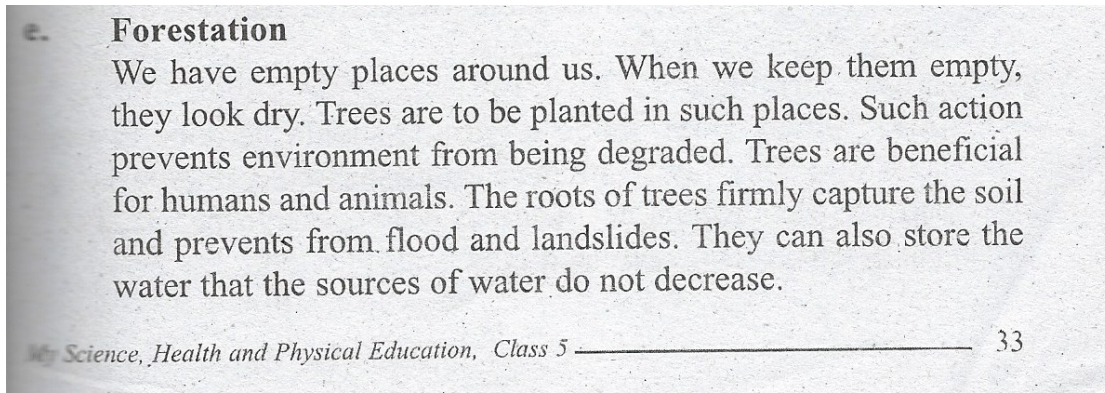


Figure 37: Excerpt from grade five's *My Science, Health and Physical Education* textbook (Curriculum Development Centre 2071b BS, p.33)

The textbook excerpt and accompanying illustration make the case that people should plant trees on bare land. The passage also states that trees help prevent landslides and floods, an idea that a number of children and their family members also articulated in interviews (Curriculum Development Centre 2071b BS).

Jharana and Kabita's mother, who did not attend school herself, also said that children learn about reforestation in school. Her children have told her what is in their textbook. She explains,

They also learn by reading, they read that we should not cut down trees, we should not deforest the jungle. They learn that we must reforest, that we must make a 'nursery' (Eng.). They learn this from the books too, today's children. Before children did not used to study, they didn't know. Today's children read and they know.

While she and her husband had previously explained that they teach children not to cut down trees or deforest, this piece on reforestation and making nurseries was new. Her statements above show that she views reading as contributing to today's children's environmental understanding.

Two of the teachers I interviewed also emphasized the importance of reforestation. Nirav Sir explained what the forest committee has and has not yet done.

Forest protection work is happening, it just now started. About a year and half ago they made the perimeter, and the committee started. They don't let people deforest by taking wood. They protect the jungle, but they haven't made a plan for reforestation and I feel this could be a problem..... In destroyed forests, if we do reforestation, it will make it green. I want to say that we must do this.

Taken together, the comments on reforestation articulated by children, Jharana and Kabita's mother, and Nirav Sir indicate that while not currently happening, and thus not applied knowledge or knowledge developed through participation, it is an idea that people are thinking about, that some connect to the forest guidelines they do follow, and that could take root in the future.

'The Sirs Also Tell Them to Go Cut Firewood?'

Not all participants said that children learned about the forest at school though. When I asked Muna and Sandip's grandmother what children learn about the forest at school, she responded,

At school? They don't learn about the jungle. They focus on reading. They play, they read. We stay at home and tell children to cut firewood. The sir's also tell them to go cut firewood? We tell them to go study and send them to school.

She draws a distinction between the learning children do about the jungle through work, and the learning children do at school through reading, positioning them as fundamentally different kinds of learning. Binita, in the following exchange with Devika, makes a similar distinction.

Binita: I learn about the jungle in the jungle. I don't learn anything about forests at school. I learn by talking with my grandmother and grandfather, I learn a lot, and in the forest I learn. I go with older people and they say 'this is this, that is that' and I learn.

Devika: We learn about the forest at school. We learn there are animals in the forest. We learn what we can find there.

Binita: At school we learn what kind of animals are found in the jungle. At school we learn different kinds of things. They give us education (*shikshaa*). It is different.

While, as other participants explained, there are connections between children's school learning and learning through participation in and application of knowledge to subsistence livelihood practices, as Binita and as Muna and Sandip's grandmother point out, school and out-of-school learning are distinct.

Other participants, even some who said they learn some similar things through work and at school, also explained that the ways they learn in both places are different.

Muna: I learn while working and while studying at school. It is different, while reading the learning is different. It is a different kind. Because while working we give attention to work. While reading, we also learn this and that. And we know. The things we learn at school are useful. There we don't have to work, we only have to read. And there we can give attention and listen. Because of that it is good.

Anita: Sir teaches us well, makes us understand, at home they don't teach us in that fun of a way, they don't have time. At home I do and learn, at school I study and learn. Compared to doing, reading and learning is easy.

Sandip: The things I learn at school and home are very different. Now the things I learn at school, teachers teach, at home mommy and daddy say, 'it is done like this.' It is different. Now the things I learn, the things school teaches are different, and the things I learn at school are different. How they are different, it doesn't stick in our mind (*dimaagmaa adkindaina*).

Thus, while some children see overlaps and connections between school and out-of-school learning, some also view the ways in which they learn as different. I continue to explore some of the ways everyday environmental learning and school learning are similar and different in the coming sections.

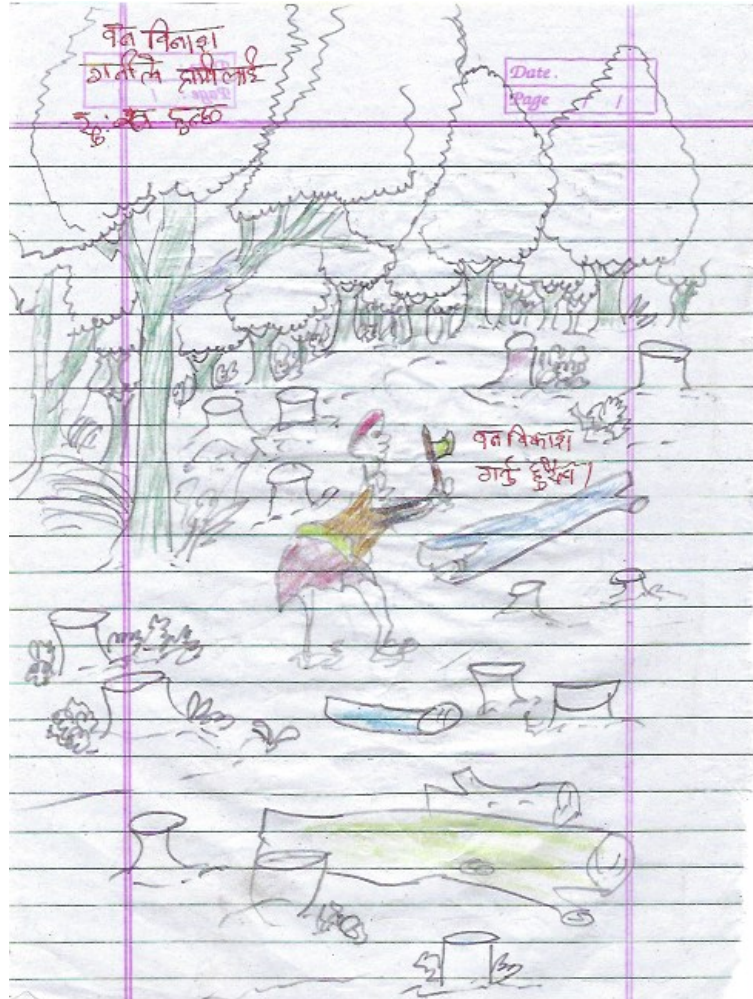


Figure 38: A grade seven student’s drawing of deforestation. The student writes, “Because of forest destruction, we suffer. Don’t destroy the forest.” This is one of many drawings this student did when I facilitated activities with their class as part of my research.

Discussion: Participation in and Application of Knowledge to Subsistence Livelihoods

This section shows that some dimensions of children’s knowledge about the local environment are shaped through their participation in and application of knowledge to subsistence livelihood practices. They come to know local forests and fields as they learn how and where to meet their families’ different resource needs. Their work also seems to influence their ideas of what makes a bad forest: one that is burned or thin, or one where they have to walk far for firewood or fodder. Their sense of what it means to interact

properly with forests and fields—do not cut *kaancho* wood, do not cut carelessly, do not start forest fires, do not let livestock graze in certain places—also seems to be developed through and applied to this work. In some cases, these dimensions of children’s environmental knowledge seem to be reinforced or expanded through school learning.

My findings align with and add to what others have observed in Nepal and the broader Himalayan region about the ways environmental knowledge is connected to livelihood practices like herding and collecting resources (Brower 1991; Bauer 2004; Spoon 2008; Guneratne 2010; Nightingale 2010; Campbell 2013; Dyson 2014, 2015; Dolma 2018; Govindrajan 2018; Gurung 2020). For example, Dyson (2014, 2015), in her work with young people in Kumaon, India, also found that children played essential roles in subsistence practices and that they came to know their local environment through this work. She observed that through herding, children came to understand the ever-changing landscape and how to navigate its dangers, such as steep slopes and snakes. And, like Muna, Binita, and Sani above, the young people Dyson worked with also knew which plants were toxic to livestock. As both Dyson and I found, moving through the landscape with livestock or in search of food for livestock influences how children know their local environment. My work thus adds, along with Dyson’s, children’s experiences to the broader, more adult-focused body of literature on livelihood-connected environmental knowledge in Nepal and the Himalayan region.

Some of children’s reflections on learning by doing work and by going to the forests with older family members show that they develop skills and knowledge through what Paradise and Rogoff (2009) call learning by observing and pitching in. This framework, learning by observing and pitching in, highlights the ways children learn by

watching and gradually participating in tasks alongside older and more experienced community members. As Paradise and Rogoff note, this learning is sometimes taken for granted. Although many of the children I worked with did say that they learned by doing work and from older family members, before I prompted them or gave examples, some seemed to see their knowledge of plants and how to do tasks as obvious or something they “just learned.” Dyson (2014), too, found that it was challenging to get young people to reflect on how they learned to do some tasks. The young people she worked with said they “picked things up as they went along” (p.46). It seems that, to some Rautamai children, learning through participation in subsistence livelihood practices was not initially visible, or at least not something they articulated until I prompted them further.

We can think of children’s direct experience with forests and local management systems as funds of knowledge that can support them in learning connected school content (Moll and González 1994). In some cases, participants understood ideas about forests encountered through practice and through school learning as the same, and thus as potentially mutually reinforcing. We saw some ideas in the textbook around cutting plants and forest fires that aligned with children’s practices and the guidelines they articulated. For example, Jiten and Himal said that they learn not to cut plants carelessly both at school and at home. This aligns with Spoon’s (2008) findings in Khumbu, Nepal that some ideas students encounter in school might reinforce some local environmental guidelines, like taboos around killing animals. In other cases, school learning seemed to expand children’s understanding of the forest guidelines they follow. We saw this when Muna explained that trees are important for water absorption and gas exchange, and thus should not be over-cut. School learning connected to forests and forest guidelines seems

to reinforce and to build on some dimensions of children's forest-related funds of knowledge.

In the case of reforestation, school learning did not align with what children do in practice. Still, many children told me that reforestation is important, which shows that they also integrate new ideas from school into their understanding of what it means to be a good actor in the forest. In her work with children in South India, de Hoop (2017) similarly found that children articulated the importance of some practices that they did not themselves follow. In de Hoop's interviews, children explained what they had learned in school about plastic waste management, but in practice, they often threw plastic on the ground, since there were no better systems in place. When there is a disjoint between what is locally possible or the ways local systems function—whether plastic waste disposal or reforestation—and the messages children learn in school about right environmental action, it seems as though children sometimes integrate the school idea into their environmental perspectives or values, even without the practice. My research did not examine the reasons children value and share school knowledge they do not practice. They might do so because, based on their experiences in the forest and their school learning, they can imagine the practical value. Or, they might do so in part because they associate school knowledge with modernity, seek to identify as an educated person, and/or view me, the interviewer, as a teacher, and as thus seeking school answers. This second set of possible reasons would align with research from Nepal on how some children and adults work to associate themselves with modernity, with expert environmental knowledge, and/or with schooling (Skinner and Holland 1996, 2009; Nightingale 2005; Valentin 2005, 2011). However, more research is needed to understand

Rautamai children's reasons for valuing school environmental knowledge they do not practice.

Although some of children's livelihood-related knowledge about forests connects to some school learning, some participants explained that learning through subsistence practices and learning at school are different. While children learn through practice and application in forests and fields, often with older family members demonstrating or instructing, they learn by reading and listening to their teachers at school. Thus, while school seems to connect to and build on some dimensions of children's funds of knowledge, here their knowledge of forests, it does not seem to connect to some of the practices through which children learn outside of school. Of course, teachers do not and should not tell children to cut firewood. As González (2005) writes about funds of knowledge,

The purpose of drawing on student experience with household knowledge is not merely to reproduce household knowledge in the classroom. Working class students are not being taught construction, plumbing, or gardening. Instead, by drawing on household knowledge, student experience is legitimated as valid, and classroom practice can build on the familiar knowledge bases that students can manipulate to enhance learning... (p.43)

Still, without simply reproducing children's subsistence livelihood practices and knowledge at school, there may be some everyday ways that teachers might integrate more learning through practice and application into school learning, alongside the reading and writing participants value, and, in so doing, connect to, leverage, and build on this practice-based and applied dimension of children's funds of knowledge, too.

COLLABORATIVE LEARNING AND TEACHING EACH OTHER

Eating *Gogan*

Chameli unties the scarf that holds her nephew on her back and sets him on the ground. She reaches for the *gogan* (*Saurauia napaulensis*) tree's lowest branch and pulls herself up. Asmita and Ujjal, who have been playing nearby, are soon up there with her.

Ujjal is picking the *gogan* flowers, round and pink. "No, not those! You can't eat those," Chameli corrects him. "Pick these, the green round ones."

Chameli and Asmita pass some down and teach me how to eat it. "Squeeze it, and eat the brown inside," Chameli instructs me. The paste is seedy, kind of fig-like. "Give some to *Bhai* too, it is sweet, he likes it!"



Figure 39: *Gogan* fruits

Introduction: Collaborative Learning and Teaching Each Other

As some participants explained in the last section, adults play an important role in helping children learn how to interact with forests and fields. But, as the above vignette suggests, children also play a role in each other's learning. In teaching each other about

different places, how to do different tasks, or, as Chameli taught Ujjal, what wild foods to eat, children seem to develop identities as knowledgeable about and capable in their local environment. Working together in mixed-age groups of siblings, cousins, and neighbors, children also seem to cultivate collaboration and leadership skills. Working together also creates opportunities to share in joy and to share in *dukha*, and to strengthen relationships. Children's collaborative learning and teaching each other stand in contrast the more individual and textbook-focused ways school learning is structured. Still, during unstructured time at school, children work together and teach one another in some ways that seem similar to how they cooperate and support each other in forests and fields.

Harvesting *Sisnu*

Simran, Saru, and Chameli are waiting for me at the top of the hill, *naamlo* tumplines on their foreheads, empty *doko* baskets on their backs, sickles and bamboo tongs in their hands. Today it is their job to harvest *sisnu* (stinging nettles).

The three of them fly downhill towards the *bhanjyaang* (hill pass), *doko* baskets bouncing.

"Where are we going?" I yell.

"We don't know!" the girls yell back.

Down at the *bhanjyaang* we run into some of the children's friends who are still walking, very slowly, home from school. A play-flight ensues, a kind of fencing match with long sticks, until two of the kids are on the ground, nearly peeing themselves laughing.

We continue down one of the newly-dug roads, past the stones that have been excavated for the new health post. The girls each pick a few *sisnu* leaves, grabbing the tops of the plants with their tongs, cutting with their sickles and then, without looking, dropping the *sisnu* behind their backs, into their *doko* baskets.

"Is this for us to eat or for the pigs?" I ask.

"For the pigs," Chameli replies.

“Our two pigs, and their two pigs.” Saru adds. “Mmmm, when Anjali has more ripe limes she’ll bring me some and we can pick *sisnu* for us to eat, too. Mommy loves *sisnu* with lime.”

Not ready to stop at any of the *sisnu* patches near the dirt road, Simran leads us down a mini landslide, the mud and rocks from road digging that slid with recent rains. The girls climb carefully down, going one-by-one and then moving out of the path of falling dirt and small rocks.

I make my way down, and then up the large, bent, moss and fern covered *uttis* (alder) tree that Simran tells me to sit in, out of the *sisnu*.

The girls spread out, laughing, singing “*Kutu Ma Kutu*” and other hit pop songs while they pick.

Their laughter and singing eventually fizzle out, giving way to a kind of meditative silence.

They fill *doko* after *doko*, dumping the *sisnu* on the ground with each filling, and then beginning again. “We will push it all together later, into the *doko*,” Saru explains.

“Miss! Come see these flowers!” Chameli calls from up a tree, taking a break after filling another *doko*. “They are orchids.”

I admire the orchids and then offer, “Should I take a turn picking *sisnu*?”

“Yes!” Chameli exclaims, handing over her tongs, sickle, and now empty *doko*.

I have picked *sisnu* with these children’s aunties a few time before, but still, I move awkwardly on the steep hillside, nearly dropping nettles down my back instead of in the *doko*.

“No. That’s too big. Big ones won’t cook. Like this.” Saru demonstrates, showing me exactly where to cut off the the top leaves.

“How did you learn?” I ask. “You are so quick!”

“By going with Mommy,” Saru answers. “I learned when I was five years old!”

After a few minutes of tree climbing and flower hunting, Chameli is ready to pick again.

In a burst of energy, the girls add an extra challenge to their task. They run-scramble up some steep rocky faces and try to pick *sisnu* growing out of the top. It looks like *sisnu* picking meets parkour.

This energy is short lived and again gives way to silence. Now though, it seems less meditative, and more like *dukha*, like repetitive labor. The girls are ready to be done, but they don't have enough. They slog on.

I am back in the *uttis* tree, and a bird call interrupts the girls' silent rhythm.

"What kind is it?" I ask.

"The kind that eats corn from the field," Chameli answers, not skipping a beat.

Sisnu plants that still have their tender tops become increasingly sparse as the girls pick their way through them. They begin packing their *sisnu* piles back into their *doko* baskets, using their sickles to shove the *sisnu* down without getting stung.

Back up at the road though, they dump their baskets again. Simran assesses the communal pile. Her face tells us that they still don't have enough. "One more basket each," Simran instructs, and they spread out down the now-overgrown path that the road has replaced, picking the easier-access *sisnu* they had saved for the end.

Simran is still disappointed when they have each picked another basket and re-packed all of their earlier-picked *sisnu*. But, she says, "It is getting dark."

"Let's go," Saru says. "At the *bhanjyaang* it is spooky. There is a *chihaan* (grave). Raju's dad is buried near there!"

Chameli play-shrieks and says, "*Jam jam!*" (Let's go, let's go!)

Baskets packed and heavy, the girls' speed surprises me as they run uphill towards home. They giggle and chase all the way to their front porches where they proudly dump their haul. Simran's disappointment seems to have faded.

"We need to go again next Saturday! Miss will carry her own *doko*. She has learned so many things at our house – how to harvest corn, how to scare monkeys, how to carry a load, and how to pick *sisnu*," Saru declares proudly.

Identities as Knowledgeable and Capable

Saru's final comment captures the sense of pride and confidence I noticed whenever I observed children teaching each other new things or whenever they taught me about their worlds. While I was often the least experienced participant, and thus the recipient of most of children's teaching—they were enthusiastic to show me how to do a new chore, or how to identify trees, bird calls, berries and more—there were many small

moments when I saw them teaching each other. Recall, for example, how in Part I's introductory vignette, Saru teaches Bimal that the stream is too small for fish, and that fish can be found in two other local streams. Often responsible for younger siblings, cousins, or neighbors while working together, older children sometimes view themselves as teachers. As Sandip explained in an interview, "I teach my little sisters and brothers, 'Little sister, don't do that, you need to do like this. Water is like this. The forest is like this. It is like this for us. Don't cut trees carelessly.'" Through work with younger children or less experienced participants, children like Sandip and Saru seem to develop teaching skills and identities as knowledgeable about and capable in their local environment.

Leadership and Collaboration

Working as a group towards a common aim—in the above vignette, collect enough *sisnu* for two households' pigs—children also seem to practice leadership and collaboration. We saw how Simran, the oldest, took on a quiet kind of leadership role, making strategic decisions around where to pick—farther off trail first, saving the easier-access *sisnu* for last—and ensuring that the group had enough. The labor was shared though. Even though Simran and Chameli belong to the same household and Saru was the only participant from her household, all of the *sisnu* was divided equally between the two households' four pigs. And, at the end of the day, the decision to turn home was a group decision. Simran noted that it was getting late, Saru mentioned the spooky *bhanjyaang* they would need to cross, Chameli agreed, and home we went. By working in mixed-age groups in forests and fields, as children share knowledge about local places, they also seem to cultivate group decision-making, cooperation, and leadership skills.

Shared Joy and *Dukha*

Sharing tasks and spending time with siblings, cousins, or neighbors seems to make work more joyful and the hard parts easier to endure, while also providing opportunities for children to deepen their relationships to each other. Simran, Saru, and Chameli sang, laughed, and made up challenges, and Chameli shared her delight upon finding an orchid. Many children told me they like doing work with friends. As Sandip explained, “I like doing work in the forest. I go to the forest with friends. You can’t go alone. It is fun with friends. Because of this I like it.” And, when work becomes *dukha*, when the task becomes tiring or monotonous, having other children around makes it more tolerable. Working with siblings, cousins, and neighbors of various ages makes children’s encounters with forests, fields, and streams opportunities for shared fun, adventure, struggle, and discoveries, and for friendship building.

Graded on Their Own

In Rautamai Secondary School, as in all government schools I have worked in in Nepal, school learning is structured around individual achievement. Most of students’ grades come from exam scores, and students write exams independently.⁹ Students are then ranked by their grades and are given a roll number that reflects their rank. While children do help each other with everyday textbook-based classwork and homework, opportunities for truly collaborative group projects or for students to share their own knowledge with one another seem relatively rare. This kind of learning is not incentivized

⁹ While most of each course’s grade comes from written exams, in theory, a certain percentage of each course’s grade should come from participation, a practical exam, a project, and/or a speaking/listening exam, depending on the subject. I was not present for exams or grading at this school, so I cannot comment on their practices. However, in other schools I have worked in, it seems that written exams carry far more weight than any other forms of assessment.

by Nepal's exam-based, textbook-focused system. That said, as the following vignette illustrates, outside of structured classes and coursework, students do work together, teach one another, and care for younger students at school.

Gardening and Older Students as Teachers

Although morning assembly is over and the first bell has rung, a group of primary level students are still outside. They are hard at work, pulling weeds and re-arranging the stones that outline a little garden outside their cement classroom.

"Is this your garden? What did you plant?" I ask.

"Flowers! Different kinds."

I look around and notice that other classrooms all have similar stone-lined plots outside them, although most seem overgrown with monsoon weeds.

"Whose idea was this, to work in the garden?" I wonder.

"All of our idea! Our class will be beautiful."

It is the second day back from the month-long monsoon holiday, given so that students can contribute to their families' agricultural work during this busy season. Many teachers have not yet returned from their break destinations: Gaighat, Murkuchi, their homes in other villages or districts. About half the school's kindergarten through tenth grade students are here, having walked up or down slippery monsoon mud paths to their school, which sits along a dirt road perched above steep, rocky, pine forest and across from a small cluster of shops.

I notice older students who, for this bell, have no teacher, watching over and running simple activities for younger students, who also have no teacher. I can hear one older student helping young kids identify pictures in their textbook. I consider how, despite age-graded classes, older kids take some responsibility for their younger siblings and neighbors at school, as they do in forests and fields, guiding and supporting their learning. Soon, I too am called over to run some simple activities for a primary class.

Finding Opportunities to Work Together

As I spent more time at Rautamai Secondary School, I observed how older students often stepped in and taught, supervised, or mentored younger students when teachers were absent, or during breaks and events. They seem to step into similar leadership roles that they fill in forests and fields while doing chores with siblings,

cousins, or neighbors. And, as our little gardeners show, students find ways to work together and apply skills they know from home at school. In my months at the school, I also saw children working together to clean up discarded plastic and paper from the school grounds, organize the science lab and library, and facilitate and play games like *kabaddi* and volleyball. Some of these activities, like cleaning and organizing, were initially directed by teachers, but the students negotiated the specifics of collaboration with each other. This shows that while collaborative learning and teaching each other are not the norm during most structured classes, there are opportunities during the school day for children to leverage and build on the collaboration and teaching skills they develop through subsistence practices.

