

**LINCOLN  
UNIVERSITY**  
TE WHARE WĀNAKA O AORAKI

# **A bibliographical review of research completed by Nepali students at Lincoln University, New Zealand (1956 - 2022)**

Prepared by **Stewart, E. J., Espiner, S. & Simmons, D. G.**  
Department of Tourism, Sport & Society, Lincoln University  
Faculty of Environment, Society and Design  
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**Front Cover:** *Colombo Plan trainees outside Lincoln Agricultural College in 1956 with Bidur Kumar Thapa, of Nepal crouching, second from left (Lincoln University Living Heritage, source: 0004112).*

**Back Cover:** *Mingma Norbu Sherpa, Ed Hillary, and Tenzing Norgay (kindly supplied by Dawa Sherpa)*

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### Contact

email: [emma.stewart@lincoln.ac.nz](mailto:emma.stewart@lincoln.ac.nz)

Web: <https://hdl.handle.net/10182/15965>

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*Lisa Choegyal pictured with Mingma Norbu Sherpa Students Pasang Sherpa and Tsewang Sherpa, Lincoln University*

# Preface

The almost 70-year-long association between Lincoln and Nepal is a source of great pride, not only to the overall New Zealand Nepal relationship, but also to the one hundred or so students and alumni whose lives are irrevocably entwined with both countries. As this bibliography demonstrates, the Lincoln experience and education in Aotearoa have contributed confidence and learning to generations of Nepali students, enabling them to return with greatly enhanced capacity to help their homeland where it most counts.

Sir Edmund Hillary's Khumjung School opened in Sagarmatha National Park in 1961, the first Kiwi-connected learning institution in Nepal. The original Khumjung classroom, little more than a tin-clad shed, was built by Sir Ed's own hands and opens this year as a restored Hillary visitor centre to mark the 70th anniversary of the first ascent of Mount Everest.

Transforming the education of the Sherpa people, several boys from the very first Khumjung School cohort found their way to Lincoln Agricultural College on Himalayan Trust scholarships. From those modest beginnings, as recorded in this historical volume, the Lincoln University relationship with Nepal has reached far beyond the Everest region to receive students from throughout the country's mountains, cities and lowlands.

Today we can find Lincoln graduates who serve at the highest level of the public and private sector, community, non-governmental organisations and development agencies. Reflecting strengths of the Lincoln curriculum and the Himalayan legacy, a large number of alumni are involved as decision-makers in the environment, agriculture, forestry, resource management, climate change, wildlife conservation, disaster risk reduction, tourism and mountaineering. These sectors are all crucial to Nepal's development, economic and social agenda.

Compounding these achievements, New Zealand government funded projects over the past 30 years have provided agricultural and community forest assistance to the people and government of Nepal implemented by Lincoln technical specialists. A number of post-graduate scholarship opportunities to Lincoln include the sixteen Nepalis who have returned with Masters degrees in the memory of alumnus Mingma Norbu Sherpa.

Future collaboration is likely to include alliances with Nepal's Kathmandu and Tribhuvan universities in order to further consolidate the relationship, deepen the commitment and broaden mutual benefits. The Consulate stands by to help where we can, and congratulates Lincoln University on the success of the past fifty years.

**Lisa Choegyal MNZM**

New Zealand Honorary Consul to Nepal



Honorary Associate Professor P. J. Devlin being presented with a "Certificate of Appreciation" from the Nepal New Zealand Alumni Association by Lincoln University Alumnus Mr Megh Pandy the then Director General of National Parks and Wildlife. Syria Pandey one of our early graduates and one of the first rangers at Sagarmatha National Park is in the background.

**In acknowledgement of  
Honorary Associate Professor Patrick J. Devlin's  
devoted service to the education  
of Nepali students at Lincoln University**





# Contents

<b>1</b>	<b>Introduction</b>
1	Summary of research themes
1	Bibliography method
3	Qualifications
10	Faculty/Department
10	Supervisors
11	Region of study
14	Research themes
<b>17</b>	<b>Theme One</b>
	Human-Environment relationships in natural resource settings
18	Tourism
21	Environmental management
<b>25</b>	<b>Theme Two</b>
	Agri-business and other commercial opportunities
26	Forest management
27	Agri-business
<b>29</b>	<b>Theme Three</b>
	Agriculture and Life Sciences
30	Animal, wildlife and habitat management
30	Crop, seed and plant improvement
31	Soil productivity
31	Peer-reviewed publications
<b>33</b>	<b>Closing remarks</b>
<b>35</b>	<b>Appendix 1</b>
	Alphabetical list of thesis bibliographical details and long form abstract (from research@Lincoln)
<b>97</b>	<b>Appendix 2</b>
	Taught qualifications completed by Nepali students
<b>99</b>	<b>Appendix 3</b>
	Lincoln University Staff (listed alphabetically) who have supervised Nepali students
<b>101</b>	<b>Appendix 4</b>
	Published journal articles and book chapters



# Introduction

Not long after the summiting of Everest in May 1953, Bidur Kumar Thapa, the first recorded Nepali student arrived at the then Lincoln Agricultural College, supported by the Colombo Plan<sup>1</sup>. He graduated in 1956 with a Masters of Agricultural Science with Honours in Soil Science under the supervision of Dr Walker, and went on to publish his findings on grassland soils in the Journal of Soil Science, in 1959. Thapa's work laid the foundation and pathway for future students from Nepal. In the following years, more than fifty Nepali research students have been recorded in the Lincoln University archives as completing a range of research-based qualifications from across the University, and in many instances going on to publish findings in scholarly journals. This annotated bibliography sets out to collate, review and curate their collective research efforts spanning almost seventy years.

## Summary of research themes

The bibliography reveals that the environment, in its many guises, has been an overarching research theme with a focus on managing people, activities and resources in a variety of natural resource settings including community forests, protected natural areas and agricultural regions. A geographic concentration of fieldwork in the Solukhumbu (Everest region and valleys), Annapurna Conservation Area and the Chitwan area indicates the contribution made to the remote mountainous and hill areas of Nepal, in particular. In addition, a key legacy of the research has been an enduring focus on the needs at the local-level. Whether that be - working alongside communities, making improvements to livelihoods, developing new tools and approaches, building local capability through education, or managing land sustainably - the local-level has been often central.

The following bibliographical review provides an overview of the students, and a thematic analysis of their collective research effort conducted mainly in Nepal, organised under the following themes:

- Human-Environment relationships in natural resource settings
- Agri-business and other commercial opportunities
- Agriculture and life sciences

Nepali students have been supported by the New Zealand Government through various funding arrangements over time. These include the Colombo Plan, the New Zealand Scholarships Programme, the New Zealand International Doctoral Research Scholarships, and through the Manaaki New Zealand Scholarship Programme. Further support has come from Lincoln University Doctoral Scholarships and the Mingma Norbu Sherpa Memorial Scholarship.

## Bibliography method

Theses and dissertations written by students at Lincoln University are deposited in the online digital archive Research@Lincoln to ensure their scholarship receives deserved recognition, fitting attribution, and for integration with the wider research publication output of the university. The inclusion of this work enables full text search capability of the content across the multidisciplinary collections of resources that showcase research and study throughout the history of the organisation.

The application of metadata, digital cross referencing, and online author verification assigned to the records describing these works provides a consistent level of access and accurate

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<sup>1</sup>The Colombo Plan for Cooperative Economic and Social Development in Asia and the Pacific is one of the oldest regional inter-governmental organisations dating back to 1950 when the idea was first conceived to enhance economic and social development of the countries of the region. The Colombo Plan was established on 1 July 1951 by Australia, Canada, India, Pakistan, New Zealand, Sri Lanka and the United Kingdom (<https://colombo-plan.org/overview/>)



*Bidur Kumar Thapa, from the Government Department of Agriculture, Kathmandu, Nepal, at work in the soil science laboratory at Lincoln Agricultural College. The image shows Mr Thapa determining organic phosphorus in soil, which was part of the practical work he undertook before commencing his master's degree in agriculture (Lincoln University Living Heritage, source: 0001439).*



*Colombo Plan trainees outside Lincoln Agricultural College in 1956 with Bidur Kumar Thapa, of Nepal crouching, second from left (Lincoln University Living Heritage, source: 0004112).*

keyword search results. This bibliography has been prepared by using a search methodology that is underpinned by this form of digital description.

Drawing on the [Lincoln University Living Heritage archive](#), student records, Research@Lincoln (an [open access](#) institutional repository collecting the research produced by [Lincoln University](#) staff and students), as well as journal repositories, a database of research completed by Nepali students has been created. The database highlights, as far as records allow, qualification(s) studied, date completed, department where the student was located, names of supervisors, location of fieldwork, key words, field of research and any related publications.

We anticipate that the bibliography will be a living document, which we will update on a regular basis, to continue to document the scholarly work conducted by our Nepali students. We have made every effort to cross-check our records, but we welcome any edits.

## Qualifications

Records indicate that sixty research-based qualifications have been completed by Nepali students, including Diplomas (nine), Masters (thirty-six) and Doctorates (fifteen) (see Table 1). Two students have completed two qualifications each, meaning there are fifty-eight unique student entries in the database<sup>2</sup>. While the qualifications span the University, they are not evenly distributed, with approximately two-thirds of students locating their programme of study in the current Faculty of Environment, Society and Design.

Qualification	Number
Diploma in Parks and Recreation	9
Master of Parks, Recreation & Tourism Management	9
Master of Tourism Management	2
Master of Applied Science	10
• Undeclared	4
• Agroforestry	2
• Parks, Tourism & Ecology	1
• Parks, Recreation & Tourism	1
• Environmental Management	1
• Disaster Risk Management	1
Master of Agricultural Science	7
Master of Natural Resources Management and Ecological Engineering	3
Master of Resource Studies	2
Master of Horticultural Science	2
Master of International Nature Conservation	1
Doctor of Philosophy	15
<b>Total:</b>	<b>60</b>

Table 1: Qualifications completed by Nepali students at Lincoln University<sup>3</sup>

The Diploma students (nine) all studied Parks and Recreation during the 1970s-1980s. A dissertation was a key component of the qualification and there were a number of pathways through the Diploma including the 'ranger option'. However, the research-based Masters qualifications are by far the most common, accounting for almost two-thirds of all completed qualifications. The Master of Applied Science, mainly with named specialisms such as

<sup>2</sup>Those students with two qualifications are Shailendra Thakali who completed a Diploma in Parks and Recreation Management (1989) and later a PhD (2012); and Chandra Bahadur Rai who completed a Masters of Applied Science (Agroforestry) (2002) and later a PhD (2012).

<sup>3</sup>This bibliography only focusses on research outputs of thesis and dissertation students, but a number of other Nepali students have completed qualifications taught by coursework. These students are listed, as far as records allow, in Appendix 2.

in Agroforestry and Disaster Risk Management, closely followed by the Master of Parks, Recreation and Tourism, and the Master of Agricultural Sciences, account for the most common programmes for Nepali research students. Fifteen students have completed PhDs, mainly graduating from what is now known as the Faculty of Agri-Business and Commerce.

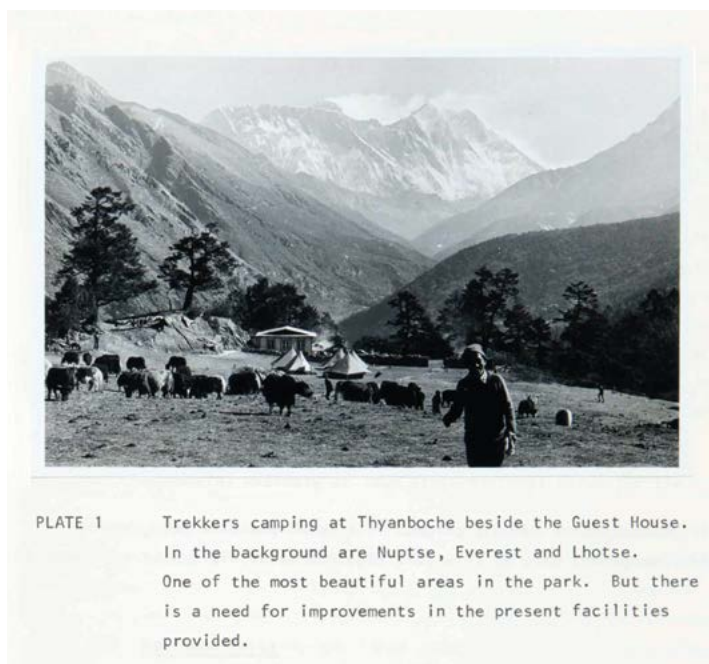
As previously indicated, B.K Thapa (1956) was the first Nepali student to complete a research-based qualification at Lincoln, studying the accumulation and composition of organic matter in grassland soils in Canterbury for his Masters of Agricultural Science (see Image 5). In each of the decades since, Nepali students have been present on the Lincoln campus; although there were no research completions in the 1960s (see Table 2).

1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s
1	0	5	8	15	5	20	6

Table 2: Number of completed research-based qualifications at Lincoln University since the 1950s.

R. C Mishra completed the first thesis with a Nepal-focus in 1970, researching farm management education across Nepal, for a Masters of Agricultural Science. N. W. Sherpa (1978) completed the first dissertation as part of the Diploma in Parks and Recreation, and his work is the first research located specifically in a national park, with a study on camping grounds in Sagarmatha National Park under the supervision of P. J Devlin (see Image 6).

The majority of the Nepali students at Lincoln University from the late 1970s through to the early 1990s were Diploma students studying Parks and Recreation, all including a dissertation component. Among this cohort of students was Mingma Norbu Sherpa (1979), who completed his dissertation on planning for interpretation in Sagarmatha National Park, and went on to have an esteemed career in nature conservation. Following his tragic death in 2006, the World Wildlife Fund, and Greater Himalayan Foundation<sup>4</sup> administered by his family, established a memorial scholarship to provide financial assistance to students from remote regions of Nepal who aspired to careers in nature conservation (see inset). Since 2008, sixteen scholars have completed a range of Masters Degrees at Lincoln University with the support of the Mingma Norbu Sherpa Memorial Scholarship<sup>5</sup>.



*Extract from N. W Sherpa's (1978) Dissertation on camping grounds Sagarmatha National Park for his Diploma in Parks and Recreation, Department of Horticulture, Landscape and Parks, Lincoln University*

PLATE 1 Trekkers camping at Thyanboche beside the Guest House. In the background are Nuptse, Everest and Lhotse. One of the most beautiful areas in the park. But there is a need for improvements in the present facilities provided.

<sup>4</sup>The Greater Himalayas Foundation is a non profit organization created to honor the legacy of Mingma Norbu Sherpa, by continuing conservation and humanitarian efforts in the Himalayas.

<sup>5</sup>See the list of Mingma Norbu Sherpa Memorial Scholarship students at: <https://www.theghf.org/mnsms>

STUDIES ON THE ACCUMULATION AND COMPOSITION OF ORGANIC  
MATTER IN GRASSLAND SOILS, WITH PARTICULAR REFERENCE TO  
ORGANIC PHOSPHORUS, CARBON, NITROGEN AND SULPHUR.

by  
B. K. THAPA.

**CANTERBURY AGRICULTURAL COLLEGE**

A THESIS SUBMITTED FOR THE DEGREE OF  
MASTER OF AGRICULTURAL SCIENCE WITH HONOURS  
IN SOIL SCIENCE.

*Presented to the  
Canterbury Agricultural College  
Library: Thapa  
1.11.56*

CANTERBURY AGRICULTURAL COLLEGE

UNIVERSITY OF NEW ZEALAND.

1956.

## Mingma Norbu Sherpa (1955–2006)

Mingma attended the Hillary Khumjung School, the first school established by Hillary in the Everest region. He later went on to gain his Master's degree in Natural Resources Management from the University of Manitoba, Canada in 1985. Mingma was the first Sherpa to serve as Warden of Sagarmatha (Everest) after the New Zealand Government helped establish the Park in 1976. He worked for the Annapurna Conservation Area Project (ACAP) before joining WWF as director of the WWF's Himalayan programme. In 1998 Mingma moved to WWF-US to become Director for WWF's Nepal and Bhutan programmes.



*Mingma Norbu Sherpa with friends at the Hillary Khumjung School (Kindly supplied by Dawa Sherpa)*

Mingma died tragically in a helicopter accident in Nepal in 2006, together with six other WWF staff, and seventeen others from Nepal, the US, the UK and Canada. To honour his life-long commitment to help Nepal's rural poor to improve their livelihoods while living in harmony with nature, WWF established a fund to support students from remote regions of Nepal to study at Lincoln University, New Zealand. This is known as the Mingma Norbu Sherpa Scholarship. The first scholarships were awarded in 2008.

<https://wwf.org.nz/mingma-norbu-sherpa-memorial-scholarships>

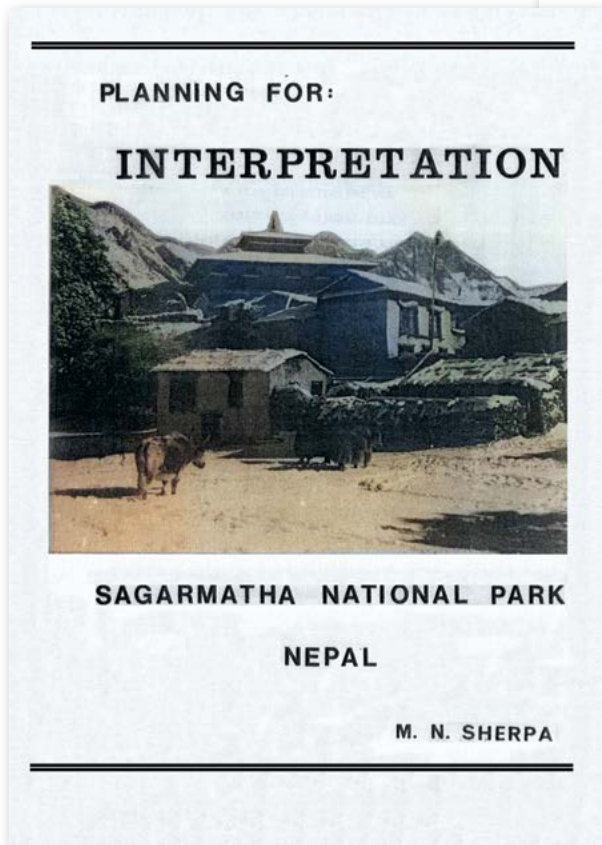


Why Interpretation  
in Sagarmatha National Park?

Because:



1. The physical features of the Park include the highest peak in the world, Mt Sagarmatha (Mt Everest), which draws 4,000 visitors per annum who require attention.



6.

The growth of tourism in the solitude of the Khumbu valley requires hospitable people, clean air, water and mountains. Tourists can help maintain an environmental quality if they are well-informed.



7.

Extracts from Mingma Norbu Sherpa's (1979) Dissertation on planning for interpretation in Sagarmatha National Park for his Diploma in Parks and Recreation, Department of Horticulture, Landscape and Parks, Lincoln University.

During the 1980s, other Nepali students completed Masters of Agricultural Science, including V. Dutta (1984), C. R. Upreti (1989) and P. Gyamtsho (1990). The Masters of Parks, Recreation and Tourism accounted for the relatively large cohort of eight Nepali students during the 1990s, with four students completing in 1993 alone. All of these students were supervised in some capacity by Honorary Associate Professor P. J. Devlin. Also during this period, three Nepali students completed the Masters in Applied Science and were supervised by staff in the then, Department of Parks Recreation and Tourism, underscoring the key contribution made by the current Department of Tourism, Sport & Society.

During the 2000s, the first doctorates were completed. The first Nepali student to be awarded a doctorate from Lincoln University was U.K Pun (2000) in plant science, under the supervision of J. S. Rowarth. Fourteen other doctoral students followed including B. Dhakal (2005), C. B. Rai (2010), B. Khanal (2011), N. B. Chand (2011), S. Thakali (2012), M. P. Khanal (2012), B. D. Yadav (2013), S. Bhattarai (2013), A. P. Bhatta (2014), M. B. Gurung (2014), M. Tripathi (2016), S. Tiwari (2019), R. Khadka (2021) and S. Sanjyal (2021). As Table 3 shows, the majority of these doctoral students (nine of the fifteen) studied under various departments in the Faculty of Agri-Business and Commerce.

<b>Current Faculty/Centre</b>	<b>Department (as stated on record)</b>	<b>Occurrences</b>
<b>Environment, Society &amp; Design</b>	Department of Environmental Management	<b>3</b>
<b>Agribusiness &amp; Commerce</b>	Departments of Land Management and Systems; Global Value Chains and Trade; Financial and Business Systems; Accounting, Economics and Finance; Agricultural Management and Property Studies	<b>9</b>
<b>Agriculture &amp; Life Sciences</b>	Wine, Food and Molecular Biosciences Bio-Protection Research Centre	<b>3</b>
<b>Total:</b>		<b>15</b>

Table 3: The number of Nepali doctoral students across the University

In the 2010s, a range of other Masterate offerings saw completions by Nepali students in the Masters of Tourism Management, Natural Resources Management and Ecological Engineering, Resource Studies, and International Nature Conservation. By the start of the 2020s, a further six students had already completed their qualifications. In the first semester of 2023, one Nepali Masters' student started her studies, and with a second one due to start in the second semester. One doctoral student is currently studying in the Department of Environmental Management examining the concepts of environmental justice in the context of the Nepali hydropower programme.



*Laxmi Gurung and Ana Nath Baral (both MNSM Scholars) graduated in 2013 with a Master of Tourism Management and a Master of Applied Science –in Parks, Tourism and Ecology – respectively.*

## Faculty/Department

While each of the University's faculties has welcomed Nepali students over the years, the majority of students have located their studies in what is now known as the Faculty of Environment, Society and Design (thirty-six students). Two-thirds of those (twenty-five) have been housed in the current Department of Tourism, Sport & Society, with the remainder (eleven) in the Department of Environmental Management (see Table 4).

Current Faculty/Centre	Department (as stated on record)	Occurrences
Environment, Society & Design	Variants of Department of Tourism, Sport & Society (including the original Department of Horticulture, Landscape and Parks)	25
	Department of Environmental Management	11
Agribusiness & Commerce	Departments of Land Management and Systems; Global Value Chains and Trade; Financial and Business Systems; Accounting, Economics and Finance; Agricultural Management and Property Studies; Applied Management and Computing	12
Agriculture & Life Sciences	Including Departments of Agricultural Sciences; Wine, Food and Molecular Biosciences; Soil and Physical Sciences; Plant Science Group; Pest Management and Conservation; Bio-Protection Research Centre	12
<b>Total:</b>		<b>60</b>

Table 4: The number of Nepali students per Faculty/Department at Lincoln University.

## Supervisors

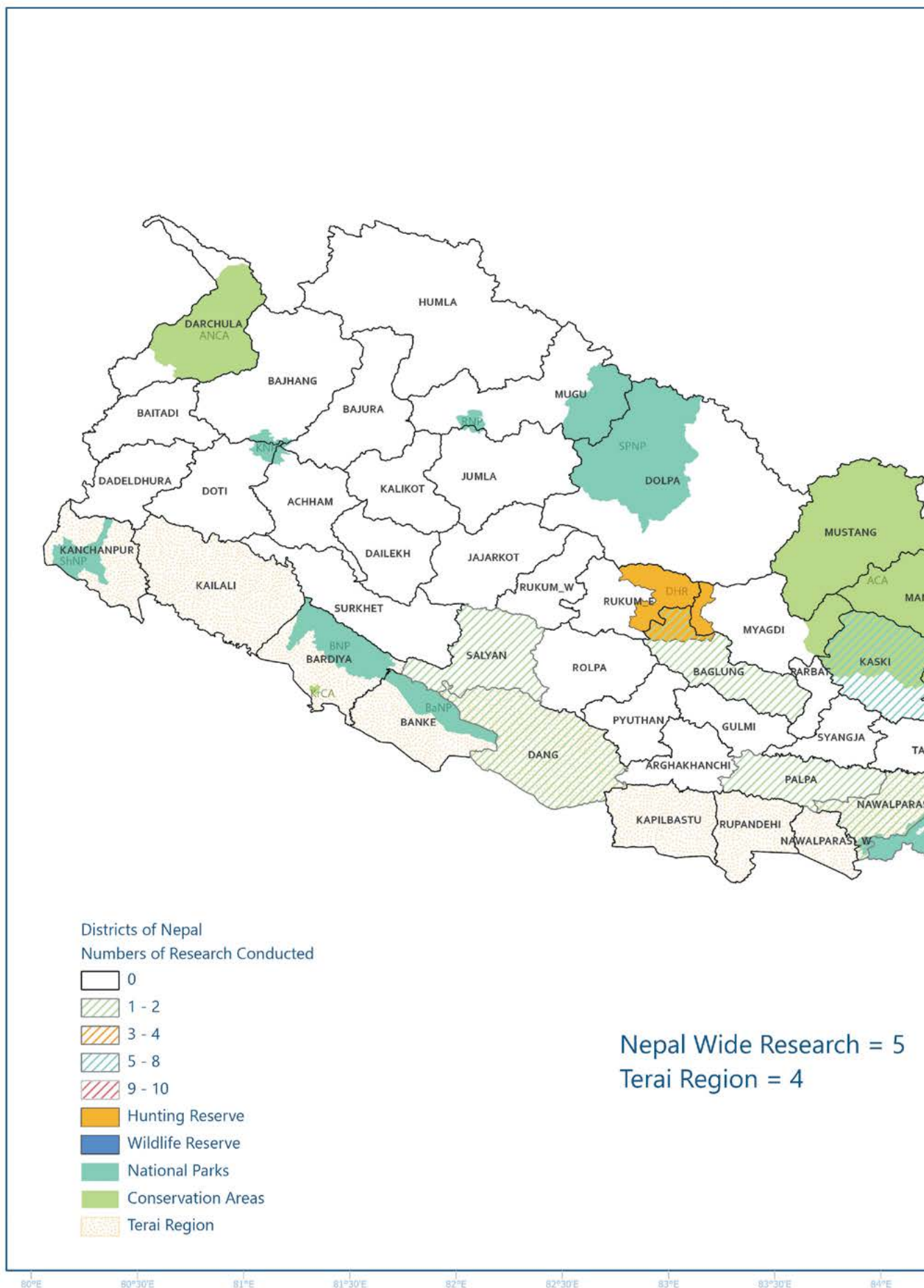
Fifty-three supervisors have been involved in the supervision of Nepali students; with supervisory expertise spanning the entire University (see Appendix 3). Honorary Associate Professor P. J. Devlin illustrates his enduring contribution to the education of Nepali students, with the supervision of twenty students (between 1978 and 1997) equating to approximately one-third of all Nepali students who have completed research degrees at Lincoln University. For fifteen of these supervisions, he was either the first, or the sole supervisor, further underscoring his remarkable impact. In addition, even after his retirement, Pat Devlin, alongside his wife Maureen, has continued to play an active role by mentoring many of the incoming Nepali students. Emeritus Professor David Simmons (CNZM), Professor Hugh Bigsby, Emeritus Professor Ken Hughey and Associate Professor Stephen Espiner have also been heavily involved with the supervision and mentorship of Nepali students.

## Region of Study

Research undertaken by Lincoln students in Nepal indicates some clear geographical patterns. Importantly, the research has been undertaken in the three major biogeographic regions – Terai (plains), Middle Hills and Mountains. The mountainous and hill areas of Solukhumbu (Everest region and valleys), Kaski and Myagdi (Annapurna Conservation Area), are the focus of 17 research projects, while the important Chitwan area (home of the Chitwan National Park with its outstanding wildlife on the Indo-Gangetic Plain) is the location of seven research projects. Additional agricultural projects have been undertaken on the Terai (Dang and Salyan) with more recent spread of individual projects across the landscape including more central and far eastern regions.



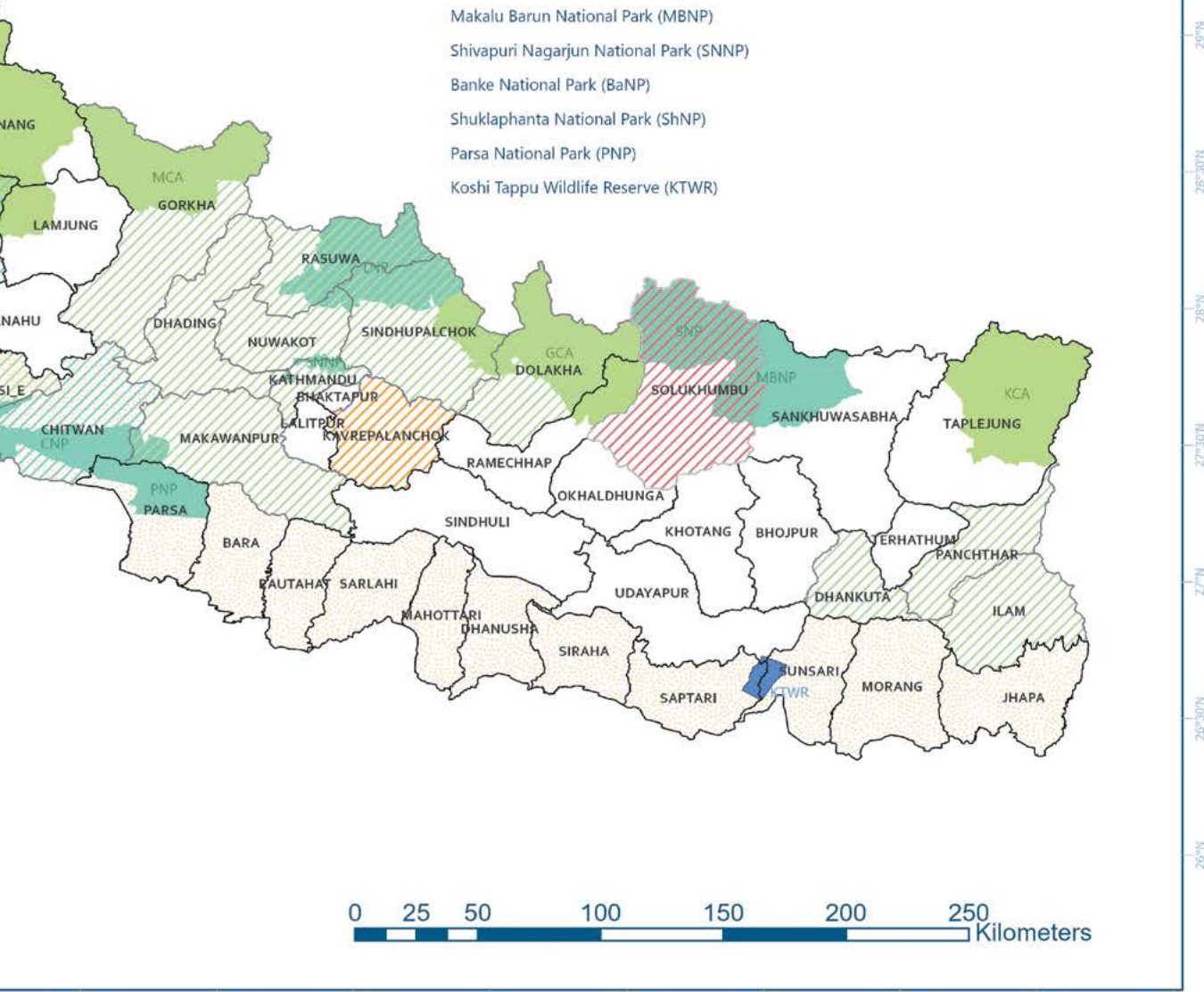
Word Cloud depicting location of student fieldwork in Nepal



Map of Nepal depicting location of student fieldwork (courtesy of Roshni Gurung, current MNSM scholar, Lincoln University)



- |   |                                      |
|---|--------------------------------------|
| Chitwan National Park (CNP)             | Dhorpatan Hunting Reserve (DHR)      |
| Langtang National Park (LNP)            | Annapurna Conservation Area (ACA)    |
| Sagarmatha National Park (SNP)          | Kanchanjunga Conservation Area (KCA) |
| Rara National Park (RNP)                | Manaslu Conservation Area (MCA)      |
| Shey Phoksundo National Park (SPNP)     | Api Nampa Conservation Area (ANCA)   |
| Khaptad National Park (KNP)             | Gaurishankar Conservation Area (GCA) |
| Bardiya National Park (BNP)             | Krishnasar Conservation Area (KrCA)  |
| Makalu Barun National Park (MBNP)       |                                      |
| Shivapuri Nagarjun National Park (SNNP) |                                      |
| Banke National Park (BaNP)              |                                      |
| Shuklaphanta National Park (ShNP)       |                                      |
| Parsa National Park (PNP)               |                                      |
| Koshi Tappu Wildlife Reserve (KTWR)     |                                      |







Given the significance of nature-based tourism in the Nepali economy, the study of parks, recreation and tourism management has been a long-standing research theme with a particular focus on planning, management and development. More recently, we see the emergence of research in the field of environmental management with a particular focus on topics such as adaptation to climate change, sustainable development and disaster risk reduction. While relatively fewer Nepali students have studied agricultural and life sciences at Lincoln University, there is a concentration of research in the area of animal, wildlife and habitat management; crop, seed and plant improvement; and soil productivity. Research in the realm of agri-business and commerce emerged in the early 2000s, with a proliferation of doctoral students, particularly in the field of forestry.

<b>Discipline/Area</b>	<b>1950s</b>	<b>1960s</b>	<b>1970s</b>	<b>1980s</b>	<b>1990s</b>	<b>2000s</b>	<b>2010s</b>	<b>2020s</b>	<b>Total</b>
Social Science			3	4	14		4	2	27
Environmental Management							6	2	8
Agricultural Science			2		1	1			4
Plant Science				2	2	1	1	1	7
Soil Science	1								1
Animal Science				1			1		2
Forestry						4	3		7
Economics							4		4
<b>Total:</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>7</b>	<b>17</b>	<b>6</b>	<b>19</b>	<b>5</b>	<b>60</b>

**Table 6: Disciplinary areas of focus for Nepali student research overtime**

The following section provides a more detailed thematic analysis of the collective research effort conducted mainly in Nepal, organised under the following main themes:

- Human-Environment relationships in natural resource settings
- Agri-business and other commercial opportunities
- Agriculture and life sciences



# **Theme One**

**Human-Environment relationships  
in natural resource settings**

The interaction between people and their environment has been a mainstay of research by Nepali students. While the study of parks, recreation and tourism management has been a well established theme, more recently, research in the field of environmental management has emerged.

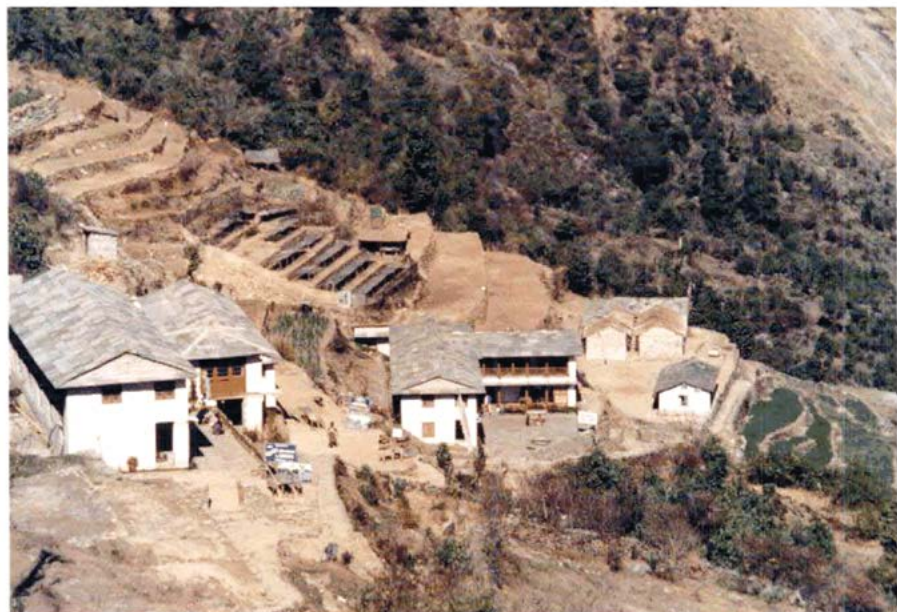
## Tourism

Given the significance of tourism in the Nepalese economy, and the nation's rich natural and cultural heritage, and New Zealand(er)'s history and relationship with Nepal, it is perhaps unsurprising that research on tourism and its intersection with natural-resource settings should be such an important theme among Lincoln University's Nepali scholars. The work has clustered around the themes of the impacts of tourism, destination planning and tourism development.

### Impacts of Tourism

Research on tourism impacts first emerged in the late 1980s, with Lal Gurung's (1989) analysis of systems and approaches to mitigate the negative consequences of tourism on local communities in the Annapurna Conservation Area. At the forefront of this early work and that which followed, was an abiding focus on the needs of local people. This is illustrated in Durga Paudyal's (1989) study investigating the impact of additions to Sagarmatha National Park, and Narayan Dhakal (1991) who revealed some of the challenges of developing tourism in two Protected Areas given the social structure and economic profile of the Sagarmatha and Chitwan National Park Communities. Similarly, Fanindra Kharel (1993) sought to understand more about people-park relationships in and around Langtang National Park. While local people clearly supported the purposes of the national park, the research also revealed deep concerns about wildlife crop-raiding, which led to some resentment of park managers. The thesis recommended the use of buffer zones to allow local people access to traditional natural resources.

*Lal Gurung's (1989) analysis of systems and approaches to mitigate the negative consequences of tourism on local communities in the Annapurna Conservation Area*



Also advancing knowledge of the people in natural resource settings, both Bodh Subedi (1999) and Ananath Baral (2013) focussed their scholarly efforts on the connections between tourism and wildlife conservation. Subedi (1999) confirmed the socio-economic significance of elephant safari tourism in Chitwan National Park and outlined recommendations for ensuring the sustainability of benefits to the community and the tourist experience. Baral's (2013) study was the first to quantify the links between wildlife tourism and Greater One-horned Rhinoceros

poaching in Nepal, underscoring the significance of wildlife tourism in establishing financial support and political pressure for conservation.

Several of the tourism scholars have utilised an evaluative framing for their research, including Gyan Nyaupane (1999), who demonstrated that a designated ecotourism area within the Annapurna Conservation Area had fewer negative impacts on the natural and socio-cultural environment, but also smaller economic benefits when compared against an established tourism trekking destination nearby. Beyond Nepal's borders, Bodh Khanal (2011) applied comparative economic analysis tools to show that tourism was the leading economic sector in Laos between 2003 and 2008 but was not without its negative impacts including cultural change and degradation of natural heritage sites.

The potential for positive impact through tourism was highlighted by Sunil Tamang (2020) in one of the first studies in Nepal to focus on the role of tourism in disaster recovery. Tamang used a case study of Langtang National Park to examine how tourism contributed to the recovery following the 2015 earthquake disaster, emphasising the benefits of diverse and flexible tourism initiatives in reconstruction and recovery efforts.

## **Destination Planning**

Advancing knowledge in the area of tourism planning has been another important theme among Nepali research scholars at Lincoln. Collectively, these studies have helped inform decisions in key national parks and other natural resource areas, maximising beneficial outcomes for conservation and communities. Several of the early works were aimed at guiding the establishment and development of appropriate park infrastructure at a critical time in the development of Nepal's national parks. Nima Sherpa (1978) outlined methods for the establishment of camping grounds in national parks, and Mingma Sherpa (1979) distilled a set of guidelines for an interpretive master plan for Sagarmatha National Park. Mingma recognised the value of harnessing visitors in support of conservation, noting that tourists can help maintain environmental quality if they are well-informed.

The relationships between tourism, conservation and community are highly evident in the work of many other Nepali scholars studying at Lincoln. Lhakpa Sherpa N (1979), for instance, contributed guidelines for management planning in Sagarmatha National Park but also emphasised the need for balance to mitigate the possible effects of park legislation on the lifestyles of local people. Similarly, Sher Thagunna (1995) scrutinised the buffer zone concept in terms of its applicability to the Nepal context and recommended a more dynamic interpretation of the idea to better incorporate the welfare of local communities. Shailendra Thakali (1989), in response to growing community concerns about the pressure tourism was putting on local resources in the Annapurna Conservation Area, conducted an analysis of recreation planning tools to assess their potential utility for managing demands on mountain lands.

Like Thakali, other Nepali scholars at Lincoln were also keen to assess the merits and challenges of emerging tourism planning tools. Both Ang Sherpa (1996) and Lhakpa Lama Sherpa (2012) investigated aspects of participatory planning approaches for tourism. Recognising the potential for negative impacts resulting from tourism development in the Manang District, Ang Sherpa (1996) demonstrated the value of frameworks that allowed for meaningful community participation in tourism planning. In a similar vein, Lhakpa Lama Sherpa (2012) conducted the first ever empirical analysis on the effectiveness of 'Appreciative Inquiry' – a public participation approach – to understand its contribution to appropriate tourism development in the Solukhumbu District. Ngawang Sherpa (2020) used a Q Sort method to analyse the recreational preferences of both local residents and visitors to Sagarmatha National Park and its Buffer Zone. In doing so, Ngawang identified factors that can inform park development plans and strategies in Nepal.

Given the significance of international tourism in the Nepal economy, it is perhaps surprising that so few Lincoln University Nepali scholars have focussed their research on the visitors themselves. In the early- mid-1990s, both Gopal Prasad (Kafle) Upadhyay (1993) and Megh Bahadur Pandey (1994) turned their attention to this very theme to create baseline data about

the visitors to Chitwan and Sagarmatha National Parks respectively. Data collected about visitor characteristics, motivation, expectation and satisfaction offered the opportunity to establish preferred levels of use and future monitoring procedures. While these studies document high satisfaction levels, international visitors also identified issues that park managers and planners might address, including those related to rubbish disposal, sanitation and drinking water.

### **Tourism Development**

A small cluster of Lincoln University Nepali scholars have focussed more specifically on aspects of tourism development, and sought to identify ways in which to enhance the conservation – tourism interface in mountain environments. These studies range from the destination-specific to macro-level analyses of the tourism development theme. Barna Thapa (1997), for instance, adopted a wide lens on the role of interpretation in national parks, and identified a series of priorities for the development of interpretive facilities, activities and programmes with the potential to maximise the positive impact of interpretation on aspects of natural and cultural resource management in Nepal. Also taking a broad view, Shankar Koirala (1997) examined how governmental institutional arrangements, organisational structures and legal frameworks influenced tourism development, applying this analysis to Nepal's second-largest city and rapidly developing tourism destination, Pokhara. Laxmi Gurung (2012) and Pasang Sherpa (2022) both used case study methodologies to examine tourism development themes in Nepal. Laxmi studied the relationships between tourism and agriculture as a mechanism for sustainable development in Kagbeni, a remote village in the Annapurna Conservation Area. Pasang's focus was on how 'place' is created in tourism and investigated the use of on-line images in the promotion of the Khumbu District. Her study revealed that local people's perspectives are often missing from the destination promotion narrative, creating the potential for a disenfranchised community. Like many of her compatriots before her, Pasang's research concludes with an emphasis on the importance of including local people's perspectives in tourism planning and development initiatives.



*Laxmi Gurung (2012)'s study of tourism and agriculture in the Annapurna Conservation Area*

# Environmental management

The critical importance of the need for effective environmental management processes and practices, as well as education and training is emphasised in graduate work, largely working out of the Department of Environmental Management. In more recent times, research attention has been turned to understanding the implications of climate change for Nepal.

## Environmental Challenges

Nepali students have traversed the varied environmental challenges presented by water scarcity, waste management and greenhouse gas emissions. Ang Rita Sherpa (1986) explored alternative energy sources for remote rural settings to help reduce the reliance on wood burning, noting that the successful uptake of alternative energy sources will depend largely on the cost to local people. Managing waste was the topic of two students. Tsewang Sherpa (2022) focused on the chronic waste problem on Mt. Everest and evaluated the Government-initiated Garbage Deposit Scheme (GDS) while highlighting the major obstacles to its implementation. Raju Khadka (2021) quantified greenhouse gas emissions of municipal solid waste and indicated the merits of installing methane-capturing facilities. Mira Tripathi (2016) sought to understand how traditional water harvesting and management techniques play a role in reducing stress on water supply while also contributing to a range of other social, cultural and economic outcomes. The emphasis on the local level was also the focus of research by Shailendra Thakali (2012) who examined the need to sustain village, i.e. local-level autonomy, in environmental governance.

## Environmental Education/Training

The importance of developing meaningful environmental education and training programmes has been a topic of interest to Nepali research students since the 1970s. R. C Mishra (1970) was the first student to conduct research with a Nepal-focus looking at farm management education. He developed and evaluated a Farm Management Game used as a tool for teaching tropical and subtropical agriculture to groups and individuals. The intention was to provide a tool, in this case a novel game, for raising awareness and interest. Later, Surya Bahadur Pandey (1985) also regarded conservation education as vital to preserve existing natural resources. He made recommendations to make conservation education in Nepal more effective by stressing responsibility for delivery should not only rest with officials. Along the same lines, Hum Bahadur Gurung (1993), developed an “Integrative and Participatory Model” for environmental education with the intention of promoting conservation education at the community level. In the same year, Ghana Gurung (1993) indicated that the tourism sector itself, in the form of tourist guides, had an important contribution to make to the conservation education of tourists, but indicated that training programmes were insufficient and inadequate in terms of knowledge and skill acquisition.

## Climate Change

Reflecting global concerns about climate change a number of Nepali students, more recently, have focused their research on understanding the implications of change for Nepal, particularly in climate-sensitive and vulnerable rural areas. The first study by Anu Lama (2010) examined the vulnerability of nature-based tourism to the climate change through the perspectives of tourism stakeholders. The study revealed that stakeholders have good levels of understanding about climate change based on their relationship with the environment, experiential knowledge, and holistic understanding, rather than from scientific knowledge. Climate change was found to be occurring amidst a number of other forces of change such as socio-economic and political drivers. Pratigya Silwal (2016) studied the effectiveness of Local Adaptation Plans of Action (LAPAs) and concluded that there was inadequate knowledge transfer and a lack of a clear coordination at all levels, presenting major challenges for the effectiveness of LAPA. This theme was extended by Rebecca Gurung (2018), who looked at how rural farming communities acquire climate change knowledge through the LAPA workshops. She also identified concerns and identified that social and cultural barriers to understanding do exist. She advocated for the use of participatory action tools to achieve meaningful dissemination of climate information in climate planning exercises.



PLATE 3: HALF RIGHT HAND SIDE OF THE BOARD

R. C. Mishra's Farm Management Game used as a tool for teaching tropical and subtropical agriculture



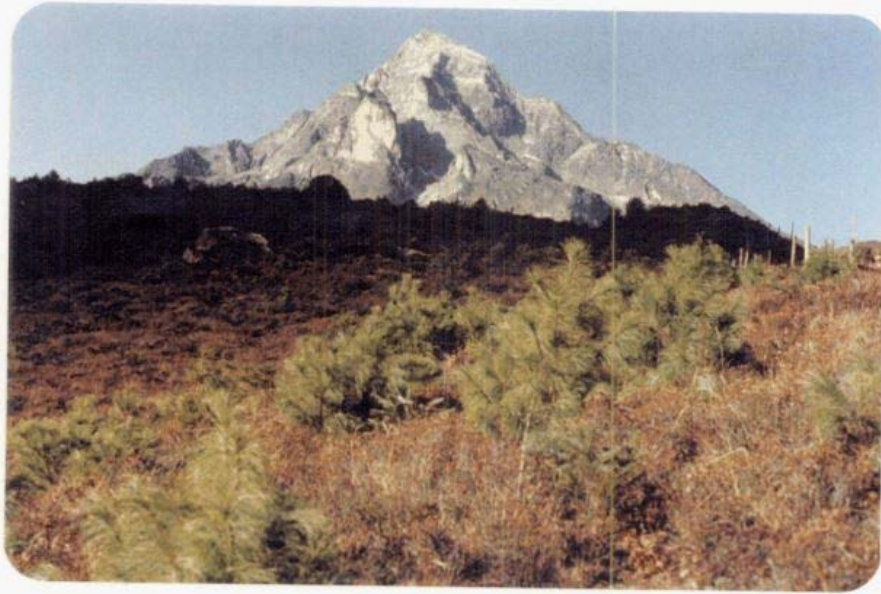


Photo 3.2. Pinus wallichiana Plantation in Sagarmatha National Park, Nepal.

*Sher Thagunna (1995) studied the role of buffer zones in protected areas in Nepal*





# **Theme Two**

**Agri-business and other  
commercial opportunities**

Research in the area of agri-business and commerce emerged in the early 2000s, with a proliferation of doctoral students, particularly in the field of forestry, farming practices and supply chain management.

## Forest management

Given the transfer into community management of large areas of Nepal's forests in the early 1990s, it is not surprising that a number of Lincoln University students have chosen to study community forests with the intention of helping to improve the implementation of community forestry programmes in terms of production, and to help address poverty alleviation for the local communities. Chandra M. Dongol (1999) examined the specific role of capital formation in contributing to sustainable community forestry concludes that capital formation is an effective medium for moving local people toward sustainable management of forests. Chandra B. Rai (2002) studied community forestry in relation to timber production and institutional barriers, specifically in the Terai and Inner-Terai regions and sought ways to increase the understanding of the timber production process and the institutional problems of community forestry. Bhubaneswor Dhakal (2005) examined the effects of community forestry policy on



Top (left): Immature forest: Top (right): Broadleaf mature forest: Bottom: Coniferous forest

**Figure 5.6 Photographs used to illustrate the type and development stage of a forest**

*Narendra B. Chand's (2011) study on the production efficiency of community forestry in Nepal*

household and community income and employment in Nepal, and usefully developed an analytical model for analysing problems and planning of common forest resources. Narendra B. Chand (2011) looked at the production efficiency of community forestry in Nepal from both an environmental and social perspective finding that communities were not producing forest products efficiently due to a range of soci-cultural factors. Bhagwan Dutta Yadav (2013) examined the effects of social and institutional structures on decision-making and the distribution benefits from community forestry, highlighting the importance of NGOs and other civil organisations to empower disadvantaged people to participate in the decision-making process. This is because a higher representation of disadvantaged people provides greater opportunities for poverty alleviation.

Mohan Babu Gurung (2014) examined the potential costs of emissions reductions in the Terai Arc Landscape of Nepal, by studying the underlying causes of deforestation and forest degradation, as well as the carbon stock in the forests. Similarly, Doma Sherpa (2014) studied the 'Reducing Emissions from Deforestation and Forest Degradation' (REDD) incentive-based scheme for climate change mitigation in the context of community forests, where equity was found to be the most important requirement for local acceptance of the scheme.

In addition to the Nepal-based forestry research, a number of Nepali students have studied forestry in New Zealand, with all the studies being located in the Canterbury region. Murari R. Joshi (2000) researched the shading effects of radiata pine trees on productivity and feeding value of cocksfoot plus clover pasture on soils at the Lincoln University agroforestry experimental area. In light of the decrease in the supply of rimu timber in New Zealand, Chandra B. Rai (2002) identified a range of strategies adopted by manufacturers in their search for alternatives to rimu. Consumer preferences for timber, particularly in relation to furniture, were also determined for key market segments. Arun Prakash Bhatta (2014) examined the impacts plantation forestry and natural reversion scenarios in the Banks Peninsula, on ecosystems services including timber production, carbon sequestration, maintenance of water quality, regulation of water flow, soil erosion control, and natural habitat provision. Both bio-physical and social assessments were made.

## **Agri-business**

Basanta R. Dhungana (2000) examined the economic efficiency of Nepali rice farms revealing large inefficiencies attributed to the variations in use intensities of resources such as farm land, seed, human labour, fertilisers and mechanical power. The study indicated the need to educate farmers on best practices to enhance efficiencies in the sector. Mahendra P. Khanal (2012) studied fresh vegetable supply chains to identify factors that impact on the environment external to these chains, information flows along them, and relationships between actors within them. It was found that factors internal to the chain were shown to be more important than those that were external. The role of cooperatives in information sharing and in performing business activities was also highlighted. Similarly, Salil Bhattarai (2013) examined the robustness of agri-business supply chains (in this instance both vegetable and spice chains) from the perspective of smallholders and advocated for investor-friendly marketing cooperatives capable of sustaining value adding activities, and the provision of credible information to promote the development and uptake of quality standards.





# **Theme Three**

## **Agriculture and Life Sciences**

While relatively fewer Nepali students have studied agricultural and life sciences at Lincoln University, there is a concentration of research in the area of animal, wildlife and habitat management; crop, seed and plant improvement; and soil productivity.