Discussion: Collaborative Learning and Teaching Each Other

We saw, in this section, some of the ways the environment and children's identities and relationships are intertwined. By working together in local forests, fields and streams, children seem to develop identities as knowledgeable and capable, skills in teaching, leadership, and collaboration, and their relationships to one another. And at school, outside of formal lessons, children seem to find opportunities to leverage and build on these identities, skills, and relationships.

Children in Rautamai spend time working and playing in mixed-age groups of siblings, cousins, or friends, often far away from adult relatives who are engaged in their own work. As Chameli carried her toddler nephew around and taught us how to eat *gogan*, and as Simran, Saru, and Chameli worked together to pick *sisnu*, we saw how children support each other's learning about the local environment. My observations here align with those of other researchers (Maynard 2004; Zarger 2002; Dyson 2014, 2015).

For example, Zarger (2002) similarly found that in the Q'eqchi' Maya community she worked with in Belize, young children—like Chameli's small nephew, or like Bimal in Part I's introductory vignette—often tagged along with or were under the care of older children. They began learning about their local environment by watching, playing with, imitating, and following instructions given by older children. But, Zarger's work looked more closely at how older children's teaching shaped younger children's knowledge, and did not pay as close attention to how this teaching might have shaped older children's knowledge or identities. Dyson (2014), however, found that in Kumaon, India, work in the forest provided opportunities for children to experiment with different identities and to take on leadership roles, like we saw Simran do when picking *sisnu*. Comments like Sandip's about teaching his siblings and like Saru's about all I had learned with them, also suggest that by sharing knowledge and skills, children's own identities not just as leaders, but also as capable in and knowledgeable about their local environment, are bolstered. My research thus suggests that by leading and teaching, some of the less-visible knowledge and skills children have developed by observing and pitching in may be rendered more visible (Paradise and Rogoff 2009).

We have also seen how as children collaborate, whether picking *sisnu* or guarding crops from monkeys, they share fun and challenges, and seem to further build their relationships to each other. Dyson's (2014, 2015) research similarly shows that participation in subsistence practices, often mixed with play, is important for children's social lives and relationship formation. Both Dyson (2014) and Nightingale (2003, 2011) have argued that the environment plays an active, rather than passive, role in social relationships. Nightingale's (2003, 2011) work in Mugu, Nepal and Dyson's (2014) work

explores the ways the environment helps shape power-laden gender and caste identities and social dynamics in ways my work does not. But, the ways they position the environment as playing an active role resonates in some ways with what I observed. Reflecting on the ways girls worked together to collect leaf litter as bedding for livestock, Dyson (2014) writes, “The forest was never a static container or background for girls’ work, but was actively embroiled in the social drama” (p.107). She explains how the forest provided opportunities and inspiration to have fun, to sing, and to make up games while working. I too observed how trees, flowers, rocks, and streams provided opportunities and inspiration for play and joy. Recall, for example, how Simran, Saru, and Chameli scrambled up the rock-face, parkour-style while picking *sisnu*, how in Part II’s introductory vignette Anita, her neighbors, and I splashed in the stream, and how in Part I’s introductory vignette Saru gave us play *tikaa* from flowers. Dyson’s (2014) research also highlights how work in the forest required teamwork, and she argues that children’s relationships were strengthened when they helped each other lift their heavy loads or checked to make sure they had gathered enough leaf litter. This is similar to what I observed with when picking *sisnu* with Simran, Saru, and Chameli. Local environments, and the opportunities for work and play they provide, thus seem to contribute to children’s relationship building with each other.

The identities, skills, and relationships children develop through collaborative work are funds of knowledge that they also bring to school (Moll and González 1994). Beyond working together on textbook-oriented classwork or homework, formal classroom instruction does not seem to provide many opportunities for children to leverage or build on these funds of knowledge. However, children, and sometimes

teachers, find opportunities outside of regular, structured class for collaboration and teaching each other. Older children step in to teach younger children, and children work together to garden, clean, and organize. Perhaps, there might be some ways to integrate collaboration into structured class time, too.

IN RELATIONSHIP TO PLACE

Watching the Jungle

Chilly, Rabin, Simran, and Ujjal sit around a small fire while a steady rain hits the plastic sheet above them. Branches and bamboo hold up the plastic, and grass ties it all together. It is Saturday, and the children have been here at the *towa* most of the day, guarding their families' corn from monkeys.

“The monkeys steal corn. They come up from the jungle. We have to watch that side,” the kids explain together, pointing to the steep, forested slope below. Their *towa* is strategically located where hilltop cornfields drop off to steep, rocky jungle, a jungle cut by deep monsoon channels through which rains find their way to the larger stream networks below. Farther down the cornfield-jungle interface, we can make out two girls through the rain, Sabina and Sital, sitting around a fire in their own *towa*.

The rain slows and someone, maybe Rabin, begins to shout, “*Baandar aayo, baandar aayo!*” alerting the others, who join in the chorus, “Monkeys have come, monkeys have come!”

A few monkeys have come up from the jungle and are in the dip between the two *towa* shelters. From both sides, the children run down the dip, shouting, clanging the blades of *khukuri* knives against metal rods, throwing stones. Rabin even lets a bamboo arrow fly from his homemade bow, crafted from a branch and some fabric.

The few monkeys that had ventured out of the jungle quickly retreat, having taken a few ears of still-unripe corn and broken a few cornstalks.

“They just break it!” Rabin explains, angrily. “They break it, eat only half, leave the rest to rot. Ruining it.”

Monkeys emerge from the jungle twice more, but the children are alert now, and scare them into retreat before they can do any more damage.

With the monkeys gone and the rain turned to mist, Rabin, Ujjal, Simran and I wander towards Sital and Sabina's *towa*, and then go with them to their *naashpaati* (pear) tree. The older of the two, Sital, climbs up and throws down a few *naashpaati* for us. From below, Rabin hits *naashpaati* off the tree's branches with a stick.

We then wander to another, bigger tree, tucked a ways back in the cornfield. I sit below, listening to the kids on branches high above, revving their “motorbikes” and “bungee jumping” to the ground. Before each bungee—which is really more

of a branch-assisted leap, no ropes involved—it is my job to clear the landing zone of caterpillars. “These caterpillars make you itch,” the kids inform me.

After a few rounds of bungee, the children become screeching monkeys. Ujjal and Rabin indeed make good monkeys, climbing to the tippy-top of the tree.

“What else do you do when you guard fields from monkeys?” I ask as we walk back to the *towa*, a heavier drizzle warning us that rain might come again soon. “Roast corn. Climb other trees. Build things.”

After reviving the fire, Rabin begins making small improvements to the shelter. A spider crawls by, and Simran decides to burn it. As she burns it, she talks of lightning. “Lightning killed two water buffaloes the other day.”

Simran asks me which animals live near my home in the US.

“Monkeys?”

“No.”

“Leopards?”

“No.”

“Rabbits?”

“Yes!”

“Deer?”

“Many!”

“*Malsaanpro?*”

“What is that?”

“They take chickens and eat *naashpaati* and *iskus* (chayote). They sit in trees.”

“Hmm, I don’t know.”

Dusk creeps closer and the children kill the fire, separating the smoldering wood and embers.

A few days later I am back, but over with the two girls, Sital and Sabina, next to their *towa*. The weather is moody, but it is not raining.

We sit in silence, staring down at the jungle below and out at the jungle across. I think about how many hours they must spend gazing out at this jungle.

Slowly, my eyes begin to notice patterns and outliers in the distant foliage.

“What is that tree, wayyyy across, on the far hill, the tree all alone?”

“Pine,” Sabina says, then points to one closer to us, and then to another big one on the far slope.

I am impressed she can recognize it from so far away. I point to another large tree, also all alone, with reddish leaves, or perhaps flowers. “And that one?”

“*Dalne*,” Sital responds. “There is another *dalne* tree near the hill pass. Monkeys eat *dalne* seeds,” she tells me.

“We can also eat *dalne* seeds, roasted.” Sabina adds.

“Do the monkeys eat other seeds too?”

“*Dalne* seeds, *baandare* seeds, corn, soybeans, millet. Usually corn. After corn they’ll take soybeans, then millet. But not as much. We don’t have to watch as much then,” Sital answers.

“Have you seen any monkeys today?” I ask.

“Not since you came. They are in the jungle. Sometimes they come alone. Sometimes all together, carrying babies,” Sital says.

“Are you scared of them?”

Sital and Sabina shake their heads. “We make a loud noise and they just go away.”

We again sit in silence, looking out at the trees.

“That’s a dove,” Sital says, her ears picking out a bird call from somewhere in the distance.

“Sometimes we see *laampuchchhre* (long-tailed blue magpie), sometimes doves, sometimes *bihuli* (bride) birds, sometimes green birds. Many birds live in this jungle. We can see them all flying above the trees from here,” Sabina adds.

And again we sit, silent.

We can see houses on the far opposite hill. The girls begin pointing out and naming other settlements.

“Above those houses, that is where our water comes from. And over there is Rauta Pokhari,” Sital tells me.

“Have you been there?” I ask.

“I have been to all those villages we can see. And others too to visit my school friends. People go to Rauta for *pujaa*, and to celebrate Tij and New Year.”

We see low clouds rolling in from the distance and the girls tell me, “Fog is coming.”

“From where?” I ask.

“From water.”

Looking in the direction of the fog, I notice a bare patch on the hill and ask,

“Why are there no trees, over on that hill?”

“Rabin’s family, Saru’s family, planted millet there this year.”

We watch as the low clouds continue rolling towards us, then over us.

From the direction of the girls’ house, we hear an older sister yelling. It is time for the girls to harvest some wild-growing amaranth for the pigs.



Figure 40: A *towa* on a sunnier day

Introduction: In Relationship to Place

Children in Rautamai experience and encounter a number of different ways to be in relationship with animals, insects, plants, deities, and the broader landscape through everyday life, rituals, stories, and school. As we see in the above vignette, children's everyday relationships with animals that threaten their subsistence livelihood practices, like monkeys, are oppositional. But, children also form more affectionate everyday relationships with animals, insects, and plants. Through all of these everyday relationships, whether oppositional or affectionate, children demonstrate attentiveness to, curiosity about, and intimate connection with animals, insects, and plants. While not evident in the above vignette, local goddess Rautamai Devi, *naag* (serpent deities who

live in water sources), and other land-based deities also shape children's understandings of what it means to be in good relationship with place. Stories, beliefs, rituals, and everyday practices related to these deities encourage reciprocity and prohibit pollution. At school, too, children encounter a number of different ideas on what it means for humans to be in good relationship with animals and plants. In this section, though, I focus on just one school idea—human-forest interdependence through gas exchange—that a few participants valued and integrated into their own sense of relationality with the forest. The following mosaic of children's everyday experiences and reflections, elder's knowledge on local deities, textbook excerpts, and teachers' perspectives, show that children come to know their local environment by being in relationship with place in many different ways.

Wild Animals and Livelihood Practices

When asked what animals live in the jungle, children's lists often included monkeys, jackals, deer, and sometimes a few other animals, such yellow-throated martens (*malsaanpro*), leopards, porcupines, and pangolins. Some children shared stories of monkeys stealing their crops, of yellow-throated martens eating their *naashpaati* or *iskus*, of these same yellow-throated martens or jackals taking chickens. Children are in a dynamic relationship with these animals, understanding them, their habits, and their food needs in relation to their own needs and work. While conversations with children and older family members indicate that today there are fewer big cats threatening livestock and fewer deer threatening crops than in the past, and that jackals and yellow-throated

martens are infrequent visitors, as the above vignette shows, monkeys create a lot of work for many children and their families.¹⁰

Spending much of corn-ripening season watching the jungle for monkeys, children develop an attentiveness to and an intimate understanding of these animals. They come to know monkeys' food preferences, where they live, that they sometimes come alone and sometimes in big groups or carrying babies, and how to scare them away. Children are connected to these monkeys through their similar tastes: just as children eat corn and soybeans, so too do monkeys, and just as monkeys eat *dalne* seeds from the jungle, so too do children. Rabin and Ujjal even imagined themselves as monkeys, climbing high into the tree and screeching. And, when monkeys do come, this same screeching energy comes out; it is exciting to make a ruckus to frighten monkeys away. Of course, monkeys are also frustrating, especially when wasteful. Monkeys leaving half-eaten corn and broken stalks to rot seemed to insult Rabin more than their theft of corn. Still, whenever I asked, children said they enjoy guarding fields from monkeys; there is lots of time to play out at the *towa*. A few children told me it is their favorite task. Their connection to monkeys is thus simultaneously playful and fraught with frustration. Through this relationship, children pay close attention to and come to intimately understand their mischievous forest-dwelling rivals. Now, let us explore a different kind

¹⁰ While most people explained that, overall, there are now fewer wild animals in the past, there was some variation. Binita's grandmother talked about how, in the past, there were so many deer that they would "come all the way up to the goat pen with the goats," but that now there are only a few. Reshma Ma'am, however, told me that in her village, there are many deer and other animals everywhere. Binita's family lives closer to a new dirt road, surrounded by fields, whereas Reshma Ma'am's small village is deep in the forest. Muna and Sandip's grandmother said that, in her village, as people have migrated to bigger towns and jungle has grown into their abandoned terraces, there are now more wild animals than in the past.

of oppositional yet intimate relationship, people’s relationship with *andhaake*, nocturnal wasps.

‘They Can Kill Us, So We Kill and Eat Them’

“These are very dangerous. You can die if they sting you. Their poison is strong. Someone in a nearby village died from *andhaake* stings. They make nests in trees and fly at night, you don’t see them. They can kill us, so we kill and eat them.” a neighbor uncle explains to me, Saru, Asmita, and Bimal as we watch him, another uncle, and the children’s dad pull larvae from the *andhaake* nest they had killed and brought home from the jungle.

Looking closely, Saru points out that some of the white, translucent larvae look much more like adult wasps than others. Noticing the different developmental stages, she comments, “It’s like the butterfly lifecycle in our book.”

We move inside where the children’s mother is roasting the adult wasps. Next she’ll roast and then fry the larvae. She seasons them both and explains, “They taste like meat.”

Even though everyone assures me that after cooking, the venom has no effect and that cooking removes the stinger, I am cautious. I try just a few of the adult wasps and a few more of the larvae, while the other adults and kids dig in. Bimal loves them, picking up and squishing the fried larvae between his fingers before eating. After eating an adult wasp he boasts, “I ate a big mother!”



Figure 41: Wasp larvae



Figure 42: Adult wasps

Learning from Wasps

The above vignette shows a relationship fraught with danger and a different kind of intimacy. The uncles, in bringing the wasps home to eat, taught Saru, Asmita, Bimal

and me that to be in relationship with these wasps is to either risk being harmed or to harm. Still, even as the children and I watched others prepare them and tried eating them ourselves, there was a kind of intimate learning in the process. We got to see the wasps' nest and wasps in different stages of the lifecycle, and Saru drew connections between what she was observing and what she had learned about insect lifecycles in her school textbook. Through this encounter, children experienced wasps up close, and came to understand how to relate to them. While wasps for dinner does not seem to be a common experience for Rautamai children, this vignette illustrates the kind of up-close relationships many Rautamai children have with the local environment, insects included. In the next vignette, as we go searching for caterpillars with Chameli, we will see that not all kid-insect relationships are quite so laced with danger.

Juseli Kira

Her plump nephew tied to her back with a scarf, Chameli pulls me downhill, away from her older sister and the grazing oxen, to some overgrown terraces near a cluster of trees. She knows exactly where she is going. As we enter the overgrowth, she lowers her voice, whispering her directions to me. We are here to look for *juseli kira* (caterpillars), her current obsession.

Small green grasshoppers pop up like popcorn as we wade through knee-high plants.

“You can catch these!” Chameli snatches a grasshopper out of the air, then lets it leap back out of her palm.

As Chameli promised, we do find many *juseli kira* here, on the grass and the wildflowers, on the old overgrown terrace sides. We mostly find the white, yellow, and black ones that seem to be everywhere, but Chameli finds a few of the big reddish ones, the ones with the long black fur, too. She leans in close, examining the caterpillars from every angle. “Their fur itches, do not touch,” she reminds me.

We wander a little farther, and Chameli points to a hole. “It looks like a snake hole.” She pauses to investigate some digging marks around it. “But it is not, see someone dug here.”

Suddenly, Chameli tells me to stay still. We hear two things in the distance: the sound of digging and the sound of thunder. We stand frozen, listening, Chameli trying to figure out which direction the digging sounds are coming from and just who is doing the digging.

A little later, walking slowly back towards the grazing ground, Chameli begins pointing out plants she knows. “*Gamauro, gogan...Let’s eat gogan seeds again!* But they are not ripe on this *gogan* tree, or the one by the grazing ground. We need to go back to the tree by the volleyball, that one is ripe.”

Little nephew is getting wiggly, so Chameli drops him off with her sister on the way.

Down at the tree, Chameli grabs my hand and pulls me over, pointing at a small wasp nest. “First there were a few, now there are many. It is getting bigger. But these kind aren’t that dangerous,” she notes, and then carefully, avoiding the wasps, climbs up the tree to pick more *gogan* fruit.

Curiosity, Affection, and Attentiveness

Spending time in particular places—whether grazing grounds, paths to the *goth*, or a monkey-watching *towa*—children develop and show curiosity about and affection for particular plants and creatures. We see this in the above vignette: Chameli is fascinated by *juseli kira*, and knows just where to find them. Chameli also demonstrates curiosity when she encounters a hole and investigates what might have made it, and demonstrates attentiveness when she shares her observation that the wasp nest is growing. She knows, too, exactly which *gogan* tree is ripe with fruits. While Chameli’s enthusiasm for and fascination with *juseli kira* seemed to be unique to her, the curiosity, affection, and attentiveness that guide her relationships with animals, insects, and plants, are not. On walks to and from school, children were eager to pull me off-path to taste berries from their favorite patches, to show me puddles with tadpoles they had been watching grow, and to invite me up the biggest rhododendron trees, which, they gushed, would bloom

with delicious flowers in the spring. In following their own curiosity and interest, they come to more deeply understand plants, animals, and insects. We see this in the next vignette, too, as we go with Saru to her family's *goth*.

'They Grow Just Like People Do'

"This tree's seeds taste like honey! It doesn't really smell like honey, but it tastes like it. The fruits get big and red!" We go over to take a closer look at the big-leaved tree and its fruits. "Not ripe yet," Saru reports. "My parents will have to come climb and pick them, after some time."

When we reach her family's *goth*, she gives the cattle the fodder her mom had cut and piled earlier. She harvests the cucumber her mom had told her to bring home, and then brings me over to her pumpkins, explaining where she planted them and excitedly showing me just how far their vines have traveled. Carefully lifting up the big leaves, she shows me the pumpkins growing beneath. "They will get this big!" She says, demonstrating with her hands.

"How will they get that big?" I ask.

"They grow just like people do. But people grow more slowly."

Saru stops walking suddenly, pointing to small pink flowers growing out of a rocky patch along the trail. "It is sour! You can eat it!" She says, passing me a stem.

"Wow! Sour! How did you learn you can eat these?" I ask.

"Mommy showed me."

Near the stream, Saru veers off trail into a dark, moist patch to check for *niguro*, fiddlehead ferns. Sure enough, there are some, ready for harvest. She picks a big bunch. "We picked these before, now they are growing back," she explains.

"Can you only pick in monsoon?" I ask.

"I don't know. We need to ask Mommy. Mommy knows everything."

Saru then picks a vine with big green pods. "What is that for?" I ask.

"Playing. For making *sirbandi* (headband)." She wears it like a crown.

We continue and somehow, through the cornstalks, Saru spots more *niguro* growing near a terrace side. She picks those too.

We get to a fork in the path, and Saru suggests we take the long way, which brings us by her relatives' house. "Their tree has the most delicious *naashpaati*. Different than our *naashpaati* tree."

We arrive home later than expected, but with *niguro* and *naashpaati*.

More on Affection

On this everyday journey to the *goth*, Saru's affection for and intimacy with particular plants is clear. Some of this affection is for plants' tastiness. She is eager to investigate whether the honey-like seeds are ripe, to have me taste the sour flower stems, and to visit the tree with the most delicious *naashpaati*. Some of her affection is for plants' power as playthings. As in Part I's introductory vignette when Saru made *tikaa* from flowers, she now makes a crown from a plant with big green pods. But, some of this affection comes from a more reciprocal, mutually-nourishing relationship. She is excited to check on the pumpkins she planted, is proud of their growth, and draws connections between their growth and people's growth. There is intimacy both in the care she shows, and in the way she sees, even if just for a moment, a parallel between people and pumpkins, living things growing at their own paces.



Figure 43: Path to the *goth*



Figure 44: Play *sirbandi*



Figure 45: Sour flowers



Figure 46: Out near the *goth*

The Animate Landscape: Reciprocity and Being in Good Relationship

Children’s connections to place are also intertwined with their relationships to land- and water-based deities. Rituals, stories, and beliefs around these deities encourage reciprocity and prohibit pollution. Below, I explore children’s relationship to *devi* (goddess) and *deutaa* (god), to *naag* (serpent water deities), and to local goddess Rautamai Devi, and how these relationships, in turn, shape their connections to place.

Devi and Deutaa

Binita: *Devi-deutaa* are at *deuraali* (sacred place on hill pass), over above Gita’s house. There is a stone and a big *chilaaune* tree. We don’t make it dirty there. And at full moon, *pujaa* is done there. If you make it polluted, the *devi* will get angry and will give a curse.

In interviews, children like Binita told me where *devi-deutaa* live, and where there are *deuraali* and *devithaan* (goddess place).¹¹ They explained to me that near *devi-*

¹¹ Different sacred places, *devi*, and *deutaa* have their own names. In interest of maintaining children’s anonymity, I am using these more general terms, even when kids named specific local *devi*, *deutaa* or sacred places. The exception is Rautamai Devi, since she is well-known and worshiped by many in and beyond Rautamai Gaunpalika.

deutaa dwelling places, cutting trees, polluting (*jutho*), and even using polluting language are forbidden, as this upsets the deities who can, in response, make bad things happen. In addition, families must sacrifice to some deities—goat kids, pigeons, roosters, the first corn, fruit, or other things, depending on the particular deity’s preference—asking for their own or their livestock’s wellbeing, or for their crops’ success. The following three exchanges explain some of the different rituals children and families participate in for different local deities.

Jharana: Up there is a *devithaan*.

Kabita: There is a stone just like a fist. We do *pujaa*, cut chickens. We do *pujaa* requesting our protection.

Kabita and Jharana’s Mother: Don’t give us suffering. Don’t give us stress. Protect us. Don’t let our livestock, our buffaloes and goats die. Let our children be good.

Kabita: And don’t let there be a famine.

Sandip: Over there is a *devithaan*, above where we were playing volleyball, above the forest. At the *devi* we do *pujaa*, we offer fruits and corn. When the corn is growing, we can’t eat it until we offer some to the *devi*. The *devi* makes our crops grow well if you give corn to her. We need to burn incense for the *devi*. And there is a *devi pujaa*, and near there everyone needs to do goat kid, pigeon *pujaa*. In the *devi’s* surroundings, we can’t cut trees.

Sandip’s Mother: Don’t kill *serpo* (snake).

Sandip: Don’t kill *serpo* in the *devi’s* surroundings.

Jiten: Across, near the hill pass. On the hill across. Everyone, all families, bring pigeons and goat kids. A little while ago we went to Rauta to do *pujaa*. Over here at this *devithaan* we’ll do one in the coming days. We give goat kids and, hmm, chickens?

Jiten’s Mother: Goat kids.

Jiten: The *devi* and *deutaa* help us.

These exchanges illustrate the reciprocal relationships that children and their families have with deities, and thus with place. To have good harvests and healthy livestock, and

to avoid disasters such as famine, Rautamai residents give to and show respect for these local land-based deities.

Some children's older family members told me that, these days, the younger generations do not pay as much attention to the deities, and that as important elder knowledge holders pass away, some rituals, beliefs, and stories are being forgotten. Bikas even told me that the deity who used to dwell near his family's water source had probably left, had probably moved far away, because the *pujaa* was not done. People had neglected their role in that human-deity relationship. Still, I observed interest in local deities during interviews. When Muna's grandfather shared his rich knowledge of many local deities, other family members all listened eagerly, asking him to say more, noting that it was important that they themselves learn. Although children did not have the same depth of knowledge on local deities that their elder family members did, the exchanges above do show that these deities play a role in their relationships to place.

Naag

Naag, children explained to me, are serpent deities who dwell at water sources. Children told me that if you pollute (*jutho*) water sources by peeing or pooping nearby, or by spitting or throwing anything dirty into water, *naag laagchha*, meaning that the *naag* will cause wounds to appear. In the following exchange, Muna and Sandip explain.

Muna: There is *naag* at the water source.

Sandip: Yes, there is *naag*.

Elsie: What does the *naag* do?

Muna: Don't make it polluted there.

Sandip: Don't make it polluted there. Don't throw polluting things, we need to clean it. If you pollute, the main thing is a wound will emerge. A wound will come up on your leg. It is like this.

The exchange between Muna and Sandip reflects what other children told me about *naag*, too. The main point—do not pee or poop near water sources, or *naag laagchha*, you will get a wound—seemed to be commonly held. Thus, to children, to be in good relationship with *naag* and to avoid wounds emerging, means to avoid polluting water sources. Keeping in mind that what children told me about *naag* was more limited than what adults told me, in the following paragraphs I look to a few of their adult family members and one teacher to paint a broader picture of the ideas of relationality that children may encounter connected to *naag* and water sources.

A few interview participants, like Sandip above, noted that it is important to clean water sources. I learned from some children and their family members that to clean water sources can mean to pull out leaves that fall in and to pull out weeds. The following exchange between Jiten's mother, older sister, and myself shows how Jiten's mother connects this practice to *naag*.

Jiten's Mother: Over there there is a big *naag* that comes out. A *naag*. If you make it dirty, a big *naag* comes out. It has different patterns on it. Over there by the well a big one comes out. Here too a small one comes out. If you make it polluted, if you say something polluting, it will come out. If people make it polluted the *naag* comes out. Snakes (*serpo*) are gods, aren't they? There are two, one over here and one over there.

Jiten's Sister: You can't spit, you can't pee or poop there.

Elsie: Does it bite?

Jiten's Mother: No, it doesn't bite. It comes out and sits. It sits, enjoying.... Before, we cleaned the well and spring well. We cleaned the drinking water place well and drank. Now, now the water is dry there. Dry. Because now, who will watch over it? Who will clean it? If the tap is there everyone goes to the tap.

Elsie: Do you see the *naag* there?

Jiten's Mother: We can't see them, today's *naag*. That was before. Maybe because of the taps.

Jiten's mother suggested that people's neglect of local springs and wells meant neglect of local *naag*. In her view, when people do not care for springs and wells they dry up, and

that may be why *naag* no longer dwell there. To her, to be in good relationship with *naag* and with water sources, is not just to avoid pollution, but to actively care for them.

Muna's grandfather emphasized just how close the relationship between *naag* and water sources is. When I asked, "Are there *naag* in water sources?" He responded emphatically, "What else would there be if not for *naag* and *naagini*? If *naag* doesn't live there, water won't bubble up. Wherever there is water bubbling up, there must be *naag*." In his view, *naag* and water sources are inseparable. Thus, to be in good relationship with *naag* means to be in good relationship with water sources and vice versa.

Jharana and Kabita's dad said that to care for water sources and to care for *naag* is to care for oneself. He explained, "If you make it [the water source] polluted, *naag* will attack you. You have to make it pure for the *naag*.... You can't poop and pee there. If you make it polluted, if you pee or poop there, you are making trouble for yourself.... If you don't worship it, you are harming yourself." He later added, "They [elder family members] used to scold us. If you drink dirty water, you will get diarrhea. They used to say this to us. You will be sick. They used to give us this advice." In connecting peeing and pooping near water sources, disrespecting *naag*, and getting sick with diarrhea, he shows how the wellbeing of *naag*, water, and people are intimately related.

Not all interview participants believe that if you pollute *naag laagchha* though. Nirav Sir spoke of *naag* with some distance, explaining the beliefs around them but not identifying with these beliefs himself. Reshma Ma'am was more direct in her perspectives on local beliefs around *naag*. As she explained,

There are some people who believe. We don't believe. And at our place, some conservative (*rudhibaadi*) people say, 'don't pee and poop in the river, don't do toilet, don't pee.' Because they say that *naag laagchha*,

people from before (*uhile ko manche*). Today's people (*ahile ko manche*) say 'the water will be dirty, will be polluted (*dushit*). ' Now we understand. Before people would say that, meaning that the water will be polluted. The elders from before. 'Don't pee and poop in the river, *naag laagchha*. Your leg will swell up this big,' they used to say. And because of this, people didn't pee or poop there. It is believed to be a deity, if there is a deity there, to make small children understand, they would say, 'there is a deity, you can't do these things.' Because that was their understanding, there the water will be polluted, in the river, don't pee and poop there. And now, there isn't a deity, but *naag laagchha* is said... 'Don't pee or poop there, otherwise you'll get a wound,' it is said you'll get a wound. But, why is this said, it is said because if you pee and poop in the water we drink, the water will be polluted, that is the meaning. There won't really be a wound. There if you just go poop, no one has gotten a wound. But, you can't poop there. Thinking this water will be polluted, to create fear, people say there will be a wound.

Reshma Ma'am draws a connection between beliefs around *naag* and keeping water sources clean, and articulates the positive effects of these beliefs: they keep people from polluting the water. But, she explains that these days, people can understand that it is pollution (*dushit*). In positioning people who believe in *naag* as conservative and as "people from before" she distances herself from these beliefs and constructs herself as different kind of person, as belonging to "today's people."

In the same interview, Reshma Ma'am also told me that she has seen small bugs and germs in water with a microscope, and that these are the cause of sickness. She said she shows students this as well, and they are surprised by what they see in the water. Muna, too, mentioned germs when explaining the importance of clean water. She explained, "When we look at the water, it looks clean. But we can't see germs. They are small." For Muna, though, this knowledge of germs and a belief in *naag* did not seem to be mutually exclusive.

Rautamai Devi

Rautamai Devi, sometimes called Rautamai Raani, and sometimes just referred to as Rauta or Rautamai, dwells at Rauta Pokhari, a large pond that sits near the top of the highest local ridge. The children I spent time with live within a few hours walk of Rauta Pokhari and visit occasionally for *pujaa*, to celebrate Tij or the Nepali New Year, or just for fun.¹² The pond and temple attract visitors from Gaighat and beyond who come to worship the goddess, hike to the top of the ridge, and enjoy views of the Himalaya.

Children I spent time with mentioned Rautamai Devi and doing *pujaa* for her, but I did not ask them to say more. Some of their elder family members and other community members, however, shared many stories about Rautamai Devi, all of which were infused with lessons on how to be in good relationship with the goddess and with place. I share Muna's grandfather's telling of a few of these interwoven stories below.

Muna's Grandfather: Rautamai came up, how many years ago did she come up, many, many years ago, I don't know, in our grandparents, great grandparents' time –

Muna's Mother: Tell about the time the goddess came.

Muna's Grandfather: As for moving, the goddess stayed one night in Pokhari [a village about a day's walk from Rauta's current location]. She got up from Pokhari, after staying for the night in a dry pond. Apparently on the other side there were pigs, and trees and plants were dying. She got up from there and stayed for one night in Rabua. From there she went up a little, and while going around, she found flat, good land. At that time it was a Sherpa village, I heard, where there were small ponds. There was a Sherpa village and Sherpa people don't raise pigs. That is an important thing. This is many years ago. Now the Sherpa are gone, some died and some left. Up until some years ago we could see their houses' walls. And those *mani* (stones with Buddhist inscriptions), those are the Sherpas'. That hill is also called Mani Bhanjyaang. I have seen that much, but not the people. They got up and left, some to the Madhesh, some up to higher

¹² I have visited Rauta Pokhari and the surrounding forest with kids to celebrate Tij, and as a class field trip. These trips to Rauta Pokhari were either prior to or after the research period. These experiences shape my own understanding of children's relationship to Rautamai Devi and Rauta Pokhari, but specific stories from those experiences are not included here.

lek (mountainous areas), they go up to *lek*, that *jaat* (caste, type) of people. Some left, some died, and Rauta Raani came. After Rautamai came, we couldn't go close to her and say dirty, polluting things. Closed. You couldn't even go around gossiping. Look, once a Rai person bought a pig and tried to pass through that place with it. That idiotic-brained person thought, 'If I don't touch the water, if I stay on the path, it will be fine.' While going, his pig died on the way.

Muna's Mother: After reaching across?

Muna's Grandfather: He reached across. Across the hill where it meets a straight path. '*Ram, Ram*, the pig is just gone, the pig was big, now I am ruined.' Sitting on the edge of where the goddess is, he said, 'Oh god, I am an unknowing fool, I didn't know anything, I didn't get that insight, now I will immediately bring a goat kid and pigeon and serve you Rauta Raani. If you have mystic crafts, please explain them to me.' Suddenly, from the side, a tree just like a mango tree came out. '*Eh baabaa*, she gave that, wow this is here,' he said, plucking a leaf and rubbing it on the pig's mouth, and the pig woke up. '*Ram, Ram Ram*, I have discovered that this is a supernatural herb.' The plant disappeared. He had run there, but it just disappeared. The pig survived. From then he immediately brought a goat to sacrifice.....

Muna's Mother: Rautamai didn't like other places, because pigs are not clean.

Muna's Grandfather: Pigs are not clean. Because of that, after coming and staying at this elevation, it is a clean place. It was also clean before. Look, she doesn't let forest leaves fly and fall into the pond. Green and yellow birds pick them off the pond and throw them out. People pull off and snatch all the leaves and put them in the pond. Birds just take them out and make them fly away *phiriririri*.

These interwoven stories illustrate what it means to be in good relationship with Rautamai Devi. In Muna's grandfather's telling of Rautamai Devi's journey to her current location, we see that Rautamai Devi decided not to stay in the village of Pokhari because the environment was not healthy. Trees and plants were dying, and pigs are considered unclean. She continued on her journey until she found a clean place, without pigs, at a higher elevation. And, when a person brought a pig, she cursed him, teaching him the importance of keeping the area clean and pure. The person then demonstrated his devotion to her and she helped him. Even the birds are devoted to keeping Rauta Pokhari

clean. Taken together, these stories show that be in good relationship with the goddess is to keep plants and trees healthy, to keep pigs away, to show devotion to Rautamai Devi, and to keep Rauta Pokhari clean.

The story of Rautamai Devi's journey to her current location and the detail about birds picking leaves off the surface of Rauta Pokhari seem to be relatively well-known. While I did not ask children how they learn about Rautamai Devi, my prior experience visiting Rauta Pokhari with children (not as part of my research) suggests that they might learn from elder family members when they go to Rauta Pokhari to do *pujaa* or to celebrate a festival. Stories about Rautamai Devi and Rauta Pokhari were also printed in a local primary level curriculum, used by a few local government schools, including Rautamai Secondary School, for a few years. While the curriculum was no longer in use at the time of my research, some children I worked with had likely studied it when younger. After my research period finished, I learned that there is a new picture book about Rauta Pokhari. I have not read it, but a friend sent me a photo of a page in the book that shows a yellow bird picking a leaf off Rauta Pokhari's surface. Children might encounter stories of Rautamai Devi and Rauta Pokhari, and thus the embedded ideas of how to be in good relationship with the goddess and the pond, in a number of different ways.

Finally, it is worth mentioning that Rautamai Devi's dwelling place is important to local watersheds. As Muna's grandfather explained, "Here sometimes there are big rain clouds, and there are rivers flowing in four directions from Rauta. Rauta is the head. The center of them all. If something is wrong with one of the streams, you must light incense up top. Water goes in four directions." And, nearby springs are the source of

many local communities' drinking water; this water is piped to taps far away. Thus, staying in good relationship with Rautamai Devi and keeping her surroundings clean can also mean keeping local waters clean.



Figure 47: Rauta Pokhari on Tij. Summer, 2017.



Figure 48: View of the Himalaya from the ridge above Rauta Pokhari. Winter, 2016.

Relationality in School: The Forest Gives Breath

Children encounter many different ideas around what it means to be in good relationship with the environment at school through classes and government-published textbooks. Some of these ideas focus on preserving resources for future use, some focus on caring for and conserving wildlife, some focus on maintaining a beautiful environment to attract tourists, some focus on the interdependence of all living things, and some focus on the connections between a healthy environment and humans' health. Diving deep into these ideas is beyond the scope of this thesis. There is one concept though, plant and animal gas exchange, that two children and all three teachers integrated into their own understandings of relationality and interdependence with the forest, and I explore that idea here.

Students encounter the idea of gas exchange, perhaps for the first time, in grade four's *My Science, Health, and Physical Education* textbook's chapter, "Interrelationship between Living Things and Environment." As Figure 49 and Figure 50 show, this textbook section introduces the concept of gas exchange in the broader context of a discussion of how nonliving things—in this case, air—and living things are related. The image at the bottom of Figure 50 shows the relationship between plants and humans as one of exchange. This section also encourages children to consider why plants and animals need to breathe by inviting them to hold their breath (Curriculum Development Centre 2075b BS).

Exchange of oxygen and carbon dioxide between plants and animals.

Can plants eat food like animals? The plants also need food because they are living things. However, the plants cannot eat food like animals. The leaves of the plants are green because of chlorophyll. The green plants prepare their food absorbing water and minerals through the roots from soil. Similarly, they take carbon dioxide found in the air and prepare food in the presence of sunlight. Such food is stored in fruits, leaves and roots. The

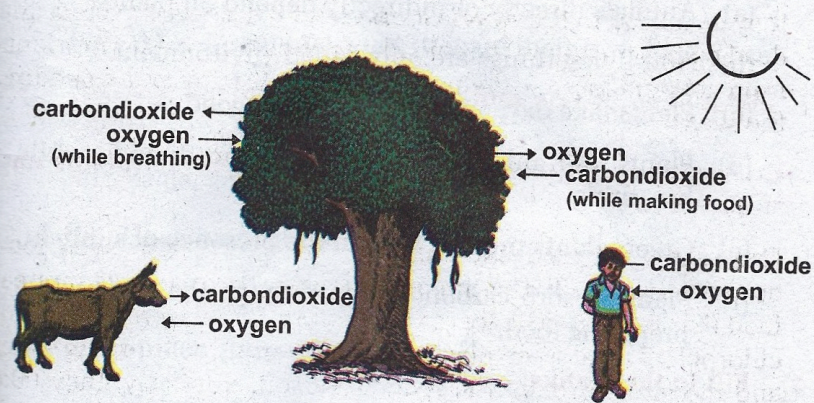
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Science, Health and Physical Education :Grade 4

Figure 49: Gas exchange (part 1) in grade four's *My Science, Health, and Physical Education* textbook. (Curriculum Development Centre 2075a BS, p.36)

plants throw out oxygen in the air when they make food and the oxygen is used by both the plants and animals.

Why should animals and plants breathe? Do you know about it? How do you feel when you stop breathing for a moment? Oxygen taken in reacts with the stored food in the body to produce energy and throws out the carbondioxide gas. So, energy is not produced when the breathing is stopped or it is not to breathe in and we feel difficulty. Thus, non-living things of environment like air, water, soil, stone, etc and living things such as plants and animals are closely interrelated.



Science, Health and Physical Education : Grade 4

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Figure 50: Gas exchange (part 2) in grade four's *My Science, Health, and Physical Education* textbook. (Curriculum Development Centre 2075a BS p.37)

Sandip, Muna, Reshma Ma'am, Nirav Sir, and Prakash Sir all explained that it is important to understand that trees give us breath. The ways they integrated this idea into their own understandings of relationality and interdependence with the forest varied. First, let us focus on what Muna, Prakash Sir, and Nirav Sir said. Muna cites gas exchange as a reason to not cut trees, connecting it to what she had previously told me about forest guidelines.

Elsie: What is the most important thing to know about the forest?

Muna: Don't cut trees, because carbon dioxide [oxygen] is available. And because of trees, because of trees we can easily get carbon dioxide [oxygen]. Oxide [oxygen]. Because of this.

Prakash Sir makes a similar point, but also explains that people should plant trees so that future generations will have enough oxygen to breathe.

People plant trees, some sprout themselves. After cutting plants and trees we must again plant them. After planting, after watering them, they will be big for the future. What is said, *ek santaan ek biruwaa* (one child one plant). If you have one child, plant one tree. The government's rule is this. When a child is born, you have to plant a plant. After planting, your own forest gives oxygen. It gives oxygen. We keep on breathing oxygen. Again if these plants and trees are finished, people can also die. Because plants and trees produce oxygen. As long as people live, if all trees and plants are cut, there won't be oxygen available, and people will die. And carbon dioxide will make things diluted. Because of that, we need to plant plants. *Hariyo ban, Nepalko dhan, ek santaan ek biruwaa* (green forest, Nepal's wealth, one child one plant).

Above, Prakash Sir also states that if plants and trees die, people will also die, further highlighting the close connection he sees between trees and people. Nirav Sir similarly connects trees with people's futures, but his take is a bit more dismal.

People survive because of the forest. To receive oxygen, we need the forest. If there wasn't a forest, people – now we are in this *yug* (era), in this time where diseases are spreading. If we don't think back and educate ourselves, develop ourselves, our future human race might be in trouble. Not right now while we live, but it might trouble the upcoming human

race, that is how I feel and think. If we don't change our course, we'll have to live a desolate life....Don't cut down the forest, we need to plant things, if there isn't a jungle people's future could be difficult, oxygen won't be available, you'll have to put an oxygen bag on your nose. We need to teach this.

Nirav Sir expresses concern that without forests, there will not be oxygen readily available. He connects this to other concerns about the direction people are heading. He sees maintaining the forest as essential to humans' survival. Muna, Prakash Sir, and Nirav Sir all focus on trees' roles in supporting human life, and on humans' role in protecting forests by refraining from cutting trees and/or by planting trees.

Sandip and Reshma Ma'am similarly explained that trees give us oxygen.

However, they both also emphasize the importance of humans giving breath to trees.

Sandip explains this below.

Now there is this carbon dioxide and oxygen. To breathe, we take from there breath, and again we give to them [trees]. They take from us. Because of this we can't cut trees and plants. We can't cut plants..... At school I read and learn not to cut the forest, not to cut trees and plants, from them, breath comes towards us, and we also send breath towards them. It goes both ways. This is happening, and because of this we can't cut. Up until now, this is what I have understood. Trees' work is to give breath, air, they give us air.¹³

Like Muna, Sandip integrates what he learns at school about gas exchange with what he learns about not cutting trees. However, he also views his own connection to trees as reciprocal; just as they give him breath, he gives them breath. Reshma Ma'am views people-tree relationships similarly, and in the exchange below emphasizes that without one another, neither people nor plants could survive.

Elsie: What do children need to learn about the jungle?

Reshma Ma'am: Kids, about the jungle, we have to first teach them that people need the forest. We can't survive without the forest. And without

¹³ Part of this was also quoted in an earlier section.

us, trees and plants can't survive. We need to breathe in oxygen, and if there isn't oxygen we will die in a minute, we have to teach them this thing. Because of this, we have to protect the forest. We have to teach like this, to the children, in my opinion.

Elsie: What is the most important thing for everyone to know about the jungle?

Reshma Ma'am: The most important thing? The first thing is that the forest and people have a close relationship, everyone must learn this. Without the forest, we can't survive. Without us too the forest can't survive, everyone must know this. Because the forest trees and plants give us oxygen. And we give trees and plants, what is it? What is it called?

Elsie: Carbon dioxide?

Reshma Ma'am: Yes, we give the forest carbon dioxide. Because of this, between us there is a very deep relationship, and everyone needs to know that without the jungle, we can't survive. And the forest too, without people it can't survive, people need to understand this too. Isn't that right?

For Reshma Ma'am, gas exchange shows that people and the forest have a deep, interdependent relationship. Without each other, they cannot survive. For both her and Sandip, school learning about gas exchange seems to contribute to their sense of relationality with the forest.

Discussion: In Relationship to Place

Rautamai children experience and encounter different ways of being in relationship with place. Through everyday interactions with animals, insects, and plants they show and practice attentiveness and curiosity. Stories, beliefs, and rituals associated with land- and water-based deities support a sense of reciprocity and teach locally important ideas on pollution. And, as Sandip and Muna showed, some children integrate school learning focused on interdependence into their own sense of relationality with the forest. These different experiences, encounters, and ideas all shape children's understandings of, ways of being in, and orientations toward their local environment.

The everyday ways Rautamai children form relationships with animals, insects and plants remind me of some North American Indigenous scholarship on land as pedagogy (Bang et al. 2014; Simpson 2014; Marin and Bang 2018). North American Indigenous perspectives on land as pedagogy are diverse, are embedded in broader efforts to decolonize, and are different from Rautamai perspectives. No one I spoke to in Rautamai explicitly positioned the land, animals, or plants as teachers. But, recall what Bang et al. (2014) wrote: “Places produce and teach particular ways of thinking about and being in the world. They tell us the way things are, even when they operate pedagogically beneath a conscious level” (p.44). This resonates, in some ways, with what I observed. In Rautamai, caterpillars, sour flour stems, wasps, seed pods, monkeys, *gogan* trees, pumpkins, and more taught “ways of thinking about and being in the world” characterized by attentiveness, curiosity, and intimacy, and sometimes by affection or opposition (Bang et al. 2014 p.44). Kwezens, the girl in Simpson’s (2014) telling of a Nishnaabeg story, similarly demonstrated curiosity and attentiveness when observing a squirrel chewing bark and drinking maple sugar water. The land taught Kwezens to wonder and notice, and the squirrel taught Kwezens how to drink maple sugar water. Reflecting on the story, Simpson writes,

Kwezens learned a tremendous amount over a two-day period – self-led, driven by both her own curiosity and her own personal desire to learn. She learned to trust herself, her family and her community. She learned the sheer joy of discovery. She learned how to interact with the spirit of the maple. She learned both *from* the land and *with* the land.... She comes to know maple sugar in the context of love. (p.7)

Land as pedagogy, as Simpson describes it, means learning through interdependent relationships and in context. While I would not call the everyday relationships Rautamai

children form with animals, insects, and plants land as pedagogy—to do so would be to appropriate this concept, and to extract it from the broader efforts to decolonize it is embedded in—I do think that land as pedagogy is a helpful lens. It illuminates the role that animals, insects, and plants play in teaching Rautamai children about and how to be in their local environment.

In her work exploring human and animal relatedness in Kumaon, India, Govindrajan (2018) positions animals somewhat similarly to how the land as pedagogy scholarship positions land. Although she does not name them as teachers, she considers animals “coparticipants in meaningful worlding” (p.20). Most directly relevant to Rautamai children’s experiences are her observations on Kumaoni participants’ relationships with monkeys. In Kumaon, Govindrajan found that people sorted rhesus macaque monkeys into two categories: outsider monkeys, who participants suspected had been brought in from cities and considered highly destructive, and local hill monkeys. Their relationship with hill monkeys was similar to what I observed in Rautamai. Hill monkeys lived in the jungle and stole crops, and people viewed these monkeys as having “an innate love of mischief” (p.92). Their mischievousness was considered frustrating, but tolerable. Rautamai children, too, view monkeys as mischievous and frustrating, especially when they break and ruin corn without fully eating it. Govindrajan also observed that some participants identified with hill monkeys. With the arrival of outsider monkeys, some participants saw the hill monkeys as marginalized by the aggressive newcomers, just as they viewed themselves as marginalized by newcomer people who bought up land, and by the newcomer monkeys that, in some extreme cases, made farming untenable. Although the context is quite different, Rautamai children seemed to

draw some more playful connections between themselves and monkeys by trying on monkey perspectives and behaviors high in the tree, or by responding to thieving monkeys' chaos with chaos of their own. Using Govindrajan's framing, Rautamai monkeys and children, through their dynamic, oppositional, yet at times playful relationship, are coparticipants in one another's worlds, if just for a rainy month off from school and series of rainy Saturdays thereafter. This deep-dive into kid-monkey relationships, with the help of Govindrajan's scholarship, further illustrates how relationships with animals shape children's knowledge of, ways of being in, and orientations towards their local environment.