## Animal, wildlife and habitat management

Two Masters' students have worked in the field of wildlife and habitat management, both with a focus on endangered species. Ujjwal Meghi (2014) investigated tiger conservation through corridor management in the Terai Arc Landscape to help address some of the tensions found to exist between conservation efforts and local communities. Understanding meanings of wildlife and underlying social processes was found to be useful to aid better wildlife management. Sonam Lama (2018) investigated the diversity, abundance and terrestrial activity patterns of the endangered red pandas in eastern Nepal by undertaking a camera trapping survey. The monitoring revealed 17 species and the approach was deemed helpful in the long-term monitoring to assist with wildlife management, and ultimately for long-term conservation efforts. In addition to these Nepal-based studies, Chet Raj Upreti (1989) looked at the effect of shelter on lamb survival in New Zealand and found that lamb survival can be improved by providing shelter during the first three days of age.



Sonam Lama's (2018) camera trapping survey capturing the first photographic record of the melanistic leopard

Figure 3.6: The first photographic record (dated 31 March 2018) of the melanistic leopard *Panthera pardus* in the Panchthar-Ilam-Taplejung Corridor, which falls in the Kangchenjunga landscape.

## Crop, seed and plant improvement

Crop, seed and plant improvement has been a key area of interest for Nepali students with the majority of research undertaken in New Zealand. Ram Krishna Raut (1973) investigated the optimum density, spacing arrangement, and fertiliser level to produce the highest possible yield of carrots. Seed production was the focus for Jiwan K. Gurung (1991) who measured seed production of rhizomatous clovers by examining flowering patterns and seed yields over three growing seasons. Pema Gyamtsho (1990) measured the performance of lucerne/ grass mixtures under different grazing durations and soil depths. V. K. Dutta (1984) examined the effect of plant growth regulators on the growth and yield of barley under New Zealand conditions. In the area of plant physiology, Bhairab Raj Kaini (1982) studied shoot growth and flower initiation in apples by researching the proximity to the root bud position and cultivars on shoot growth. Also in this area, Umed Kumar Pun (2000) examined the role of ethanol and acetaldehyde treatments to increase the vase life of cut carnation flowers, and determined both were effective but that efficacy depends upon plant variety. In the field of invertebrate biology, Sundar Tiwari (2019) investigated how best to manage the prevalence of wheat bug



pests in forage brassicas in New Zealand and developed a habitat management protocol using trap plant species. The only Nepal-based study has been that of Sunita Sanjyal (2021) who assessed the seed production potential of Teosinte, a herbage crop, in the central region of Nepal and determined optimal times for seed harvesting, sowing and cutting.



Figure 1.6 Teosinte inflorescence



Figure 1.7 Teosinte plants ready for seed harvest



Figure 1.8 Seeds from different cob position



Figure 1.9 Fresh seeds

*Sunita Sanjyal's (2021) assessment of Teosinte in the central region of Nepal*

## Soil productivity

The first Lincoln Nepali research student, Bidur Kumar Thapa (1956) worked in the area of soil productivity and researched the accumulation and composition of organic matter in grassland soils, with particular reference to organic phosphorus, carbon, nitrogen and sulphur. He identified the importance of phosphorus, in particular.

## Peer-reviewed publications

In addition to the unpublished dissertations and theses reviewed in this bibliography, we have also collected data on the students who have gone on to publish their Lincoln research findings in peer-reviewed outlets (see Appendix 4). Since all of the research outputs are quality assured through the peer-review process, disseminating research beyond the thesis/dissertation itself demonstrates the quality and significant collective scholarly impact of the work of these students and their supervisors. Importantly, publishing is a critical mechanism to ensure a much wider readership and application of the research findings.

B. Thapa, who was the first documented Nepali research student at the then Lincoln Agricultural College, published his findings on grassland soils in the *Journal of Soil Science* in 1959. Since then a total of twenty-four Nepali students have published a total of fifty articles or book chapters based on their research at Lincoln University. This equates to just under one-half of all completed research students. All but two of the Nepali PhD students published from their doctorates.

While the publications are distributed widely across the disciplinary specialisms of the University, forestry dominates the outputs, reflecting the number of doctoral students working

in this area (thirteen publications). The current Faculty of Agri-Business and Commerce had 21 publications; Agriculture and Life Sciences had 20 publications, and Environment, Society & Design had 10 publications. Some of the students have published multiple times, including doctoral students: S. Tiwari (12); D. B Yadav (5); B. Dhakal (4); R. Khadka (3); U. K Pun (3) S. Bhattarai (2) and M. Tripathi (2). Master's student, H.B Gurung also published from his thesis (3).

Of note, a large number of graduates have taken up careers in research informed organisations or as University teachers themselves. We have not included these potentially extensive indirect outcomes here but focus solely on work that has arisen directly from their Lincoln research studies.



# **Closing remarks**

## Closing remarks

This bibliographic review document serves as a testament to the extra-ordinary contribution of Nepali students who, through their scholarly journey at Lincoln University, have sought to advance our understanding of people, activities and natural resources in a variety of settings across the remote mountainous, hill and Terai areas of Nepal. The range of themes that span the specialisms of the University are equally impactful, from exploring the interface of tourism and protected areas, to assessing the merits of innovations in agriculture and forestry management practices. In more recent times students have turned their attention to the complex challenges associated with climate change, bio-diversity loss and disaster risk reduction. Recognising that the impacts of change are likely to manifest at the local community scale, perhaps the most enduring collective contribution is the focus on the needs of people at the local level. We witness in our Nepali research students an academic drive and endeavour centred on making improvements to livelihoods, developing new tools and approaches, building local capability, and managing land sustainably. As we reflect on the 70 years since the Everest summiting, and the presence of Nepali research students at Lincoln University for almost the same time span, the University could not be more proud of these efforts.

**Namaste and Kia Kaha!**

# **Appendix 1**

**Alphabetical list of thesis bibliographical details  
and long form abstract (from [research@Lincoln](mailto:research@Lincoln))**

## **Baral, Ana (2013)**

**Impacts of wildlife tourism on poaching of Greater One-horned Rhinoceros (*Rhinoceros unicornis*) in Chitwan National Park, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Applied Science (Parks, Tourism and Ecology) at Lincoln University**

### **Abstract**

Chitwan National Park (CNP) is one of the most important global destinations to view wildlife, particularly rhinoceros. The total number of wildlife tourists visiting the park has increased from 836 in Fiscal Year (FY) 1974/75 to 172,112 in FY 2011/12. But the rhinoceros, the main attraction for the tourists, is seriously threatened by poaching for its horn (CNP, 2012). Thus, the study of the relationship between wildlife tourism and rhinoceros poaching is essential for the management of tourism and control of the poaching. This research identifies the impacts of tourism on the poaching. It documents the relationships among key indicators of tourism and poaching in CNP. It further interprets the identified relationships through the understandings of local wildlife tourism stakeholders. Finally, it suggests future research and policy, and management recommendations for better management of tourism and control of poaching. Information was collected using both quantitative and qualitative research approaches. Data were collected focussing on the indicators of the research hypotheses which link tourism and poaching. Data required for the indicators were gathered from the existing records of the CNP, Department of National Parks and Wildlife Conservation (DNPWC), published materials and the research literature. Indicators of each hypothesis were graphed and interpreted by 21 key stakeholders through semi-structured interviews. Field observation was also conducted to gain in depth knowledge of the physical settings of the rhinoceros conservation. The study shows that as wildlife tourism increases, park surveillance and anti-poaching operations (APOs) also increase. Movement of the tourism activities serve as a form of patrolling the park. Moreover, tourism generates money for the surveillance and the APOs through buffer zone management programmes and stakeholders' support. The surveillance and the APOs are vital to reducing poaching. In addition, as the penalty rate for the poachers decreases, poaching increases and vice versa. Furthermore, as the value of the rhinoceros horn in international black market increases, the poaching also increases. Political instability has been the primary cause of the poaching since 1950s. Wildlife tourism and rhinoceros poaching impact upon each other. Financial support is the most important contribution made by tourism for anti-poaching activities. Habituation and the displacement of the rhinoceroses from the usual habitats caused by the tourism create the poaching environment. Hence, the most important implication of this finding is for the management of tourism and the control of poaching through the integrated conservation efforts of the Park, the Nepal army, police and buffer zone communities. The impacts of the habituation and the displacement on poaching and of the poaching on tourism need to be further studied in detail. The study makes an important theoretical contribution to strengthen Higginbottom and Tribe's (2004) framework for wildlife tourism. The study attempts to systematically quantify the links between wildlife tourism and the rhinoceros population, and identifies that wildlife tourism increases the financial support and political pressure for conservation, which were identified as weak linkages in the original framework.

### **Keywords**

*conservation; habituation; Chitwan National Park; wildlife tourism; Greater One-horned Rhinoceros/rhinoceros; poaching; displacement; stakeholders; penalty; political instability; impact; indicators; surveillance; anti-poaching operations; buffer zone; Nepal*

## **Bhattarai, Salil (2013)**

### **Robustness of agribusiness supply chains from a smallholder perspective: case studies in Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University**

#### **Abstract**

This study aims to identify effective ways of improving chain robustness from a smallholder perspective. The study developed a model based primarily on theories of New Institutional Economics. This model was used to identify factors that constrain choices in modes of engagement available to smallholders, limiting the chain's robustness from their perspective. A qualitative, multiple case study method was used to gather and analyse data on four agribusiness chains in Nepal; organic and conventional vegetable chains, and ginger and large cardamom spice chains. The analysis followed the approach of searching for patterns in the data and comparing or contrasting observed patterns with those predicted by theory. Individual case studies were analysed separately to identify transaction specific determinants of the observed modes of engagement. Cross-case comparisons within the vegetable and spice chains were then made to identify the effects of external attributes on the observed modes of engagement. The organic vegetable chain was characterised mainly by relational contracting and informal markets. There was also evidence of vertical integration. The conventional vegetable chain was characterised mainly by spot markets and informal markets. Informal market trading was the only form of smallholder engagement in the large cardamom and ginger chains. However, smallholders had previously engaged in relational contracts in the ginger chain, and in 'captive' relational contracts in the large cardamom chain. There was no evidence that smallholders had ever engaged in conventional contracts in any of these chains. The 'captive' relational contract observed in the large cardamom chain was unanticipated, and hence informed a revision of the conceptual model. Among the external attributes, market product attributes, market structure, access to information and credit, and collective action were found to alter the modes of engagement available to smallholders. Extension services and the formal legal system had little impact on modes of engagement, possibly reflecting inadequacies in the extension system and high costs of using the legal system to enforce small contracts. The study showed that products possessing only search attributes were traded in either spot or informal markets, whereas products with both search and credence attributes were exchanged via relational contracts. The long export chains with many intermediaries did not favour spot markets or contractual arrangements because farmers' perceptions of asymmetric information discouraged investment in value-adding assets and deterred efforts to establish and comply with grades and standards. The case studies also demonstrated that the expansion of mobile telephone services and the emergence of rural financial institutions opened more beneficial modes of engagement to smallholders. While traditional cooperatives can and do help smallholders to acquire more bargaining power, and to address high unit transaction costs, the study revealed that the traditional cooperative model is unlikely to sustain modes of engagement for value-added products because it discourages member investment and undermines compliance with relational contracts. Although the study chains sustained smallholder engagement in at least one mode of engagement, the vegetable chains were more robust than the spice chains as they offered smallholders a choice in selecting a portfolio of engagement modes that better satisfied their risk-reward preferences. The analysis suggests that improvements in the flow of information, introduction of grades and standards, a switch to more innovative cooperative models, a market-oriented extension service and access to more affordable ways of resolving contract disputes would help smallholders to achieve better utility outcomes in existing modes of engagement, and also could provide them with new modes of engagement. In this regard, the evidence pointed strongly to the role of investor-friendly marketing cooperatives capable of sustaining value adding activities, and the provision of credible information to promote the development and uptake of quality standards.

#### **Keywords**

*Vegetable chains; spice chains; farmer-buyer dyads; transaction costs; collective marketing; case study*

## **Bhatta, Arun Prakash (2014)**

**The contribution of limited-focus land-use programmes in the provision of ecosystem services in New Zealand**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University**

### **Abstract**

A common approach in the provision of Ecosystem Services (ES) is to develop comprehensive ES markets or establish payments for ES, both of which are complex and costly. As an alternative, this research has focused on (i) ES provided by different types of single or limited-focus, land-use programmes, (ii) people's preferences for different ES and effect on relative ES from single or limited-focus land-use programmes, and (iii) relative cost of delivering ES from single or limited-focus land-use programmes. To achieve these objectives, this research studied the ES from an afforestation (plantation) project and a reforestation project, either or both of which could arise from three forest-related programmes in New Zealand, the New Zealand Emissions Trading Scheme or ETS (a market approach), the East Coast Forestry Project (ECFP) (a subsidy/regulation approach), and the QEII National Trust (a partial subsidy through an NGO approach). Each programme provides incentives to landowners to plant and/or conserve trees on their lands to meet particular ES objective(s), but which also produce other ES. The impacts of the plantation forestry and natural reversion scenarios on flows of six ES – timber production, carbon sequestration, maintenance of water quality, regulation of water flow, soil erosion control, and natural habitat provision – were studied. For this purpose, biophysical models and a habitat function developed in New Zealand were used for estimating flows of ES (bio-physical assessment). Analytical Hierarchy Process and Max100 methods were used to derive preference weights for the flows of ES from members of the public (social assessment). The Kaituna catchment in the Banks Peninsula was selected for the study site as it is on the Environment Canterbury list of potential flow-sensitive catchments. The results of converting steep, Class 4 and above land (about half of the catchment area) from existing sheep and beef grazing to plantation forestry or to scrubland enhances a number of ES, namely climate regulation, water quality, erosion control, and natural habitat provision. However, water yield decreases by about 21 and 10 percent respectively in the plantation forestry and scrubland scenarios (an indicator that may be relevant in other low rainfall areas). Using a cumulative indicator score of all ES flows measured, calculated by normalising ES outputs for each land-use scenario, the plantation forestry scenario showed a higher combined ES flow score (1.88) than the scrubland scenario (1.39). The main reason for this is that timber revenue is foregone in the scrubland scenario and scrub stores less carbon than does plantation forests. The research also assessed three extreme (and less likely to occur) land use scenarios, in which all the land available in the catchment except Department of Conservation land, were converted to either plantation forestry, scrubland, or exotic pastures (dairy). In the extreme scenarios, an 'all plantation forestry' scenario gives the highest cumulative ES indicator score (2.77) whereas an 'all pasture (dairy)' scenario gives the lowest cumulative indicator score (-1.84). A survey of members of the public in Canterbury found their preferences for ES in this order: water quality (regulating ES), followed by production (provisioning ES), other regulating ES (erosion control, and water yield, except carbon sequestration which was least preferred), and cultural ES. When ES indicator scores for each land-use scenario were weighted by preference weights, the rankings of which scenario provided the highest combined ES flows changed. Different land-use programmes can be used for the provision of ES, but the relative costs of achieving the scenarios are different. The ETS had the lowest cost per hectare to deliver the programme. The treatment of extra land by natural reversion via QEII can be achieved at approximately half of the cost required for ECFP grants. The research approach used demonstrates how readily available climate, landform, and soil data can be integrated with preferences of members of the public to analyse the impacts of land-use change on flows of ES without the need to monetise them. This research method is useful in situations where it is a struggle to find a balance between the interests of different stakeholders, while striving to maximise flows of ES at local, regional, and national levels.

### **Keywords**

*ecosystem services; land use; simulation; preference weights; cost analysis; New Zealand*



## **Chand, Narendra B. (2011)**

**Production efficiency of community forestry in Nepal: a stochastic frontier analysis:  
Community forestry policy impacts and alternative policies for poverty alleviation in Nepal  
A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of  
Philosophy**

### **Abstract**

During the past three decades, 1.2 million hectares of Nepal's forests have been transferred to community management with the twin objectives of supplying forest products and addressing local environmental problems. Community forests provide a range of benefits, from direct forest products such as timber, fuelwood, fodder, litter and grasses to ecosystem services such as soil protection and wildlife conservation. However, there is limited information on the relationship between the environmental and the community welfare effects of entrusting forests to communities. This study has analysed the production of natural environmental and direct forest product benefits in CFs, and identified the relationships between the outputs. Community Forest User Groups were surveyed to measure the flow of products from their community forests. Environmental benefits were measured using a novel application of the Analytic Network Process (ANP). The ANP is generally executed by taking expert opinions; however, this study has taken forest user member's opinions. The stochastic frontier production analysis indicated that the production of direct forest product benefits per hectare was influenced by various socioeconomic and forest related factors, most prominently forest size, group heterogeneity, forest product dependency, size of community and links to the market. In addition, forest product benefits and environmental benefits were complementary to each other. Likewise, the production efficiency analysis showed that communities were not producing forest products efficiently. It also showed that factors such as social capital, support from the government and the longevity of CF management, contributed positively to the production efficiency, whereas caste heterogeneity in the executive committees of community forest user groups was negatively associated. It is anticipated that these findings will contribute to better implementation of community forestry programmes in Nepal and consequently will improve the welfare of communities by increasing direct forest product benefits and environmental benefits.

### **Keywords**

*community forestry; stochastic frontier; production efficiency; Nepal; development*

## **Dhakal, Bhubaneswor (2005)**

**Community forestry policy impacts and alternative policies for poverty alleviation in Nepal**  
**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy**

### **Abstract**

This study examined the effects of existing community forestry policy on household and community income and employment in Nepal. Alternative policies to address income and employment problems are also assessed. To analyse the problem a linear programming model for welfare maximization was developed. The model was used to examine the effects of seven community forestry policy scenarios in three districts of the mid-hill region of Nepal. The data for analysis were collected from 259 farming households of six forest user groups. The model parameters were mainly from secondary sources. This study shows that current community forest policy has some effects on household income and employment. Current policy dictates the use of community forestland for timber production, which produces little of the firewood and fodder needed daily by local households. The policy restricts timber harvest to less than 30 percent mean annual increment (MAI) for hardwood and generally 50 percent MAI for softwood. This policy affects the income of poor households the most and has made them unable to meet their requirements for minimum calories and other basic, non-food items. The forest policy constrains women from obtaining benefits from community forests. The effects are highest for people in remote areas, high agro-climatic zones, community forest areas in wildlife buffer zones, and other communities where there is no market for timber products from community forests or they are only used for home consumption. This policy increases income inequalities between households and affects poor households the most. The best community forest management policies for increasing income and employment were either leasing community forestland to households according to their ability to use them or collectively producing firewood, fodder and timber according to household needs. These unconstrained policies benefit all disadvantaged people and these benefits are highest for poor households. The results show that most of the communities have sufficient forestland to meet the timber, firewood and fodder needs of all households. If the government introduced an unconstrained leasing policy or a collective management policy, the access of poor households to the resources could be increased without affecting the resource needs of other households. About 10 percent of the total land area, including private and community forest area, is sufficient to meet the need for household timber supplies. In situations where sufficient fodder is produced, a small area is required to supplement the firewood needs of households. After meeting basic timber and firewood needs, the most profitable land use is fodder production. Under local technological and geo-ecological conditions profitable fodder production is possible without removing tree cover and affecting environmental conservation. Under alternative forest management policies the income and employment of communities, particularly poor households, can increase to a level sufficient to meet their minimum requirement for basic needs. This study has many implications. This study explained that the emerging socio-economic problems of community forests are largely determined by the government policies. The implication is that these emerging problems can be solved only a little by community-level support alone. Similarly the study shows socially disadvantaged people are not benefited in the programme with sound socioeconomic goals and a participatory development approach. This means achieving sound development policy goals is not possible only by the participatory development approach if governments introduce policy frameworks for production and distribution of common property goods and services that are inappropriate in given socioeconomic conditions. Another implication is that poor people get most disadvantaged in agricultural dependent countries like Nepal if the government's overriding priority of land based resources management is for environment conservation. This study has developed an analytical model for analysing problems and planning of common forest resources for mountain communities, and has identified some potential areas for future work. These works are a foundation for analysing productive and distributive problems in common natural resources useful particularly for mountain rural communities.

### **Keywords**

*development; community forest; household level impacts; policy analysis; poverty; resource allocation*

## **Dhakal, Narayan (1991)**

### **Socio-cultural impacts of tourism in third world countries: a case study of Nepal**

#### **Dissertation as partial fulfilment of Post Graduate Diploma in Parks, Recreation and Tourism**

#### **Abstract**

Traditionally, most of the world's people were dependent upon agriculture. In the early development of agriculture it is assumed that "survival" was the primary motive. As people developed better equipment and facilities so too did they increase their living standards. Fulfilment of one need is often the origin of another. During this period, society was ever changing. Change is an on going feature of all societies. Tourism in the third world is often regarded often a principal source of foreign currency. Social and cultural impacts of tourism have been neglected in order to gain economic benefit. Advantages of tourism appear to be dominated by economic considerations. Tourism is not only an economic phenomenon but has social implications as well. The relationship of hosts and guests is an important aspect of this. Mutual understanding between hosts and guests is an essential aspect of tourism, particularly in the third world countries. This study looks at some social aspects of tourism. When discussing the social impact of tourism, it is appropriate to discuss some basic theoretical aspects of sociology. The first chapter deals with the relevant concepts of sociology including social change, social impact and cultural change. The second chapter, provides a definition of third world countries, and examines characteristics of these countries. Social structures of the third world countries and their resources are discussed. Chapter three starts with a definition of tourism, types of tourism and negative and positive impacts of tourism. In chapter four social consequences of tourism, such as host / guest encounters and the social impacts of tourism are discussed. Chapter five highlights some cultural events which may be impacted by tourism, such as arts, crafts and festivals and the benefits and costs of these impacts. Similarly, chapter six discusses tourism in the third world and its economic and social consequences. The seventh chapter is particularly concerned with the social impacts of tourism in Nepal, as a case study. Social impacts of tourism in two important areas, the Sagarmatha National Park area, and the Chitwan National Park area are chosen for the study. Finally, chapter eight offers some suggestions and recommendations. These may be useful for considering community aspects of tourism. Chapter nine is the conclusion of the study.

#### **Keywords**

*third world tourism; impacts of tourism; cultural impacts; social impacts; Nepal; development*

## **Dhungana Basanta, R. (2000)**

**Measuring and explaining economic inefficiency of Nepali rice farms: a non-parametric production frontier approach**

**A thesis submitted in partial fulfilment of the requirements for the degree of Master of Agricultural Science (Agricultural Economics) at Lincoln University**

### **Abstract**

Efficiency has been proven to be an important managerial concept in improving total factor productivity in agriculture. The four sources of economic inefficiency: allocative, technical, pure technical and scale inefficiency of a sample of seventy-six Nepali rice farmers were examined using the data envelopment analysis (DEA) decomposition method. The inefficiency indices computed by the DEA were then used as the dependent variable in a Tobit (censored) regression model using decision-makers' attributes as the explanatory variables. The results revealed relatively large inefficiencies among the farms sampled. The average economic, allocative, technical, pure technical and scale inefficiencies were 34%, 13%, 24%, 18%, and 7% respectively. There is also a significant variation in the level of inefficiency across farms. The inefficiencies are attributed to the variations in use intensities of resources such as farm land, seed, human labour, fertilisers and mechanical power. The variations were explained by farmers' age, education, gender, family labour endowment and risk aversion. Therefore, to be successful the efficiency improvement program must be flexible enough to accommodate the diversity of farmers and their improvement needs. The results also suggest that increasing effort towards educating farmers on best practices can enhance efficiency in Nepali rice farming. Thus government effort in educating farmers in order to increase the total factor productivity in agriculture is desirable. This effort must go hand in hand with using the knowledge from the benchmarking farms. Other policy implications and development strategies are also drawn from the findings.[Hide full abstract]

### **Keywords**

*development; DEA; frontier; efficiency; rice farming; Tobit regression; socioeconomic attributes; risk attitude; Nepal*

## **Dongol, Chandra M. (1999)**

**The role of capital formation in contributing to sustainable community forestry in Nepal**  
**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Resource Studies at Lincoln University**

### **Abstract**

The Nepali Forest Act 1993 clearly identifies the roles and rights of forest user groups (FUG's) and gives them the legal right to manage all forest products from their forests in return for forest protection. In the 1990s, community forestry in Nepal has taken a holistic approach that embraces forestry as a source of income, employment and community development. Many of the FUG's in Nepal have used community forestry as a source of income and to gain capital for investment. This thesis investigates the roles of capital formation in contributing to the sustainability of community forestry in Nepal using a case study approach based on 23 FUG's. The approach uses questionnaire surveys and semi structured face to face interviews with key informants and government and non government staff working in community forestry. The study examines the sources of incomes and expenditures, people's beliefs on fund management in terms of sustainable development and the effect of capital formation on community forestry development. Through cluster analysis and triangulation approaches attention is also focused on the elements necessary for a FUG to be successful in capital formation. The analysis of results shows that manageable mature forest, accessibility, high prices, a system of charging for all kinds of forest products and the sales of surplus forest products outside the FUG are the key elements for successful capital accumulation in a FUG. Three groups of FUG's were identified with the help of cluster analysis: successful, moderately successful and unsuccessful clusters. The results further suggest that successful capital formation in community forestry changes the people from destroyers to protectors. The multiple benefits of funds, community development and forest improvement changed people's vision and behaviour, their attitude towards and understanding of community forestry. This has increased the people's interest and awareness in community forestry, which has stimulated thinking about the sustainability of community forestry among users. This kind of local people's initiative makes community forests more secure, protected and wisely managed for sustainable development. However, capital formation has led to resource acquisition thinking among those FUG's seeking higher incomes. The study finishes by discussing a number of issues identified by the research and concludes that capital formation is an effective medium for moving local people toward sustainable management of forests and it has brought a new vision to community forestry. Future research needs are identified and recommendations are made to increase the benefits of community forestry for local people.