In this section, we saw that plants and animals are not the only beings influencing Rautamai children's relationship to place. *Devi-deutaa*, *naag*, and Rautamai Devi, and the stories, beliefs, and rituals associated with them, also seem to influence children's ideas of pollution, and sense of relationality and reciprocity. While some of the details differ, the overarching ideas on pollution, relationality, reciprocity I observed in Rautamai seem similar to what other researchers have observed across the broader Himalayan region (Tautscher 2007; Spoon 2008; Aggarwal 2010; Skog 2010; Campbell 2013; Govindrajan 2018; Gurung 2020). For example, just as Rautamai children told me that it is important not to pee or poop in water sources because *naag* live there and can give wounds, the Dolpo participant in Gurung's (2020) research explained that a *klu* made picnickers sick after they spilled sheep blood into a lake. In both cases, keeping water sources clean is viewed as essential to staying in good relationship with *naag* or *klu*, and thus to staying healthy. And, as Govindrajan (2018) and I both found, in order for *devi-deutaa* to support humans', livestock's, and crops' wellbeing, Rautamai and

Kumaoni residents work to meet *devi-deutaa*'s needs through sacrifice and ritual. In doing so, Rautamai and Kumaoni residents seem to position themselves not as dominant over or in control of the environment, but as participants in broader webs of reciprocity. Aggarwal (2010), also working in Kumaon, described how some beliefs and practices connected to *devi-deutaa* may have ecological benefits. I similarly observed that the ways Rautamai residents are in relationship with Rautamai Devi—with taboos around polluting and cutting trees in her surroundings—might also support the health of local watersheds. However, as Aggarwal (2010) reminds us, beliefs and practices connected to *devi-deutaa* can also lead to environmental degradation. Connecting this to Rautamai Devi, it is not hard to imagine how, if the number of pilgrims visiting Rauta Pokhari to worship Rautamai Devi increases, this could potentially have a negative ecological impact. Overall though, potential ecological benefits or negative impacts aside, it seems as though Rautamai children encounter relational, reciprocal ways of thinking about and being in their local environment through stories, beliefs, and rituals connected to local deities.

As we also saw, not all participants subscribed to all beliefs, practices, or rituals connected to local deities. Reshma Ma'am associated beliefs around *naag* with conservative people and people of the past. She positioned herself as a person of today and as someone who, through schooling, understands that people should not pollute water sources for reasons other than respecting *naag*. Other researchers have similarly found that people with more formal schooling sometimes position deity-related beliefs and rituals as of the past or as superstitious, as they simultaneously work to position themselves as schooled and modern (Govindrajan 2018; Gurung 2020). While some

children, like Bikas, did note that some rituals for local deities practiced in the past had been neglected, no children explicitly framed belief in local deities as of the past in the way Reshma Ma'am did with *naag*. It seems as though for these children, their identities as students and their beliefs in local deities are not in conflict.

Although Reshma Ma'am distanced herself from ideas about *naag*, as she, the other teachers, Muna, and Sandip all showed through their explanations of gas exchange, school knowledge and relational frameworks do not seem to be incompatible. These participants' explanations of humans' and trees' interdependence seem to suggest that relational frameworks can support some children's engagement with and meaning-making around some school learning, and that some school learning can support or expand some children's sense of relationality with the environment. In their work with North American Indigenous communities, Bang and Medin (2010) similarly found that relational epistemologies can support natural science learning. The natural science learning their community-based design research explored differs from Rautamai children's government school learning though. Bang and Medin worked closely with community members to integrate communities' own relational epistemologies into natural science programming for youth. In Rautamai, it seemed that some teachers and children drew on the government-published textbook's ideas of interdependence through gas exchange, and integrated these ideas to their sense of relationality with the forest.

The attentiveness and curiosity children develop and demonstrate through their everyday relationships with animals, insects, and plants might also support their in-school learning. As Marin and Bang (2018) write on their work with North American Indigenous communities, they view "observational practices both as an Indigenous methodology and

as a central practice in western science” (p.92). Observation, as they define it, is not just seeing, but also asking questions, making predictions, and interpreting. The skills that Rautamai children cultivate by, for example, noticing how a wasp nest or a pumpkin grows over time, are relevant to school science learning, too. Children pay close attention, notice and interpret change, and follow curiosity in ways that shape their understanding of the local environment, and that might also connect to in-school science practices.

EMBODIED AND SENSORY LEARNING

Cutting Cornstalks

“*Dodhaar, dodhaarmai pare ma, laajai laajaile mare ma,*” Binita, Devika, and Sani sing together, moving through the mixed corn and soybean field, their sickles cutting cornstalks. Once their non-sickle hand is full with a few stalks, they pile them up on the side for their grandmother to make into a big bundle.

Their grandmother brings me a sickle, and Binita demonstrates how to cut the cornstalks.

“Cut little lower. Like this. You have to hit hard.”

She gets back in her rhythm while I try to find mine.

We move to another field, and then another. In some fields, *latte* (amaranth) grows wild, and in others, beans grow up the cornstalks.

“Leave these,” Binita instructs, pointing to the stalks with beans. “We will cut them later, once the beans are ripe.”

While we work, the girls ask me questions about my home in the US—“Is it closer or farther than Pokhara?”—and sing more pop songs.

As we get close to finishing each field we speed up, knowing that we will take a short break after. Between fields, the girls scurry up a favorite *gogan* tree. They play “motorbike,” bouncing on the tree’s branches. They borrow my phone to take photos of themselves posing in the tree and down on the ground with their work tools.

“I planted all this *kodo* myself,” Binita boasts, pointing to a millet field. “Devika doesn’t know how to plant *kodo*. Sani can plant faster than Devika, even though she is younger.”

“Why doesn’t Devika know how?” I ask.

“Because Devika’s school doesn’t give a *Saaun* (Nepali month) holiday for planting. She only plants on the weekend. We plant everyday.”

“Those are the fields I planted,” Devika pushes pack, pointing at some smaller millet fields.

I have asked the girls whether they enjoy this work, and they have said yes. But, as we move out of the bigger fields into the narrower ones, the dynamic shifts. The sun is hot, and our hands hurt. Mine are starting to blister where I hold the sickle. An uncle joins us and his quick pace speeds us up again. With cornstalks left to cut in Binita’s family’s fields, her uncle’s fields, and her elderly neighbor’s fields, we have got a few days of work ahead of us.



Figure 51: Cornstalks in motion

Introduction: Embodied and Sensory Learning

Children come to know local forests, fields, and streams through embodied practices and sensory experiences. As in the above vignette, some of these practices are those of work: children's hands and bodies learn how to cut cornstalks and plant millet. Other embodied learning comes as children move through the landscape. Their feet come to know steep and slippery paths, their arms come to know the tingle of *sisnu*, their faces come to know where they can catch the evening sun. Their knowledge of local forests, fields, and streams is not simply information stored in their minds; it is felt, sensed, and known through their bodies. At school, however, learning is more stationary, more oriented towards deciphering and recalling textbook information. Still, teachers work to

bring some movement into their classes and to connect learning to children's embodied knowledge.

With Repetition, Hands and Bodies Learn

As many of the vignettes in this thesis show, children's hands and bodies learn how to do tasks such as cut cornstalks, plant millet, harvest nettles, collect fodder, and weed rice paddy through repetition. Binita recognized this in her comments on how Devika is not as skilled at planting millet as their youngest sister because she has had less practice. This learning by doing and through repetition begins when children are young, as Muna's grandfather explains in the following exchange.

Muna's Mother: Children see their parents going to the jungle and learn about fodder and firewood.

Muna's Grandfather: From early childhood they go with their mother, they go with their father, carrying a small *doko*, bringing a *naamlo*, even if they can't cut anything themselves, they carry a small load of fodder. Children go with their mom or dad, and their parents put a *doko* on them. And by doing this again and again, they learn. By going to the jungle, they learn like this.

As Muna's grandfather describes it, children's learning about the jungle is intertwined with these embodied practices of learning to carry a *doko*, of learning to carry a load of fodder. This embodied knowing is an important part of how children understand and relate to forests, fields, and streams.

Searching for *Niguro*

School has just been called off early and Himaj and Suraj are already out of their uniforms and on their way to the jungle, singing as they walk. I hurry to catch up. Not wanting to interrupt their singing, I follow them along the rocky path, winding along a ridge.

When we get to the *bhanjyaang* I finally ask, "Are we going to cut fodder?" This had been my assumption, since they had sickles in hand.

“No, *niguro*,” Himal answers. We are going to collect fiddlehead ferns.

And with that, the boys plunge down a steep ravine into damp forest. They move quickly, sometimes along livestock trails—neighbors graze goats and oxen here—but more often beating their own trails through the *banmaaraa* (Crofton weed) and *sisnu* with long sticks.

Suraj points toward a dark, damp spot, where the duff looks as though someone or something has walked through it. He pokes around a bit, finding a few fiddleheads and using his sickle to harvest them.

“Where should I search?” I ask.

“Damp, cool places.”

Gravity and a sense of adventure pull the boys down deeper into the forest. We then make our way back up a different route, along a small seasonal trickle of a stream. There are a few fiddleheads, but not many. Already-cut *niguro* stems show that other harvesters have recently been here. The boys are disappointed.

Back up at the *bhanjyaang*, the boys tuck their bundle under the cool shade of large boulder, explaining that they’ll stay fresh here. We venture down a new branch of the dirt road, just recently cut and, so far, only drivable by tractor.

A few minutes down we encounter some village uncles and cousins, excavating rocks from the hillside and breaking them, construction materials for the new health post. Himal and Suraj sit with a cousin-brother, taking turns playing games on his mobile phone. Then, without saying anything, the boys agree it is time to move. Up they stand and we continue.

The dirt road meets, or rather, cuts through, a ravine. Again, down we plunge. This ravine, though, is steeper and its stream has much more water flowing through it. The boys use *banmaaraa* to rappel quickly down small waterfalls while I slowly, cautiously follow.

Observing the boys and experimenting myself, I soon realize that walking through the stream, slick and steep as it is, is far preferable to walking alongside it. *Sisnu*, deep mud, and leeches all threaten.

Although the boys travel through the stream, when they see streamside patches that look to them like they might have *niguro* they use their long sticks to beat back the shoulder-high *sisnu* and wade in.

Niguro is plentiful here, far more so than in the first ravine. It is clear that no other harvesters have whacked through this *sisnu* or slid down this stream in a while. What is not clear to me, however, is just how the boys know where to

look for *niguro*. Sometimes they find big bunches growing far from the stream, and sometimes right alongside it. When I ask how they know where to look, their answers are, as usual, short. “In damp places.”

Everywhere is damp though. I must be missing some subtle clues, focused as I am on staying upright on slick stones, picking leeches off my skin before they can latch, and narrowly avoiding face-planting in the *sisnu*. The boys’ hands and flip-flop clad feet know this place, know slippery streams, *sisnu* patches, and leeches in a way that mine do not.

The boys, noticing my struggle, tell me to stay put on a large rock while they continue their search. I oblige, until it is time to continue down stream.

“I found one! Is this one good?” I ask, excitedly pointing to a fiddlehead.
“No, those are not *niguro*. Pigs eat that kind.”

Soon after, I find some small fiddleheads and point them out to the boys.
“These are the right kind, these are *niguro*, but they are too small to pick,” Suraj explains.

Himal finds some big *karkalo* (taro) leaves and cuts them. “To bring home for the pigs.”

We continue down, and see some *niguro* clusters that have recently been harvested. “Will they grow back here?” I ask.
“Yes, after some time, they grow back.” Suraj answers.

Then, among the *banmaaraa* and *sisnu*, we spot some different plants.
“*Sinkauli, alaichi, besaar*” (Indian bay leaf trees, black cardamom, turmeric), Himal notes.
“There is a house there,” Suraj adds, using his lips to motion down, indicating that these plants belong to the owners.

Just past the house we pop out onto another freshly-cut dirt road. I feel, for a moment, relief. Perhaps we can follow this road back up, instead of *sisnu*-whacking?

No. We follow the road for a few minutes, the boys looking at the uphill slope, discussing where to cut up. There is no trail, and we cannot see up through the thick jungle, but the boys seem to know where we are.

When the boys find the right place, we go back up, beating our way through more shoulder-high *sisnu* and picking off leeches. Our legs flow with small rivulets of blood. My body tingles with *sisnu* stings. I am grateful that I grew up in a nettle-filled woods and am familiar with the feeling. Still, I wonder briefly

whether it is possible to have some kind of adverse reaction to too many *sisnu* stings.

We climb over a huge rotting log and I note the shelf mushroom. “*Chyaau!*” “Not for eating. It is poisonous.” the boys state, making sure I know.

Eventually, we emerge into gold-glowing evening sunshine, into tall grass. “Finally, we have arrived in a place without *sisnu* or leeches!” Suraj exclaims. This is the closest thing to a complaint about the *sisnu* or leeches that I have heard from either boy all afternoon.

We sit on a big, sun-warmed rock and pick off our remaining leeches. We dab our bloody legs with *banmaaraa* leaves, which people say stop bleeding and often use as a kind of bandaid. The boys look at their *niguro* bundle. “Not even enough for two houses,” Suraj says, disappointed. I am surprised; it looks to me like they have collected a lot.

It is nearly dusk, and reluctantly we leave the warm rock and start moving again. We cut across some overgrown terraces, back to the *bhanjyaang*. We meet neighbors there, grazing their goats and oxen, soaking up the last of the evening’s sun. Suraj and Himel retrieve their earlier-picked bundle of *niguro* from beneath the cool rock we head towards home.



Figure 52: Ravine, looking down

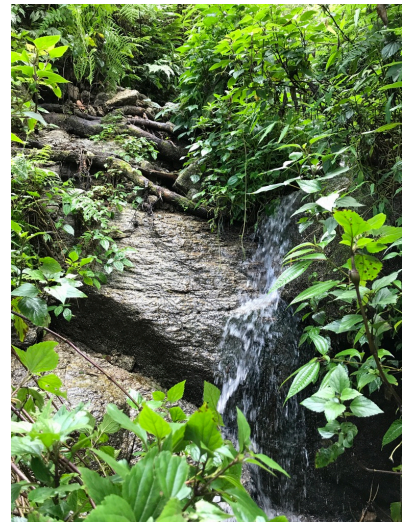


Figure 53: Ravine, looking up



Figure 54: *Karkalo* for pigs



Figure 55: Tying the *niguro* bundle

Embodied and Sensory Knowledge

Sliding down damp, cool ravines with *sisnu* stinging and leeches latching was a full-body, sensory experience. In moving through the landscape, children's bodies learn how to navigate different kinds of terrain and, in doing so, build associations between different sensations, micro-climates, and the ecology. Children like Himal and Suraj know which places are cool and wet, and what lives there: *sisnu*, *niguro*, and leeches. Other children I spent time with showed me the best places to catch the early morning sun, the *sital* (cool) places where they rest each afternoon on their way home from school, the damp sections of various trails to hurry through to avoid leeches, and the steep pine-needle covered slopes that are best for "playing slide." I found that their mental maps of their worlds, of the paths they take to school or to do chores, are full of sensory knowledge.

Learning from Desks

At school, children spend much of their structured class time listening to lectures, reading the textbook, writing, and memorizing, all from rows of wooden benches and

desks. Spending the day at a desk is a very different embodied experience than moving through forest ravines or cutting cornstalks; it is a very different way of learning about the environment. Still, teachers work to integrate some movement into their lessons.

Below, I share a vignette with scenes from a lesson on Nepal's geography, directions, and seasons, and from a lesson on atmospheric pressure. This vignette gives a sense of the small ways embodied learning is integrated into otherwise stationary classes.

Pointing North and Blowing Bubbles

Binita, Sani, Sabina, Sital and I are late for school, but we are walking with Nisha Ma'am and the kids are helping her carry some heavy sacks of *naashpaati*, which she will share with other teachers. We come in after morning assembly but before classes have really gotten started.

In the office, charismatic Reshma Ma'am invites me to go with her to seventh grade. "There is a little about the environment in social studies subject, come with me."

Reshma Ma'am begins class by reading from the textbook, asking the students questions as she goes. Some questions are specific, while others are the typical, "*Ho ki hoina?*" (Yes or no?) that she uses to keep students engaged. She soon pivots from the book though, sending a student to bring the globe from the office.

Holding it up, she shows how it spins. Bringing it closer to the first row students, she asks, "Can anyone find Nepal?" The rest of the class crowds around, but after they have searched for some time, none have found Nepal. "What continent are we on?" Reshma Ma'am asks, zooming out a bit. "Asia," a few students offer.

"How many countries are in SAARC?" Reshma Ma'am asks. She helps the students list them out. Finding India on the globe, they then find Nepal.

"How many parts is Nepal divided into?" Reshma Ma'am now draws a map of Nepal on the chalkboard. "Before, it was divided into three parts, mountains, hills, and Terai. And then divided into five development regions and fourteen administrative zones. Now the 2015 constitution divides the districts into seven provinces. Now write in your copy what I am writing on the board." Using her mobile phone as a resource, she starts writing out how many districts are in each

of the seven provinces of Nepal. She notes that she has to use her phone, since the textbook has not caught up with Nepal's recent political changes.

After the students copy, Reshma Ma'am asks the students to point north. They all point, but in different directions.

"Stand up," she tells them. "Which way does the sun rise? Turn that direction."

The students turn in the same direction.

"No matter where you are, if you look toward where the sun rises, your left hand will be to the north, your right hand to the south, your back to the west."

She calls out different directions, and this time the students' pointing is more accurate.

Turning back to the book, she asks a student to stand and read the section on seasons. The section the student reads out loud tells about a student who wants to learn why seasons change. In the reading, the student asks his mother. She does not know, so he Googles season change and learns from a website.

After the student finishes reading, Reshma Ma'am draws the earth and sun on the board to explain further, but then—*clang, clang, clang*—class is over.

I go to Prakash Sir's eighth grade science class. While I had hoped to observe him teaching the environment part of the Science and Environment course, that part does not come until the end of the textbook, and thus not until the end of the school year. Still, I am grateful for the opportunities he gives me to observe him teaching science.

Prakash Sir begins class by having each student stand up and recite the textbook's definition of atmospheric pressure, part of last night's homework. Next, he replicates the textbook's drawing on the whiteboard, sketching an upside-down cup with water in it, paper stuck to the bottom, and arrows pointing up, representing the pressure that keeps the paper there. He attempts to demonstrate this himself, turning over a cup with water with an old piece of paper on it. The paper is too thin and wrinkled and the water dumps on the floor.

"This is thick," a student sitting in the front row volunteers the cardstock cover of her notebook. It works!

"Because of pressure," Prakash Sir emphasizes.

"Move it around!" some students call out.

"It is magic!" says another.

"It is because the cup is filled with water. That is why it works," Prakash Sir reiterates.

"Will it work if there is half water and half air?" inquires a student.

"No, because of the air," Prakash Sir responds, handing over the cup to a student.

Whoosh. The paper drops and water spills.

We are back to reading from the textbook now, a more detailed explanation of the experiment we have just observed.

Preparing for the textbook's next experiment, Prakash Sir draws a small fire with a can with a lid on top. "What happens when we put water over fire?" "It boils," chime the students in response. "After that?" "Steam." "Yes, and after 10-15 minutes, the water will be dry. Where is that water?" "In the sky," students chime again.

Prakash Sir then brings the drawing to life, heating up a can over a small fire. He sets the lid on the can, and then pours water on it – it shrinks and crumples. "Because of pressure," he explains. "Now read the section in the book, without chatting."

While they read, he sets up another demonstration. He then dunks an empty cup, top down, into a jug of water, and shows how no water gets in. A student asks, "What if it tilts sideways?" "Water would just come right in." Prakash Sir responds. "Here is another example, think about when you are swimming in a river, the pressure of the water keeps you up. Or if you are swimming in a pond, with no current."

I look at my watch and see that class is almost finished, but Prakash Sir is ready to fit in one last experiment. "Did anyone bring a 'pipe' from Fruiti juice or from wheat or rice straw?" A few students had remembered the previous day's instructions, and are given cups of water to blow bubbles in. "What do you hear? Why is that?" Prakash Sir prompts. Some students shout out, "Water!" "It is air pressure that comes from the mouth. The air comes to the top of the water," Prakash Sir explains, and then instructs the students with the straws, "Now pull the water up slowly. Why does it go up when sucking?"

Clang, clang, clang. The bell rings, signaling the end of the period. "For tomorrow, study pages 27-28."

Inviting Movement

Both Reshma Ma'am and Prakash Sir invited some movement into their classes and connected their lessons to students' embodied knowledge. In Reshma Ma'am's class, we saw that students knew which way the sun rises; mornings spent outside and life with

minimal or no electricity mean children know the direction from which the sun first greets them. Connecting her lesson to this knowledge, she teaches them a trick to remember the cardinal directions, and has them practice it with their bodies. Prakash Sir, too, connected his lesson to the embodied experience of floating in a stream. And, in his class, a few students participated in experiments, holding the upside-down water cup with the paper beneath it, and blowing and sucking through straws. For those who got to participate, this provided an opportunity to not just “do science,” but to also connect the feeling of blowing through the straw, for example, with the science lesson. While we also saw book work in each class, moments of movement and connections to embodied knowledge show how school learning can, in small ways, overlap with some of children’s home ways of learning and knowing.

Discussion: Embodied and Sensory Learning

My observations on how Rautamai children learn about the environment through embodied practice and sensory engagement largely align with other researchers’ findings on subsistence livelihood practices and on environmental learning (Sarangapani 2003; Nightingale 2010; Dyson 2014, 2015; Baines and Zarger 2017; Marin and Bang 2018). Nightingale (2010) has described livelihood practices in Nepal as “profoundly embodied;” it thus makes sense that as children participate in these activities, their experiences with the environment are also highly embodied (p.160). Some researchers, like Marin and Bang (2018) and Dyson (2014, 2015), have examined how children come to know their local environment as they move through it. Marin and Bang (2018) write, “relationships with the land and walking are important knowledge-making processes, especially when it comes to knowing ecosystems” (p.91). We saw this in Rautamai as

Suraj and Himat moved down ravines, searching in wet places for *niguro* and feeling *sisnu* stings, building their understandings of the damp, ravine ecology as they went. Like children in Rautamai, the children Dyson (2014, 2015) worked with similarly developed understandings of place layered with embodied and sensory memories. She describes, for example, how children knew which big rocks would be covered with lizards on sunny days, and where to find ice for “mountain biscuits” (2015 p.58). Dyson’s research and my own observations both demonstrate that children’s knowledge of their local environment is in part learned, felt, and known, through the body.

As this section showed, school learning in Rautamai is quite different from the embodied, sensory learning children experience outside of school. Drawing on her work with the Baiga in central India, Sarangapani (2003) has argued that local environmental knowledge should not be taught in school, in part, because it is embodied. She views this kind of embodied learning as incompatible with India’s memorization- and exam-oriented schooling system. While I too observed differences between the embodied ways Rautamai children come to know the local environment and the ways they learn at school, I also observed some small ways that teachers integrate movement and connect learning to children’s embodied knowledge. Perhaps, teachers might expand on these practices and further draw on children’s funds of knowledge by integrating more movement into their classes, even as they work within a textbook- and exam-oriented system.

PART II CONCLUSION

Through vignettes, interview quotes, and textbook excerpts, Part II worked to illuminate the dynamic, multidimensional ways Rautamai children learn about their local environment. We saw that children learn through participation in subsistence practices, through collaboration with other children, through relationships with animals, insects, plants, and deities, and through embodied engagement with place. We also saw that while school learning differs from the learning children do in forests, fields, and streams, it does, in some ways, connect to and expand on children's funds of knowledge. Now, let us turn to Part III, where I consider some of the broader implications of this research.



Figure 56: A view of a cornfield, trees, and hills

PART III: WHERE MIGHT WE GO FROM HERE?

PART III INTRODUCTION

In Part III, I synthesize my findings from Rautamai Gaunpalika, connecting them with broader conversations on environmental knowledge and schooling in Nepal and beyond. I also consider future research directions and some general ways my findings might be applied.¹⁴ Then, I conclude by bringing us back out into the forest with Rautamai children one last time.