### **Keywords**

*development; Nepal; community forestry; capital formation; sustainable development; Forest User Groups FUG; forestry assets*

## Dutta, V. K. (1984)

### The effect of plant growth regulators on the growth and yield of barley

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Agriculture [i.e. Agricultural] Science in the University of Canterbury [Lincoln College]

#### **Abstract**

(1.) Recent investigations have shown that applying plant growth regulators (PGRs) to barley can prevent yield losses which would otherwise be caused by lodging and, in some conditions, enhance yield even in the absence of lodging. The purpose of the work described here was to establish the physiological and morphological basis of such responses and to determine whether they are likely to occur under field conditions in New Zealand. (2.) Four experiments were conducted in 1982-83 to investigate the influence of the growth promoter ( $GA_3$ ), and the growth retardants CCC, Terpal, barleyquat and Cerone (applied at the recommended stage) on the stem extension, tillering, grain and straw yield, and yield components of several cultivars of spring barley (*Hordeum vulgare* L.). Two of the experiments were done in the field, one of which was also done in a growth cabinet and glasshouse. There were no PGR X cultivar interactions with respect to the major variables measured. (3.) CCC applied before tillering (ZGS 13) in the controlled environment experiment slowed stem growth initially but had no influence on plant height at maturity. Terpal applied at ZGS 32-37 severely slowed stem extension and decreased plant height at maturity in all environments. An early application (ZGS 13) of  $GA_3$  increased plant height initially in all environments but the effect disappeared within 3-4 weeks of application. barleyquat and Cerone had no effect on plant height at maturity. (4.) CCC stimulated tillering shortly after application but had no effect on ear production. Terpal not only stimulated tillering but also increased the number of ears plant<sup>-1</sup> in all environments except the growth cabinet where number of ears plant<sup>-1</sup> was decreased. These increases in tillering were associated with an initial restriction of stem extension caused by Terpal.  $GA_3$  had no effect on tillering 1 or ears plant<sup>-1</sup> (5.) Terpal decreased grain yield only in the growth cabinet and the glasshouse and this was associated with very poor grain set. In the field Terpal decreased grain ea<sup>-1</sup> and 1000-grain weight. Other PGRs had no effect on yield or yield components. (6.) Terpal delayed ear emergence and maturity by 2 days in the field; the other PGRs were without effect. (7.) The six-row cultivar, Kakapo, yielded well in the growth cabinet where the two-row cultivars were handicapped by their failure to set many grains. (8.) Among the PGRs investigated, Terpal alone constantly decreased plant height. This suggests that Terpal was potential for preventing yield losses due to lodging in cultivars commonly grown in New Zealand. The likelihood of yield enhancement in the absence of lodging appears small.[Hide full abstract]

#### **Keywords**

*plant growth regulators; growth promoter; barley; yield; growth promotion; stem extension; tillering; yield components; Hordeum vulgare L.; Terpal*

## Gurung, Ghana (1993)

### The roles of tourist guides and their training needs: A case study in Nepal

A thesis submitted to the Lincoln University in partial fulfilment of the requirements for the degree of Master of Parks and Recreation Management

#### **Abstract**

Current growth of tourism into peripheral regions such as mountains and remote areas is occurring at the same time as tourists, predominantly from First World countries, are increasingly seeking qualitative components to their travel experience. Thus, adventure, along with ecological and cultural interpretation, and understanding are assuming greater significance in the tourist experience. Within the increasing literature on the sociocultural and environmental impacts of tourism, tourist guides are being suggested as a necessary requirement to manage tourist encounters and experiences, especially in Third World destinations. Nepal is one such destination that has experienced rapid and sustained growth in tourist arrivals, particularly in the past 25 years. Beside the Himalayas, cultural and biogeographical diversity have been the key 'products' of tourism in Nepal. However the generally Mountainous terrain and limited infrastructure ensures that many tourists contract trekking or touring guides. Field research involving host communities, tourists, guides and their managers was undertaken to examine and evaluate the various components of the guiding role, and to determine potential educational and training needs. The methods used were survey interviews, a postal survey of New Zealand travellers to Nepal, and informal interviews with local people and international visitors to Nepal. In this study, structured face-to-face interviews has been the most appropriate research technique despite being time consuming and costly. In spite of the recognition of the environmental and socio-cultural costs of tourism, further development of tourism is considered vital to Nepal's economic growth and as one solution to the numerous challenges facing the country. However, the majority of international visitors and locals, who are not directly involved in the tourist industry, believe tourism has room to grow but should not dominate as a strategy for development. Indeed, most participants in this research favour tourism policies that incorporate compulsory training for tourist guides, educating locals and visitors in environmental and socio-cultural sensitivities, and promote spending of tourist dollars at the local level in a way that helps to achieve wider environmental and social objectives. The need for trained tourist guides in the tourist industry is acknowledged by respondents to this research. Specific suggestions are made concerning the importance of culture and nature interpretation within Nepal, and for visitor safety. These suggestions however, are primarily targeted to meet the needs of tourists, rather than to safeguard the tourism products (host culture and environment). The majority of guides who have undertaken training report that their training programmes are insufficient and inadequate in terms of knowledge and skills. As a result, most of them are unable to perform some of the duties expected of guides such as nature and culture interpretation even though they were aware of these duties. Guiding related training programmes will therefore need to be updated to ensure production of skilled personnel for the tourist industry. The Department of Tourism and the Hotel Management Tourism Training Centre of Nepal were seen by most respondent groups as the appropriate organisations to accomplish these tasks.

#### **Keywords**

tourist experience; development; tourism development; socio-cultural impacts; environmental impact; education; Nepal; tourism; tour guide; tourism management

## **Gurung, Lal P. (1989)**

**Socio-cultural, economic and physical impacts of tourism in the southern part of Annapurna Region, Nepal**

**Dissertation submitted in partial fulfilment of the requirements for the Diploma in Parks and Recreation Management in Lincoln College, University of Canterbury**

### **Abstract**

My particular interest in preparation of this dissertation is my concern about the deteriorating socio-cultural and physical environment of the Modi Khola valley. The apparent conflict between tourism and the environment is largely due to the difficulties of protecting the environment in the face of economic pressures to promote the growth of tourism. The economic pressures arise because tourism is a means of generating income in depressed areas, like the Modi Khola valley. Being a local person of the valley, I am aware of the needs of the local people. To understand the problems, it is necessary to identify differing priorities between rich western nations which generally see the destruction of the environment as a pressing problem affecting everyone in the world, and poor nations like Nepal, whose priorities are first to raise their living standard. What is lacking here is a proper system of management of both tourists and resources, and a better knowledge based on sound research, to avoid the negative impact of tourists. This dissertation provides an overview of tourism in the Modi Khola valley and its impact on the local communities. It provides recommendations to minimise these impacts.

### **Keywords**

*tourism conflict; Modi Khola; socio-cultural environment; physical environment; economic pressure; tourism impacts; Nepal; development*



## Gurung, Laxmi (2012)

Exploring links between tourism and agriculture in sustainable development: A case study of Kagbeni VDC, Nepal

A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Tourism Management at Lincoln University

### **Abstract**

Tourism is widely recognized as one of the world's largest industries (Torres, 2003, p. 546). With approximately one-third of all trekking costs spent on food, creating linkages between tourism and agriculture holds great potential as a mechanism for sustainable development at the village level. This is particularly true for developing countries that have large rural populations highly dependent on traditional farming. For several decades, linking tourism and agriculture to promote sustainable development has been a major focus of the Government of Nepal (GoN) (CR, 2002). Until now, however, the effectiveness of these efforts has not been studied. Therefore, it was considered important to conduct a case study of Kagbeni VDC, a remote village located in the high mountains of the Annapurna Conservation Area (ACA) of Nepal where tourism was first introduced over 50 years ago. The field work was conducted in September and October of 2011 using qualitative methodology involving oral history interviews. On return from the field, transcription of the unstructured interviews was recorded in English, coded and analysis accomplished using computer-assisted qualitative data analysis software (NVivo). Sorting and memoing enabled the data to be divided into five, roughly equal, time periods and characterized into four themes in order to make the data more meaningful. As documented by the results, a qualitative method proved to be effective in detailing the emerging linkages between tourism and agriculture in Kagbeni. It also enabled a comprehensive picture to be drawn of the economic, environmental, cultural, and lifestyle changes occurring over time stemming from the increase in tourism (from an occasional trekker or researcher in the 1960s to over 30,000 visitors per year at present). In large part, because of the positive interaction between tourists and local villagers, and aided by GoN inputs (e.g., creation of the ACA, introduction of better seeds in the 1990s and completion of a road linking the village with the outside world in 2006), tourism and agriculture in Kagbeni have become symbiotically linked. Thus, as tourism has increased so has the need for local agricultural products and workers. Now, as a result of the growth in tourism and agriculture, nearly year around employment is available for local villagers at many levels, and villagers who previously emigrated are returning to Kagbeni. In conclusion, the positive linkages between tourism and agriculture documented in this case study demonstrate that, under the right conditions and given sufficient time, these two sectors can coexist and also become a driving force in sustainable development at the village level.

### **Keywords**

*Kagbeni VDC; Annapurna Conservation Area; Oral History; Nepal; tourism; agriculture; sustainable development; qualitative methodology; case study; non probability sampling; traditional farming; NVivo*

## **Gurung, Hum Bahadur (1993)**

**An evaluation of models for environmental education in developing countries**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Parks and Recreation Management at Lincoln University**

### **Abstract**

The planet Earth is under growing stress from human activity, and there is increasing pessimism surrounding the outlook for the world environment. Despite rapid escalation of environmental problems in developing countries, there seems to be little concern about solving these problems. Environmental education is vital to heighten people's awareness of sustainable resource use and development. This study evaluates selected environmental education models and processes. In it, I argue that present models could only be used in developing countries with considerable modification. There is thus a need for an environmental education model more directly applicable to developing countries in order to facilitate conservation education at the community level. Such a model will help solve environmental problems which directly impact local people's quality of life. A literature review, an expert survey, and interviews were used to collect information for this research. Thirty-one international respondents returned a questionnaire about the underlying basis for models of environmental education. From these thirty-one, fifteen people were selected to review the researcher's model. Results from the expert opinions surveyed indicate differences in the magnitude and causes of environmental problems in various countries and differences of opinion about the role of environmental education in resolving these problems. There was consistent support for the participation of local people in environmental education planning and for the integration of cultural and religious values in nature conservation. The outcome is an "Integrative and Participatory Model" for environmental education which will promote the goals of conservation and sustainable development via a synergic relationship between local people and nature conservation agencies.

### **Keywords**

*environmental education; conservation education; developing countries; environmental problems; cultural and religious values; local people participation; nature conservation; sustainable development*

## Gurung, Jiwan K. (1991)

### Seed production and seedling establishment in rhizomatous clovers

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Agricultural Sciences

#### Abstract

Seed production was measured from four seed lines of rhizomatous clovers, Caucasian clover (*T. ambiguum*) cultivars Alpine (diploid) and Monaro (hexaploid), and zigzag clover (*T. medium*) seed lines Porters Pass and Kentucky in 1987/88 (first year), 1988/89 (second year) and 1989/90 (third year). Flowering patterns and seed yields were studied in all three seasons. Seed yield components were studied in the second year. In the three year old plants the effect of six closing times on seed yields, seed yield components and dry matter yields were investigated in the third year. The experimental design in 1987/88 and 1988/89 was a randomised block design with two replicates, and a split-plot design was used in 1989/90. The eight plots, each measuring 3.75 X 10m, had five rows of plants at 1m and 0.5m inter- and intra row spacing respectively. In 1989/90, each plot was divided into six sub-plots to accommodate six closing treatments. The soil in the trial area was Templeton Silt Loam with 31% (w/w) field capacity. In 1988/89 and 1989/90, 20mm and 40mm of water was applied through irrigation on 20 December and 15-16 December respectively. No irrigation was applied after post-harvest. In 1989/90, superphosphate was applied on 3 October 1989 at the rate of 200 kg/ha. Crops were sprayed with herbicides on 14 February 1989 and 26 June 1989. During the 1989/90 flowering period plants were sprayed twice with the insecticide 'Marvarik' on 21 December and 19 January. Climatic conditions over the 1987/88, 1988/89 and 1989/90 experimental periods (Sept-Feb) fluctuated considerably. The 1988/89 period was much warmer and drier than the other two periods. On average Alpine Caucasian clover flowered six days earlier than Monaro. This could be due to difference in their ploidy levels. In zigzag clover, there was little variation in flowering pattern between Porters Pass and Kentucky over the three seasons. Alpine Caucasian clover was about two weeks and three weeks earlier in flowering than zigzag clovers in the second and third year respectively. Timing of flowering and its duration varied from one season to another. In the second year, all seed lines flowered earlier than the other two seasons. This was probably due to the high temperatures and dry conditions that prevailed during flowering period; flowering rate was also enhanced and flowering periods were shorter compared with the other two seasons. In the first two years, zigzag clovers had a low seed yield. The study of seed yield components in the second year showed that this was caused by fewer seeds produced per head. About 57% of seed-pods were without seeds. In addition about 42% of total seeds present were destroyed by chalcids in the second year. The average seed yield in zigzag clovers increased threefold, from 80kg in the second year to 250kg/ha in the third year. This was attributed mainly to chalcid control (reduced to 33%) and better management practices such as fertilisation, irrigation and weed control. More favourable climatic conditions may have also helped. Except in the first year when plants were small, Caucasian clovers produced good seed yields. Monaro produced the highest seed yield of 398 kg/ha in the second year of production. In the third year, seed yield in Caucasian clovers was significantly increased by vegetative closing. In Alpine and Monaro, seed yield increased from 160 to 228 kg/ha and 398 to 560 kg/ha respectively compared to uncut plants. In zigzag clover, however, seed yields were similar in uncut and vegetative cut plants. Porters Pass and Kentucky had the highest seed yields of 210 kg and 304 kg/ha respectively from vegetative cut. Closings at flowering stages greatly reduced all seed yield components, causing a large reduction in seed yield of all seed lines. Dry matter yields were measured in the third year at the time of closings, seed-harvest and four months after harvest. Most of the dry matter yield was produced in spring/early-summer. Zigzag clovers produced more dry matter than Caucasian clovers. All seedlines produced more dry matter with later closing treatments than the vegetative cut closing time. The highest total dry matter yield of 8.9t/ha was produced by Porters Pass from uncut plants. Post-harvest yield was very low, which was mainly due to slow regrowth after harvest and lack of rain in summer and autumn. A laboratory germination test of scarified and non-scarified seeds of rhizomatous clovers was carried out to determine the advantage of mechanical seed scarification. The average germination percentage was increased from about 8% to 70% by seed scarification. In autumn 1989 (22 March), seed was sown into Templeton silt loam and seedling growth was studied. The highest seedling emergence was only 52% in Monaro. About half of the emerged seedlings were killed by frost lift during winter. Seedling growth measured over autumn, winter and early spring was very slow and all four seedlines had a similar pattern of growth. Early seedling root growth was more rapid than top growth. Two months after sowing, the mean root to leaf petiole length ratio of four seedlines was 2.4:1, but five months later it declined to 1.4:1. This indicates that the slow top growth in rhizomatous clovers at the initial establishment stage was probably due to higher under-ground activity which was more apparent in Alpine Caucasian clover.

#### Keywords

Caucasian clover; zigzag clover; flowering pattern; seed yield; chalcid damage; closing time; seed yield components; dry matter yield; germination; seedling emergence; frost-lift; seedling growth; root to top ratio; Trifolium ambiguum; Trifolium medium

## **Gurung, Mohan Babu (2014)**

**Essays on reducing emissions from deforestation and forest degradation in the Terai Arc landscape of Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University**

### **Abstract**

Opportunity costs of conserving forest for the purpose of greenhouse gas emissions reductions underpin economic sustainability of 'reducing emissions from deforestation and forest degradation (REDD+)' and are essential to ascertain before embarking into this newly proposed mechanism to mitigate climate change. Two major determinants of REDD+ opportunity costs are the drivers of deforestation and forest degradation and the carbon stock. These factors differ from place to place. Use of global land use models and of forest carbon stock estimates to design REDD+ at sub-national or national scale may be misleading if they do not reflect local socio-economic and agro-ecological conditions. This study examined the potential costs of emissions reductions in the Terai Arc Landscape of Nepal, one of the biodiversity hotspots of the world. The first part of the thesis examines the underlying causes of deforestation and forest degradation. A synthesized econometric model of deforestation is prepared including rarely integrated part of forest degradation. A newly assembled panel data sets of 15 districts of Nepal over a 19-year period were used for the analysis. The results highlight that increased agricultural yield and promotion of community-based forest management regimes reduce deforestation. Fuel wood, the main source of energy used for cooking in the landscape, is the proximate cause of forest degradation along with timber extraction. Alternative energy sources like solar and biogas can be substituted for fuel wood to reduce forest degradation. The second part of the study deals with carbon stock in the forests. The research estimated the distribution of C stock across the different pools and management regimes of tropical Sal forest. It applied a field measurement approach and collected biomass data from 113 sample plots. The estimated average total carbon stock was  $228.76 \pm 19.61 \text{ Mg ha}^{-1}$ . The value of total C stock, however, varied according to management regimes. The estimated carbon stocks differed from all earlier estimates based on biome-average dataset. Evidence of strong association of C stock with management regime provides valuable information for policy makers to make informed choice of management regime for the landscape. The third part of the study is focused on estimation of opportunity costs of emissions reductions through avoided deforestation and forest degradation. A bottom-up approach is applied using time series data of agriculture, timber and fuel wood production and prices to estimate the opportunity costs. The estimated mean opportunity cost of emissions reductions from avoided deforestation on the Terai Arc Landscape is found to be US\$ 8.95 per Mg CO<sub>2</sub>e. The study reveals that emission reduction from avoided forest degradation is cheaper than emission reduction through avoided deforestation. The opportunity cost estimates are higher than those reported in earlier global studies and are attributed to higher agricultural returns and lower carbon density in the forest of the Terai Arc Landscape. The study suggests that the levels of funding needed for REDD+ based on the earlier global estimates may be insufficient for effective emissions reductions. Policy makers to be cautious when using global models and values to design any sub-national REDD+ scheme.

### **Keywords**

*drivers of deforestation and forest degradation; carbon stock; opportunity cost; emissions reductions; REDD+; Tropical Sal forest; Terai Arc landscape*

## Gurung, Rebecca (2018)

**The 'gift' of climate change knowledge: Acquisition of climate change knowledge in rural farmer communities of Darma Rural municipality-1, Salyan, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Applied Science at Lincoln University**

### **Abstract**

Climate change is the most pressing issue in today's world. The impacts of climate change raises concerns for rural agricultural communities of developing countries because livelihoods in these rural communities are often vulnerable to climate disruption. Nepal, a developing country, is considered one of the most vulnerable to climate change. For 74% of the Nepali population, agriculture is the main source of livelihood. The Mid-Western hills of Nepal are susceptible to climate change due of difficult geographic terrain and complex social and cultural reasons. In order to adapt to a changing climate, knowledge of the cause of this change and identifying its effects enables rural farmer communities to make better decisions. However, rarely does information on climate change reach such rural farmer communities. In addition, there is a mismatch of knowledge demand and knowledge supply in rural Nepal. Preparation of Local Adaptation Plans of Action (LAPAs) has been established in Nepal as a means of addressing this lack of knowledge while providing a mechanism for future adaptive actions. A key process carried out as part of the LAPA preparation is the 'sensitisation' of participants to the nature of climate change. Two main research questions based on the LAPA process drove this research: how climate change knowledge is disseminated in the rural farmer communities through the LAPA sensitising processes and how this knowledge has influenced locals' understanding of climate change. These questions aid in addressing the broader question - how rural farmer communities acquire climate change knowledge. The research comprises a case study of a government endorsed LAPA workshop conducted in Darma Rural Municipality-1 of Salyan, a rural area in the Mid-Western hills of Nepal. The results show that the rural farmer communities were sensitised throughout the entire LAPA workshop, not just during the section dedicated to sensitisation. The participants' learning was aided by showing how the climate change information related to their personal experiences. It was found that five out of 28 participants interviewed after the workshop had not learnt anything, while 16 participants were 'rote' learners and only seven were 'meaningful' learners. The meaningful learners were able to develop procedural knowledge, which helped them to convert gained knowledge into practice. The acquisition of such knowledge lead to learning, which in turn changed the beliefs and behaviour of some participants. Some participants were able to share the learning with their family members. Thus, knowledge is spread from one unit to another and brings change, exemplifying a form of social learning. The study suggests that such social learning can be a response to knowledge provided through such climate change adaptation processes as LAPA in rural farmer communities. While the results show that knowledge was acquired by most participants, social and cultural drivers created boundaries to understanding. These were overcome through the effective use of PRA tools in the LAPA workshop and may be aided in the future by integrated knowledge management and dissemination through school textbooks.

### **Keywords**

*climate change; sensitisation; knowledge transfer; knowledge integration; climate change adaptation; Nepal*

## Gyamtsho, Pema (1990)

Performance of lucerne/grass mixtures under different grazing durations and soil depths in a dryland environment

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Agricultural Science at Lincoln University, New Zealand

### **Abstract**

Two studies were conducted on pure WL320 lucerne, lucerne/ 'Grasslands Matua' prairie grass and lucerne/ 'Grasslands Maru' phalaris mixtures at Lincoln University, between April 1988 and September 1989. The 0.042 ha plots were sown in early November 1986 into a Templeton fine sandy loam soil. The weather during the experimental period was very dry during spring and summer, but was warm and moist in winter. The first study investigated the effects of short (3-7 days) and long (6-14 days) sheep grazing durations on the three pastures. Short grazing resulted in 15% more total yield from six grazing cycles (15000 versus 13000 kg DMha<sup>-1</sup>). There were no significant differences in total yields between the pastures. Total lucerne yields were 20% higher under short duration for pure lucerne and lucerne/ phalaris, but were not different for lucerne/prairie grass. The total yield of prairie grass under short grazing (9160 kg DMha<sup>-1</sup>) was 36% higher than under long grazing (6740 kg DMha<sup>-1</sup>), but phalaris yields were similar at 2570 and 2320 kg DMha<sup>-1</sup> respectively for short and long grazing. The results indicated that short grazing duration was superior to long grazing duration, when rotation lengths were equal. The second experiment compared the performance of lucerne with the lucerne/grass mixtures in shallow (<50 cm) and deep (>80 cm) soils on mini-plots of 8 m<sup>2</sup> selected from areas within the grazed plots. Water use from the soil was measured using a neutron probe. Root cores were sampled in May 1989 from deep soil plots. On the shallow soils total yields from pure lucerne and lucerne/phalaris were similar (11700 and 11400 kg DMha<sup>-1</sup>) and were significantly higher than the lucerne/prairie yield of 8500 kg DMha<sup>-1</sup>. Pure lucerne and lucerne/prairie yields were 17% and 45% higher in the deep soils than in the shallow soils, but in both soil types, lucerne/phalaris yields were similar. Winter yields from pure lucerne and lucerne/prairie were similar on both soils (3000 kg DMha<sup>-1</sup>), but lucerne/phalaris produced 27% more on shallow (3700 kg DMha<sup>-1</sup>) than on deep soils (2900 kg DMha<sup>-1</sup>). Total lucerne production in lucerne/phalaris of 9900 kg DMha<sup>-1</sup> was not affected by soil depth but in lucerne/prairie, lucerne yield was 57% less on shallow (3950 kg DMha<sup>-1</sup>) than on deep soils (9100 kg DMha<sup>-1</sup>). Total yields from prairie grass and phalaris were higher by 30% and 10% respectively on shallow soils. Total water use was not different between the pastures at 384, 376 and 375 mm respectively for lucerne, lucerne/prairie and lucerne/phalaris, but was 10% higher on deep soils (398 mm) than on shallow soils (360 mm). Seasonal water use was similar for all three pastures and was higher in deep soils by 39% in spring and 20% in early summer. All three pastures showed similar water use efficiency (WUE) in deep soils but in shallow soils, the WUE of lucerne/prairie was significantly lower (10-13 kg DMmm<sup>-1</sup> H<sub>2</sub>O) than either the lucerne or the lucerne/phalaris mixture (18-24 kg DMmm<sup>-1</sup> H<sub>2</sub>O). Pure lucerne extracted water from greater depth than the mixtures. Under all pastures, water was extracted until soil volumetric water content reached 10%. Pure prairie grass and phalaris had 70% and 50% of their roots in the top 20 cm, and roots of both grasses were traced to 70 cm depth. In the top 20 cm lucerne root yield of lucerne/prairie was only 60% (4 kg DMm<sup>-3</sup>) compared to 88% (9 kg DMm<sup>-3</sup>) of lucerne/phalaris at that depth. The results showed that under the extremely dry conditions of 1988/89, there was no advantage in pasture yield of lucerne/grass mixtures over pure lucerne. However the inclusion of phalaris in shallow soils and prairie grass in deep soils provided effective weed control and good cool season growth without adversely affecting pasture productivity.

### **Keywords**

WL 320 Lucerne; Medicago sativa L.; Grasslands Matua prairie grass; Bromus willdenowii Kunth.; Grasslands Maru phalaris; Phalaris aquatica L.; lucerne grass mixtures; grazing duration; dry matter yield; seasonal production; soil depth; water use; water use efficiency; water extraction pattern; root yield

## Joshi, Murari R. (2000)

**Shading effects of *Pinus radiata* on productivity and feeding value of cocksfoot pasture in an agroforestry system**

**A thesis submitted in partial fulfilment of the requirements for the degree of Master of Applied Science in Plant Science Group Soil, Plant and Ecological Sciences Division at Lincoln University Canterbury**

### **Abstract**

The shading effects of radiata pine (*Pinus radiata* D. Don) trees on productivity and feeding value of nine-year-old cocksfoot (*Dactylis glomerata* L) plus clovers (*Trifolium* spp) pasture on Templeton silt loam of medium fertility was measured under four light regimes in a sub-humid temperate climate at the Lincoln University agroforestry experimental area over four seasons from February 1998. The experiment was a randomised split-plot design with three levels of shade under trees as main plots and  $\pm$  water applied to cocksfoot cv Grasslands Wana pasture areas with or without sheep urine patches as sub-plots in each of three blocks. In an adjacent open pasture plot of the same age, four sub-plots were randomly assigned to each of three blocks. Photosynthetic photon flux density (PPFD) measured under radiata pine trees was 18% of full sunlight at 650 trees ha<sup>-1</sup>, 40% at 300 trees ha<sup>-1</sup> and 67% at 200 trees ha<sup>-1</sup> compared with the ambient PPFD of adjacent open cocksfoot pasture. Tree shade reduced soil temperature at 100 mm soil depth in summer by 0.9-1.9°C and increased it in winter by 0.5°C under moderate shade (40% to 67% PPFD) compared with open pasture with 20.5°C summer and 5.8°C winter mean temperatures. Likewise, volumetric water content (%) at 0-300 mm soil depth under 18% and 40% PPFD was significantly lower in late autumn, winter and spring seasons and higher during summer under 18% PPFD. Under 40% and 67% PPFD there was more soil water only in January compared with open pasture which had 30.9% and 9.8% soil moisture in June and January respectively. Partial irrigation reduced soil temperature significantly in late spring, summer and autumn and increased soil water content in summer under trees by only 1.3% and in open pasture by only 0.8% compared with unirrigated plots. Botanical composition, expressed as percentage cover of nine-year-old Wana cocksfoot plus clover pasture along permanent transects in open pasture was 83% cocksfoot, 4% white clover, 1% subterranean clover, 5% weeds, 1% dead material and 6% bare ground compared with 74% cocksfoot, 3% white clover, 4% subterranean clover, 4% weeds, 5% dead material and 10% bare ground under trees with 67% ambient PPFD. The five, 30 day production periods in March, June, September and November 1998, and February 1999 showed that cocksfoot pasture production at 18% PPFD was reduced by 55% even in irrigated urine and non-urine patches compared with open pasture. In this heavy shade, cocksfoot pasture productivity and feeding value was reduced by tree shade. However, under 40% and 67% PPFD pasture production without irrigation in urine and non-urine patches in the very dry 1998/99 season was reduced by 30% and 21% compared with open pasture which yielded 319 g DM/m<sup>2</sup> and by 16% and only 1% with irrigation (520 g DM/m<sup>2</sup> over the five months in irrigated open pasture). The apparent feeding value of shaded cocksfoot pasture was reduced because of changes in grass morphology (longer and thinner leaves) of shaded pasture which resulted in reduced pasture bulk density which may reduce pasture intake through smaller bite size. This possible adverse effect on intake together with reductions in the nutritive value (digestible organic matter, nitrogen and metabolisable energy) of shaded pasture could result in reduced per head animal performance. However, the small (4%) increase of clover content and the decrease (29%) in reproductive tiller numbers under 40 to 67% PPFD may partially compensate these adverse effects in spring and early summer compared with open pasture. Results showed that cocksfoot pastures under moderate shade (40% to 67% PPFD) were more stressed by water and nitrogen than by tree shade because the addition of water and nitrogen (urine) under moderate shade gave large increases in pasture production, pasture bulk density and nutritive value compared with the nil treatment pasture areas.

### **Keywords**

agroforestry; botanical composition; cocksfoot; feeding value; nutritive value; palatability; pasture bulk density; productivity; silvopastoralism; solar radiation; subterranean clover; tree shade; white clover; *Pinus radiata*

## **Kaini, Bhairab Raj (1982)**

### **Studies on shoot growth and flower initiation in apples**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Horticultural Science in the University of Canterbury**

#### **Abstract**

In experiments with mature apple trees (*Malus domestica* Borkh.), cv. Splendour, Granny Smith, Golden Delicious and Red Delicious on MM 106, trained to Lincoln canopy, the effects of proximity to the root bud position and cultivars on shoot growth were studied. Proximity to the root and bud position were the two main factors affecting shoot growth. Most of the large shoots were produced from basal buds on the upper side of the stem. The production of short shoots or spurs in the basal region was mainly from buds on the two sides of the stem and in the apical region from buds on the upper side of the stem. Most of the buds on the lower side, in both regions and on the sides at the distal end, remained dormant and few grew into spurs. Despite slightly delayed bursting, the basal shoots were dominant over the apical shoots due to their higher growth rates and longer period of growth; in fact, they grew almost the entire season. Shoots arising at positions more distant from the centre of the tree had slow growth rates, shorter internodes, more flowers and grew for a very limited period. Although the general pattern of shoot growth in all cultivars was found to be similar, there were some varietal differences both in the production and distribution of shoots. The ratio of large shoots to small shoots was the highest in Red Delicious followed by Splendour, Granny Smith and Golden Delicious. In Red Delicious, there were few shoots with less than 0.5 cm diameter. In another experiment, the effect of NAA and IBA on stump sprout control in apples was studied. Both NAA and IBA at 2.0% in lanolin were most effective in controlling sprouting below the pruning cut. In the year of application, IBA was better than NAA in checking shoot regrowth, but in the carry-over effect to the second year, NAA was better than IBA. There was no effect on crop yield. Suppressing growth of basal shoots on an apple tree by NAA and IBA had no effect on the number of shoots or the total amount of shoot growth in the apical region.

#### **Keywords**

*shoot growth; flower initiation; apples; root position; bud position; growth regulator; pruning*



## **Khadka, Raju (2021)**

### **Quantification of greenhouse gas emissions under different solid waste management scenarios: A case study of Kathmandu Metropolitan City, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University**

#### **Abstract**

Urbanization is expanding at a disturbing rate in Nepal which is squeezing municipal services, especially those dealing with the always expanding amounts of municipal solid waste (MSW). Currently, the greater part of the wastes produced in the city are not being sufficiently administered thereby threatening human wellbeing and the environment. It is an issue with financial, environmental, and social ramifications, making it both significant and complex. Notwithstanding metropolitan environmental contamination, the wrong disposal causes the production of greenhouse gases like methane, leachates from landfill sites and energy consumption. The assessment of MSW production and greenhouse gas (GHG) emissions is important to reduce global warming. To address the issue, this study aimed to: (1) determine the MSW generation and composition in Kathmandu Metropolitan City (KMC); (2) compare different solid waste management (SWM) scenarios in terms of GHG emission in KMC; and (3) determine the feasibility of reducing methane emissions from SWM in the Sisdole landfill site, Kathmandu. KMC was used as a model case study. A survey of 288 households in 32 wards of KMC was conducted to determine the MSW generation and its composition. Five different MSW management scenarios were developed, and greenhouse gas emissions were estimated for each scenario using the Intergovernmental Panel on Climate Change (IPCC) model and the Life Cycle Assessment (LCA) tool. The LandGEM model was used to estimate total landfill gas emission in the Sisdole landfill site. The outcome is that per capita MSW generation in Kathmandu is 0.3 kg per day. It is estimated that households create around 76,879 tonnes of organic waste each year, most of which is uncollected: the rest is disposed of in an open dumpsite. Investigation showed that organic waste is 51% of the MSW; 49% is recyclable waste comprising 19% plastic, 13% textiles, 5% paper and paper items, 4% rubber and leather, 3% glass, 1% metal, and 4% 'other waste. Five MSW management scenarios were tested: S0, S1, S2, S3 and S4; where: S0 is 'business as usual'; S1 is upgraded to landfill gas capture; S2 is composting; S3 is recycling; and S4 is the integration of gas capture, recycling, and composting. The CH<sub>4</sub> outflow is high at 15,136 m<sup>3</sup> for scenario S0. The greatest decrease, 73%, in CH<sub>4</sub> discharges happened with the integrated gas capture, composting and recycling (S4) system. Composting S2 is the best of the other three scenarios because of the high volume of organic waste. The quantity of CH<sub>4</sub> generation from solid waste in the Sisdole landfill site was calculated as 1.050E+06 (Mg/year) in 2006. The maximum methane generation rate occurred during 2015-2035 with the peak generation being approximately 1.100E+07 (Mg/year). Based on these volumes, it is now necessary to consider installing methane capturing facilities. The proposed S4 solid waste management technique will make an important contribution towards improving the SWM system in Kathmandu Metropolitan City (KMC) and elsewhere. Landfill discharge results can be used to calculate power generation planning from the MSW and to establish a gas capture system at the Sisdole landfill site, eventually supporting Nepal's contribution to global greenhouse gas emission reduction. It would also reduce environmental contamination by decreasing greenhouse gases from waste generation.

#### **Keywords**

methane (CH<sub>4</sub>); greenhouse gas emissions; Kathmandu Metropolitan City; municipal solid waste; waste management; solid waste; climate change; Nepal; global warming; environmental contamination; landfill gas emissions; life cycle assessment (LCA); organic waste; methane capture; composting; recycling

## **Khanal, Bhoj R. (2011)**

An economic analysis of the Lao PDR tourism industry

A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy in Economics at Lincoln University

### **Abstract**

Since 2001, Lao PDR tourism sector ranked second in terms of foreign exchange earnings after the mining and quarrying sector. Over two million international tourists visited the country in 2010, generating US\$313million tourism receipts (LNTA, 2010). The tourism sector is regarded as one of the fastest growing sector economies in the country. Despite its importance, there has been no in-depth analysis of tourism's contribution to the economy. This study investigates the economic impacts of tourism on the Lao PDR economy. Using a visitors' expenditure survey and input-output models, the tourism sector was disaggregated from rest of the economy. The economic multipliers and inter-industry linkages of the 14 economic sectors for 2003 and 2008 were analyzed using SimSIP SAM Software. Tourism stakeholders' perceptions of the country's tourism were also analyzed. The results revealed that tourism is the leading sector in the country impacting positively on the economy during 2003-2008. Tourism contributed 7.5 percent to the national GDP and one in every seven people depended on tourism related businesses as their major employment in 2008. The multiplier results showed tourism contributes significantly to the economy in terms of generating output, value added and employment. However, the income multiplier was insignificant indicating high imports and relatively low income from tourism. The results further indicated that the indirect and induced impacts grew faster than the direct impacts of the tourism sector indicating tourism's secondary impacts are potentially important to the economy. The tourism normal and ratio multipliers are among the top three economic sectors demonstrating tourism substantial contribution on the economy. The higher average backward and forward linkages of the tourism sector compared with other economic sectors during 2003-2008 imply the sector's greater dependency on the domestic economy. Inter-industry linkages analysis showed tourism is a key sector in creating demand and stimulating production within the sector as well as other sectors of the economy. Tourism stakeholders also perceived that tourism was a catalyst in expanding businesses and generated positive impacts such as increased income, output and employment at local and national levels. The stakeholders also underlined some negative impacts such as cultural change, unsafe migration, human trafficking and the degradation of natural and heritage sites in the country.

### **Keywords**

*Lao PDR; tourism; input-output analysis; backward and forward linkages; multipliers; key sectors*

## **Khanal, Mahendra P. (2012)**

### **Information structure and coordination in vegetable supply chains**

#### **Abstract**

The purpose of this study on Nepali fresh vegetable supply chains is to identify factors that impact on the environment external to these chains, information flows along them, and relationships between actors within them. It identifies the role that information structure plays in chain coordination, and so contributes to the emerging literature on this, while also providing policy insights for the Nepali government. A theoretical framework was developed by incorporating principles of coordination theory, transaction cost economics and network theory, to postulate relationships between information structure and coordination in a supply chain. Empirical research on four Nepali vegetable supply chains was conducted using an embedded multiple case study approach. It was found that the environment external to the chains had little influence on information structure and chain coordination. Instead, factors internal to the chain were shown to be more important. The results showed that the four chains could be collapsed into two models. The first model exhibited a relatively complete information structure and strong vertical and horizontal coordination. The second model had a relatively asymmetric information structure, along with weak horizontal and vertical coordination. Hence, the completeness of information structure was positively associated with the degree of coordination, both horizontal and vertical. It was observed that strong horizontal coordination accompanied by complete information structure at the farmers' level aligns producers in the production and supply of vegetables according to market requirements, assembles vegetables to attract buyers, and disseminates knowledge and experience to increase the efficiency of all members. Similarly, strong vertical coordination in association with a complete information structure from input suppliers to retailers aligns activities and incentives, leads actors towards achieving the chain goal, and increases efficiency in the delivery of produce. One insight to emerge is that the observed relationship between information structure and chain coordination result from an underlying factor. This factor was identified as the benefits that chain actors receive or expect to receive from the information they share and the transactions they conduct with other actors. Profits, assurance in buying and selling and strong buyer-supplier relationships are such benefits, which then drive both the completeness of information structure and the degree of coordination, leading to an association between complete information structures and strong coordination and conversely, less complete information structures and weak coordination. Another insight to emerge is that the completeness of information structure and the degree of coordination in these chains also depends on the role that cooperatives play in sharing information and performing business activities. In particular, the greater is the role of cooperatives in information sharing and in performing business activities, the stronger is the coordination in the chain, and vice versa.

#### **Keywords**

*vertical co-ordination; horizontal coordination; vegetable supply chain; information structure; embedded multiple case study; benefits; cooperatives; Nepal; agribusiness supply chains*

## **Kharel, Fanindra Raj (1993)**

**Park - People conflict in Langtang National Park, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the degree of Master of Parks and Recreation Management at Lincoln University**

### **Abstract**

Out of 23 village units that are dependent on Park resources for wood and pasture, nine village units were randomly selected for detailed investigation. The investigation included structured questionnaire interviews of 212 randomly selected heads of households and 62 Park staff (who were currently working in different units within the Park administrative system). In addition, a self-administered questionnaire survey was done. This comprised 33 office-heads of Rasuwa administrative district headquarters at Dhunche located inside the Park boundary. Some in-depth interviews were carried out with selected people such as local leaders and wildlife biologists to get some additional qualitative information. A comparative study is made of local people's understanding of the purpose of Langtang National Park with the other two groups (i.e., Park staff and office-heads). This study revealed a positive perception of each group on the issue and made it obvious that purposes of the Park do not appear to be an area of conflict between the park administration and the local population, but the degree of commitment to these purposes is less strongly held by local people. Wild-pig was found to be the principal crop raiding animal, followed by Himalayan black bear, monkey and deer species. This resulted in resentment of the local people towards the Park administration. Adoption of wild-pig farming by capturing young wild-pigs and selective culling of old ones has been proposed as a solution to the problem and also a source for income generation for the local people through meat trading. Adoption of land-use zoning and the declaration of "buffer-zones" have been proposed as a solution to the problems of crop and livestock depredation by other park wildlife through implementation of community forest resource development activities in the buffer areas. Buffer zones can function as multiple-use management areas for the purposes of reducing the movement of park wildlife towards settlements, reducing encroachment of the park by the domestic stock of local people and providing the local people with access to additional Park resources in the future. Tourism is seen as a source of national and local income in the Park area. Although no negative impacts of tourism have been reported from this study, the adoption of a proper tourism planning procedure is needed to reduce or prevent negative impacts in the future. The majority of the local people and the park staff are familiar with each other. The local people have perceived that the park staff were helpful and friendly. These positive relations can facilitate the involvement of local people in decision making regarding Park-people related problems in the future.

### **Keywords**

*local people; park staff; office-heads; Nepal; conflict; administration; Langtang; national parks; boundary; wildlife; wild-pigs; resource dependents; concessions; conservation; tourism; impacts; problems; solutions; buffer zone; community forestry; development*

## **Koirala, Shankar P. (1997)**

**Towards an institutional framework for tourism development: a case study of Pokhara, Nepal**  
**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Parks, Recreation and Tourism Management at Lincoln University**

### **Abstract**

A Government's institutional arrangements - organisational structures and legal framework are important for the development and management of tourism. They serve several important functions including: tourism planning and development; coordination; marketing and promotion; and regulation and control. The main aim of this study is to examine the existing institutional framework (organisational structure and legal framework) in relation to tourism development in Pokhara, Nepal. This area contains Nepal's second largest city and serves as the gateway to the Annapurna Region. In keeping with tourism development in many Third world destinations Pokhara's tourism development has been at the forefront of rapid infrastructure and urban development. To achieve the above aim, an analysis has been made of: the existing legal and structural arrangements; current issues/problems in tourism planning and development; and potential ways to mitigate these. Primary research methods include the Nominal Group Technique (NGT), applied in combination with in-depth interviews of key actors. The main goals of the NGT in this study are first, to encourage local residents, political leaders, business people and planners to think systematically about current issues/problems associated with tourism development in Pokhara, and second to identify their possible solutions. To achieve these goals, five different nominal group sessions were conducted with different stakeholder groups, and interviews undertaken with a wide range of key people from both inside and outside the tourism industry to elaborate the 'issues' and explore their possible solutions. Nine major issues associated with the tourism development of Pokhara have been identified. They are: conservation of natural areas; the development of additional attractions, events and activities; lack of professionalism; waste management; poor coordination in tourism planning and implementation; poor implementation of existing rules and regulations; haphazard urbanisation; lack of marketing and promotion; and inadequate infrastructure to develop rural areas. The contributing reasons have been identified as; limited roles of local tourist organisations; lack of coordination between local organisations; lack of 'technical back-up support'; overlapping legal frameworks; inadequate power of local tourist organisations to regulate the tourism industry; lack of legal frameworks to regulate tariff rates and to protect consumers (tourists). The main conclusion from this study is that the resolution of these issues clearly requires organisational strengthening and legal reforms at the local level in Pokhara, Nepal. A framework for a strengthened local tourism organisation is presented.

### **Keywords**

*development; institutional framework; legal framework; Nepal; tourism development; organisational structure; tourism management; third world tourism*

## **Lama, Anu K. (2010)**

**Vulnerability of nature based tourism to climate change: stakeholders' perceptions of and response to climate change in the lower Mustang Region of the Annapurna conservation area**  
**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Parks, Recreation and Tourism Management at Lincoln University**

### **Abstract**

Nature based tourism (NBT) is a major contributor to the economy of the lower Mustang region in Nepal. This high Himalayan region is an important destination within the Annapurna Conservation Area (ACA). The contribution of NBT to conservation is also significant. However, recently, NBT is being subjected to multiple stressors. Socio-economically, the opening of the Beni – Jomsom road has transformed this remote area with its subsistence economy to a busy destination with diverse tourism activities and a cash based economy. The ruling regime change and the ongoing political instability have also affected the NBT supply system of lower Mustang. Similarly increasing climate variability and other climatic changes are increasing the vulnerability of the place, the people and their livelihoods. This research reports on an investigation into the vulnerability of the NBT supply system of lower Mustang to these multiple stressors, with special emphasis on climate change. In particular, the study explores the key drivers of change, and analyses the sensitivity and adaptive capacity of the system through the tourism stakeholders' perspectives. A vulnerability assessment framework has been developed to understand stakeholders' perceptions of the exposure to and impacts of these multiple stressors. A multi-methods qualitative approach was used to elicit understandings of climate change among public and private tourism stakeholders. This study found that the NBT supply system is exposed to climate variability and change. However, it was also evident that climate change is occurring amidst a number of other socio-economic and political changes. The new road, changing tourism dynamics, low carrying capacity, and demographic forces, coupled with the ongoing political instability and destabilized power structures in the communities are important vulnerability issues for the system and its management. The study shows that stakeholders have a wide range of perceptions and levels of awareness and knowledge on climate change which is based on their historical relationships with the environment, experiential knowledge tied closely to livelihood practice, and holistic understanding, rather than scientific knowledge. Impacts of climate variability are perceived to affect all three key assets (tourism, human and natural) of the NBT system. The range of climatic impacts, the system's sensitivities to them, and the adaptive capacities are varied and socially constructed. Most importantly, the study shows that the contexts for stakeholders' vulnerability to climate change are multidimensional and that they are shaped by non-climatic stressors, such as socio-economic change and political change. In turn, these perceptions are likely to influence the NBT supply system itself and its vulnerability to climate change.

### **Keywords**

*adaptive capacity; climate change impacts; stakeholders; vulnerability; climate variability; exposure; lower Mustang; nature based tourism; Nepal; perception; sensitivity*

## Lama, Lhakpa (2012)

The appreciative inquiry process in pro-poor tourism planning and development: Experiences from Nepal

A thesis submitted in partial fulfilment of the requirement for the Degree of Master of Tourism Management at Lincoln University

### **Abstract**

The United Nations Millennium Development Goals (UN, 2000) aimed to halve the 1990 global poverty level of people living on less than a US dollar a day, by 2015. Tourism, as one of the largest economic drivers in the world, is considered to have the potential to make a significant contribution to achieving this goal. Poverty reduction is possible only when the host country retains maximum profit from tourism and ensures that the benefits from tourism reach the poor sectors of society. Various planning approaches have been used to develop tourism in order to address poverty reduction goals; one such approach is Pro-poor Tourism (PPT). PPT has a specific focus to generate maximum benefits for people living in poverty. One relatively recent approach to PPT planning and development is Appreciative Inquiry (AI). AI is considered an alternative to traditional 'problem solving' approaches and focuses especially on strengths and successes of individuals, organisations and communities. This research explored the relevance of the AI process in PPT in Nepal, and examined the contribution of AI to local people's participation in PPT planning and development in rural areas. Nepal has been using AI in tourism planning and development for more than a decade. However, to date, no empirical studies have been conducted to assess AI's effectiveness in pro-poor tourism planning and development. This research is expected to contribute to the literature by filling the gap from theoretical, as well as practical, perspectives. It also provides context to policy makers and planners to develop appropriate policies to maximise tourism benefits to the local people, including the poorest. Two communities (Junbesi and Pattale), at different stages of tourism development in Nepal's Solukhumbu district, were used as case study sites where the AI approach was implemented. The research applied qualitative approaches to reveal the experiences of local residents, and both district- and national-level experts in tourism planning and development processes. The local people's perception indicates that the poorest people in the communities are likely to benefit less from tourism due to lack of skills and capital. However, despite this finding the study also shows that AI has potential to become an effective planning tool to promote PPT, provided there are adequate strategies and means in place to address existing challenges such as political instability, socio-cultural stratification, resource availability, and the local context.

### **Keywords**

*community participation; participatory approach; tourism planning; Nepal; pro-poor tourism; appreciative inquiry (AI)*

## **Lama, Sonam (2018)**

**Assessing mammal diversity, distribution, and abundance: piloting arboreal camera trapping as a tool for monitoring endangered red panda in temperate forest of Eastern Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of International Nature Conservation at Lincoln University**

### **Abstract**

I investigated the diversity, abundance and terrestrial activity patterns of medium and large sized wild mammals including a dedicated camera trapping survey for endangered and arboreal red pandas in the non-protected forests of Ilam, Panchthar and Taplejung districts of eastern Nepal. This thesis presents the first camera trap-based inventory of the southern Kangchenjunga region. The mammalian inventory was done during the winter and spring season of 2018 with 107 different camera trap locations (53 in winter and 54 in spring). The dedicated camera trapping survey for red panda camera was conducted in 19 different locations of Ilam and Panchthar districts using a pair of camera traps at each site (one on ground and one in tree canopy). There were 903 photographs (96 from ground camera and 807 from arboreal camera) of red panda from 1,620 camera trap days. Over 3,014 camera trap days there were 93,336 photographs taken (5,176 of wild mammals, 3,621 of birds, 11,692 of people, and livestock, 65,488 of false triggers and 6,061 during camera set ups). 5,177 photographs of medium to large sized mammals were used for the analysis in Camera Base. There were 17 species of medium to large sized wild mammals observed belonging to 4 orders and 12 families. Notable species records from this study were red panda *Ailurus fulgens*, common leopard *Panthera pardus*, marbled cat *Pardofelis marmorata*, Asiatic golden cat *Catopuma temminckii*, Himalayan serow *Capricornis thar*, Himalayan goral *Naemorhedus goral*, Assam macaque *Macaca assamensis*, Himalayan black bear *Ursus thibetanus*, and Spotted linsang *Prionodon pardicolor*. The leopard cat *Prionailurus bengalensis* was found to have the most diverse distribution covering temperate to alpine habitat. The Northern red muntjac *Muntiacus vaginalis* was found to be the most abundant species followed by wild boar *Sus scrofa*, leopard cat, and red fox *Vulpes vulpes*. Despite some limitations, camera trapping was found to be effective in monitoring medium to large sized mammals in this study, particularly for red panda. Employing camera trap surveys for similar kinds of studies, and also for the long-term monitoring of mammals in a study area, is recommended for management of wildlife and effective conservation.

### **Keywords**

*camera trapping; Nepal; red panda; temperate forest; Himalayas; mammal diversity; endangered species; mammals; arboreal camera trapping; Ailurus fulgens (red panda)*



## Meghi, Ujjwal (2014)

### **Tiger in landscapes, tiger in mindscapes: a constructionist analysis of tiger conservation through corridor management in the Terai Arc Landscape, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Resource Studies at Lincoln University**

#### **Abstract**

Asian forests are losing their top predator, the tiger (*Panthera tigris*), at a rate that threatens its survival in the wild and poses a serious threat to local ecosystem balance. On the other hand, conservation efforts for the tiger are heavily influenced by conflicts with humans living adjacent to their last remaining habitats. Amidst this tension the countries, which make up tigers' natural habitat range, together with conservation organizations are continuously making efforts to save this endangered species. A recent commitment has been to attempt to double tiger numbers by 2022. To this end, an emerging landscape-based approach to conservation has been identified as the most effective approach to save tigers and other important wildlife species on a large scale in these countries. This approach aims to connect habitat patches such as protected areas through restoring and maintaining biological corridors to facilitate dispersal and movement of wildlife for their genetically viable, long term survival. However, the biological corridors outside protected areas within human dominated landscapes such as Terai Arc Landscapes (TAL), Nepal, a highly prioritized tiger conservation landscape, fall within community-managed forest areas having widespread access by local village people for forest products. Tigers already pose significant threats to livestock and human lives around protected areas and hence have the potential to create even greater risk in such corridors. In this context, using "moderate constructionism" and Social Construction of Nature theoretical perspectives under constructionist epistemology, this research aims to understand how social constructions of tiger are changing with the intervention of the TAL Nepal program in Khata community-managed forest corridor, how such local changes in constructions are influenced by contemporary national and global constructions, and what implications such changes have to sustainable tiger conservation management. While using the constructionist approach, this research also attempts to ascertain its increasingly claimed practical significance to wildlife management. Semi-structured interviews and discourse analysis methods were employed for data collection. It was found that negative or agnostic constructions of tiger in Khata corridor prior to implementation of the TAL program has transformed to mostly positive constructions post TAL. This transformation is local people's negotiation between their own experience based meaning of tigers and the overarching global and national tide of saving endangered tigers. Currently prevailing positive constructions, however, are fragile as they are influenced by many factors, most importantly, conflict with tigers and other wildlife, sustained external assistance, development aspirations and actualisation, and realization of tangible benefits of tigers and equitable sharing of those benefits among local people. This implies that continued community support for tiger conservation in Khata is determined by those influencing factors. Recommendations from this research include the need for concerned agencies to appropriately address those factors. Application of the constructionist approach was found to be useful to aid better wildlife management through understanding meanings of wildlife and underlying social processes. This approach has great potential to assist species focused large scale landscape approach to conservation through mapping temporal and spatial diversity of meanings of wildlife and their implication to wildlife management.

#### **Keywords**

*landscape approach to conservation; tiger conservation; social construction theory; social construction of Nature; Khata corridor; Nepal*

## **Mishra, R. C. (1970)**

**The development and evaluation of a peasant farm management game - A tool in extension - Education in Nepal and other under developed countries**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Agricultural Science in the University of Canterbury**

### **Abstract**

In this project, an attempt has been made to develop and evaluate a Peasant Farm Management Game to be used as a tool for teaching tropical and subtropical agriculture to groups and individuals. The main aim is to provide the Nepali extension agents with a teaching technique for peasant farmers to be used at the "awareness" and "interest" stages of adoption. As far as the author knows this is the first attempt to design a game for the peasant farmers' education. Though the elements of the game represent the Nepali and bordering areas of North Indian conditions, it could be adopted for any tropical and subtropical countries by changing its perimeters.