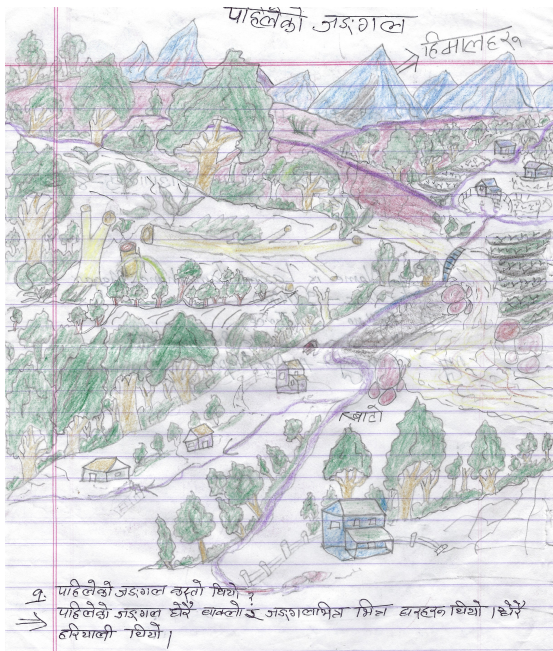


Figure 57: What the jungle may have looked like in the past

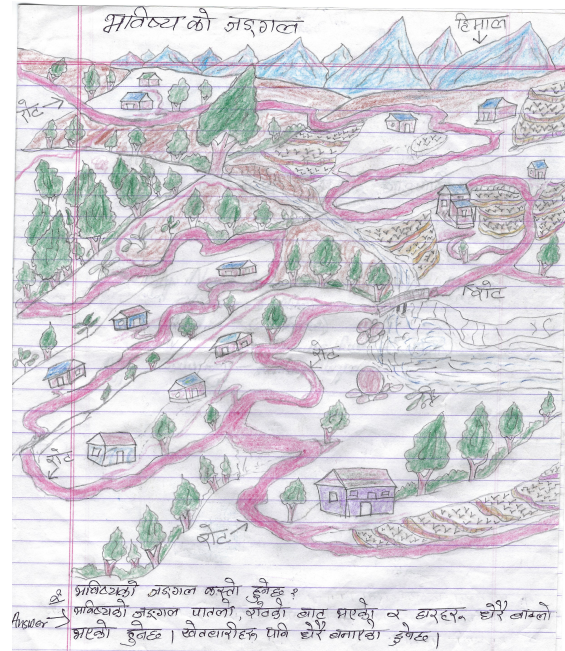


Figure 58: What the jungle might look like in the future

Both Figure 57 and Figure 58 show the forest as imagined and drawn by a ninth grade student. On the drawing of the past the student writes, “Before the jungle was very thick and houses were deep inside the jungle. It was very green.” On the drawing of the future the student writes, “In the future the jungle will be thin because of roads and because houses will be very thick. A lot of fields will be made too.” The student drew these for a research activity I facilitated with their class.

¹⁴ See Appendix D for a more detailed discussion on how my research findings might be applied in Rautamai Gaunpalika. In Appendix D, I also provide a sample instructional arc, which offers one example of how teachers might further connect their practice to Rautamai children’s funds of knowledge.

SYNTHESIS

As Rautamai children have demonstrated, children living in communities engaged in agropastoral and other subsistence practices can be important actors in their local forests, fields, and streams. Like adults across the broader Himalayan region, Rautamai children participate in subsistence practices, developing applied knowledge and skills connected to their local environment. And, like adults, they come to know the environment in relational and embodied ways, and through collaboration with others. While this research did not focus on school learning as much as it focused on learning in forests, fields, and streams, my findings also suggest that some Rautamai children draw on environmental learning from school in ways they find meaningful. For those interested in agropastoral and subsistence practices, animate landscapes, and environmental knowledge change and hybridity, my research shows that children are important participants and knowledge holders, and that their experiences and perspectives are worthy of further scholarly attention.

Paying attention to children's experiences and perspectives is particularly important when we consider how the environment will continue to change in the coming years and decades, in Rautamai and across the region. Every time I visit Rautamai, bulldozers seem to have dug new dirt roads, leaving cut trees and small landslides in their wake. Some elders explain that some springs have dried. Some describe areas where roads, homes, and fields have replaced forests, and say that there are now fewer wild animals, while others describe how, as neighbors have migrated to larger towns, forests and wild animals have moved into abandoned terraces. Plastic waste management proves challenging, with the only options to burn or bury it. These changes—road-cutting,

springs drying, forest destruction and regrowth, plastic waste—are common throughout Nepal. And now, with climate change increasingly affecting the region, already precarious agropastoral and subsistence-based livelihoods are becoming more so. I hope that Rautamai children’s dynamic, multidimensional ways of knowing their local environment—their practice-based and applied knowledge, collaboration skills, relational perspectives, embodied wisdom, and ability to draw on and integrate school learning—will position them well to adapt to the challenges and opportunities ahead. This multidimensional environmental knowing might serve them and other Nepali children better than textbook-oriented environmental knowing alone could.

With this in mind, as teachers, school leaders, elected officials, non-governmental organizations, and others in Nepal continue discussing, designing, and implementing local subject classes, and as these same stakeholders continue working to improve the quality and inclusiveness of instruction through the existing national curriculum, they might consider emphasizing learning through application, collaboration, embodied practices, and relational frameworks, along with the more standard reading and writing. The goal would not be to reproduce children’s everyday learning, but to further connect to and build on their funds of knowledge. This might support children in better accessing school learning and in further developing their multidimensional ways of knowing the environment. Such an approach could also, potentially, help push against narratives that position expert or school knowledge as superior to livelihood-based and everyday ways of knowing the environment. Future research might explore the development and implementation of local subject classes that include environmental content, and future design-based research might explore possibilities for, barriers to, and the effectiveness of

further connecting school environmental learning—whether through new local subject classes or existing national curriculum classes—to Nepali children’s funds of knowledge.

Beyond Nepal, outdoor, environmental, place-based, experiential, or other educators working to integrate local ways of learning and knowing into their practice might also learn from Rautamai children. The vignettes and quotes shared in this thesis provide examples that might inspire other educators to consider new ways of integrating participatory, collaborative, relational, and embodied learning into their lessons or programs. Rautamai children show kids’ capacity to work together, to move through the landscape, to apply their learning, and to form relationships with different elements of the environment. Stories from Rautamai might also encourage educators to learn more about the ways their own students come to know the environment outside of school, and to position these ways of learning as students’ funds of knowledge.

CONCLUSION

I began my fieldwork and this thesis during late monsoon, guarding ripening corn from thieving monkeys. Through my fieldwork I saw and through this thesis I demonstrated that Rautamai children come to know their local environment in multidimensional ways. Participating in everyday chores like grazing livestock, collecting fodder, or cutting firewood, children develop applied knowledge and skills connected to place, and come to understand local use systems. Working with other children, they practice collaboration, share in joy and *dukha*, and seem to develop identities as knowledgeable and capable. Through everyday relationships with animals, insects, and plants children demonstrate and cultivate curiosity and attentiveness. Local deities, too, shape children's ideas of what it means to be in good, reciprocal, relationship with place. And, as children work, play, and move through the landscape, they come to know the local environment in embodied, sensory ways. Schooling, sometimes, connects to these everyday ways children come to know their local environment, and some children draw on school learning in ways they find meaningful. Above, I briefly discussed how stakeholders might consider further connecting local subject classes or national curriculum lessons to children's everyday ways of knowing and learning about the environment. Now, I conclude by taking us into the forest once more, with a vignette from near the end of my fieldwork. Monsoon season and monkey guarding season are both tapering off. We see, one last time, how children's subsistence practices, the local environment, and school intertwine in simple, everyday ways.

Weaving Grass and Homework Scraps

Two of Kabita and Jharana’s younger sisters, Kopila and Sarala, lead their oxen and me through a bamboo grove and along a forested path, to where it opens into overgrown *baari*. This overgrown *baari* is deep, deep in the jungle, and we are far away from any crop fields.

After releasing the oxen to graze the overgrowth, Kopila is up a tree, perched and singing. From where she sits a bigger town is visible, far, far below, near a river.

“Listen! Monkeys!” Kopila notes, drawing my attention to far-off screeches.

“Monkeys. Jackals. All come from the forest,” Sarala adds.

“Is anyone guarding from monkeys today?” I ask.

“Nabin is there. Now the corn is harvested, it is just soybeans.” Sarala implies that now, with the corn harvested, the monkeys can do less damage.

On a big rock, Sarala starts to weave grass into a kind of patterned cord. She shows me how to first choose the right kind of grass—the long, thin kind—and tells me to pick it all same length. She demonstrates how to knot it. My hands follow hers, and the movements remind me of making friendship bracelets.

Weaving, singing, and making sure the oxen stay within sight, the girls are relaxed in this little patch of overgrown *baari*, its edges blending into the surrounding jungle.

“What are these?” I ask, noticing some soggy paper shreds around the large sitting rock.

“Old homework.”

“Most days we do our homework here. While grazing. But today is a holiday.”



Figure 59: Sarala teaches me to weave grass



Figure 60: Grazing oxen



Figure 61: Woven grass

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APPENDIX A: SEMI-STRUCTURED INTERVIEW QUESTIONS FOR YOUTH

Biographical Information

In the beginning, I will ask you some biographical questions. This is to help me understand you. I won't share this information with anyone.

सुरुमा, म तपाइलइ को जिवान को बारामा केहि प्रश्नहरु सोध्छु, तपाईंको परिचय बुझ्न को लागि। म तपाईंले भन्नेको जवाफहरु कोही पनी लाई भन्दिन।

[Note: Gender and age range (3 year interval) were kept with interview answers, but the rest of the biographical data was stored separately. This was made clear, verbally, to participants.]

1. Gender

महिला / पुरुष; केटी / केटा

2. Age estimate

तपाईं कति वर्ष पुग्नुभयो? थाहा भएन भने, अनुमान गर्नुस।

11-15 16-20 21-25 26-30 31-35 36-40 41-45 46-50
51-55 56-60 61-65 66-70 71-75 76-80 81-85 86-90
91-95

[Note: While the above intervals were on the original interview script, children shared exact ages, which I ultimately converted to different age intervals – 10-12, 13-15, etc.]

3. How many in household

घर मा कतिजाना बस्छन?

4. Occupation / specialization / general tasks performed

तपाईं के काम गर्नुहुन्छ? (घर मा, घर बाहिर, खेत बारी मा)

5. Occupations of other household members

तपाईंको _____ के काम गर्नुहुन्छ?

6. Approximately how many years spent living in this area?
कति वर्ष देखि यहाँ बसिरहानुभएको छ? (सानो उमेर देखि, बिहा देखि?)
7. Through what class have you studied?
कति कक्षासम्म पढनुभएको छ?

अन्तर्वार्ता / Interview

Semi-structured Interviews: Children

Please tell me your own thoughts. I want to learn about your own opinions. I want to understand your own knowledge. Whatever answer you give will be correct / okay. Whatever you say, that is will be okay, it will be useful.

तपाइ तपाईको आफ्नो विचार सुनाइदिनुस, बुझाइदिनुस । मलाई तपाईको आफ्नो विचार को बारे सिक्न मन लाग्छ। मलाई तपाईको आफ्नो ज्ञान बुझ्न मन लाग्छ। तपाई जे जवाफ दिनुहुन्छ, त्यो जवाफ ठीक हुन्छ। जे भन्नुहुन्छ, ते ठीक हुन्छ, उपयोगी हुन्छ।

I. Forests वन जङ्गलहरू

- A.** Tell me about the nearby forests. (*Very open-ended so that participants may begin with what they think is most important.*)

यहाँ नजिकको वन जङ्गलहरूको बारेमा भन।

- B.** What is important to know about these forests?

हामी सबैजनाले यी वन जङ्गलहरूको बारेमा मुख्य कुरा (महत्त्वपूर्ण कुरा) के के थाहा पाउनु पर्छ?

Some potential follow up questions:

- a.** What kind of things do you do in these forests?

यी वन जङ्गलमा के के गर्छौ ?

- b.** What grows and/or lives in these forests?

यी वन जङ्गलमा के के उमरिन्छ ? कुन कुन बोट बिरुवाहरू उमरिन्छ ?

कुन कुन बनयजन्तु बस्छन ? जडीबूटि ?

- c. Are there gods and goddesses in these forests and, if so, what is their role?
यी वन जङ्गलमा देवी देवताहरू बास गर्छन (बस्छन) ? यदि बस्छन भने उनिहरू जङ्गलमा के के गर्छन ? उनिहरूको मुख्य काम के हो जङ्गलमा ?
- d. What are some advantageous or important things to do in the forest?
मान्छेहरू वन जङ्गलमा के के राम्रो काम गर्छन? (वन जङ्गलको लागि के महत्त्वपूर्ण काम गर्ना सकिन्छ ?)
- e. What are some negative or harmful things to do in the forest?
मान्छेहरू वन जङ्गलमा के के नाराम्रो काम गर्छन? (वन जङ्गलको लागि के नाराम्रो काम गरिन्छ ?)

C. What do you think the forests were like when your grandparents were younger?

तिम्रो हाजुर आमा - हाजुर बुवा सानो हुदा, यी जङ्गलहरू कस्तो थिए, तिम्रो विचार मा?

Some potential follow up questions:

- a. Why do you think this is?
किन येस्तै थियो, तपाईंको विचारमा?
- b. What do you think about this? (Positive/negative/neutral)
तिम्रो विचारमा, यो राम्रो छ कि छैन?

D. How do you imagine the forests might be when you are grown up?

तिमी ठुलो भएपाछि जङ्गल कस्तो हुन्छ, तिम्रो विचार मा?

Some potential follow up questions:

- a. What makes you think it might be that way in the future?
भविष्यमा किन त्येस्ते हुन्छ, तिम्रो विचारमा?
- b. What do you think about this? (Positive/negative/neutral)
तिम्रो विचारमा, यो राम्रो छ कि छैन?

I. Water sources पानी को स्रोत

A. Tell me about the nearby ponds, streams, rivers, or springs (*Very open-ended so that participants may begin with what they think is most important.*)

यहाँ नजिकको पोखरि, नदी, खोला, कुवा, पानी को मुल, इत्यादि को बारेमा भन।

B. What is important to know about these water sources?

हामी सबैजनाले यी पानी को स्रोतहरूको बारेमा मुख्य कुरा (महत्त्वपूर्ण कुरा) के के थाहा पाउनु पर्छ?

Some potential follow up questions:

a. What kind of things do you do there?

त्यहाँ के के गर्छौं?

b. What lives in / near these water sources?

यी पानी को स्रोतहरूमा कि निर के के बस्छ? कुन कुन बोट बिरुवाहरू उमरिन्छ ? कुन कुन बनयजन्तु बस्छन ?

c. Are there gods and goddesses in or near these water sources? If so, what is their role?

यी पानी को स्रोतहरूमा कि निरा देवी देवताहरू बास गर्छन (बस्छन) ? यदि बस्छन भने उनिहरू पानी को स्रोतहरूमा के के गर्छन ? उनिहरूको मुख्य काम के हो ?

d. What are some advantageous or important things to do near water sources?

मान्छेहरू पानी निरा के के राम्रो काम गर्छन? (पानी को लागि के महत्त्वपूर्ण काम गर्ना सकिन्छ ?)

e. What are some negative or harmful things to do in near water sources?

मान्छेहरू पानी निरा के के नाराम्रो काम गर्छन? (पानी को लागि के नाराम्रो काम गरिन्छ ?)

C. What do you think these water sources were like when your grandparents were younger?

तिम्नो हाजुर आमा - हाजुर बुवा सानो हुदा, यी पानी को स्रोतहरु कस्तो थिए, तिम्नो विचार मा?

Some potential follow up questions:

c. Why do you think this is?

किन येस्तै थियो, तपाईंको विचारमा?

d. What do you think about this? (Positive/negative/neutral)

तिम्नो विचारमा, यो राम्रो छ कि छैन?

E. How do you imagine the water sources might be when you are grown up?

तिमी ठुलो भएपाछि पानी को स्रोत कस्तो हुन्छ, तिम्नो विचार मा?

Some potential follow up questions:

a. What makes you think it might be that way in the future?

भविष्यमा किन त्येस्ते हुन्छ, तिम्नो विचारमा?

b. What do you think about this? (Positive/negative/neutral)

तिम्नो विचारमा, यो राम्रो छ कि छैन?

Valuing of different environmental knowledges

[Note: After the first interview, I changed the order of the questions, and asked the forest related questions below when asking about the forest, and the water questions below when asking about water, rather than asking them towards the end.]

Forests बन जङ्गल:

A. Is people's thinking about forests changing? Why/why not?

जङ्गल बारे मान्छेहरु को विचार परिवर्तन हुदै छ? किन?

B. What is important for you to learn about the forest and why?

तिम्नो विचार मा, तिमीहरु ले जङ्गल बारे मा के के थाहा पाउन राम्रो हुन्छ? के के सिकने महत्त्वपूर्ण छ? किन?

C. Where and how should you learn about the forest?

जङ्गल बारे मा कहाँ र कसरी सिक्न राम्रो हुन्छ? (घर? स्कुल? किताब?)

D. What kinds of things do you learn about forests in school?

स्कुलमा जङ्गल बारे मा के के सिक्छौं?

a. Where do you use what you learn?

b. स्कुलमा सिकेको कुरा कहाँ परयोग गर्छौं?

E. What kinds of things do you learn about forests at home?

घरमा जङ्गल बारे मा के के सिक्छौं?

a. Where do you use what you learn?

घरमा सिकेको कुरा कहाँ परयोग गर्छौं?

F. What is similar or different about what you learn in school about forests compared to what you learn at home?

तिमीले स्कुलमा सिकेको कुरा र घरमा सिकेको कुरा उस्तै छ कि फरक छ? उस्तै के छ? फरक के छ?

a. What do you think about this?

येसको बारे मा तिम्रो विचार के के छ?

II. Water sources पानी को स्रोत:

A. Is people's thinking about water sources changing? Why/why not?

पानी को स्रोत बारे मान्छेहरु को विचार परिवर्तन हुदै छ? किन?

B. What is important for you to learn about water sources and why?

तिम्रो विचार मा, तिमिहरु ले पानी को स्रोत बारे मा के के थाहा पाउन राम्रो हुन्छ? के के सिकने महत्त्वपूर्ण छ? किन?

C. Where and how should you learn about water sources?

पानी को स्रोत बारे मा कहाँ र कसरी सिक्न राम्रो हुन्छ? (घर? स्कुल? किताब?)

D. What kinds of things do you learn about water sources in school?
स्कूलमा पानी को स्रोत बारे मा के के सिक्छौं?

- a. Where do you use what you learn?
- b. स्कूलमा सिकेको कुरा कहाँ परयोग गर्छौं?

E. What kinds of things do you learn about water sources at home?
घरमा पानी को स्रोत बारे मा के के सिक्छौं?

- a. Where do you use what you learn?
घरमा सिकेको कुरा कहाँ परयोग गर्छौं?

F. What is similar or different about what you learn in school about water sources compared to what you learn at home?
तिमीले स्कूलमा सिकेको कुरा र घरमा सिकेको कुरा उस्तै छ कि फरक छ? उस्तै के छ? फरक के छ?

- a. What do you think about this?
येसको बारे मा तिम्रो विचार के के छ?

APPENDIX B: SEMI-STRUCTURED INTERVIEW QUESTIONS FOR ADULTS

Biographical Information

In the beginning, I will ask you some biographical questions. This is to help me understand you. I won't share this information with anyone.

सुरुमा, म तपाइलइ को जिवान को बारामा केहि प्रश्नहरु सोध्छु, तपाईंको परिचय बुझ्न को लागि। म तपाईंले भन्नेको जवाफहरु कोही पनी लाई भन्दिन।

[Note: Gender and age range (10 year interval) were kept with interview answers, but the rest of the biographical data stored separately. This was made clear, verbally, to participants.]

1. Gender

महिला / पुरुष; केटी / केटा

2. Age estimate

तपाईं कति वर्ष पुग्नुभयो? थाहा भएन भने, अनुमान गर्नुस।

11-15 16-20 21-25 26-30 31-35 36-40 41-45 46-50
51-55 56-60 61-65 66-70 71-75 76-80 81-85 86-90
91-95

[Note: Age ultimately recorded in 10 year intervals for adults]

3. How many in household

घर मा कतिजाना बस्छन?

4. Occupation / specialization / general tasks performed

तपाईं के काम गर्नुहुन्छ? (घर मा, घर बाहिर, खेत बारी मा)

5. Occupations of other household members

तपाईंको _____ के काम गर्नुहुन्छ?

6. Approximately how many years spent living in this area?

कति वर्ष देखि यहाँ बसिरहानुभएको छ? (सानो उमेर देखि, बिहा देखि?)

7. Through what class have you studied?
कति कक्षासम्म पढ्नुभएको छ?

अन्तर्वार्ता / Interview

Semi-structured Interviews: Grandparents/Parents/Teachers

Please tell me your own thoughts. I want to learn about your own opinions. I want to understand your own knowledge. Whatever answer you give will be correct / okay. Whatever you say, that is will be okay, it will be useful.

तपाइ तपाईको आफ्नो विचार सुनाइदिनुस, बुझाइदिनुस । मलाई तपाईको आफ्नो विचार को बारे सिक्न मन लाग्छ। मलाई तपाईको आफ्नो ज्ञान बुझ्न मन लाग्छ। तपाई जे जवाफ दिनुहुन्छ, त्यो जवाफ ठीक हुन्छ। जे भन्नुहुन्छ, ते ठीक हुन्छ, उपयोगी हुन्छ।

I. Forests वन जङ्गलहरू

- A. Tell me about the nearby forests. (*Very open-ended so that participants may begin with what they think is most important.*)

यहाँ नजिकको वन जङ्गलहरूको बारेमा भन्नुहोस्।

- B. What is important to know about these forests?

हामी सबैजनाले यी वन जङ्गलहरूको बारेमा मुख्य कुरा (महत्त्वपूर्ण कुरा) के के थाहा पाउनु पर्छ?

Some potential follow up questions:

- a. What kind of things do you do in these forests?

यी वन जङ्गलमा के के गर्नुहुन्छ ?

- b. What grows and/or lives in these forests?

यी वन जङ्गलमा के के उमरिन्छ ? कुन कुन बोट बिरुवाहरू उमरिन्छ ?
कुन कुन बनयजन्तु बस्छन ? जडीबूटि ?

- c. Are there gods and goddesses in these forests and, if so, what is their role?

यी वन जङ्गलमा देवी देवताहरू बास गर्छन (बस्छन) ? यदि बस्छन भने उनिहरू जङ्गलमा के के गर्छन ? उनिहरूको मुख्य काम के हो जङ्गलमा ?

d. What are some advantageous or important things to do in the forest?

मान्छेहरू वन जङ्गलमा के के राम्रो काम गर्छन? (वन जङ्गलको लागि के महत्त्वपूर्ण काम गर्ना सकिन्छ ?)

e. What are some negative or harmful things to do in the forest?

मान्छेहरू वन जङ्गलमा के के नाराम्रो काम गर्छन? (वन जङ्गलको लागि के नाराम्रो काम गरिन्छ ?)

C. How has the forests changed in your lifetime?

सानो उमेर देखि अहिले सम्म के परिवर्तन देखनुभयो, वन जङ्गलमा? पाहिला कासतो हुनतहयो अहिले कासतो छ ।

Some potential follow up questions:

a. What what are these? Why do you think this happened?
ती के हुन? किन भयो, तपाईंको विचारमा?

b. What do you think about this? (Positive/negative/neutral)
तपाईंको विचारमा, यी परिवर्तनहरू राम्रो छ कि छैन?

D. How do you imagine the forests might be when your grandchildren/children/students are grown up?

तपाईंको विचारमा, आउने पुस्ता को लागि यो जङ्गल कस्तो हुने छ? (के कल्पना गर्नुहुन्छ?)

Some potential follow up questions:

a. What makes you think it might be that way in the future?
किन यो विचार गर्नुहुन्छ?

b. What do you think about this? (Positive/negative/neutral)

तपाईंको विचारमा यो राम्रो छ कि छैन?

E. Valuing and teaching of different environmental knowledges:

a. Is people's thinking about forests changing? Why/why not?

जङ्गल बारे मान्छेहरू को कसरी विचार परिवर्तन हुदै छ? किन?

b. What is important for children to learn about the forest and why?

सानो केटा केटीहरू को लागि जङ्गल बारे सिक्न के के महत्वपूर्ण छ?

(सानो केटा केटीहरू ले जङ्गल बारे के के सिक्नु पर्छ?)

c. Where and how should children learn about the forest?

केटा केटीहरू ले जङ्गल बारे कहाँ बाट सिक्नु पर्छ? कसरी सिक्नु

पर्छ? (परिवार बाट? समाज बाट? किताब बाट?)

d. What kinds of things do you think they learn about forests in school, and how might this be useful/not useful?