### **Keywords**

*management games; farm management; extension; Nepal; development*

## Nyaupane, Gyan P. (1999)

**A comparative evaluation of ecotourism: A case study of the Annapurna Conservation Area, Nepal**

**Submitted in partial fulfilment of the requirements for the Degree of Master of Parks, Recreation and Tourism Management at Lincoln University**

### **Abstract**

Ecotourism operations have been established all over the world, particularly in developing countries on the assumption that there will be minimum negative impacts, maximum benefits for local people and their environment, and first hand natural and cultural experiences for visitors. But ecotourism areas are rarely compared with other types of tourism areas. This study compares an officially designated ecotourism area with an established trekking area in terms of environmental, economic and socio-cultural costs and benefits, and tourists' experience. Research data arise from surveys and interviews with local residents, managers and tourists, and participant observation in both the Ghalekharka-Sikles Eco-trek area and the Annapurna Sanctuary Trail (AST) area, Nepal. For each impact theme a set of key criteria were developed as Likert scales, and put to local residents, managers and tourists. The study shows the designated ecotourism area has experienced slightly less marked negative impacts on the natural and socio-cultural environment, and fewer negative economic impacts than the established trekking/tourism area. However, the designated ecotourism area also has experienced slightly fewer positive impacts on the natural and socio-cultural environment, and significantly fewer positive economic impacts than the established trekking area. The ecotourism area experienced fewer economic benefits in terms of employment generation than the traditional trekking area and this is perceived to outweigh the other benefits of tourism. Hotels and lodges are identified as important sources of employment generation and consequently a source of economic benefits in the established trekking area which are lacking in the Eco-trek area. In addition, the study shows that tourists visiting the ecotourism area indicated more positive experiences from their visits to the ecotourism area than in the established trekking area. While the areas have markedly different histories of involvement with tourism, and subsequently cater to distinctively different volumes of visitors, ecotourism in Nepal appears to have less negative impacts than traditional trekking tourism but it does not ensure more benefits than other forms of tourism. If economic benefits are not derived from ecotourism, the ecotourism area will be under evolutionary pressures to end up like the established trekking area. Hence, the most important implication of this finding is balance between the economic benefits and environmental and social costs. Key approaches to achieve this goal are discussed.[Hide full abstract]

### **Keywords**

development; ecotourism; evaluation; comparison; impacts; Annapurna Conservation Area; Nepal; comparative approach; conservation; sustainable tourism; indicators; environmental aspects; economic aspects; protected areas

## **Pandey, Megh Bahadur (1994)**

**International visitor attitudes to Sagarmatha (Mt. Everest) National Park, Nepal**

**A thesis presented to Lincoln University in fulfilment of the thesis required for the degree of Master of Parks and Recreation Management**

### **Abstract**

This study was done in Sagarmatha (Mt. Everest) National Park (SNP), Nepal over a period of two months - December, 1991 and January, 1992. Sagarmatha National Park is a prime destination for many of the tourists who visit Nepal. It is a World Heritage Site and thus has great importance for conservation as well as for tourism. The success of the tourism industry depends on visitor satisfactions with their visits to these destinations. The success of SNP as a conservation area is equally dependent on visitor appreciation and sensitivity in terms of their activities while in the Park. This study explores visitor reasons for visiting SNP, visitor satisfaction with their visit to the Park and the local beliefs about the visitors. Data for this research were collected from the SNP visitors and local residents through questionnaire surveys and in-depth interviews. Due to field constraints, true random sampling was not possible. Trekking, viewing scenery, Mt. Everest and Sherpa culture were the main visitor reasons (motivations) for visiting SNP. Visitors reported "highly achieved" for each of these and thus were highly satisfied with their visit to SNP. It does not negate the fact that tourism brings with it many problems. In SNP rubbish and firewood were seen to be the major problems. Among the locals, lack of knowledge and awareness were seen as being the major drawbacks in trying to solve these problems. Visitors indicated a number of other issues which they felt needed improvement such as rubbish disposal, hygiene, sanitation and the quality of drinking water. These issues were not perceived as lessening visitor satisfactions as visitors indicated that they expected these conditions. This information points out that anticipated expectations of a destination were the determinant of the actual satisfaction. Visitors rated most of the SNP hotel/lodge facilities as "reasonable" or higher but in their comments and in-depth interviews they commented about needed improvements. Visitors evaluated these facilities in terms of what they anticipated not what they thought the facilities should be.

### **Keywords**

*Khumbu, Nepal; Sagarmatha National Park; tourism impacts; visitor motivations; local people; visitor satisfaction; sherpas; National Parks and reserves; visitor attitudes; visitor expectations; Nepal; sense of place*

## Pandey, Surya Bahadur (1985)

Natural resources/conservation education (for Nepal)

This dissertation is submitted in partial fulfilment of the requirements for the Diploma in Parks and Recreation at Lincoln College

### **Abstract**

A small mountainous country Nepal has a large amount of natural resources. It has been recognised a Himalayan paradise in the minds of millions of Foreign tourists. A small country, which has a population of fifteen million, means that natural resources are being over-used. Natural resource conservation education is vital to preserve existing natural resources in perpetuity. This dissertation on natural resource conservation education for Nepal is designed to develop public awareness towards natural resource conservation. It deals with a few essential aspects of natural resource conservation, such as description and distribution of unique existing natural resources, establishment of the National Parks and the Wildlife Reserves for natural resources preservation, recognition of resource conservation problems, objectives of resource conservation education, the World Conservation strategy and its goals for resource conservation, the conservation strategy for Nepal to obtain conservation education in public and the constructive recommendations to make conservation education system fruitful. However, many people think, that the conservation and the preservation work should be done by National Parks and, wildlife conservation officials only. But the reality is that, every man, woman and child has got the responsibility to conserve natural resources. Everyone must understand the national and international importance of our natural resources. The country has internationally renowned resources, such as mountains, the highest peak in the world "Mt. Everest", and the valuable wildlife, such as the Tiger, Rhino, Fresh Water Crocodile and Dolphin.

### **Keywords**

*Nepal; natural resources; conservation education; national parks; plastic rubbish; environmental management; pollution*

## **Paudyal, Durga (1989)**

### **Extending protected area systems in Nepal: a case study of the Hongu and Hinku Valleys**

#### **Abstract**

His Majesty's Government in Nepal has established a system of National Parks and Protected Areas for the conservation of natural areas and cultural values. This dissertation examines the case for the designation of the Hongu and Hinku Valleys as a protected area within the boundaries of Sagarmatha National Park. The concept of national parks and protected areas is examined in terms of broad definitions. The legislative framework in Nepal for establishment of National Parks and protected areas is established, along with a brief history of Conservation in Nepal. The case for inclusion of the Hongu and Hinku Valleys within the protected area system is based on a study of literature on the matter of protected areas generally, and of those publications which have particular relevance to Nepal. Data taken into consideration comes largely from a field survey undertaken by the writer. This survey provides the only substantial material available for the Upper Valleys. Data was gathered using a newly developed methodology and covered: (a) measurements of altitude and slope; (b) livestock and wildlife counts; (c) grassland and forest transect analysis (d) key informant interviewers. Information from the survey appears as an appendix. The survey results indicated that seasonal human impact has imposed stress on a fragile environment which contains unique species and sites of spiritual significance. These impacts are examined in appropriate chapters. The dissertation concludes that to preserve both natural and cultural values, the Hongu and Hinku Valleys should be accorded protected area status and the boundaries of Sagarmatha National Park adjusted to give effect to this course. It is also concluded that in addition to the act of providing protected area status to the valleys, a system of management, which takes into account the needs of the People, is essential. Recommendations for a management system are made and discussion is undertaken of an approach to public relations activities which would assist in the management process.

#### **Keywords**

*conservation; values; cultural; natural; protected areas; Nepal*

## **Pun, Umed Kumar (2000)**

### **Role of ethanol in inhibition of climacteric senescence in carnation (*Dianthus caryophyllus* L.) cut flowers**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University**

#### **Abstract**

Increases in the vase life of carnation flowers have been reported with ethanol and with acetaldehyde. The increase with ethanol has been attributed either to inhibition of ethylene biosynthesis or sensitivity to ethylene or both, whereas acetaldehyde has been reported to inhibit ethylene biosynthesis only. Tomato cultivars responded differently in terms of delay in ripening and inhibition of ethylene production when treated with ethanol. This research was designed to determine whether carnation cultivars responded differently to ethanol or acetaldehyde, and if they did, to determine the underlying reason for the differential responses. Further aims of the research were to determine whether ethanol or acetaldehyde is the beneficial compound which delays senescence in carnation flowers, and to assess the specific role of the effective compound in the biosynthesis of ethylene. Ethanol at various concentrations (0, 2, 4, 6 or 8%) was applied to five carnation cultivars (Yellow Candy, White Candy, Lury, Sandrosa and Francesco) and vase life was assessed by visual assessment. Ethanol at 4 or 6% gave maximum increase in vase life of carnation cvs Yellow Candy (9 or 11 days), White Candy (3 or 7 days) or Lury (5 or 3 days) but did not increase vase life of cvs Sandrosa or Francesco. From these carnation cultivars, three cultivars contrasting in terms of response to ethanol were selected and were treated with 0 or 4% ethanol with or without short term (8h) ethylene exposure ( $0.1 \mu\text{l.l}^{-1}$ ). Vase life was assessed visually and ethylene production was measured by gas chromatography using a flame ionisation detector (FID). Ethanol at 4% significantly ( $P < 0.05$ ) inhibited ethylene biosynthesis and sensitivity to ethylene in cvs Yellow Candy, White Candy and Sandrosa. Cultivar Yellow Candy was a short lasting (10 days), high ethylene producer ( $245 \text{ nl flower}^{-1} \text{ h}^{-1}$ ) with a 10 day extension of vase life when treated with ethanol. Cultivar White Candy was intermediate lasting (14 days), medium ethylene producer ( $190 \text{ nl flower}^{-1} \text{ h}^{-1}$ ) and with a 3.5 day extension of vase life whereas cv. Sandrosa was long lasting (19 days), low ethylene producer ( $<100 \text{ nl flower}^{-1} \text{ h}^{-1}$ ) and non-responsive to ethanol (0%). Acetaldehyde, a metabolite of ethanol, was applied at various concentrations (0, 0.025, 0.05, 0.1, 0.2, 0.3, 0.4 or 0.5%) to two cultivars of carnation (Yellow Candy and Sandrosa). Acetaldehyde at 0.05% significantly ( $P < 0.001$ ) increased the vase life of carnation cvs Yellow Candy and Sandrosa by 3 days irrespective of their short or long lasting nature. Two cultivars of carnation (Yellow Candy or Sandrosa) were then treated with acetaldehyde (0 or 0.05%) with or without short term (8h) ethylene exposure ( $0.1 \mu\text{l.l}^{-1}$ ). Vase life was assessed and ethylene production measured by gas chromatography. Acetaldehyde at 0.05% increased the vase life of carnation cv. Sandrosa by 2 days after short term ethylene exposure. However, acetaldehyde failed to increase vase life of cv. Yellow Candy after short term ethylene exposure or when ethylene was measured. The increase in vase life of cv. Sandrosa was associated with a 5 day delay in the ethylene climacteric peak without short term ethylene exposure and with a 3 day delay after short term ethylene exposure. Ethanol and acetaldehyde can be interconverted by alcohol dehydrogenase (ADH). In order to determine which of these compounds (ethanol or acetaldehyde) was responsible for the increase of flower vase life and inhibition of ethylene production, 4-methyl pyrazole (4-MP), a specific inhibitor of ADH, was applied and ADH activity measured. Ethanol at 4% in the presence or absence of 4-MP significantly ( $P < 0.001$ ) inhibited ethylene biosynthesis and sensitivity to ethylene in cv. Yellow Candy. The ADH activity of cv. Yellow Candy was half that of cv. Sandrosa suggesting that in cv. Yellow Candy applied ethanol remained as ethanol. In cv. Sandrosa ADH activity was stimulated with exogenous ethanol or acetaldehyde suggesting interconversion of these compounds. To determine how ethanol was interfering with ethylene production, the activity of various enzymes and the concentration of metabolites involved in the ethylene production were measured. Ethanol was found to be effective in inhibiting ethylene biosynthesis in carnation cv. Yellow Candy by significantly inhibiting ( $P < 0.01$ ) conversion of S-adenosyl methionine (SAM) to ACC. How the inhibition of ACC production occurs was not determined but there was a trend towards reduction of ACC synthase activity. In addition, ethanol inhibited ethylene sensitivity, thereby inhibiting autocatalytic ethylene production. However, ethanol did not interfere in the ethylene biosynthesis step from methionine to SAM or ACC to ethylene. From the results of this research it is suggested that both ethanol and acetaldehyde can increase the vase life of carnation flowers; efficacy depends upon cultivar. It has been found that the compound that inhibits ethylene biosynthesis is ethanol but not acetaldehyde and the inhibition of ethylene biosynthesis with ethanol is due to inhibition of the conversion of SAM to ACC.

#### **Keywords**

acetaldehyde; alcohol dehydrogenase activity; carnation; ethanol; ethylene; L-methionine; L-aminocyclopropane-L-carboxylic acid (ACC); ACC synthase; S-adenosyl methionine (SAM); spennidine; 4-methyl pyrazole (4-MP); vase life; Dianthus caryophyllus L.; postharvest technology; horticulture

## **Rai, Chandra B. (2002)**

**The rimu furniture industry in Canterbury, New Zealand: a study of consumer preference for alternatives**

**A thesis submitted in partial fulfilment of the requirements for the degree of Masters in Applied Science (Forestry) at Lincoln University**

### **Abstract**

Rimu is one of the main timber species used in the furniture industry in New Zealand. The main source of rimu timber is the West Coast forests of the South Island. In May 2000, the Government of New Zealand announced a logging ban on all public forests, including the West Coast forests that will take effect from March 2002. Because of this ban, there is a substantial decrease in the supply of rimu timber in the market. This shortfall creates uncertainty among furniture manufacturers regarding what to use as alternative timbers to rimu. In order to understand what alternatives might be viable for manufacturers, it's important to know the preference of furniture consumers for timber. This study determines manufacturers' strategies for alternatives to rimu and examines consumer preferences for timber used in furniture. In addition, this study determines wood-specific attributes and other factors that influence consumer preferences. Finally, this study investigates whether there are unique market segments for furniture timber and develops a profile of these segments. This study is conducted in the Canterbury region of New Zealand. Data were collected in two stages: a manufacturer survey and a consumer survey. Eight manufacturers were interviewed using a personal interview method and an open-ended questionnaire. Eighty two furniture show visitors were interviewed for the consumer survey, using Q methodology and a questionnaire. Seventeen timber samples, which were selected from the manufacturers' survey, were used for Q sorting to examine consumer preferences for furniture timber. Data were analysed using factor analysis and simple statistical tools. This study indicates that there is a significant impact of the logging ban on manufacturers in the region. Manufacturers are applying a range of strategies to cope with the rimu shortfall problem. Based on consumer preference for furniture timber this study identified five consumer segments. The colour and grain of the timber are the key attributes for consumers when choosing furniture. In addition to these attributes, matching of furniture timber with existing furniture and origin of timber are other important factors that influence consumer preference for furniture timber. Profiles of these consumer segments are not as clear as anticipated. However, there is statistical evidence that these segments are different in terms of gender and income.

### **Keywords**

*rimu; furniture; furniture industry; manufacturer; timber; consumer; consumer preference; consumer segments; Q method*



## **Rai, Chandra B. (2010)**

**Analysis of timber production and institutional barriers: A case of community forestry in the Terai and Inner-Terai regions of Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy in Forestry Economics at Lincoln University**

### **Abstract**

Community forestry in Nepal is intended to facilitate both improved forest conditions and the alleviation of poverty, by increasing community participation in forest resource management. While this programme has been successful in improving forest conditions, the economic returns to local people from community forests are not as apparent, especially in the case of the Sal forests in the Terai and Inner-Terai regions of Nepal. Despite having several advantages; high value forest, fertile land, connection with the transportation network, and being close to the regional markets, there is very little timber production from these forests. This research has analysed the problems inherent in the institutional structure of the community forests that would explain why such a high value timber was not being fully utilized. In particular, the research has looked at two aspects of the structure. The first is, whether the size of community forests has a negative effect on the efficiency of commercial timber production, and thus whether there is a need to develop cooperative or joint management structures with other user groups. The second aspect of the research is to look at whether the internal management structures of community forest user groups, and relationships with government institutions, affect their ability to make production decisions within the user groups, or affect their ability to make external commercial contracts with other user groups, log buyers, or contractors. The findings of this research are expected to increase the understanding of the timber production process and the institutional problems of community forestry in the Terai and Inner-Terai regions. Research findings may also be helpful in other regions of Nepal, other parts of the world, and other sectors, such as fisheries, where similar resource management settings exist.

### **Keywords**

*development; community forest user group; community forest; Terai; Sal; timber production; transaction cost economics; contracting; cooperative; new institutional economics*

## **Raut, Ram Krishna (1973)**

**The effect of plant density on carrot yield**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Masters of Horticultural Science at Lincoln University**

### **Abstract**

In production of field and vegetable crops plant density and application of fertiliser play an important role. There exists a relationship between density and crop yield, whether the harvested portion comprises the vegetative part of the plant or the reproductive part. In root crops where yield is due to the vegetative part of the plant, yield has generally been found to increase asymptotically with increase in density. Where the density is constant, yield can be affected by the alteration of the arrangement of plants in the row or between the rows. At a given density, as the plant arrangement approaches a 1:1 rectangularity the yield obtained should be a maximum.

Although soil nutrient levels have been reported to influence yield and show an interaction with density, results of experiments have been extremely variable from crop to crop and between soil type and weather conditions.

In New Zealand, carrots are commonly sown in spring in rows 10-12 in. apart for early bunching and 15 in. apart for the main or summer sown crop. Some large varieties such as Taranaki Strongtop may be grown as far apart as 30 in. between rows. The plants are commonly thinned to 1-2 in. apart in the rows. There is a very wide range of fertiliser base dressings used.

The object of the investigation was to determine the optimum density, spacing arrangement, and fertiliser level to produce the highest possible yield of good quality carrots.

## Sanjyal, Sunita (2021)

### **Assessment of seed production potential of Teosinte (*Euchlaena mexicana*) under varying agronomic management practices in the central region of Nepal**

**A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy at Lincoln University**

#### **Abstract**

Teosinte (*Euchlaena mexicana*) is a popular summer herbage crop in Nepal. While it has good seed production potential, the management for seed production is unknown. A two year study was undertaken in order to investigate teosinte seed yield and seed quality for different sowing dates, seed sowing rates and cutting management in the Terai region of Nepal. A seed development, a genotypic diversity and an economic study were also conducted. There were four different sowing dates (30 March, 30 April, 30 May and 30 June), four seed rates (20, 40, 60 and 80 kg/ha) and three cutting management treatments (uncut, once cut and twice cut) arranged in a split split plot design. The only certified variety of teosinte in Nepal, Sirsa was used for the study. Herbage yield of teosinte was affected by sowing date, seed rate and cutting management. Maximum herbage yield (HY) and dry matter yield (DMY) from a teosinte crop grown for seed production was obtained from the 30 April sowing together with the 60 kg/ha seed rate and two cuts. There was a positive correlation of plant height, tiller number, leaf number and leaf area index (LAI) with DMY. The effect of the environment on both teosinte herbage and seed yield was studied. Higher herbage and seed yield were produced from early sown teosinte because the longer growing season allowed the accumulation of higher growing degree days (GDD). Five critical growth stages of teosinte were identified. The temperature and GDD requirements for each growth stage were 26.1°C (135°C days), 26.0°C (2189°C days), 24.1°C (2442°C days), 20.4°C (3049°C days) and 17.2°C (3150°C days) for emergence stage (GS1), vegetative stage (GS2), flowering stage (GS3), seed development stage (GS4) and seed maturity stage (GS5) respectively. Maximum seed yield (kg/ha) was obtained from the two earlier sowings (30 March and 30 April) in both years because early sown plants were taller, and had higher LAI and more tillers and cobs per plant, ears per cob and seeds per ear than later sown plants. In 2017, there was a non-significant effect of seed rate on seed yield because of natural thinning of plants due to heavy rainfall and wind which caused lodging in the early vegetative stage, but in 2018 the two lower seed rates (20 and 40 kg/ha) produced the highest seed yield. For cutting management, seed yield was higher for uncut plants in both years. Seed quality was tested for seeds harvested from different sowing dates, seed rates, cutting management and cob position on the plant. Over the two seasons of trials, seed harvested from the 30 March sowing at the two lower seed rates (20 and 40 kg/ha) and uncut plants resulted in higher germination percentage and thousand seed weight (TSW) in both years. There was a significant negative correlation between the sowing dates and germination percentage and a negative correlation between sowing dates and TSW because germination percentage and TSW were reduced with each delay in sowing. There was a positive correlation between TSW and germination percentage for different sowing dates for all cobs in 2017 ( $R^2 = 0.77$ ) ( $P > 0.05$ ) and 2018 ( $R^2 = 0.80$ ) ( $P > 0.05$ ). Seed quality was also affected by the cob position on the plant. When seeds were hand harvested separately from top, middle and bottom positioned cobs, higher quality seeds (germination percentage and TSW) were obtained from seed harvested from the top positioned cobs. Teosinte seeds physiological maturity (PM) was attained at 59 days after anthesis. Harvesting teosinte seeds from the top and middle positioned cobs on the plant recovered 78% of the total seed yield, while that from the middle and the bottom positioned cobs recovered 57% of the total seed yield. Therefore harvesting mature seeds from the top and middle positioned cobs is recommended to minimize loss of quality seed from shattering which would occur if harvesting was delayed until seeds from the bottom cobs were mature. A diversity study of teosinte was conducted for 18 teosinte accessions, 17 from CYMMIT Mexico and Sirsa, to identify if any of the introduced accessions could perform better than Sirsa in terms of herbage yield, seed yield and time to seed maturation. Out of 17 accessions, accessions 5, 7 and 12 out yielded Sirsa in terms of herbage yield, seed yield and were earlier to maturity. This preliminary result suggest a possible source of material for developing new teosinte varieties in Nepal better suited for farmer's needs, particularly to reduce the length of time required to grow a seed crop. A separate study was conducted on seven seed lots of teosinte collected from different regions of Nepal. Hierarchical cluster analysis based using morphological characteristics gave two distinct clusters; cluster I (Makwanpur) from the midhills and cluster II (Sarlahi, Mohattari, Bara, Chitwan, Gaughat and Tikapur) from across the southern Terai. These two clusters suggest an agro ecological differentiation for teosinte genotypes grown in Nepal. An economic analysis conducted based on the total costs and income from the different management in this research study showed that the highest gross margin was obtained from the March and the April sowings at the 20-60 kg/ha seed rates and none or one cuts. Taking one herbage cut was not detrimental to a farmer's gross margin for seed production.

#### **Keywords**

Teosinte; sowing date; cutting management; herbage yield; seed yield; seed quality; growing degree days; genotypes; economics; seeding rates; Nepal; Terai

## Sherpa, Ang P. (1996)

### **Participatory rural appraisal (PRA) in community tourism planning: a case study in the Nyishang and Nar-phu regions of the Manang District, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Parks, Recreation and Tourism Management at Lincoln University**

#### **Abstract**

Third World countries are continually being promoted as important tourist destinations due to their cultural and biological diversity. However, in the rush for tourist development, many culturally unique and physically fragile rural areas are opened for tourism without a proper assessment of the existing problems of these areas or of the concerns of the people living there. These problems arise not only due to the lack of experts but also due to the lack of a framework that is appropriate to the problems of Third World rural areas. Central to such an assessment are the impacts that tourism might have on the destination community's resources (social, cultural, economic, and environmental), which nurture and sustain tourism. It is, therefore, essential to have community participation and input to integrate overall community objectives into the mainstream of tourism development. In order to achieve these goals in Third World rural areas, an appropriate framework suitable for both the assessment of tourism impacts on host societies and to facilitate community participation measures is required. To fulfil these requirements, a modified Participatory Rural Appraisal (PRA) approach is proposed and evaluated in the Manang District of Nepal. This study has two major objectives. It has first adopted, tested, and evaluated Participatory Rural Appraisal (PRA) techniques for their potential in encouraging community participation in tourism planning within a Third World rural setting. Second, specific tourism development strategies for the study area, as articulated by its residents, are presented, interpreted, and elaborated. Four major techniques of PRA were adapted and used for this research. They are: a review of secondary data; followed by semi-structured interviews of key informants and other individuals; group interviews and discussions; and finally a community workshop. Residents of two regions, Nyishang and Nar-Phu of the Manang District of Nepal comprised the study audience. The former is a popular tourist destination on the Annapurna circuit, and the latter is a potential tourist destination which has not yet been opened to foreign visitors. The above PRA techniques and their sequential introduction have been vital in allowing research participants an analysis of their common problems and concerns, and to move systematically towards defining acceptable styles of development and desirable future tourism opportunities. Interviewees of both Nyishang and Nar-Phu see tourism as one option to supplement agropastoralism in meeting basic community needs. Knowledge of tourists, tourism, its impacts and planning was very poor, particularly among the residents of Nar-Phu who are not exposed to tourism. Therefore, Nar-phu has much to learn from its adjacent neighbour Nyishang. Despite this, most of the interviewees were able to identify the existing tourism product of the research area. Given the poor tourism knowledge base, residents may need a high level of an external agency's assistance in the planning process, at least in the initial phase. However, the formation of a tourism management committee representing all groups of people living in the area, emerged as an appealing institutional arrangement. This can build locals' confidence and accumulate experience. Meaningful participation, however, will depend on tourism education and awareness for both the general residents and the industry sector and their balanced inputs into planning and implementation. Although the adapted PRA process has facilitated community participation for this case study, future design should include evaluation and monitoring aspects, so as to be iterative in meeting community needs at different stages of tourism development.