स्कूलमा उनीहरू जङ्गल को बारे मा के के सिक्छन? कुन किसिमको

कुरा सिक्छन? यो सिकेको कुरा उपयोगी छ कि छैन?

e. What kinds of things do you think they learn about forests at home, and how might this be useful/not useful?

परिवार बाट उनीहरू जङ्गल बारे के के सिक्छन? यो सिकेको कुरा

उपयोगी छ कि छैन?

II. Water sources पानी को स्रोत

A. Tell me about the nearby ponds, streams, rivers, or springs (*Very open-ended so that participants may begin with what they think is most important.*)

यहाँ नजिकको पोखरि, नदी, खोला, कुवा, पानी को मुल, इत्यादि को बारेमा भन्नुहोस्।

B. What is important to know about these water sources?

हामी सबैजनाले यी पानी को स्रोतहरूको बारेमा मुख्य कुरा (महत्वपूर्ण कुरा) के के थाहा पाउनु पर्छ?

Some potential follow up questions:

- a. What kind of things do you do there?
त्यहाँ के के गर्नुहुन्छ ?
- b. What lives in / near these water sources?
यी पानी को स्रोतहरूमा कि निर के के बस्छ? कुन कुन बोट बिरुवाहरू उमरिन्छ ? कुन कुन बनयजन्तु बस्छन ?
- c. Are there gods and goddesses in or near these water sources? If so, what is their role?
यी पानी को स्रोतहरूमा कि निरा देवी देवताहरू बास गर्छन (बस्छन) ?
यदि बस्छन भने उनिहरू पानि कोस्रोतहरूम के के गर्छन ? उनिहरूको मुख्य काम के हो ?
- d. What are some advantageous or important things to do near water sources?
मान्छेहरू पानी नि के के राम्रो काम गर्छन? (पानी को लागि के महत्त्वपूर्ण काम गर्ना सकिन्छ ?)
- e. What are some negative or harmful things to do in near water sources?
मान्छेहरू पानी निरा के के नाराम्रो काम गर्छन? (पानी को लागि के नाराम्रो काम गरिन्छ ?)

C. How have these water sources changed in your lifetime?

सानो उमेर देखि अहिले सम्म के परिवर्तन देखनुभयो, पानी को स्रोत मा?

Some potential follow up questions:

- a. What what are these? Why do you think this happened?
ती के के हुन? किन भयो, तपाईंको विचारमा?
- b. What do you think about this? (Positive/negative/neutral)
तपाईंको विचारमा, यी परिवर्तनहरू राम्रो छ कि छैन?

D. How do you imagine these water sources might be when your grandchildren/children/students are grown up?

तपाईंको विचारमा, आउने पुस्ता को लागि यी पानी को स्रोत कस्तो हुने छ? (के कल्पना गर्नुहुन्छ?)

Some potential follow up questions:

a. What makes you think it might be that way in the future?
किन यो विचार गर्नुहुन्छ?

b. What do you think about this? (Positive/negative/neutral)
तपाईंको विचारमा यो राम्रो छ कि छैन?

E. Valuing and teaching of different environmental knowledges:

a. Is people's thinking about water sources changing? Why/why not?

पानी को स्रोत बारे मान्छेहरु को विचार परिवर्तन हुदै छ? किन?

b. What is important for children to learn about water sources and why?

सानो केटा केटीहरु को लागि पानी को स्रोत बारे सिक्न के के महत्वपूर्ण छ?
(सानो केटा केटीहरु ले पानी स्रोत बारे के के सिक्नु पर्छ?)

c. Where and how should children learn about water sources?

केटा केटीहरु ले पानी को स्रोत बारे कहाँ बाट सिक्नु पर्छ? कसरी सिक्नु पर्छ?
(परिवार बाट? समाज बाट? किताब बाट?)

d. What kinds of things do you think they learn about water resources in school, and how might this be useful/not useful?

स्कुलमा उनीहरु पानी स्रोत बारे के के सिक्छन? कुन किसिमको कुरा सिक्छन?
यो सिकेको कुरा उपयोगी छ कि छैन?

e. What kinds of things do you think they learn about water sources at home, and how might this be useful/not useful?

परिवार बाट उनीहरु पानी को स्रोत बारे के के सिक्छन? यो सिकेको कुरा
उपयोगी छ कि छैन?

APPENDIX C: INFORMED CONSENT AND PERMISSION FORMS (YOUTH, PARENTAL, ADULT)

Youth Consent to Participate – Semi-structured interviews and/or participant observation

The Portland State University
पोर्तलान्द स्तेत विश्वविद्यालय
YOUTH Consent to Participate in Research
अनुसन्धान मा भाग लिन सहमति / मन्जूरी

Semi-structured interviews / Participant observation

अन्तर्वार्ता / अवलोकन

Environmental Learning in Udayapur District, Nepal वातावरण शिक्षा, उदयपुर जिल्ला

Elsie Love, from Portland State University, is doing a research study on the environment.

म, एलिस लव, पोर्तलान्द स्तेत विश्वविद्यालय मा “मसतर डिगिरि” पढ्दै छु। म प्राकृतिक वातावरण को बारे मा अध्ययन अनुसन्धान गर्दै छु।

What Will I Have To Do?

तिमी के के गर्नु पर्छ?

- Answer some questions in what is called a semi-structured interview. These questions will be about the forests and water sources nearby, and how you learn about these things.

म तिमी अन्तर्वार्ता मा भाग लिन अनुरोध गर्ने छु। म तिमी लाई केहि प्रश्न हरु सोध्ने छु। यि प्रश्नहरु बन जंगल र पानी को श्रोत को बारे मा हुने छन। तिमी कसरी बन र पानी को बारे मा सिक्छौ भनेर पनि म सोध्ने छु।

- Continue your chores and life at home as normal, but allow Elsie to come with you to do some of these things. If it is okay with you, she may take notes to remember what you did together.

तिमी भाग लियौ भने, म ३-४ दिन तिम्रो घर मा आउने छु। ३ दिन स्कुल पाछि र एक शनिबार। म तिम्रो घर हुदा, तिमी संधै जस्तै धन्दा गर्ने छौ। म पनि तिमिसंग आउने छु, तिम्रो दैनिक जीवन को बारे मा सिक्न को लागि। तिमिले अनुमति दिन्छौ भने, म तिम्रो घर मा हुदा मेरो अफनो टिपोत गर्छु।

Are There Any Risks?

भाग लिएको ले केहि नराम्रो असर हुन सकिन्छ?

There are no serious risks in this study.

यस अनुसन्धान मा भाग लिएको खण्ड मा कुने पनि हानि नक्सानि हुने छैन।

One small risk is that you may feel uncomfortable answering some questions, and that the research will take some of your time.
Another small risk is you may feel uncomfortable having Elsie at your home. Your answers will have no affect on your school grades.

Youth Consent to Participate – Semi-structured interviews and/or participant observation

अनुसन्धान मा भाग लिन समय लाग्छ। केहि प्रश्नहरू ले आपत्यरा आउन सक्लान। यदि आएमा तिमी त्यो प्रश्न छोड्न सक्छौ, उत्तर दिन पर्दैन। म तिम्रो घर मा आएको ले आपत्यरा आउन सक्लान। तिमी ले दिएको कि नदिएको उत्तरहरू ले तिम्रो “माक्स” (अन्क) लाई केहि पनि असर पर्दैन।

You do not have to participate in this study if you do not want to. It will have no impact on your grades. And, if you do participate, you can stop at any time, or can skip any questions. If you do not want Elsie to observe or come with you on your activities, you can tell her and she will not do so.

तिमी लाई मन लाग्दैनौ भने, अनुसन्धानमा भाग लिन पर्दैन। तिम्रो “माक्स” (अन्क) लाई केहि पनि असर पर्दैन। तिमिले भाग लियो भने, कहिले पनि भाग लिन छोड्न हुन्छ। सबै प्रश्नहरू को उत्तर दिन पर्दैन। तिमिलाई म तिमिसंग बस्न नराम्रो लाग्यो भने, कि तिमिलाई म तिमि संग गतिविधिहरू गर्न मन लाग्दैन भने, तिमि मलाई भन अनि म आउदिन।

If you are upset after the study and need to talk with someone, I can help you call Barbara Brower at the Geography Department at Portland State University in the US; this is the person leading the project in Portland. I can also help you contact the Center for Mental Health and Counseling Nepal.

अनुसन्धान मा भाग लिएपछि, प्रश्नहरू छन कि तिमिलाई नराम्रो लाग्यो भने, म तिमिलाई मेरो शिक्षक लाई फोन गर्न मद्दत गर्न सक्छु। डाक्टरम संग कुरा गर्न मन लाग्यो भने, म तिमिलाई “CMC-Nepal” लाई फोन गर्न मद्दत गर्न सक्छु।

What Will I Get In Return?

भाग लिएको ले तिमिलाई के पाईन्छ?

- Fun conversation and knowing you are helping others. Many people feel good about helping others. We can learn so much from you about the environment and how you learn about it.

रमाईलो कुराकानि पाईन्छ। भाग लिएको मा तिमि हामीलाई वातावरण को बारे मा सिकन मद्दत गर्छौं। हामी तिमि संग धेरै सिक्न सक्छौं।

- Your family will be given a small gift of nuts, and will be given money for any meals that they share with me.

म तिम्रो परिवारलाई मैले खाएको खाना को लागि पैसा दिने छु। म तिम्रो परिवारलाई सानो उपहार (बदाम) पनि दिने छु।

What Are You Doing To Protect Me?

तिमिले भनेको कुरा कसरि सुरक्षित हुने छन?

Your privacy is very important to us. We have done many things to protect you:

तिम्रो गोपनीयता धेरै महत्त्वपूर्ण छ। तिमिले भनेको कुरा सुरक्षित छन।

- When we talk to you, it will be in a private place. This means no one will be able to overhear what you tell us.

हामी अन्तर्वार्ता गर्छौं भने, हामी एकलै बसेर गर्छौं। अरु ले तिमिले भनेको कुरा सुन पाउदैनन्।

- Your name and what you tell us will be kept confidential to the extent allowed by law. (By “kept confidential” we mean that the names of people who take part in the study will not be given to anyone else. And it means that we will only reveal what

Youth Consent to Participate – Semi-structured interviews and/or participant observation

you say in a way that no one could ever guess or know it was you who said it.) If, in the course of the study, you disclose that you are, or are intending to, harm yourself or others, we are ethically and legally required to notify the appropriate authorities.

म तिम्रो नाम मेरो रिपोर्ट मा लेखिदैन। तिमिले भनेको कुरा म मेरो रिपोर्ट मा लेख्छु होला, तर तिम्रो नाम, थार, गाँउ को नाम, इत्यादि लेखिदैन। तर, तिमिले खतरनाक कुरा को बारे मा मलाई भन्यौ भने, मलाई निकाय लाई भन्नु पर्छ।

- Only I and one or two other assistants for the research project will know what you say. We will not tell anyone else, such as your teacher, your parents, or your friends.

म र मेरा एक-दुई जाना सहायकहरू लाई मात्रै तिमिले भनेको कुर थाहा पाउछ। हामी तिम्रो आमा-बुवा, शिक्षकहरू, साथिहरू लाई भन्दैनौ।

- Your name and other personal information will be kept safe on my laptop and my research notebooks will be kept safe in a locked room. This form (which has your name on it) will be kept locked in the room.

तिमिले भनेको कुरा सुरक्षित ठाउँ मा राख्ने छु। यो कागाज र “अदियो रिकोर्ड” गर्ने मेशिन मेरो कोठा मा राख्ने छु, अनि कोठा को ढोका बन्द हुने छ।

- When we write or talk about what we learned in this study, we will leave things out so no one will be able to tell who we are talking about.

मैले सिकेको कुरा रिपोर्ट मा लेख्दा, तिम्रो नाम लेखिदैन। त्यसे ले, कसले कुन कुरा भनेको थिए भनेर कोही पनि लाई थाहा पाउदैन।

Any Questions?

If you have any questions about this study, this form, or the study, you can talk to the person leading the project in Portland, Barbara Brower, (503) 725-8044. You can also contact the Office of Research Integrity of Portland State University about your rights as a research participant (someone who takes part in a study). Hours in Nepal time are 9:45 PM to 5:45 AM. The telephone number is (503) 725-2227

तिम्रो केहि प्रश्नहरू छन?

यदि तिम्रो कुनै गुनासोहरू, प्रश्नहरू वा चासो छन भने, बाबरा वा उनका सहायोगि तपाईंको प्रश्नहरूको उत्तर दिनको लागि खुशि हुने छन। बाबरा को मोबिल: +१ (५०३) ७२५ ८०४४। तिमि मेरो विश्वविद्यालय लाई पनि फोन गर्न सक्छौ: +१ (५०३) ७२५ २२२७। यो कार्यालय ९:४५ बजे देखि ५:४५ सम्म खोलेको छ।

If I Sign, What Does It Mean?

तिमिले सहि दिको भनेर के मतलब हुन्छ?

This is a consent form. Your signature below means that:

यो अनुसन्धान मा भाग लिन सहमति / मन्जूरी फोर्म हो। तिमि ले सहि दिन्छौ भने, तिम्रो सहि भनेको कि:

- You have read and understand what this form says, OR I have read this form to you and you understand what it says.

तिमिले यो कागाज पढेको छौ कि सुनेको छौ। तिमिले पुरा बुझ्यौ।

- You are willing to take part in the study.

Youth Consent to Participate – Semi-structured interviews and/or participant observation

तिमीलाई मेरो अनुसन्धान मा भाग लिन मन लाग्छ।

- You know that you do not have to take part in this study. And even if you agree, you can change your mind and stop at any time. No problem.

मन लाग्दैन भने, तिमीलाई मेरो अनुसन्धान मा भाग लिन पर्दैन भनेर तिमीलाई थाहा छौ। तिमी कुनै पनि समय भाग लिन छोड्न सक्छौ। केहि हुदैन।

- You know that taking part in this study has nothing to do with the your school grades. If you agree to take part or if you say no, your teacher or principle won't get upset. They will treat you the same.

अनुसन्धान भाग लिएको कि न लिएको भनेर तिम्रो स्कुल “मर्क्स” (अन्क) लाई केहि असर पर्दैन। तिम्रो शिक्षक / शिक्षिका लाई रिस उठ्दैन।

- You will get a copy of this form to keep for yourself.

म तिमीलाई यो कागाज तिमीलाई पनि दिन्छु।

Participant Signature तिम्रो सहि

Date गते / तरिक

Participant name, printed तिम्रो नाम

Interviewer/Witness/Legal Guardian Signature एलिस को सहि

Date गते / तरिक

Interviewer/Witness/Legal Guardian name, printed
एलिस को नाम

Parental Permission: Interview and/or Participant Observation

The Portland State University

पोर्टलान्द स्तेत विश्वविद्यालय

Parental Permission

अभिभावक को आनुमति:

PARENTAL PERMISSION: Interview and Participant Observation

अभिभावक को आनुमति: अन्तर्वार्ता / अवलोकन

Environmental Learning in Udayapur District, Nepal

वातावरण शिक्षा, उदयपुर जिल्ला

Your child is invited to participate in a research study conducted by Barbara Brower and me, Elsie Love, from Portland State University, Geography Department. Elsie hopes to learn what children think about the local forests and water sources, and how they learn about these places. This research is for Elsie's master's degree. She is working under Professor Barbara Brower. Your child was selected as a possible participant in this study because he or she is in the 6-9th grade at this school, and because he or she expressed that she was interested in participating in this part of the research.

तपाईंको नानीलाई अध्ययन अनुसन्धान मा भाग लिनु बोलायको छ। म, एल्सि लव, र मेरो बर्बारा ब्रौअर भन्ने शिक्षिका, केहि अनुसन्धान गरिराहेको छौ। हामी अमेरिकामा पोर्टलान्द स्तेत विश्वविद्यालय को भूगोल विभाग मा काम गर्छौ। यो अनुसन्धान बन जंगल र पानी को स्रोत को बारे मा छ। कक्षा ६-९ को विद्यार्थीहरू बन र पानी को स्रोत को बारे मा के के सोच्छन? कक्षा ८ को विद्यार्थीहरू बन र पानी को स्रोत को बारे मा कसरी सिक्छन? हामी यी किसिमको कुराहरू बुझ्न प्रयास गर्दै छौ। हामी तपाईंको नानीलाई हाम्रो अनुसन्धान मा भाग लिनु अनुरोध गर्दैछौ।

If you decide to let your child participate, Elsie will visit your home for four days. Elsie will come home with your student after school on Wednesday -- Friday, and will come in the morning on Saturday. On these days Elsie will go with your child to do his or her chores. She might watch or participate in other activities, such as meals, family conversation, and relaxation. During these four days, She will also interview your child about the forests and water sources near here. If you and your child agree, she might audio record these interviews or notes during participant observation. If she audio-records any conversations, she will show your child how to use the audio-recorder, so that he or she can stop the recording if he or she so desires. These audio-recordings will only be accessible to Elsie and her translation assistant. Others will not be able to listen to them.

तपाईंले तपाईंको नानीलाई यस अध्ययन अनुसन्धानमा भाग लिन सहमति दिनुभयो भने म ३-४ दिन तपाईंको घर मा आउछु, २-३ दिन स्कुल पाछि र शानिबार। म तपाईंको नानीसंग घर घन्दा गर्न जान्छु। म तपाईंको नानीको दैनिक जीवन अवलोकन गर्ने छु। तपाईंको घर मा अरु गतिविधिहरू मा पनि भाग लिन्छु होला, जस्तै उदाहरणको लागि: परिवार संग कुराकानी गर्छु, खाना खान्छु, र आराम गर्छु। म तपाईंको नानी संग बन र पानी को स्रोत को बारे मा अन्तर्वार्ता गर्छु। तपाईं र तपाईंको नानीले सहमत गर्नुहुन्छ भने, म अन्तर्वार्ता गर्दा "अदियो रिकोर्ड" गर्छु र नानीले भनेको कुरा लेख्छु, तपाईंको नानीले भनेको कुरा सम्झना लाई। "अदियो रिकोर्ड" गर्ने मेशिन कसरी चलाउने भने म तपाईंको नानी लाई सिकाईदिन्छु, अनि नानीको इच्छा अनुसार मेशिन खुल्नु र बन्द गर्न हुन्छ। अनतर्वार्ता सिदेपछि, म र मेरो सहायक लाई मात्रै तपाईंको नानी ले भनेको कुरा सुन पाउछ। रिकोर्ड गरेको जवाफ हरु अरुलाई दिदैनौ।

While participating in this study, it is possible your child might feel shy, nervous, or uncomfortable. Your child may not receive any direct benefit from taking part in this study, but the study may help to increase knowledge which may help others in the future.

Parental Permission: Interview and/or Participant Observation

अध्ययन अनुसन्धान मा भाग लिदा, तपाईं को नानीलाई लाज कि आसयरो लाग्न सकिन्छ। अध्ययन अनुसन्धानले सहयोगी ज्ञान बढ्न सकिन्छ।

Any information that is obtained in connection with this study and that can be linked to your child or identify your child will be kept confidential. This means Elsie will use a fake name for the school, village, and your child when she writes up her work.

म तपाईं को नानीले दिएको यस अध्यायन, अनुसन्धान मा परयोग भएका सबै प्रश्न उत्तरहरू गोप्य राखिने छन। म तपाईं को नानीको नम, स्कूल को नाम, र गाँउ को नाम लेखिन मेरो "रिपोरत" मा।

If Elsie learns that your child is being abused, or intends to harm themself or others, she must legally report this to authorities.

मलाई बाल हिंसा, बाल बेवास्ता, कि अरु खतरनाक को बारे मा सुने भने मलाई निकाय लाई भन्नु पर्छ।

Your child's participation is voluntary. He/she does not have to take part in this study, and it will not affect his/her grade. You may also withdraw your permission for your child to participate from this study at any time without affecting his/her grades.

तपाईं को नानि को सम्मगता उनिहरू को ईच्छा विपरित हुने छैनन्। यस अध्यायन, अनुसन्धान भाग लिएको खण्ड मा उनिहरूको नियमित परिवर्तन मा कुनै किसिमको असर पर्ने छैन। तपाईं कुनै पनि समय आफ्नो नानी लाई यस अध्यायन, अनुसन्धान बाट निकाल्न सक्नुहुने छ।

If you have questions or concerns about your child's participation in this study, ask Elsie or contact Barbara Brower at (503) 725-8044. If you have concerns about your child's rights as a research subject, please contact the PSU Office of Research Integrity, Market Center Building Ste. 620, Portland State University, (503) 7252227.

तपाईं को केहि प्रश्नहरू वा जिज्ञासा छन भने, मलाई सोधुस कि बर्बर ब्रौर लाई फोन गर्नुस: +१ ५०३ ७२५ ८०४४। यदि तपाईंलाई यस अनुसन्धानमा भाग लिएको कारण वा तपाईं को नानी को अधिकार को बारे मा कुनै पनि किसिमको प्रश्नहरू वा जिज्ञासा छन भने तपाईं मेरो विश्वविद्यालय लाई फोन गर्नु सक्नुहुने छ: +१ ५०३ ७२५ २२२७ कि १ ८७७ ४८० ४४००।

Your signature indicates that you have read and understand the above information and agree to let your child take part in this study, or it means that Elsie has read this form with you and helped explain it. The researcher should provide you with a copy of this form for your own records.

तपाईं को केहि प्रश्न छन? तपाईं ले यस कागाजले पुरा पढ्नुभयो / सुनुभयो, पुरा बुझ्नुभयो, र तपाईं को नानी लाई भाग लिन दिनुहुन्छ भने, तल सहि गरिदिनुस। यस "फोरम" (कागाज) को एक कोपी पनी पाउनुहुने छ।

Participant Signature

सहि

Date गति / तरिक

Participant Printed Name

Parental Permission: Interview and/or Participant Observation

नाम (लेखनुस)

Investigator Signature एलिस को सहि

Date गति / तरिक

Investigator Printed Name

एलिस को नाम

Adult Participation Consent Form

The Portland State University
पोर्टलान्ड स्तेत विश्वविद्यालय
Consent to Participate in Research
अनुसन्धान मा भाग लिन सहमति / मन्जूरी

Adult Participation Consent Form

Environmental Learning in Udayapur District, Nepal वातावरण शिक्षा, उदयपुर जिल्ला

Introduction परिचय

You are being asked to participate in a research study that is being done by Barbara Brower, who is the Principal Investigator and me, Elsie Love, from the Department of Geography, at Portland State University in Portland, Oregon. This research is studying what people think about forests and water sources, and how students learn about these places.

म, एल्सि लव, र मेरो बर्बारा ब्रौअर भन्ने शिक्षिका, केहि अनुसन्धान गरिराहेको छौं। हामी अमेरिकामा पोर्टलान्ड स्तेत विश्वविद्यालय को भूगोल विभाग मा काम गर्छौं। यो अनुसन्धान बन जंगल र पानी को स्रोत को बारे मा छ। मान्छेहरु बन र पानी को स्रोत को बारे मा के के सोच्छन? विद्यार्थीहरु बन र पानी को स्रोत को बारे मा कसरी सिक्छन? हामी यी किसिमको कुराहरु बुझ्न प्रयास गर्दै छौं। हामी तपाईंलाई हाम्रो अनुसन्धान मा भाग लिनु अनुरोध गर्दैछौं।

You are being asked to participate in this study because you are either a Science and Environment teacher, an elder relative of a student participant in this study, and/or hold expertise on this topic.

तपाईं: १) विज्ञान तथा वातावरण शिक्षिका/ शिक्षिका कि २) भाग लिने विद्यार्थी को आमा/ बुबा/ हाजुर-आमा/ हाजुर-बुबा कि ३) यो विषय बारे जानकार भएको ले, हामी तपाईं को सहभागिताको लागि अनुरोध गर्दैछौं।

This form will explain the research study, and will also explain the possible risks as well as the possible benefits to you. We encourage you to talk with your family and friends before you decide to take part in this research study. If you have any questions, please ask one of the study investigators.

यो कागजले हाम्रो अनुसन्धान बारे बताउछ। हाम्रो अनुसन्धानमा भाग लिएको मा के के सम्भावित असरहरु र के के सम्भावित फाइदाहरु हुन सकिन्छ भनेर यो कागजले बताउछ। हाम्रो अनुसन्धानमा भाग लिनु निर्णय गर्नु अघि, तपाईं को परिवार संग कुरा गर्नुस। तपाईं को केहि प्रश्न छ भने, मलाई सोधनुस।

What will happen if you decide to participate?

तपाईं भाग लिनु निर्णय गर्नुहुन्छ भने, के के हुन्छ?

If you agree to participate, the following things will happen:

तपाईं भाग लिनु निर्णय गर्नुभयो भने, येस्तै हुन्छ:

- Elsie will ask you questions on nearby forests and water sources. She will also ask about how children learn about these places. With your permission, she will audio record these interviews to remember what you say. If you agree to have the conversation audio-recorded, Elsie will show you how the recorder works, and let you have control over the "on/off" switch, so you can stop recording at any time. Only Elsie and a translation assistant will be able to listen to these audio recordings. Others will not have access to them.

Adult Participation Consent Form

म, एल्सि, तपाईंलाई वरिपरि को बन र पानी को स्रोत को बारे मा केहि प्रश्नहरू सोध्छु। बच्चाहरू यी ठाउँहरू बारे कसरी सिक्छन भनेर पनी सोध्छु। यदि तपाईं सहमत हुनुभयो भने, म तपाईं ले दिको जवाफहरू “अदियो रिकोरद” गर्छु। “अदियो रिकोरद” गर्ने मेशिन कसरी चलाउने भने म तपाईं लाई सिकाईदिन्छु, अनि तपाईंको इच्छा अनुसार मेशिन खुल्नु र बन्द गर्न हुन्छ। अनतार्वार्ता सिदेपछि, म र मेरो सहायक लाई मात्रै तपाईं ले भनेको कुरा सुन पाउछ। रिकोरद गरेको जवाफ हरु अरुलाई दिदैनौं।

- If you are a teacher, she may observe your classes.

शिक्षीक/ शिक्षीका: म तपाईंको कक्षा अवलोकन गर्छु।

- If you are an elder family member of a student, she will also visit your home and participate or observe your daily life.

विद्यार्थी को आमा / बुबा / हाजुर-आमा / हाजुर-बुबा हुनुहुन्छ: म तपाईं को घर गएर र तपाईं को दैनिक जीवन को बारे मा सिक्छु।

- She may take notes to remember the experiences for her project.

अनतार्वार्ता गर्दा कि अवलोकन गर्दा, म मेरो अनुभव सम्झन कापी मा लेख्छु।

How long will I be in this study?

यो परियोजना कति समय लाग्छ ?

- Science and Environment teacher, 8th grade: Participation in this study will take a total of 30 hours over a period of 7 weeks. Nearly all of this time will be “participant observation” in your classroom. Only about two to three hours will consist of semi-structured interviews, and these can happen over multiple sessions, at your convenience.

विज्ञान तथा वातावरण शिक्षीक/ शिक्षीका, कक्षा ८: म ७ हप्ता को लागि तपाईं को कक्षा मा बसेर

अवलोकन गर्छु। अनतार्वार्ता गर्ना २-३ घण्टा लाग्छ होला। (एक दिन मा २-३ घण्टा गर्नु पाईन -- एक दिन एक घण्टा, अरको दिन एक घण्टा पनि हुन्छ।) जम्मा, यो परियोजना लगभग ३० घण्टा लाग्छ तपाईं लाई।

- Science and Environment Teacher, other grades: Participation in this study will take a total of two the three hours, which can take place over multiple interview sessions, based on what is most convenient to you.

विज्ञान तथा वातावरण शिक्षीक/ शिक्षीका, अर्का कक्षाहरू: २-३ घण्टा लाग्छ। (एक दिन मा २-३ घण्टा गर्नु पाईन -- एक दिन एक घण्टा, अरको दिन एक घण्टा पनि हुन्छ।)

- Elder family member: Participation in this study will take a total of 30 hours over 4 days. Most of this time will be participant observation. Interviews will likely take two to three hours, and these can happen over multiple interview periods. They will be scheduled to be convenient to you.

विद्यार्थी को आमा / बुबा / हाजुर-आमा / हाजुर-बुबा हुनुहुन्छ: म ४ दिन को लागि तपाईं को घर मा आउछु। म तपाईं को दैनिक जीवन को बारे मा सिक्न आउछु। तपाईं को घर मा हुदा, म तपाईं लाई अनतार्वार्ता गर्छु, अनि अनतार्वार्ता गर्न जम्मा २-३ घण्टा लाग्छ। (एक दिन मा २-३ घण्टा गर्नु पाईन -- एक दिन एक घण्टा, अरको दिन एक घण्टा पनि हुन्छ।)

Adult Participation Consent Form

- Experts: Participation in this study will take a total of two to three hours, over one day. These interviews can take place over multiple sessions, as is convenient for you.

जानकार मान्छे हरु: जम्मा २-३ घण्टा लाग्छ। (एकै पटकमा २-३ घण्टा गर्नु पाउँदैन -- एक घण्टा, केहि घण्टा पछि फेरि एक घण्टा पनि हुन्छ।)

What are the risks of being in this study?

असरहरु के के छन्?

- There are very slight risks of stress, emotional distress, inconvenience and possible loss of privacy and confidentiality associated with participating in a research study.

सानो, सानो असरहरु हुन सक्छन्। उदाहरणका लागि, अन्तर्वार्ता गर्दा, तपाईंलाई तनाव, टेन्सन, लाज, इत्यादि लाग्न सकिन्छ। तपाईंले भनेको कुरा अरुलाई थाहा पाउन सकिन्छ होला, तर असरहरु कम बनाउन, म तपाईं ले दिएको उत्तरहरु अरुलाई भन्दिन अनि तपाईंले भनेको कुरा म सुरक्षित ठाउँ मा राख्ने छु।

- To mitigate these risks, Elsie will keep all of your information confidential.

असरहरु कम बनाउन, म तपाईंले भनेको कुरा अरुलाई भन्दिन।

- She will make sure you know you can skip any questions or stop participating at any time.

अन्तर्वार्ता गर्दा, तपाईं सबै प्रश्नहरु को जवाफ दिनु पाउँदैन। अनि, जहिले पनि परियोजना छोड्न पाउनुहुन्छ।

For more information about risks and discomforts, ask the investigator.

तपाईंको केहि प्रश्नहरु थिए भने, मलाई सोध्नुस।

What are the benefits to being in this study?

के के फाइदा हुन्छ?

- Benefits include participating in interesting conversation, sharing your knowledge about this topic, and, if you are an elder family member, intergenerational knowledge sharing.

फाइदा: रमाइलो कुराकानी, आफ्नो ज्ञान अरुलाई सिकाउन मौका छ, आउने-पुस्तालाई ज्ञान दिन मौका छ

How will my information be kept confidential?

तपाईंले भनेको कुरा कसरि गोप्य भइरहेको छ?

We will take measures to protect the security of all your personal information, but we cannot guarantee confidentiality of all study data. We will not include your name or identifying details in the final reports, presentations, or research return (unless you are an expert speaking in your professional capacity, and agree to allow identifying details in the report). I will keep your data on a password protected external hard drive in a locked box in a locked room. Translation assistants will also be instructed to keep your identity secret.

Adult Participation Consent Form

हामी तपाईंले दिएका सबै उत्तरहरू सुरक्षित संग प्रयोग गर्ने छौं। म तपाईंको तथ्याङ्क सुरक्षित ठाउँ मा राख्छु। तर तपाईंले दिएका उत्तरहरू मेरो शैक्षिक तथ्याङ्कहरू मा प्रयोग हुने छन। हामी तपाईंको नम, ठेगाना, रिपोर्ट मा उल्लेख गर्दैनौं। मेरो सहृदयक ले पनि तपाईंले दिएका उत्तरहरूलाई सुरक्षित संग राख्ने छ।

Information contained in your study records is used by study staff. The Portland State University Institutional Review Board (IRB) that oversees human subject research and/or other entities may be permitted to access your records, and there may be times when we are required by law to share your information. It is the investigator's legal obligation to report child abuse, child neglect, elder abuse, harm to self or others or any life-threatening situation to the appropriate authorities, and; therefore, your confidentiality will not be maintained. Your name will not be used in any published reports about this study.

तपाईंले दिएका सुचनहरू शैक्षिक मैले प्रयोग गर्ने छु। अध्ययन अनुसन्धान को समय मा कुनै पनि किसिमको बाल हिंसा, बाल बेवास्ता, वृद्ध बेवास्ता, अरु खतरनाक गतिविधिहरू भएमा तपाईंको नाम निकाय लाई दिनु पर्ने छ। तर तपाईं को नम मेरो रिपोर्ट मा उल्लेख छैन।

Will I be paid for taking part in this study?

के तपाईंलाई यस अनुसन्धान को समयमा पैसा उपलब्ध हुन्छ?

No, but you will be reimbursed if you share meals with Elsie.

हुदैन, तर म तपाईं को घर मा बसे भने म तपाईंलाई खानेकुरा को लागि पैसा दिने छु।

Can I stop being in the study once I begin?

के तपाईं अनुसन्धान को बिचमा छोड्न सक्नुहुन्छ?

Your participation in this study is completely voluntary. You have the right to choose not to participate or to withdraw your participation at any point in this study without penalty or loss of benefits to which you are otherwise entitled.

हुन्छ। सम्लागत सोइच्छले हुने छ। तपाईं कुनै पनि बेल अपनो सम्लागत छोड्न सक्नु हुने छ।

Whom can I call with questions or complaints about this study?

तपाईं को गुनासोहरू, प्रश्नहरू तपाईं कसलाई भन्न सक्नुहुन्छ?

If you have any questions, concerns or complaints at any time about the research study, Barbara Brower, or his/her associates will be glad to answer them at (503) 725-8044.

यदि तपाईंको कुनै गुनासोहरू, प्रश्नहरू वा चासो छन भने, बार्बरा वा उनका सहायोगि तपाईंको प्रश्नहरूको उत्तर दिनको लागि खुशि हुने छन। +१ (५०३) ७२५ ८०४४।

Whom can I call with questions about my rights as a research participant?

Adult Participation Consent Form

अनुसन्धानमा भाग लिएको नाताले तपाईंलाई कसलाई आफ्नो प्रश्न सोध्न अधिकार छ?

If you have questions regarding your rights as a research participant, you may call the PSU Office for Research Integrity at (503) 725-2227 or 1(877) 480-4400. The ORI is the office that supports the PSU Institutional Review Board (IRB). The IRB is a group of people from PSU and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the IRB website at <https://sites.google.com/a/pdx.edu/research/integrity>.

यदि तपाईंलाई यस अनुसन्धानमा भाग लिएको कारण कुनै पनि किसिमको प्रश्नहरू वा जिज्ञासा छन भने तपाईं मेरो विश्वविद्यालय लाई फोन गर्नु सक्नुहुने छ: +१ ५०३ ७२५ २२२७ कि १ ८७७ ४८० ४४००। अरु बिस्तृत जानकारी को लागि यस वेबसित हेरनुहोला: <https://sites.google.com/a/pdx.edu/research/integrity>.

CONSENT

मन्जूरी

You are making a decision whether to participate in this study. Your signature below indicates that you have read the information provided (or the information was read to you). By signing this consent form, you are not waiving any of your legal rights as a research participant.

You have had an opportunity to ask questions and all questions have been answered to your satisfaction. By signing this consent form, you agree to participate in this study. A copy of this consent form will be provided to you.

तपाईंले यस अध्ययन अनुसन्धान मा भाग लिने निर्णय गर्दैहुनुहुन्छ। तल तपाईंको सही ले तपाईंले माथि उल्लेख भएका सबै पढाउनुभयो / सुनुभयो भने जानाउछ। यस “फोरम” (कागाज) मा सही गरेर तपाईं यस अध्ययन अनुसन्धान मा भाग लिने सहमति जानाउनुहुन्छ। म यस “फोरम” (कागाज) को एक कोपी पनी पाउनुहुने छ।

_____	_____	_____
Name of Adult Subject (print)	Signature of Adult Subject	Date
नम (लेख्नुस)	सही	गते / तरिक

INVESTIGATOR SIGNATURE

मेरो सही

This research study has been explained to the participant and all of his/her questions have been answered. The participant understands the information described in this consent form and freely consents to participate.

मैले अध्ययन अनुसन्धान बताएको छु र वहनहरू ले सोधेको प्रश्नहरू को जवाफ दिएको छु। वहाले यो कागाज ले बताएको कुरा पुरा बुझनुभएको छ र अफनो इच्छा अनुसार भाग लिनुभएको छ।

Name of Investigator/ Research Team Member (type or print)

Adult Participation Consent Form

नाम (लेखतुस)

Investigator Signature एलिस को सहि

Date गति / तरिक

Investigator Printed Name

एलिस को नाम

Youth Consent to Participate in Research: Focus groups / participant observation / drawing narrations

The Portland State University
पोर्तलान्द स्तेत विश्वविद्यालय
YOUTH Consent to Participate in Research
अनुसन्धान मा भाग लिन सहमति / मन्जूरी

Focus groups / participant observation / drawing narrations

अभिभावक को आनुमति: समुह कुराकानि / अवलोकन / चित्र

Environmental Learning in Udayapur District, Nepal वातावरण शिक्षा, उदयपुर जिल्ला

Elsie Love, from Portland State University, is doing a research study on the environment.

म, एलिस लव, पोर्तलान्द स्तेत विश्वविद्यालय मा “मसतर डिगिरि” पढ्दै छु। म प्राकृतिक वातावरण को बारे मा अध्ययन अनुसन्धान गर्दै छु।

What Will I Have To Do?

तिमी के के गर्नु पर्छ?

If you decide to take part in this project, we will ask you to to:

तिमी ले भाग लिन निर्णय गर्छौं भने, म तिमीलाई केहि गतिविधिहरू गर्न लगाउछु:

- Participate in a focus group. This means, we will ask you to discuss some questions with your classmates. These questions will be about the forests, water sources, and how you learn about these places.

समुह कुराकानि: म तिमी र तिम्रो साथिहरू लाई केहि प्रश्नहरू सोध्छु। बन जंगल, पानी को श्रोत, र तिमी कसरि बन र पानि को बारे मा सिक्छौ भनेर सोध्ने छु।

- Continue studying in class as normal, and allow Elsie to take some notes about your class.

म तिम्रो कक्षा मा हुदा, तिमी साथै जस्तो पढ, र म मेरो अफनो तेपोत गर्छु।

- Draw pictures of the environment, and tell Elsie about these pictures. She might audio-record your conversation about the pictures. But, she will show you how to work the recorder, so you can control when to record and when to stop recording.

तिमी वातावरण को चित्र बनाउछौ, अनि त्यस पाछी मलाई यि चित्र हरु को बारे मा बताउछौ। तिमी बोल्दाखेरि, म “अदियो रिकोरद” गर्छु, तिमीले भनेको कुरा सम्झना को लागि। “अदियो रिकोरद” गर्ने मेशिन कसरी चलाउने भने म तिमी लाई सिकाईदिन्छु, अनि तिम्रो इच्छा अनुसार मेशिन खुल्नु र बन्द गर्न हुन्छ।

Are There Any Risks?

भाग लिएको ले केहि नराम्रो असर हुन सकिन्छ?

Youth Consent to Participate in Research: Focus groups / participant observation / drawing narrations

There are no serious risks in this study.

यस अनुसन्धान मा भाग लिएको खण्ड मा कुनै पनि हानि नक्सानि हुने छैन।

One small risk is that you may feel uncomfortable answering some questions, and that the research will take some of your time. Your answers will have no affect on your school grades.

अनुसन्धान मा भाग लिन समय लाग्छ। केहि प्रश्नहरु ले आपत्यरा आउन सक्लान। यदि आएमा तिमी त्यो प्रश्न छोड्न सक्छौ, उत्तर दिन पर्दैन। । तिमी ले दिएको कि नदिएको उत्तरहरु ले तिम्रो “माक्स” (अन्क) लाई केहि पनि असर पर्दैन।

You do not have to participate in this study if you do not want to. It will have no impact on your grades. And, if you do participate, you can stop at any time, or can skip any questions.

तिमी लाई मन लाग्दैनौ भने, अनुसन्धानमा भाग लिन पर्दैन। तिम्रो “माक्स” (अन्क) लाई केहि पनि असर पर्दैन। तिमिले भाग लियो भने, कहिले पनि भाग लिन छोड्न हुन्छ। सबै प्रश्नहरु को उत्तर दिन पर्दैन।

If you are upset after the study and need to talk with someone, I can help you call Barbara Brower at the Geography Department at Portland State University in the US; this is the person leading the project in Portland. I can also help you contact the Center for Mental Health and Counseling Nepal.

अनुसन्धान मा भाग लिएपछि, प्रश्नहरु छन कि तिमीलाई नराम्रो लाग्यो भने, म तिमीलाई मेरो शिक्षक लाई फोन गर्न मद्दत गर्न सक्छु। डाक्टरम संग कुरा गर्न मन लाग्यो भने, म तिमीलाई “CMC-Nepal” लाई फोन गर्न मद्दत गर्न सक्छु।

What Will I Get In Return?

भाग लिएको ले तिमीलाई के पाईन्छ?

- Fun conversation and knowing you are helping others. Many people feel good about helping others. We can learn so much from you about the environment and how you learn about it.

रमाईलो कुराकानि पाईन्छ। भाग लिएको मा तिमी हामीलाई वातावरण को बारे मा सिकन मद्दत गर्छौ। हामी तिमी संग धेरै सिक्न सक्छौ।

What Are You Doing To Protect Me?

तिमिले भनेको कुरा कसरि सुरक्षित हुने छन?

Your privacy is very important to us. We have done many things to protect you:

तिम्रो गोपनीयता धेरै महत्त्वपूर्ण छ। तिमिले भनेको कुरा सुरक्षित छन।

- When we talk to you, it will be in a private place. This means no one will be able to overhear what you tell us.

हामी अन्तर्वार्ता गर्छौ भने, हामी एकलै बसेर गर्छौ। अरु ले तिमिले भनेको कुरा सुन पाउदैनन्।

Youth Consent to Participate in Research: Focus groups / participant observation / drawing narrations

- Your name and what you tell us will be kept confidential to the extent allowed by law. (By “kept confidential” we mean that the names of people who take part in the study will not be given to anyone else. And it means that we will only reveal what you say in a way that no one could ever guess or know it was you who said it.) If, in the course of the study, you disclose that you are, or are intending to, harm yourself or others, we are ethically and legally required to notify the appropriate authorities.

म तिम्रो नाम मेरो रिपोर्ट मा लेखिदैन। तिमिले भनेको कुरा म मेरो रिपोर्ट मा लेख्छु होला, तर तिम्रो नाम, थार, गाँउ को नाम, इत्यादि लेखिदैन। तर, तिमिले खतरनाक कुरा को बारे मा मलाई भन्यौ भने, मलाई निकाय लाई भन्नु पर्छ।

- Only I and one or two other assistants for the research project will know what you say. We will not tell anyone else, such as your teacher, your parents, or your friends.

म र मेरा एक-दुई जाना सहायकहरू लाई मात्रै तिमिले भनेको कुरा थाहा पाउछ। हामी तिम्रो आमा-बुवा, शिक्षकहरू, साथिहरू लाई भन्दैनौ।

- Your name and other personal information will be kept safe on my laptop and my research notebooks will be kept safe in a locked room. This form (which has your name on it) will be kept locked in the room.

तिमिले भनेको कुरा सुरक्षित ठाउँ मा राख्ने छु। यो कागाज र “अदियो रिकोर्ड” गर्ने मेशिन मेरो कोठा मा राख्ने छु, अनि कोठा को ढोका बन्द हुने छ।

- When we write or talk about what we learned in this study, we will leave things out so no one will be able to tell who we are talking about.

मैले सिकेको कुरा रिपोर्ट मा लेख्दा, तिम्रो नाम लेखिदैन। त्यसै ले, कसले कुन कुरा भनेको थिए भनेर कोही पनि लाई थाहा पाउदैन।

Any Questions?

If you have any questions about this study, this form, or the study, you can talk to the person leading the project in Portland, Barbara Brower, (503) 725-8044. You can also contact the Office of Research Integrity of Portland State University about your rights as a research participant (someone who takes part in a study). Hours in Nepal time are 9:45 PM to 5:45 AM. The telephone number is (503) 725-2227

तिम्रो केहि प्रश्नहरू छन?

यदि तिम्रो कुनै गुनासोहरू, प्रश्नहरू वा चासो छन भने, बार्बरा वा उनका सहायोगि तपाईंको प्रश्नहरूको उत्तर दिनको लागि खुशि हुने छन। बार्बरा को मोबिल: +१ (५०३) ७२५ ८०४४। तिमि मेरो विश्वविद्यालय लाई पनि फोन गर्न सक्छौ: +१ (५०३) ७२५ २२२७। यो कार्यालय ९:४५ बजे देखि ५:४५ सम्म खोलेको छ।

If I Sign, What Does It Mean?

तिमिले सहि दिको भनेर के मतलब हुन्छ?

This is a consent form. Your signature below means that:

यो अनुसन्धान मा भाग लिन सहमति / मन्जूरी फोर्म हो। तिमि ले सहि दिन्छौ भने, तिम्रो सहि भनेको कि:

- You have read and understand what this form says, OR I have read this form to you and you understand what it says.

तिमिले यो कागाज पढेको छौ कि सुनेको छौ। तिमिले पुरा बुझ्यौ।

Youth Consent to Participate in Research: Focus groups / participant observation / drawing narrations

- You are willing to take part in the study.

तिमीलाई मेरो अनुसन्धान मा भाग लिन मन लाग्छ।

- You know that you do not have to take part in this study. And even if you agree, you can change your mind and stop at any time. No problem.

मन लाग्दैन भने, तिमीलाई मेरो अनुसन्धान मा भाग लिन पर्दैन भनेर तिमीलाई थाहा छौ। तिमी कुनै पनि समय भाग लिन छोड्न सक्छौ। केहि हुदैन।

- You know that taking part in this study has nothing to do with the your school grades. If you agree to take part or if you say no, your teacher or principle won't get upset. They will treat you the same.

अनुसन्धान भाग लिएको कि न लिएको भनेर तिम्रो स्कुल "मर्क्स" (अन्क) लाई केहि असर पर्दैन। तिम्रो शिक्षक / शिक्षिका लाई रिस उठ्दैन।

- You will get a copy of this form to keep for yourself.

म तिमीलाई यो कागाज तिमीलाई पनि दिन्छु।

Participant Signature तिम्रो सहि

Date गते / तरिक

Participant name, printed तिम्रो नाम

Interviewer/Witness/Legal Guardian Signature एल्सि को सहि

Date गते / तरिक

Interviewer/Witness/Legal Guardian name, printed
एल्सि को नाम

Parental Permission: Focus groups / participant observation / drawing narration

The Portland State University

पोर्टलान्द स्तेत विश्वविद्यालय

Parental Permission

अभिभावक को आनुमति:

PARENTAL PERMISSION: Focus groups / participant observation / drawing narrations

अभिभावक को आनुमति: समुह कुराकानि / अवलोकन / चित्र

Environmental Learning in Udayapur District, Nepal

वातावरण शिक्षा, उदयपुर जिल्ला

Your child is invited to participate in a research study conducted by Barbara Brower and me, Elsie Love, from Portland State University, Geography Department. The researcher hopes to learn what children think about the local forests and water sources, and how they learn about these places. This research is for Elsie's master's degree. She is working under Professor Barbara Brower. Your child was selected as a possible participant in this study because he or she is in the 8th grade at this school. Elsie is focusing on 8th graders for her project.

तपाईंको नानीलाई अध्ययन अनुसन्धान मा भाग लिनु बोलायको छ। म, एल्सि लव, र मेरो बर्बारा ब्रौअर भन्ने शिक्षिका, केहि अनुसन्धान गरिराहेको छौ। हामी अमेरिकामा पोर्टलान्द स्तेत विश्वविद्यालय को भूगोल विभाग मा काम गर्छौ। यो अनुसन्धान बन जंगल र पानी को स्रोत को बारे मा छ। कक्षा ८ को विद्यार्थीहरू बन र पानी को स्रोत को बारे मा के के सोच्छन? कक्षा ८ को विद्यार्थीहरू बन र पानी को स्रोत को बारे मा कसरी सिक्छन? हामी यी किसिमको कुराहरू बुझ्न प्रयास गर्दै छौ। हामी तपाईंको नानीलाई हाम्रो अनुसन्धान मा भाग लिनु अनुरोध गर्दैछौ।

If you decide to let your child participate, he/she will be asked to participate in a focus group, which is a class discussion, about the environment. Elsie will also sit and observe the 6th-8th grade Science and Environment classes. She might also ask your child to draw pictures of the environment. She will ask him or her to tell her about these drawings. She may audio-record these conversations, so that she can remember what your child said. If she audio-records these conversations, she will show your child how to use the recording device, and allow him or her to start and stop the recording as he or she wishes. Only Elsie and her translation assistant will have access to these recordings.