#### **Keywords**

*environmental impact; developmen; Participatory Rural Appraisal (PRA); Nepal; tourism impacts; tourist destinations; third world tourism; perceptions; attitudes; tourism planning; surveys*

## **Sherpa, Ang Rita (1986)**

**Alternative energy sources for Sagarmatha National Park in Khumbu Region**

**Dissertation is presented in partial fulfilment of the Diploma in Parks and Recreation Management, Ranger Option, at Lincoln College**

### **Abstract**

The Everest region or Solu Khumbu is one of the most celebrated areas of the world. It is here that the highest mountain in the world, Mount Everest, or as the Nepali call her, Sagarmatha "Mother of Universe" is situated. The high mountains and valleys of the Solu Khumbu is not only the home of Mt Everest but also that of a hardy ethnic group called "Sherpa" who migrated to the area from Eastern Tibet in the early 16th century. This remote part of the world holds some of the most awe inspiring peaks to be found anywhere, framing a backdrop to the fascinating old Bhuddist Monasteries and amiable Sherpa villages. These people have not only adapted to this marginal environment overcoming its problems and poor soil, but have also established a rich cultural heritage. Up until 1950, the forests of Khumbu region had served as a multi-purpose resource for the Sherpas; firewood, building materials, leaf litter for compost and grazing animals. The influx of tourism since the fifties increased demand for this resource. Large areas of forest have been burnt to ash by mountaineering and trekking groups who have used the wood for cooking, heating and hot showers, particularly on the route to Mt Everest and wherever there are lodges, tea shops and hotels. This dissertation is concerned with the problems already outlined, along with proposals for introducing alternative energy sources. In an area where income is limited, the success of alternative energy sources will depend largely on the cost to the local inhabitants.

### **Keywords**

*Sagarmatha National Park; tourism; alternative energy; forest management; resource management; Nepal*

## **Sherpa, Doma (2014)**

### **How to share the potential benefits of REDD+? The case of Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Natural Resources Management and Ecological Engineering at Lincoln University**

#### **Abstract**

Reducing Emissions from Deforestation and Forest Degradation (REDD) is an incentive based measure for climate change mitigation. REDD+ transcends deforestation and forest degradation and includes sustainable management of forests and enhancement of carbon stocks. Advocates suggest that its innovative approach rewards local communities' efforts in the conservation of forest resources and preventing deforestation, while enabling them to derive benefits from international sources for contributing to mitigating climate change. The Government of Nepal is currently planning to implement REDD+ activities in community forests already involved in sustainable forest management. However, there are unsolved questions on equitable and efficient sharing of benefits. What are the existing factors that affect the flow and sharing of benefits of REDD+ in Nepal? How can these factors be controlled to promote an equitable allocation and sharing of benefits of REDD+? Similar issues regarding equity have also been observed in community forest management. To investigate these questions, the researcher conducted a case study in one of Nepal's REDD+ pilot project implemented in community forests to explore issues and concerns related to equity and efficiency that are vital to the adoption of a benefit sharing mechanism. Qualitative information was collected by interview techniques through semi-structured questions. Interestingly, the results show that Nepal has decided to participate in REDD+ to bring additional ii benefits, but who the beneficiaries will be is a question that has not been addressed. Also, much of the research on REDD+ has focused on advancing the technical components of REDD+. By contrast, research on benefit sharing has not been initiated by the government at any level. And questions of how the benefits will be distributed remain. The research recommends potential mechanisms – including a normative basis for the allocation and distribution of benefits – that could help to advance equity. The issues of needs vs. contributions in determining what is equitable leads to the formulation of guidelines for how benefits should be shared at two levels in Nepal. First, the vertical distribution of benefits by the central government should be based on the determination of ownership of carbon benefits and on performance criteria. Second, at the community level, horizontal benefit distribution should be determined by the community itself based on its definition of needs. However, at both levels, issues of elite capture, transparency, and accountability must be addressed. In addition, with regard to the issue of trade-offs between the 3 Es (effectiveness, efficiency and equity) in benefit sharing of REDD+, equity was found to be the most important requirement for local acceptance of any REDD+ programme.

#### **Keywords**

*REDD+; benefit sharing; equity; efficiency; effectiveness; benefit sharing mechanism; communities; community forestry*

## **Sherpa, Lhakpa N (1979)**

### **Considerations for management planning of Sagarmatha National Park**

**Dissertation submitted in partial fulfilment of the requirements for the Diploma in Parks and Recreation, Lincoln College, University of Canterbury**

#### **Abstract**

Although 'Considerations for management planning of Sagarmatha National Park' has been prepared primarily as a dissertation for the completion of Diploma in Parks and Recreation, this particular subject has been chosen to contribute towards Nepal's conservation programme. This dissertation consists of recommendations and supporting information, rather than policy statements. Thus, it should provide guidelines for management planning rather than to serve as a proper management plan for Sagarmatha National Park. My interest in nature conservation and training in National Park management has made me aware of urgent need for conservation measures in the Khumbu Region. I appreciate His Majesty's Government's concern over the conservation problems of the Khumbu region, and strongly support the idea of protecting the environment of the region under national park status. As an inhabitant of the Khumbu region, I am also aware of the needs of the local people, and I share their concern over possible effects of national Park legislation on their life-style. This unique has compelled me to explore in depth, the possible impacts of my recommendations on the conservation programme and on present human needs. This, I hope, has contributed towards making balanced recommendations in order to minimize the conservation and the use conflicts in the Khumbu region.

#### **Keywords**

*national park management; Nepal; Sagarmatha National Park; conservation; resource management*

## Sherpa, Mingma N (1979)

**Planning for interpretation: a planning guideline for Sagarmatha National Park in preparing an interpretative master plan**

**A dissertation submitted in partial fulfilment of the Diploma in Parks and Recreation.**

### **Abstract**

The uniqueness of the area is described in the report prepared by the 1974 New Zealand mission to Sagarmatha National Park, Nepal. Khumbu is a region of 1,243 km<sup>2</sup> and is the home of 3,500 Sherpas. Similarly, it is the habitat for many wildlife species such as Muskdeer, Snowleopard, Tahr, and many bird species including blood pigeons. The resource managers have a big responsibility to preserve its natural, cultural, historical and landscape values for the enjoyment, education, inspiration and peace of mankind. In order to achieve these objectives, I feel that management requires an interpretative plan to be developed as soon as possible. The importance of having this in the Park is best expressed by William Carr when he said "Not having an interpreter in a Park is like inviting a guest to your house, opening the door and then disappearing". Sagarmatha National Park, established in Khumbu, had 4,000 visitors in 1978 and it is the Park Manager's job to make the visitors' time enjoyable by providing facilities for interpretation. At the same time, the impact on the local people's way of life and the resources will have to be minimized. Hence the purpose of my dissertation is to prepare guidelines for an interpretative plan which relates and explains the cultural/historical and natural values of the Park and the surrounding mountains, in ways which will make them more meaningful and enjoyable. The guidelines consist of a statement of needs, goals and objectives from which the interpretative programme will evolve. The resources to be interpreted are then investigated and assessed. The final stage outlines possible media through which to present the information. The aim of the guidelines discussed is to help Park Managers and interpreters to achieve the following goals: i) resource protection by increasing people's awareness of their impact on nature, ii) increased enjoyment and fulfilment of people's experiences by providing opportunities for greater understanding of what they see.[Hide full abstract]

### **Keywords**

*Sagarmatha National Park; interpretative plan; landscape; resources; cultural; values; Nepal*



## Sherpa, Ngawang Thapke (2020)

**Cultural ecosystem services provided by mountain landscapes - understanding recreational preferences: A case study of Sagarmatha (Mt. Everest) National Park and buffer zone, Everest region, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Natural Resources Management and Ecological Engineering at Lincoln University**

### **Abstract**

Cultural ecosystem services [CES] are non material benefits that humans receive from the natural environment. They are often characterized as intangible, subjective and difficult to quantify. People can enjoy direct benefits of CES through recreational activities. Tourism and recreation have been argued to provide positive disposition towards the protection of ecosystems and motivation for the management of human-nature interactions. Over the years, mountain regions have emerged as popular tourist destinations due to their spectacular landscapes, natural and cultural features, and amenity values. Pristine mountain environments offer visitors physical, social and psychological benefits. While much of the research work in CES focuses on assessment and mapping of cultural service values using quantitative approaches, there is paucity of literature that focuses on subjective nature of recreational preferences in mountain regions. This research therefore aims to explore recreational preferences of the significant stakeholders (visitors and local residents) in Sagarmatha National Park and its Buffer Zone [SNPBZ], Nepal. Q method is a robust research method for the subjective study of a range and diversity of perspectives, shared viewpoints & experiences, through thematic identification and analysis. The main strength of this method is that it generates rich data and provides a robust result from relatively small number of participants through the integration of quantitative analysis with qualitative interpretation. A set of 30 images widely representing recreational features/conditions was Q sorted by international visitors to SNPBZ and local residents. The Q sort data were factor analysed using principal component analysis followed by varimax rotation in the PQMethod software program. Using Q method, three distinct factors emerged across visitors. They are 'superlative scenery seekers', who have strong preferences for 'wild and scenic nature'; 'culturally curious visitors' who have strong preferences for 'culture within nature'; and 'freedom finders', who have strong preferences for 'mountains as a space for freedom'. Similarly, two distinct factors emerged across local residents. They include 'recreational enthusiasts', who have preferences for 'local culture with nature'; and 'recreational pragmatists' who have preferences for 'facilities and infrastructure'. The study also found that two significant stakeholders share a common viewpoint to the issues such as seasonal overcrowding, stray dogs, donkeys/mules, solid waste and degraded trail which are evolving as 'reputational risks' to SNPBZ. It is expected that the research results will inform concerned authorities, including local government and park management, of the dimensions along which tourism development plans and park management strategies might evolve.

### **Keywords**

Q method; recreational preferences; cultural ecosystem services (CES); mountain lands; Sagarmatha National Park; buffer zone; Everest region; Nepal; mountain land recreation; recreation

## **Sherpa, Nima Wangchu (1978)**

**Camping grounds in national parks in Nepal: Case study of Sagarmatha National Park  
Dissertation is presented as a part requirement for the Diploma in Parks and Recreation**

### **Abstract**

This dissertation concerns the establishment of camping grounds in the national parks of Nepal. Although it is specifically written for Sagarmatha National Park, the dissertation could provide useful principles when establishing camping grounds in other parks, as parks in Nepal are at an early developmental stage. The objective of this dissertation is to suggest methods for the establishment of camping grounds. It is hoped that the National Parks & Wildlife Conservation Office will find this dissertation useful when establishing camping grounds in the national parks of Nepal in the near future. The limited time and resources available for this dissertation, distance from Nepal and lack of specific information from Nepal related to tourism has meant the dissertation has had to be of a general nature. However, it will deal comprehensively with the basic requirements necessary for the establishment of camping grounds.

### **Keywords**

*Sagarmatha National Park; recreational facilities; camping grounds; Nepal*

## **Sherpa, Pasang (2022)**

**Exploring local peoples' perspectives of online destination images: A case study of the Khumbu region**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Applied Science at Lincoln University**

### **Abstract**

Through various benefits of tourism, a place is transformed into a destination. These destinations compete with one another for tourists, with promoters creating and promoting the place as a destination, a product. Due to increased access to and use of the internet, promotion and reach have become much easier online, where individuals may obtain destination information with relative ease. These factors can contribute to tourists developing an illusory perception of a place that frequently differs from their experience. Locals are frequently absent from the narratives (both contributing and being a part) of their place which are depicted online. This can result in dissatisfaction among both residents and visitors and has the potential to negatively affect the relationships between them. While much of the research on locals' perspectives on place focuses on developed country settings using quantitative approaches, there is a scarcity of literature that focuses on the qualitative nature of locals' place image and their perceptions in a developing country setting. This research aims to address these gaps by exploring how local people respond to the online images used to promote their places. The study utilised as its case study site an area that is one of the most famous tourist destinations in Nepal, the Khumbu, the upper region of Solukhumbu which is known as the Everest region. The official Nepali tourism website was used as the source for the online images analysed. Text and photos were gathered from Nepal's official tourism website and analysed to develop themes for a semi-structured interview with local people about their perspectives on destination image. Semi-structured online interviews were undertaken with 19 Khumbu residents. Their perspectives reveal that they have a strong sense of place based on their ancestral connection. They lacked faith in the official website as the true face of Khumbu. Their responses to the online themes were classified into three categories: acceptance, tolerance and disapproval. It was discovered that all of the participants wanted their community to be promoted and wanted to showcase Khumbu as their contemporary reality, including the stories of the various places and highlighting more of the culture and lifestyle, rather than only focusing on the mountains. The destination image formation model (Beerli & Martin, 2004) was modified based on the findings, to draw attention to the importance of local people and promoters as key agents in the destination image-making process. It is expected that this research will help inform authorities including official tourism promoters about the perspectives local people have regarding the portrayal of their place online. This will assist promoters in comprehending the destination which includes local people while also identifying opportunities to collaborate which improves the relationship between officials and local people and contribute to a more harmonious tourism system.

### **Keywords**

*destination image; tourism; place identity; place making; local people; website content analysis; Everest region; Khumbu, Nepal; Nepal; tourism marketing; case study*

## **Sherpa, Tsewang (2022)**

**A critical evaluation of the Mt Everest garbage deposit scheme**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Masters at Lincoln University**

### **Abstract**

Waste on Mt Everest is often treated as 'out of sight, out of mind' – discarded into the nearest receptacle and promptly forgotten. The accumulation of solid waste on the world's highest mountain's camping sites (Base Camp and high camps) has been a chronic problem since mountaineering first became popular in 1951 and has further intensified with the steady acceleration of mountaineering in the past four decades. The implementation of the Garbage Deposit Scheme (GDS) was a government intervention aimed at solving waste management issues on Mt Everest. The evaluation of the GDS is important to understanding whether the results achieved correspond to the policy goals and to identifying obstacles to and outlining strategies for any necessary improvements. Such a study has not been conducted. This study assesses the effectiveness of the GDS. Empirical analysis was carried out to evaluate whether waste management on Mt Everest has improved. The findings suggest that the GDS has not accomplished the desired objectives in waste management, particularly because of its low level of acceptance among stakeholders and low level of government support. This study highlights major obstacles to the GDS's implementation. The study concludes with recommendations that could improve the scheme.

### **Keywords**

*Nepal; environmental policy; waste management; Mount Everest; waste disposal; Garbage Deposit Scheme (GDS)*

## **Silwal, Pratigya (2016)**

### **Local Adaptation Plans of Action (LAPAs): an analysis of approaches to planning for climate change in Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Natural Resources Management and Ecological Engineering at Lincoln University**

#### **Abstract**

Adaptation to climate change has become a major focus globally since 2001. In accordance with the United Nations Framework Convention on Climate Change (UNFCCC) decision in 2001, each least developed country prepared National Adaptation Programme of Action (NAPA) so that these countries would be able to adapt to the adverse effect of climate change. Concerns were expressed about the local variability of effects and impacts of climate change and hence Local Adaptation Plans of Action (LAPAs) have been developed particularly to address these issues, with Nepal being the pioneer country to do so. In Nepal, it is generally accepted that LAPA reflects a bottom-up and participatory approach to planning, unlike the NAPA. However, the plans have been prepared and implemented by different organisations through different programme, making them contentious and inconsistent. The sustainable livelihoods framework has been utilised to address the knowledge deficit on the planning approaches specific to LAPA by exploring the approaches to LAPA planning undertaken by different programmes in Nepal. The programmes selected for study are three of the large-scale interventions on adaptation planning, namely, Nepal Climate Change Support Programme (NCCSP), Multi-Stakeholder Forestry Programme (MSFP) and Hariyo Ban Program (HBP). Two of these (MSFP and HBP) are broad forest-based programmes which include climate change adaptation as a subset of their activities, while the third (NCCSP) is a broad climate change adaptation programme which includes forest-based projects as a subset of their activities. I analyse the approach undertaken by these organisations in the LAPA process and finally examine the activities identified in the plan. Data were collected using semi-structured interviews at three levels, that is, national, district and community, and included people from government agencies, non-government organisations and the community. A total of 37 interviews were undertaken and the relevant documents were reviewed and analysed to provide a comprehensive understanding on the process. Key findings reveal a rigorous approach to LAPA planning, with vulnerability assessment as the factor determining the adaptation strategies in all three cases reviewed. However, there was greater ownership and acknowledgement of the resulting plan when the implementing agency had the authority and ability to mobilise the necessary resources and to make decisions, that is, when there was top-down implementation of a bottom-up plan by local government. Inadequate knowledge and capacity on technical aspects and the lack of a clear coordination mechanism at all levels in terms of adaptation planning are major challenges for the survival of LAPA. The findings suggest an integrated approach as an option to address the issue around overlapping objectives of development and adaptation. This learning and understanding can be applied in further scaling up of the adaptation planning in Nepal as well as other developing countries.

#### **Keywords**

*climate change adaptation; LAPA; planning process; bottom-up; forest; community; government; non-government organisation*

## **Subedi, Bodh R. (1999)**

**Wildlife tourism & recreation: Impacts of elephant safaris in the Royal Chitwan National Park, Nepal**

**A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Applied Science at Lincoln University**

### **Abstract**

The Royal Chitwan National Park (RCNP) of Nepal is renowned for its large variety of wildlife, including rhinoceros and tiger, which can be viewed during safaris from the back of an elephant. The demand for elephant safaris has risen as a result of increasing tourist visits to the park. The total number of tourists visiting the park increased from 836 in 1974 to 96,062 in 1997. The impact of this tourist or recreation activity on park resources is as yet unknown. Thus, this study investigates the impacts of elephant safaris on the park. The main purpose of this study was to investigate people's perceptions of the biophysical, social and economic impacts of elephant safaris. The study also investigated the current and historical status of the safaris in Nepal. Finally, on the basis of the findings of this research, both future research and practical management recommendations are suggested to enhance the quality of elephant safaris while minimising impacts in the park. Both qualitative and quantitative approaches were adapted for this study. Two different questionnaires were developed. First, a self-administered questionnaire was offered to park visitors (203) and second, a questionnaire was used for interviewing elephant drivers (40), tourist guides (30), and park staff (30). More than ten key informants, including park managers and conservationists, were interviewed. Field observations to gain an in depth knowledge of the wildlife responses to the elephant safaris were also done. Social impacts were determined on the basis of tourist attractions, and satisfaction with and crowding levels of the safaris. It was found that more than 97 per cent of visitors wanted to participate in elephant safaris and that was a most enjoyable activity for the majority of visitors. More than 68 per cent of visitors gave high satisfaction ratings for elephant safaris. The crowding level of elephant safaris at Sauraha, as rated by the respondents, was higher than in both the Tiger Tops and Kasara areas. Economic impacts were analysed on the basis of tourist expenditure and the revenue and employment generated by the safaris. The study indicates overall agreement of respondents that elephant safaris have been the main cause of economic development of Sauraha (main entrance gate of the park). Elephant safaris have generated 428 full time jobs and more than 16 per cent of the revenue in the park in 1997. This study found that an elephant safari is a perfect way to go wildlife viewing. It is very eco-friendly overall, and surpasses its alternatives, especially noisy Jeep safaris. However, more people are becoming aware of the biophysical impacts of the safaris in the park. They perceive that the safaris cause negative impacts on wildlife and can impact on their habitat through soil compaction and erosion, vegetation damage and wildlife disturbance. The study also estimated that the current wildlife observation distances from elephant safaris are less than 15 metres, which is too close and may be harmful to wildlife. There is considerable variation in the perception of appropriate wildlife viewing distances among different groups of people (elephant drivers, tourist guides and tourists). The park staff recommended that wildlife viewing distances should be more than 15 metres while the other three groups suggested less than 15 metres. This suggests that park staff are more concerned that the closeness of the safaris approaching wildlife has negative effects on their behaviour. This study also provides interesting comparisons with previous studies on impacts of tourist activities on wildlife from a biological perspective in that the appropriate distance perceived by park staff to view wildlife was the only one to "fit" the distance recommended by these earlier studies. The distances perceived by other groups of people as appropriate would in fact cause unacceptable levels of disturbance. Therefore, this study concludes that social (human) perception of disturbance by elephant safaris may not accurately reflect the biological severity of their impacts.

### **Keywords**

*wildlife; tourism (eco-tourism); recreation; elephant safaris; Royal Chitwan National Park; biophysical; social; economic; impacts; disturbance; biology; observation distance; perception; tourist satisfaction; crowding; Nepal*

## Tamang, Sunil (2020)

### **Contributions by 'foreign tourists' in post-disaster tourism destination recovery: Langtang National Park following the 2015 Nepal earthquake**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Applied Science at Lincoln University**

#### **Abstract**

In the face of increasing numbers of disastrous events, the Sendai Framework for Disaster Risk Reduction emphasised strengthening of resources and capabilities for the least developed countries, small island developing states, and landlocked developing countries to reduce the risk of disasters and to recover after disasters have occurred. To sustain traditional mountain livelihoods of agriculture and animal husbandry, tourism is increasingly considered an avenue for economic diversification, income generation and employment opportunities. Although tourism, when managed sustainably has the potential to contribute to all 17 Sustainable Development Goals (SDGs) and support to build disaster resilient communities, it has been always affected by natural disasters in all settings. In particular, mountainous tourism destinations are mostly affected by earthquakes and their cascading hazards. Nepal suffered a massive loss of lives and infrastructure when two devastating earthquakes of magnitude of 7.8 and 7.3 hit on April 25 and May 12, 2015, respectively. Tourism destinations in protected areas and their surrounding areas (mostly in mountain regions) where 60 percent of foreign tourists travel to engage in nature-based tourism and recreational activities were affected and Langtang National Park, located north of Nepal's capital was no exception. While multi-stakeholder participation and collaboration is related to effective and sustainable disaster recovery, participation of tourists, major stakeholders of the tourism industry in disaster recovery of a tourism destination, are not adequately addressed in disaster management related research literature. Therefore, this study aims to explore contributions by foreign tourists in post-disaster tourism destination recovery through a case study of Langtang. This study used face to face and Skype interviews to conduct 46 semi-structured interviews (34 local residents, seven foreign tourists, one Nepali facilitator and four key informant interviews). The study findings show that substantial contributions by foreign tourists in addressing local people's post-disaster recovery needs in a tourism destination were embedded in their mutual relationship and connection with host families of a community affected by a disaster. The four foreign tourists typologies: 'active relation tourists', 'passive relation tourists', 'informal group tourists', and 'formal group tourists' used three disaster aid contribution and distribution methods to meet local recovery needs: 1) direct contributions to recipients, 2) contributions facilitated by a medium or facilitator, and 3) contributions involving both a medium and facilitator. While contributions from foreign tourists alone are not sufficient to address reconstruction and recovery needs of all residents in a disaster-affected tourism destination, this study provides valuable insights into leadership roles of community-based organisations in securing a community voice to understand their local reconstruction and recovery needs and coordinating with foreign tourists and other stakeholders in supporting all local residents to meet those needs. In a nutshell, diverse means of contribution used by foreign tourists embraced flexibility to achieve the urgent reconstruction and recovery needs through both an equality-based approach and an equity-based approach to aid distribution, which collectively complemented more than formal government led disaster recovery initiatives in a tourism destination. The study thus contributes to strengthening theories and practices based on place attachment and linked to the Sustainable Livelihoods Framework in terms of the role of tourism in disaster recovery.

#### **Keywords**

*tourist-host relationship; social capital; informal contributions; sustainable livelihoods framework; mountain tourism destination; Langtang; Nepal; disaster recovery; disaster response; mountain lands; disasters*

## **Thapa, Bidur Kumar (1956)**

**Studies on the accumulation and composition of organic matter in grassland soils, with particular reference to organic phosphorus, carbon, nitrogen and sulphur**

**A thesis submitted for the Degree of Master of Agricultural Science with Honours in Soil Science**

### **Abstract**

An attempt was made to study the effect of the time factor on the accumulation of organic carbon, nitrogen, sulphur and organic phosphorus, and the relationship between carbon and nitrogen, carbon and sulphur, carbon and organic phosphorus, total phosphorus and organic phosphorus, and carbon and cation exchange capacity. A study was also made on the amount of organic phosphorus in the surface layer of different soils in Canterbury and a positive correlation between carbon and organic phosphorus, and total phosphorus and organic phosphorus was obtained. It is suggested that because high levels of organic phosphorus are associated with level of phosphorus in the parent material the phosphorus situation of the whole profile is worthy of further study.