तपाईंले तपाईंको नानीलाई यस अध्ययन अनुसन्धानमा भाग लिन सहमति दिनुभयो भने म उनिहरूलाई समुह मा र कक्षामा पर्शन सोध्ने छु। प्रश्नहरू प्राकृतिक वातावरण को बारे मा हुने छन। म केहि हाप्त को लागि कक्षा ६-८ मा बसेर अवलोकन गर्ने छु। म तपाईंको नानीलाई प्राकृतिक वातावरण को चित्र बनाउन पनि अनुरोध गर्ने छु। म तपाईंको नानीलाई बनाएको चित्र को बारे मा बताउन अनुरोध गर्ने छु। म “अदियो रिकोरद” पनि गर्छु होला, तपाईं को नानीले भनेको कुरा सम्झना लाई। अदियो रिकोरद” गर्ने मेशिन कसरी चलाउने भने म तपाईंको नानी लाई सिकाईदिन्छु, अनि नानीको इच्छा अनुसार मेशिन खुल्नु र बन्द गर्न हुन्छ। अनतार्वाता सिदेपछि, म र मेरो सहायक लाई मात्रै तपाईंको नानी ले भनेको कुरा सुन पाउछ। रिकोरद गरेको जवाफ हरु अरुलाई दिदैनौ।

While participating in this study, it is possible your child might feel shy, nervous, or uncomfortable. Your child may not receive any direct benefit from taking part in this study, but the study may help to increase knowledge which may help others in the future.

Parental Permission: Focus groups / participant observation / drawing narration

अध्ययन अनुसन्धान मा भाग लिदा, तपाईं को नानीलाई लाज कि आसयरो लाग्न सकिन्छ। अध्ययन अनुसन्धानले सहयोगी ज्ञान बढ्न सकिन्छ।

Any information that is obtained in connection with this study and that can be linked to your child or identify your child will be kept confidential. This means Elsie will use a fake name for the school, village, and your child when she writes up her work.

म तपाईं को नानीले दिएको यस अध्यायन, अनुसन्धान मा परयोग भएका सबै प्रश्न उत्तरहरू गोप्य राखिने छन्। म तपाईं को नानीको नाम, स्कूल को नाम, र गाँउ को नाम लेखिदिन मेरो “रिपोर्ट” मा।

If Elsie learns that your child is being abused, or intends to harm themselves or others, she must legally report this to authorities.

मलाई बाल हिम्सा, बाल बेवास्ता, कि अरु खतरनाक को बारे मा सुने भने मलाई निकाय लाई भन्नु पर्छ।

Your child's participation is voluntary. He/she does not have to take part in this study, and it will not affect his/her grade. You may also withdraw your permission for your child to participate from this study at any time without affecting his/her grades.

तपाईं को नानि को सम्मगता उनिहरू को ईच्छा विपरित हुने छैनन्। यस अध्यायन, अनुसन्धान भाग लिएको खण्ड मा उनिहरूको नियमित परिवर्तन मा कुने किसिमको असर पर्ने छैन। तपाईं कुने पनि समय आफ्नो नानी लाई यस अध्यायन, अनुसन्धान बाट निकाल्न सक्नुहुने छ।

If you have questions or concerns about your child's participation in this study, ask Elsie or contact Barbara Brower at (503) 725-8044. If you have concerns about your child's rights as a research subject, please contact the PSU Office of Research Integrity, Market Center Building Ste. 620, Portland State University, (503) 7252227.

तपाईं को केहि प्रश्नहरू वा जिज्ञासा छन भने, मलाई सोध्नुस कि बर्बर ब्रौर लाई फोन गर्नुस: +१ ५०३ ७२५ ८०४४। यदि तपाईंलाई यस अनुसन्धानमा भाग लिएको करण वा तपाईं को नानी को अधिकार को बारे मा कुने पनि किसिमको प्रश्नहरू वा जिज्ञासा छन भने तपाईं मेरो विश्वविद्यालय लाई फोन गर्नु सक्नुहुने छ: +१ ५०३ ७२५ २२२७ कि १ ८७७ ४८० ४४००।

Your signature indicates that you have read and understand the above information and agree to let your child take part in this study, or it means that Elsie has read this form with you and helped explain it. The researcher should provide you with a copy of this form for your own records.

तपाईं को केहि प्रश्न छन? तपाईं ले यस कागाजले पुरा पढ्नुभयो / सुनुभयो, पुरा बुझ्नुभयो, र तपाईं को नानी लाई भाग लिन दिनुहुन्छ भने, तल सहि गरिदिनुस। यस “फोरम” (कागाज) को एक कोपी पनी पाउनुहुने छ।

Participant Signature
सहि

Date गति / तरिक

APPENDIX D: POSSIBLE APPLICATIONS IN RAUTAMAI GAUNPALIKA

POSSIBLE APPLICATIONS AND FUTURE RESEARCH DIRECTIONS IN RAUTAMAI GAUNPALIKA

As mentioned briefly, Rautamai Secondary School did, for a while, teach a local subject class for primary-level students. Reshma Ma'am was one of the teachers. She said that the children loved hearing stories about familiar places and enjoyed going outside and looking for medicinal plants. But, as she told me, "Our students are weak in English," and needed an additional English class more than they needed a local subject class. When I asked in 2018, Reshma Ma'am did not think that their school would reimplement a local subject class. Perhaps, the latest national curriculum framework (2076 BS) or other, local-level dynamics have since changed or will change this.

Regardless, my research shows that even without a local subject course, teachers and children draw some connections between school learning and children's everyday knowledge of the local environment. As we saw in Part II, some children view what they learn as connected to their work in forests and fields, reinforcing and expanding their understanding of local guidelines. Outside of structured class time, children find opportunities to work together and teach each other, drawing on the collaboration, teaching, and leadership skills they apply to work outside of school. It seems as though an emphasis on human-tree relationships through gas exchange resonated for a couple of students, and they integrated this learning into their own sense of relationality with the forest. And, teachers integrate some movement into lessons and make some connections to children's embodied knowledge. These may be subtle, everyday connections, but they might support student learning.

My research also revealed areas where school learning does not seem to connect to children's everyday ways of learning about the environment. We saw that while school learning on forests connects, in some ways, to the rules and guidelines children learn through participation in subsistence practices, in-school learning does not, in this case, seem to connect to the practice-based or applied ways Rautamai children learn outside of school. Teachers might consider integrating more practice-based or applied ways of teaching into their pedagogy. They might also consider providing opportunities for collaboration and for students to teach one another during structured class time, integrating more embodied learning, and drawing on Rautamai kids' curiosity and attentiveness by taking students outdoors. In further connecting school learning to Rautamai children's funds of knowledge, as other researchers' work suggests, they might support children's school learning, reinforce their identities as capable and knowledgeable, and/or legitimate children's and communities' everyday ways of learning and knowing the environment as valuable in school (Medin and Bang 2014; Baines and Zarger 2017).

Expanding on existing teaching practices or trying new approaches that further connect school learning to Rautamai children's funds of knowledge could, perhaps, align with teachers' expressed interest in teaching in practical ways, too. During interviews, all three teachers told me that they value practical learning, although they each seemed to understand it slightly differently. As the following quotes demonstrate, they seemed to understand practical learning as learning from outside the textbook, as learning by doing, and/or as learning that is connected to children's everyday lives.

Reshma Ma'am: There are still a lot of things about nature and environment. For so many children, it is limited to the textbook. I would like to teach them some outside knowledge if I could, about the environment. Compared to just teaching from the book. If we could teach in a 'practical' (Eng.) form, if we had some training to teach in this way, we could.

Nirav Sir: The things they learn at home and school are different.... School is always theoretical. The place to do practical things is at home, so it's heaven and earth different.... Here [at school] we don't teach in a practical (*vyaavahaarik*) way, we just have the practice of speaking in a theoretical (*saidhaantik*) way. Isn't that right? In 'practical' (Eng.) form, after they go home, in a 'practical' (Eng.) form if they have learned that we must plant like this, 'practically' (Eng.) in the 'field' (Eng.) they could do it. But at school, here it is 'theory' (Eng.). Isn't that right? *Karaayo karaayo, raat bhari karaayo, dakshinaa haraayo* (shouted, shouted, shouted all night, and money was lost). Isn't it right? *Karaayo, karaayo, eutaa kaan baata sunyo, eutaa baata udyo* (shouted, shouted, listened from one ear, flew out the other). They go home, and now they learn [in school] don't cut the forest, but they go home and cut from the bottom of the tree. We say [in school] they need to plant the forest, we need to do reforestation. If we teach them in a practical way they will achieve this knowledge better.

Prakash Sir: I teach from the book and 'practically' (Eng.). I teach from the book too, the government has made a rule. According to that, we must teach this curriculum. We also add some to the curriculum and teach. 'Children, now we are learning about the forest. *Hariyo ban, Nepalko dhan* (green forest, Nepal's wealth)... Here are these kinds of plants and trees, they make it green. We should not destroy plants and trees. We should not graze cows and goats every which place. We need to fence from all directions. And we need to do reforestation.' We need to teach these kind of things. 'Don't cut plants and trees, they are useful. Take dry firewood. Build houses from dry wood. Don't destroy.'

These quotes demonstrate that teachers are interested in and value practical teaching, even though they all seem to understand it slightly differently, and it may not be part of all teachers' everyday practice.

There are two other things I want to highlight in the above quotes. First, in his arguments in favor of more practical learning, Nirav Sir assumes that children cut down

trees when in the forest. He is using some deficit framing, arguing that practical learning is important, in part, to change some of children's home behavior. But, at the same time, Nirav Sir is also demonstrating that he views the practical ways they learn at home as more powerful than the theoretical ways they learn in school. He emphasizes that children will learn school knowledge better if they are taught in a practical or applied way.

Other teachers, too, explained during interviews that they hoped children would apply or share some school learning with their families in order to correct what they viewed as environmentally problematic or unhealthy behaviors. The textbooks, in some cases, encourage this. For example, in the "Need of Environmental Cleanliness" chapter of grade five's *My Science, Health and Physical Education* textbook, the teaching instructions read, "Teach focusing on the lifeskills that can change their wrong concept and behavior regarding the environment. Also observe their behavior from time to time" (Curriculum Development Centre 2071b BS, p. 88). Perhaps, in highlighting the environmental learning Rautamai children do at home and in framing this learning as children's funds of knowledge, my findings could spark conversations among teachers on children's at-home environmental learning. Teachers might consider what they can learn from the practical ways children are engaged with the environment at home, and might consider how they could position and leverage children's at-home learning as a strength.

Second, as Prakash Sir explained what he sees as practical and important to teach students, he also noted that teachers are required to teach the textbook and curriculum. In practice, this generally means that teachers are supposed to get through their subject's government-published textbook within the school year. In my experience, both as a full-

time teacher and as a researcher in government schools, it is quite challenging and sometimes impossible to get through many subjects' textbooks in a school year. Exams are based on these books, so teachers are often under a lot of pressure to move quickly through them. This limits the amount of time and energy they can give to teaching beyond the textbook or trying new things. Still, it seems as though Prakash Sir thinks it is important to teach children additional things that he views as valuable and relevant to their lives.

With these challenges, teachers' interest in and different understandings of practical teaching, and my research findings in mind, I created a sample instructional arc that highlights what I view as opportunities to further connect school learning to Rautamai children's funds of knowledge, and provides a simple example of what this could look like in practice. Note that this research did not pilot this instructional arc, and that it was not generated through collaboration. It is simply an example of one way interested teachers might consider applying some of what my research findings revealed about Rautamai children's everyday environmental learning to their practice.

If Rautamai community members and teachers are interested, perhaps in the future they could participate in collaborative, design-based research, through which they could co-create and pilot their own practical teaching activities that connect to children's everyday environmental learning. Depending on community and teacher interest, these activities could be similar to those described in the sample instructional arc below or could be quite different. Either way, this collaborative, design-based research could build on my research findings and explore whether further connecting children's funds of

knowledge to school learning does indeed support their learning and identities, and support teachers' interest in practical teaching.

SAMPLE INSTRUCTIONAL ARC

Introduction

This instructional arc focuses on people's relationships with fodder trees and the forest. I have chosen this topic since many participants emphasized the importance of their relationship to the forest, and since it caters well to applied and practical learning, collaborating, embodied and sensory learning, practicing curiosity and attentiveness, relational thinking, and learning from elder community members. It would invite students to draw on their curiosity, attentiveness, and embodied knowledge by making observations in local forests and overgrown fields, connect locally-held knowledge to school learning by interviewing community members, apply their knowledge by planting fodder trees and observing them over time, and consider relationships between trees, themselves, and the broader environment through drawing, acting, or web activities. These activities could, potentially, draw on and expand on children's knowledge of, skills connected to, and orientations towards local fodder trees and forests. They could also connect to the national curriculum's lessons on plant lifecycles, plant parts, interdependence, gas exchange, reforestation, environmental change, and more. Teachers might integrate these activities with textbook learning on these topics and, in so doing, teach the textbook material in ways they consider practical. Some of the activities I describe are also similar to some of the activities, project work, or practical work described in the textbooks. The instructional arc highlights some of the ways these kinds of activities connect to Rautamai children's funds of knowledge.

Although, as part of this instructional arc children will plant fodder trees, the goal is not reforestation. Recall that children shared that trees sprout and grow on their own in the forest. The goal is to learn through practice, observation, collaboration, interviews, and reflection, and to connect school learning to children’s funds of knowledge.

The ideas I offer below form a broader learning arc, but the approaches I describe could be adapted to other topics or used as stand-alone activities. Teachers might make these simpler or more complex for different grade levels or in response to time constraints. Recognizing that implementing this learning arc might be too time consuming or out of reach for some teachers, in the footnotes I provide a few examples of simple ways similar approaches could be adapted to different topics and integrated into everyday lessons.

Relationships with the Forest and Fodder Trees

Basic Premise: Students will consider their relationship to the forest and fodder trees by walking through forests and overgrown fields and making observations, interviewing community members, planting and observing fodder trees, and drawing, acting out, or creating a yarn web showing some of the ways they and other parts of the environment are connected to these trees.

Step 1: Forming Groups

As we saw in Part II, children in Rautamai often work together, practicing collaboration, leadership, and teamwork. To leverage and expand on these skills, students will work in small groups of three to five students for most activities.¹⁵ If teachers plan to

¹⁵ Group work can be woven into lessons on most textbook topics. For example, once the teacher has given their initial lesson on a textbook topic—seasons, different kinds of plants, different environmental concerns, etc.—they might assign different parts of that chapter to different groups. The groups then

have children do most activities during class time and near the school itself, students might form groups with children from different settlements, since this could support knowledge sharing. If teachers plan to have children do most activities outside of class time and near their homes, children can form groups with others who live in their same settlement.

Step 2: Asking Questions and Learning from the Land

In Part II's discussion of children's everyday relationships with place, we saw that Rautamai children demonstrate curiosity as they interact with animals, insects, and plants. Asking questions is both a science practice and a way for children to apply their curiosity.¹⁶ After the teacher introduces the basic premise of the learning arc—and, if time allows, takes them on a short, preliminary walk to spark initial wonderings—students will work with their groups to generate a few questions they might want to explore while going on a longer walk through the forest and overgrown fields. Teachers can provide examples of the kinds of questions students might be able to explore as they walk. Some examples might include: Where does the forest appear thicker or thinner, and why might this be? Where do we find different kinds of fodder tree saplings or small fodder trees growing? Are they growing in wet places, dry places, sunny places, or shady places? How might different fodder trees' seeds travel? Which kinds of fodder trees' seeds might be easy to plant, and where can we find them?

illustrate their topic with a poster, and share with the rest of the class through one of the sharing methods described in this section. Through this process, they practice collaboration and teaching each other.

¹⁶ Teachers might integrate question generating into other, everyday lessons as well. For example, when beginning a new textbook topic, they might give students time to brainstorm what they already know on the topic, and what they would like to know. Or, they might bring in an object or picture related to the textbook topic, and ask students what they wonder about it. This helps students draw connections between prior knowledge and the topic, and helps spark curiosity and engagement.

Students will then make observations connected to a few of the questions they generated as they walk with their group through forests and overgrown fields.¹⁷ In doing so, they will draw on their embodied and sensory knowledge of their local environment, and will apply the same kind of attentiveness they demonstrated through everyday place relationships described in Part II. As they walk, students might make observations that further spark their curiosity and generate new questions they want to explore. Depending on the teacher's goals, students might take notes, make simple sketches, and/or collect leaves or seeds to share with the class. Again depending on the teacher's preference, students might do this step during class time, walking around forests or overgrown fields near school grounds, or they might do it as homework, in forests or fields near their homes (perhaps as they graze livestock or collect fodder). If they do these activities as homework, the teacher should still bring students outdoors during class, briefly, to model what to do.

Once students have made observations, each group will share what they have learned with the other groups. They might do this in the more traditional school way—standing up and reporting out—or they might try a different, less formal approach to sharing. The teacher might, for example, pair groups together, and have the paired groups share what they learned with each other. Or, the teacher might make new groups comprised of members of different original groups; each individual shares with the new group what their original group learned. Either way, in sharing what they learned through

¹⁷ Either as homework (possible for students to do while working in the forest) or during class, teachers can invite students to make observations about local plants, water sources, weather, the broader landscape, and more connected to their science lessons. By inviting students to share these observations in class, they support them in connecting their knowledge of the local landscape to in-class learning.

observations, children will practice teaching others. If they have taken notes, made sketches, or collected leaves or seeds from the forest, they might share these as well. Sharing what they learned might reinforce their sense that they are knowledgeable and capable, and facilitate knowledge exchange, as we saw in Part II.

Step 3: Community Interviews

Now that students have made some initial observations in forests and overgrown fields, it is time to learn from community members.¹⁸ The teacher might ask: Who in our community might know how local forests have changed over time? Who in our community has experience planting fodder trees in their *baari* fields? In their groups, students can then brainstorm who in their families or in the broader community might have knowledge and experience they can learn from.

The teacher can then support students, again working in their groups, to brainstorm questions they might ask these community members. Some more general examples might include: Which places have thinner forest or fewer trees than before, and why? Which places have thicker forest or more trees than before, and why? Which places have many different kinds of trees, and why? Questions for community members with experience planting fodder trees might include: Did you plant trees from seeds or from saplings? Which kinds of trees grew best? During which season did you plant? Are there any places where it might be helpful to plant more fodder trees? After brainstorming,

¹⁸ A shorter version of community interviews, mini-community interviews, is a great way to consistently connect school learning to community knowledge. Students can ask their elder family members, local business owners, or other community members one to three simple questions connected to some textbook topics. Questions could include: What kind of wild animals have you seen? How have water sources changed over time? Have you noticed any changes to seasons or weather? In class, students then share what they learned in small groups. This brings in local context and positions community members' knowledge as relevant to school learning.

each group will choose three to five questions they want to ask community members. If time allows, the teacher can then support students in doing practice interviews with each other. The teacher might also support students in dividing tasks. For example, each student might ask a different question, and they might take turns taking notes when not asking questions.

Next, students interview community members. They might work in their groups, together interviewing a community member who lives near the school, or they might split into smaller groups, interviewing family members or community members who live near their homes. Once the students have done these interviews, they can again share what they learned with other students, following one of the sharing models described in Step 2. This activity might help students garner locally-relevant knowledge, and also support students in connecting community-held knowledge to school learning, potentially validating community-held knowledge as relevant in this space, too.

Step 4: Looking for Seeds

Now, students again walk through forests and overgrown fields, using their attentiveness and embodied knowledge. This time, they will look for seeds that, based on their own observations and what community members have shared, might be easy to plant and might grow well.¹⁹ The class might first discuss how many seeds they should collect. The teacher might invite them to consider: Are there many seeds available here, or just a few? If we take them all, what might happen? What animals or insects might rely on these seeds? If focusing on textbook lessons on plant lifecycles or plant parts, the

¹⁹ As part of other science lessons, too, teachers can invite students to bring in leaves, seeds, stones, different kinds of soil and clay, and more. This can make learning more hands-on, and further connect children's knowledge of place to school learning.

teacher might also have students compare and draw the different seeds they collect, consider how these different seeds might travel or spread in the forest, or germinate a few in damp paper or soil.

Step 5: Applying Learning by Planting

Having gathered knowledge from the land and from community members, and having gathered seeds, it is time for students to plant. During this step, they learn through application and embodied practice, getting their hands dirty, and draw on their prior experience planting and tending to different kinds of plants. They also continue to practice collaboration.

Depending on what they have learned in interviews and on the time and resources available, they might plant seeds in containers first, or might decide to plant them directly in the ground. If they are going to plant the seeds in containers first, children might use old instant noodle packaging or old plastic bottles as containers. Students might also each bring a bag of manure-rich soil from home. They will then work together to plant the seeds in their containers and, depending on the season, come up with a watering schedule. Since the school is fenced, their plants should be safe from livestock as they grow, but students might consider where on campus they might grow best and place their containers there.

If students decide to plant their seeds directly in the ground, or when it is time to transplant seedlings, they will need to decide where to plant them. Working with their groupmates, they can draw on learning from walking the land and community interviews to choose a location where they think their seeds or seedlings might be successful. Or, they might choose a few different kinds of locations to compare. They might plant their

seeds or seedlings on or near school grounds, or in students' *baari* fields. They may need to give their seeds or seedlings some manure and, depending on the season and location, may need to come up with a watering schedule. Depending on where they plant them, they may also need to make small bamboo fences to protect them from browsing livestock.

Step 6: Relationships

Once students have planted seeds, the teacher could invite them to draw on textbook material on interdependence and on gas exchange, and on their own knowledge of these fodder trees and the local environment, to create a drawing, short skit, or yarn web on human-tree-environment relationships. If drawing, they might work independently or with their group to depict some ways that their fodder tree is connected to local birds, animals, insects, other plants, themselves, air, soil, the sun, and more. If doing a short play, each group member could take on one of the different roles listed above, and come up with simple movements that demonstrate their relationship to different kinds of fodder trees.²⁰ If making a yarn web, the teacher might give students cards with different roles, like air, monkey, caterpillar, human, fodder tree, or bird. Students could then make a circle, with the student with the fodder tree card in the middle. The student in the middle would then throw a ball of yarn to someone in the circle, and that person then explains how their card connects to the tree. Then, that person

²⁰ Acting, or connecting motions to class material, does not have to be complex. The teacher can lead kids in acting out the plant lifecycle, food chains, the water cycle, weather patterns, and more. The students first follow the teacher's motions and repeat key words connected to what they are doing. For example, if acting out the plant lifecycle, all students might first tuck themselves into a ball and say "seed," then uncurl their hands and say "germination," then straighten up a little and say "seedling." Once all students know the motions and keywords, these activities can be used as class warm-ups, energizers, or even for exam review. While this kind of movement is quite different than the embodied learning kids do outside of school, integrating motion can still support kids in making sense of and remembering new concepts.

throws the yarn to someone else in the circle, who explains how their card connects to the fodder tree. The web ends when the last person in the circle throws the yarn back to the student in the middle. Any of these activities could encourage children to take on perspectives of different members of the local ecosystem. These activities might also encourage students to reflect on their relationship to these fodder trees, and encourages further connections between textbook ideas and their own knowledge of the local environment.

Step 7: Attentiveness and Curiosity Over Time

Students will now observe their plants over time, perhaps more frequently at first (maybe once a week), and then less often (maybe once a month). Depending on the teacher's goals, students might make and record observations on particular things—how many of each kind of seed sprouted, how tall the seedlings have grown, how many leaves they have, how many sprouted or are doing well in different kinds of locations—or make more general observations. These observations might inspire students to ask new questions. Students might also consider and discuss why their seedlings are, or are not, doing well. Through these observations, students continue to practice attentiveness and curiosity, and, depending on how the teacher structures the activity, might draw connections to more textbook content.

Depending on time constraints, students might continue to occasionally share their observations with their classmates, following one of the possible sharing structures suggested above. If students have planted their seeds or seedlings nearby, they might show them to other groups, too. Through attentiveness over time, they might learn more about plant lifecycles and about what did, and did not, work well for their seeds and

seedlings. And, they can consider what questions they might ask and what they might try differently next time. Students' observations of their plants over time, and their learning from walks and interviews, might also inspire class discussions on whether or not it is helpful, necessary, or feasible to plant fodder trees in Rautamai.