### **Keywords**

*humus; soil analysis; phosphorus*



## Tiwari, Sundar (2019)

### **Agro-ecological management of the wheat bug, *Nysius huttoni* (Hemiptera: Lygaeidae) and other pests in brassicas**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy**

#### **Abstract**

Modern agriculture offers a range of benefits including sufficient food production for a constantly increasing human population. Improved living standards, enhanced social stability and avoiding food insecurity are other advantages of agricultural intensification. Unfortunately, such agricultural intensification relies heavily on anthropogenic agricultural inputs such as high-yielding varieties, fertilizers and chemical pesticides. Some aspects of these practices are associated with human health problems, reduced biodiversity, degradation of soil fertility, air and water pollution, eutrophication of rivers and lakes, pollinator decline as well as impacts on atmospheric constituents and global warming. In New Zealand, wheat bug, *Nysius huttoni*, is considered an economic pest of forage brassicas and many other cultivated crops such as cereals and vegetables. This bug damages forage brassicas; greater economic losses have been recorded at the germination/seedling stage (90% plant loss in extreme situations). Insecticides as seed coatings and sprays are frequently used to manage this and other New Zealand forage brassica pests. Although seed coatings represent selective placement of the toxin, it is still true that large quantities are applied. A high proportion of these compounds enters the soil and leads to pesticide resistance, and they impact beneficial arthropods and soil microorganisms creating an adverse effect on ecosystem services (ES). This study developed a habitat management protocol using trap plant species in a 'sustainable intensification' approach, which is an alternative, more benign approach to pest management. Specifically, the study developed trap-crop technologies to draw *N. huttoni* away from kale seedlings. The use of less susceptible kale cultivars and integrating these into the trap cropping technology are important pest management strategies in integrated pest management (IPM) and potentially reduce over-reliance on orthodox pesticides on brassicas. Flowering trap plants can improve conservation biological control (CBC) and improve multiple ES in and off-farm in brassicas. A range of laboratory, field-cage and open-field experiments were carried out at Lincoln University (43° 38' S; 172° 27' E), New Zealand, during 2016 and 2017, and at Chitwan (27° 37' N; 84° 22' E), Nepal, during 2018 to: 1) evaluate host plant selection by *N. huttoni* of a range of potential trap plant species; 2) evaluate the susceptibility of kale cultivars to *N. huttoni*; 3) assess the growth stage of alyssum (*Lobularia maritima*) preferred by *N. huttoni*; 4) evaluate potential trap plant species for the *N. huttoni* in forage brassicas; and 5) improve CBC by using alyssum floral strips in a radish field. A series of laboratory choice, no-choice and paired-choice tests were conducted to evaluate the preference of *N. huttoni* for seedlings of eight potential trap plant species: *L. maritima* (alyssum), *Triticum aestivum* (wheat), *Phacelia tanacetifolia* (phacelia), *Fagopyrum esculentum* (buckwheat), *Coriandrum sativum* (coriander), *Trifolium repens* (white clover) and *Medicago sativa* (alfalfa). These species were compared with *Brassica oleracea* (kale) as a potentially susceptible control. Alyssum and wheat were the most favoured potential trap plants for *N. huttoni*, with a significantly higher survival rate, earlier feeding damage and quicker settling time. Laboratory bioassays were performed to evaluate *N. huttoni* preference for a range of kale cultivars: Kestrel, Gruner, Sovereign, Regal, Corka and Colear. Kestrel and Colear are the most popular kale cultivars used as forage brassicas in New Zealand but they are the most susceptible to *N. huttoni*. Corka and Regal were the least susceptible cultivars; the others showed medium susceptibility cultivars to the *N. huttoni*. However, farmers mostly consider other agronomic factors such as yield and disease resistance during cultivar selection. The less susceptible kale cultivars can be integrated into an IPM strategy with trap cropping, biological and microbial approaches, for future low-pesticide management of the bug. Laboratory bioassays of two growth stages of alyssum were performed to evaluate *N. huttoni* preference for the growth stages of alyssum. Flowering alyssum was significantly more suitable for *N. huttoni* than seedlings. Assessment of bug preference for the various growth stages of alyssum plants suggests appropriate planting times for the trap and main crop. Efficient trapping of *N. huttoni* in brassica fields can be achieved if flowering alyssum strips are maintained at the brassica seedling stage in fields. Field cages and open-field experiments were established at the Biological Husbandry Unit (BHU), Lincoln University, to evaluate the performance of *L. maritima* and *T. aestivum* as potential trap plants of *N. huttoni* compared with kale. In field cages, the most suitable trap plants, *L. maritima* and *T. aestivum*, were compared with the least suitable plants, *C. sativum* and *T. repens*, and all were compared with kale. In open field experiments, alyssum, wheat, 'alyssum plus wheat' and kale were used; other species were discarded based on their poor performance in the field-cage experiments. In field cages, alyssum was the most suitable trap plant of the bugs followed by wheat; this was also true in the open-field experiments. However, the 'alyssum plus wheat' trap strips have a greater potential to trap *N. huttoni* than wheat alone, but less potential than alyssum alone. In open fields, flowering, fruiting and senescent alyssum stages, and ripening and senescent wheat stages were significantly more suitable for trapping the bug than the vegetative stage. This information is important; it is necessary to maintain the flowering or fruiting stages of potential trap plants at the brassica seedling stage to reduce pest pressure in brassica fields. *Nysius huttoni* populations declined with distance from the edge trap strips. That significantly higher numbers of *N. huttoni* were intercepted at the edge trap strips suggests focussing *N. huttoni* management practices, such as 'soft' chemicals, at the edges rather than other parts of fields, which would reduce pesticide

cost. Less damage was recorded on kale seedlings next to wheat trap strips followed by alyssum, 'alyssum plus wheat' and kale strips. Flowering alyssum strips also provide habitat for many beneficial arthropods such as spiders, seven-spotted ladybirds (*Coccinella septempunctata*), and lacewings (*Micromus tasmaniae*), that could potentially kill *N. huttoni* and other brassica pests in forage brassicas. A study in Nepal to test alyssum (*L. maritima*), as a potential trap plant for the *N. huttoni* in CBC of pests in radish fields. Alyssum in radish fields significantly increased beneficial arthropods such as hoverflies (Diptera: Syrphidae), ladybirds (*C. septempunctata*), and spiders and reduced the pest pressure of aphids (*Myzus persicae*) and other pests. These findings are useful in developing a pest management protocol for *N. huttoni* using a 'push-pull' strategy in which less susceptible kale cultivars can be used as a 'push' component and alyssum plants as a 'pull' component. The less susceptible kale cultivars can also be used as a 'push' component and highly susceptible kale cultivars as a 'pull' component in a 'push-pull' strategy of pest management. Maintaining potential trap plant species at the flowering stage or growing highly susceptible kale cultivars at the edge of the main field can keep the wheat bugs away from the main crop and keep them from entering the main field. Flowering alyssum can also improve CBC and multiple ES in brassica fields and improve the quality of landscape.

### **Keywords**

*Hemiptera; Lygaeidae; trap cropping; forage brassicas; kale; choice; Lobularia maritima; wheat; preference; conservation biological control; ecosystem services; wheat bug; Nysius huttoni; Entomology*

## **Thagunna, Sher S. (1995)**

**The role of buffer zones in protected areas: A review and synthesis of the case for Nepal**  
**A dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Applied Science in Lincoln University**

### **Abstract**

The early concept of buffer zones was focused on the protection of protected areas from external pressures, particularly human created pressures. The main emphasis was to establish restrictions on the utilisation of park resources. This system did not become very successful. Thus, this dissertation proposes a dynamic definition of buffer zones in that it incorporates the welfare of local people and the preservation of biodiversity in perpetuity thereby eliminating gaps between development and conservation. This dissertation also includes a working model of a buffer zone, in particular, for countries like Nepal. This thesis examines park-people relationships with special reference to Nepal. For this, it identifies use patterns and resource needs which are essential for the livelihoods of park neighbours who are dependent on national park and reserve resources. The needs of local people for natural resources such as firewood, animal fodder and land for agriculture have increased and the present status of resources is not enough to meet the requirements of growing populations. The establishment of protected areas has shown positive results in conserving biological diversity within them. However, problems are present with the growing populations within and in the immediate vicinity of the protected areas in Nepal and degraded resources in public and private lands which are considered the root causes of illicit harvesting of park properties. To overcome this situation, buffer zone management is suggested. This dissertation also identifies some of the constraints which can arise with the process of buffer zone development and management. His Majesty's Government of Nepal made a fourth amendment to the National Parks and Wildlife Conservation Act of Nepal in 1993 for the creation of buffer zones around the boundaries of protected areas. It is obvious that the management of buffer zones in Nepal's national parks and reserves will lessen the conflict between local residents and park authorities. In addition, local people will be benefitted through participatory management. The sustainable use of resources maintains healthy ecosystems which will ensure the conservation of plant and animal species. Protected areas will safeguard their assets which have national and international importance. This dissertation examines the problems that the Park Manager may have to resolve in buffer zone establishment and management. To clarify this, issues of actual users, funds and technical expertise and land use are included. General recommendations are presented which can be implemented in order to maintain sustainable use in the buffer zones and protected areas. This dissertation is a review of the buffer zone literature supported by the author's experience of forestry and national parks systems.

### **Keywords**

*development; sustainability; indigenous people; natural resources; park authorities or administrations; local people; resident peoples; buffer zones or areas; parks; park-people environment; living standards; biodiversity; protected areas*

## **Thakali, Shailendra (1989)**

**Recreation planning framework for the Annapurna conservation area**

**Dissertation [Diploma in Parks and Recreation Management, Lincoln College]**

### **Abstract**

Since the 1950's, the Annapurna Area in central Nepal has been the focus of international mountain land recreation. This area is the most popular trekking and mountaineering destination in Nepal. Lack of stringent planning procedures and management actions over four decades has seen no limit to the enormous pressures being placed on local resources. Consequently there has been growth of undesirable social and environmental problems, with subsequent loss of quality of life and recreation experience for local residents and mountain recreationists, respectively. To cope with these problems, His Majesty the King Birendra of Nepal issued directives to the King Mahendra Trust for Nature Conservation (KMTNC) for the harmonious development of tourism and rural development. As a result of these directives, in 1986 the KMTNC, a non-governmental organisation solely committed to conservation in Nepal, joined the government of Nepal to declare conservation status for the Annapurna Area. The idea behind the Annapurna Conservation Area embraces "multiple land" use principles and attempts to encourage maximum local involvement in the decision making process. My dissertation examines a planning framework to integrated mountain land recreation and other non-recreation uses. I discuss the Recreation Opportunity Spectrum (ROS) and Limits of Acceptable Change (LAC) to develop an integrated planning framework for the Annapurna Conservation Area.

### **Keywords**

*recreation; local resources; Annapurna; Nepal; conservation; planning*

## **Thakali, Shailendra (2012)**

### **Localising environment: Mustang's struggle to sustain village autonomy in environmental governance**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University**

#### **Abstract**

Decentralisation of environmental governance is a general trend worldwide and its emergence has largely coincided with a neo-liberal shift in policies for the management of environmental resources. Decentralisation is based on an assumption that the participation of the local people in natural resource management regimes will produce better long term outcomes for communities and their environment. There is little concrete evidence, however, on what transpires when local inhabitants are explicitly included in resource management planning and implementation, and more specifically, why and how the environment becomes their domain of concern in terms of environmental practices and beliefs. It was this gap that inspired me to undertake this research. This qualitative research uses 'environmentality' as an underpinning analytical construct to study the evolution of institutional arrangements for environmental governance. The research was designed to examine the validity of Agrawal's thesis to explain long term shifts in environmental governance by examining the complex relationships between changes in government and related shifts in environmental beliefs and practices of local inhabitants by subjecting it to empirical assessment in the socio-political and historical setting of the Mustang district in Nepal. My research findings suggest that the configuration of current institutional arrangements for environmental governance in Mustang can be characterised as multi layered and relatively fragmented. Conceptually, the environmental governance institutional framework comprises elements of three inter-related governance layers: the endogenous village governance layer; the central government led development governance layer; and the non-governmental organisation led conservation governance layer. This research suggests that while the concept of 'environmentality' is useful to examine the evolution of environmental governance in Mustang, its basic premise, that the process of governmentalisation has direct bearing on the transformation of local inhabitants into environmental subjects, is arguably not valid in respect to Mustang. Even when central government had limited jurisdiction over this district, natural resources such as forests, water, land and pastures were not treated as open access resources by the local inhabitants of Mustang. They were locally managed by villagers in the context of an endogenous village governance system under the leadership of the Ghempa and Mukhiya. This layer of environmental governance, prevalent across Mustang, is a historically rooted phenomenon. It did not emerge as a result of recent governmentalisation processes, but has been invariably shaped by processes of socio-political subjugation, marginalisation and exclusion from the power centres. My findings suggest that the environmental beliefs and practices were, and have continued to be, socially embedded in Mustang village institutions under the leadership of the Ghempa and Mukhiya. The local environmental beliefs and practices have invariably been motivated by a strong local desire to protect the village autonomy, and is inherently linked to village rights over the resources necessary to meet their basic needs. My case study highlights the local struggles as well as the adaptive capacity of the endogenous village based governance institutions in reaction to different central government policy regimes and allied institutional arrangement over centuries. Thus, arguably, the recent central government environmental and economic development and decentralisation policies coupled with a greatly increased role of non-governmental organisations in implementing central government conservation policies has not necessarily led to dramatic transformation in local environmental beliefs and practices as Agrawal's Indian case study has suggested. My research also demonstrates that an exclusive focus on environmentality to analyse the effect of central government's power in shaping environmental beliefs and practices has two drawbacks. It underestimates the influence of a wider range of different actors and power relationships. It does not provide adequate grounds to explain how this dynamic of power and power relations at the local level impacts on institutional building and ultimately in shaping people-environment relationships in changing socio-political contexts.

#### **Keywords**

*Mustang Nepal; environmentality; people participation; Agrawal; environmental beliefs and practices; technologies of government; environmental governance; village-based governance; village adaptation and traditional resilience; environmental subjects; Foucault*

## **Thapa Barna, B. (1997)**

**The role of interpretation in protected area management: A case study of Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Parks, Recreation, and Tourism Management at Lincoln University**

### **Abstract**

This study describes the role of interpretation in park management. The main purpose of this study is to examine and determine the need for, and importance of, interpretation for park management in Nepal. This study initially examines the theoretical aspects of interpretation in terms of the process, planning and policy issues which underpin its successful application. Issues within interpretation are then examined using Nepal as a case study. In order to achieve the above objectives, a questionnaire survey was used to obtain data from three different sample groups (park wardens/rangers from Nepal, selected experts familiar with protected areas, and selected New Zealand visitors familiar with national parks of Nepal). Respondents were chosen for this research because of their experience in parks and protected areas, their knowledge of park management and their high community profile. The results of this study indicate that there is a strong relationship between interpretation and park management. All of the survey groups reported positive links with park management. They saw interpretation as having positive impacts on resource management (cultural and natural), visitor services, communication and public relations and conservation education. This study has also attempted to identify current or existing interpretive facilities, activities, and programmes alongside the most pressing management problems. It also identifies the order of priority for improvements required to upgrade interpretive facilities, activities, programmes, training, and equipment in relation to protected area management in Nepal. No attempt is made to generalise from these findings to all visitors, all park practitioners or administrators. There is no doubt, however, that the results are strongly indicative of the probable outcomes of further research. There is sufficient justification for the findings of this dissertation to be used to guide policy and planning for interpretation. The most profitable avenue for further research is likely to be a cross sectional survey of tourists (visitors) using qualitative and quantitative methods together.

### **Keywords**

*interpretation; conservation education; communication and public relations; parks and protected areas; park management; selected experts; selected visitors; park wardens; park rangers; management problems; local people; interpretive media; facilities; activities; programmes; interpretive training; visitor centre; Nepal; New Zealand*

## Upadhyay, Gopal Prasad (Kafle) (1993)

**The characteristics and satisfactions of international visitors to Royal Chitwan National Park, Nepal**

**A thesis submitted in partial fulfilment of the requirements for the Degree of Master of Parks and Recreation Management in the Lincoln University**

### **Abstract**

This study traces the nature of national park use for recreation and other human uses in Nepal. Particularly, it focuses on international visitors to Royal Chitwan National Park (RCNP) and the issues of nature conservation that are affecting the Park ecosystems. The Park, a World Heritage site, is the first National Park of Nepal and was established in 1973. The Park has a worldwide reputation as one of the best places in the South-east Asian region for nature tourism. More than fifty thousand people visit the Park annually. Of these, 76 percent are foreign tourists. More than sixty thousand local people enter the Park under permit every year for a period of two weeks to cut grass for thatch and crafts. In addition, there is considerable illegal harvesting of forest products. The loss of the Park's adjacent forests and lack of suitable alternative sources of forest products have both contributed significantly to pressure from local people on the Park resources. Impacts of industrial development in the region and consequent river pollution are other forms of human development which are also affecting the Park's ecosystems. With increasing human pressure on RCNP, and other parks, reserves and natural areas of Nepal there is a compelling need for an integrated approach for studying recreational use and its relationship with natural resources conservation. The aim of this research was to provide base line information on the nature of Park use, both for recreation and for fulfilment of the needs of local people. Research was completed in the Park during the winter months of 1991/92, November to February. Both qualitative (in-depth interviews and participant observation) and quantitative (survey questionnaires) methods were employed to collect information about Park visitors and the opinions of Park staff, local people and hotel/lodge managers. An understanding of the characteristics and motivations of Park users, the nature of local people's demands for natural resources from the Park and the factors which may influence their level of impacts on Park resources were central to this research. Visitors to Royal Chitwan National Park have many features in common with park visitors reported in park surveys in other countries and come with relatively similar socio-economic and demographic backgrounds. The majority of visitors to this Park originated from European, Australasian and North American regions, but Indians and foreigners working in Nepal also emerged as significant Park users. They have diverse reasons for visiting the Park, with 'Viewing Wildlife', 'Being With Nature', 'Peace and Quiet', and an 'Elephant Safari' being their prime motivations. From a tourist management perspective their satisfactions with the activities are of equal importance. They appeared to seek more psychologically based benefits which vary from fulfilling social needs to appreciation and interaction with nature. A nine-point crowding scale and the number of encounters with other groups were used to measure social aspects of crowding in the Park. Similarly, responses to the question of impacts caused by other visitors were used to identify and measure issues directly relating to the 'optimal experience' available in the Park. These measures form the basis for establishing preferred levels of use and future monitoring procedures. Park visitation is a function of the psychological and sociological processes which are part of an individual's 'personal community'. This was evident in this study and offered the best understanding and explanation of recreational use while at the Park. This research goes on to analyse current issues and conflicts between RCNP and local people. Evidence from this study suggests that establishment of the RCNP has resulted in the loss of traditional rights and benefits of local people. Grazing lands, grasses and fodder, timber, fuelwood, bamboo and other minor forest products are necessary to address the basic needs of these people. Problems of livestock and crop depredation, loss of human lives and injuries, damage to buildings and other properties caused by Park wildlife are discussed. Rhino, wild boar, chital deer, tiger, leopard, sloth bear, wild elephants, monkey and parakeet are the main cause of damage. The annual concession of grasscutting in the Park is a single benefit received by these people from the Park and makes a significant contribution to the local economy. There is an expressed need to develop and implement a strategic policy that can better address these issues without compromising the prime objective of conservation of the Park's ecosystems. Potential solutions discussed emphasise the compelling need for the RCNP to accept the responsibility of taking account of the needs of its local people. Solutions, such as community forestry, buffer zones and efficient use of available resources are examined. The protected area concept must be a compromise between protection and development if it is to serve humanitarian as well as conservation needs. Finally, for a growing understanding of Park use for both recreation and other human uses as well as to safeguard sustainable and efficient use of natural resources, analysis of the changing use of this Park in terms of the nature of demands and extent of use and resources limitations, must be continued. A recommendation on the focus of future research is also made.

### **Keywords**

conservation lands; Royal Chitwan National Park; tourism impacts; national parks; recreational surveys; local communities; natural resource management; international tourists

## **Tripathi, Mira (2016)**

**A comparative evaluation of stone spout management systems in heritage and non-heritage areas of Kathmandu Valley, Nepal**

**A thesis submitted in partial fulfilment of the requirement for the Degree of Doctor of Philosophy at Lincoln University**

### **Abstract**

Management of water resources is a major challenge throughout the world and in many long-established societies people still use traditional water harvesting and management techniques. Despite often being seen as efficient and cost effective, traditional methods are in decline or have been abandoned in many countries. Nevertheless, traditional approaches continue to be useful in some countries, such as Nepal. The extent to which such traditional processes, in this case supply via stone spouts, may survive modernization, while fulfilling socio-cultural and other needs, is the focus of the research. The research develops an understanding of the socio-cultural and other values of stone spouts for the people of the urban and peri-urban heritage and non-heritage areas of the Kathmandu Valley, Nepal, in order to foster ongoing sustainable management of the remaining spouts. In order to compare the traditional stone spout management systems in both the urban and peri-urban heritage and non-heritage areas of the Kathmandu Valley, three evaluation criteria were identified from the literature to apply to the selected study areas, they are: area must have stone spouts, they needed to have a diverse range of possible users and governance systems and they needed to be logistically acceptable. Likewise, three research questions are addressed in this research: a) what are the impacts of changes in social, cultural, institutional norms and values and how do they influence the stone spout management system? b) How do modern pipe-line systems and other development activities affect traditional stone spout management systems in heritage and non-heritage areas? c) What are the implications for local communities of the incremental and ongoing loss of traditional stone spout infrastructure in terms of sustainable management of remaining spouts and water supplies? A meta-theory framework was established which synthesizes Institutional, Attachment, Central Place and Common Property theories, thus forming analytical lenses fundamental to the mixed-method research approach used in research. Field data were collected mainly using face-to-face interviews, focus group discussions, and biophysical data collected and linked to Global Positioning System (GPS) coordinates. To improve the validity and consistency of the data, other data sources (such as on-site observations and document analysis) were used for triangulation purposes. The results suggest that management of spouts could both be more effective and efficient if their ownership was somehow vested in the local community as was the case with the earlier guthi system. Ongoing population growth, power cut-offs and irregular water supplies to pipe-lines have in recent times increased the "utility value" of spouts. Besides this, the religious, cultural and unique engineering values of spouts provide an incentive for people to think about the preservation and management of spouts in a sustainable way. Beginning at the early analytical assessment of the meta-theory approach, this research returned the somewhat surprising outcome that spout condition is better in non-heritage areas than in heritage areas as the latter are less affected by changing socio-cultural contexts, institutional norms and values and by dissemination of modern pipe-line technology and other development activities. Authorities could clearly be better coordinated and provide both financial and technical support aimed at solving the management issues of spouts. From this study, it is clear that it is unlikely that stone spouts will ever be the complete solution to the problem of water scarcity, but nevertheless, if well-managed this ancient system could continue to play an important role in reducing water stresses in the Kathmandu Valley while concurrently contributing to a range of other social, cultural and economic outcomes.[Hide full abstract]

### **Keywords**

*Nepal; heritage; peri-urban; urban; stone spouts; religious values; Guthi; water management; water distribution*



## Upreti, Chet Raj (1989)

### Effect of shelter on lamb survival in a high fecundity flock

#### **Abstract**

The effect of 3 levels of shelter on perinatal mortality of lambs of Booroola x Coopworth ewes was examined during the lambing period for animals grazing or feeding on ryegrass white clover pastures. Highest survival rate was recorded for partial shelter compared with complete shelter and non shelter treatments. Death from starvation-exposure during the first 3 days of life was the most important cause of lamb losses where 40% of all deaths were attributed to this cause. Of the remaining deaths, 22% occurred within 3 to 4 hours of birth probably due to cold stress, 2% because of dystocia and no particular causes could be diagnosed for the remaining 36%. About 58% of deaths due to starvation-exposure were recorded in the non shelter treatment compared to 21% in each of the partial and complete shelter treatments indicating the importance of shelter in improving lamb survival. Mean chill index for each shelter treatment was highest in the non shelter treatment ( $1009 \text{ KJ m}^{-2} \text{ h}^{-1}$ ) indicating that the environment was cooler in this treatment compared to the partial shelter and complete shelter treatments ( $981$  and  $879 \text{ KJ m}^{-2} \text{ h}^{-1}$  respectively). Birth weight was the most important factor contributing to lamb survival. There was a highly significant relationship between birth weight and lamb survival. Lamb survival in different birth weight categories of 1-2.5 kg, 2.6-3.5 kg, 3.6-4.5 kg and 4.6-6.0 kg was 40, 80, 84, and 85 % respectively. Birth rank also significantly affected survival rate, mostly mediated through the birth weight. Survival rates of single, twin, triplet and quadruplet plus quintuplet lambs was about 94, 81, 66 and 51% respectively. Lamb survival was higher in younger ewes except for the 3 year old ewe group. Low survival rate in 3 year old ewes (61.2%) was due to higher losses in the triplet and quadruplet plus quintuplet lambs (46.7 and 55.6% respectively) in the non shelter treatment. Lamb sex had no significant effect on lamb survival. Overall survival rate was significantly higher in hairy birth coated compared to fine birth coated lambs (84 vs 67%). It was concluded that lamb survival can be improved by providing shelter during the first three days of age.

#### **Keywords**

*lambs; mortality; ewes; animal grazing; feeding; partial shelter; complete shelter; lamb survival; birth coat; lambing management; animal management*

## Yadav, Bhagwan Dutta (2013)

The effects of social and institutional structures on decision-making and benefit distribution of community forestry in Nepal

A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University, New Zealand

### **Abstract**

Participatory democracy has been an official part of Community Forestry (CF) since 1989 when the main policy document, the Master Plan for the Forestry Sector (MPFS), was introduced in Nepal. However, many problems related to benefit distribution from CF have emerged because of the way decision-making is influenced by the social and institutional structures present at the community level, particularly in terms of dominance by wealthy and caste elite and the inability of poor and disadvantaged households to participate fully in decisions. The purpose of the study is to investigate the potential for poor and disadvantaged households to have positions on the Executive Committee (EC) of the Community Forestry User Group (CFUG), and whether representation of the poor and disadvantaged on the EC has any influence on the distribution of CF products or the formulation of distribution rules. The study used a conceptual approach using elite theory with models that looked at EC decisions based on whether there was a single caste in the CFUG or multiple castes, and whether only rich households were on the EC or whether a mix of rich and poor households were on the EC. Rich and/or high caste individuals, typically identified with EC membership, would interact on the EC either as a consensually integrated elite where there was one caste, or a plural elite where there was a mix of castes. A mix of rich and poor households on the EC was characterised as an organisational elite model, in which the EC organisation provided power and influence to members of the EC, including the poor, thus providing a balance to the dominance by the traditional elite. The study uses CFUG-level data from 31 CFUGs in the Baglung district and household data from 310 households. The results of the study show that while the usual factors associated with wealth and caste are important for selection to EC leadership positions, NGO membership was also an important factor EC leadership positions. The importance of NGO membership is that it means that NGOs and civil organisations are able to strengthen the leadership capabilities of poorer and disadvantaged people or encourage/empower someone to be an EC member through training, workshops and study tours. This finding also supports the concept of the organisational elite model. The study also examined the effect of representation of the poor and disadvantaged on the EC by studying the factors that determined the relative distribution of forest products and the rules of distribution. In both cases, the higher the representation of the poor and disadvantage on the EC, the greater the benefits to the poor, both in terms of greater quantities distributed and longer distribution or collection periods. The policy implication of the study is that there is a way to overcome the traditional domination of the EC by the local elite through greater activity of NGOs, CBOs and civil society organisations. These organisations help the poor and underprivileged households to build up capacity to undertake leadership roles and through the organisational elite model become part of the elite decision-making.

### **Keywords**

community forest; leadership; community forest user group; organisational elites; consensually integrated elites; plural elites; proportion of EC; influences; timber; firewood; fodder; leaf litter

# **Appendix 2**

**Taught qualifications completed  
by Nepali students**

This bibliography only focusses on research outputs of thesis and dissertation students, but it would be remiss not to highlight that a number of other Nepali students have completed qualifications taught by coursework (see Table below).

Qualification (taught-courses)	Date	Qualification
Komal Prasad Timilsena	1986	Diploma in Agricultural Engineering
Ganga Ram Singh	1989	Diploma in Parks & Recreation Management
Puran Shrestha	1994	Masters of Applied Science in Protected Area Management
Tara Devi Gurung	1995	Post Graduate Diploma in Parks, Recreation & Tourism Management
Helen Sherpa/Smith	1981	Diploma in Parks & Recreation (Ranger Option)
Peru (Prerana) Dixit	2008	Diploma in Natural Resources
Salina Poudyal	2009	Masters of Environmental Policy
Shailaja Shrestha	2009	Graduate Certificate in Applied Science
Krishna Bahardur Karki	2010	Post Graduate Diploma in Applied Science
Shiva Poudyal	2011	Post Graduate Diploma in Social Science
Geeta Dongol	2014	Masters of Environmental Policy
Phulamu Sherpa	2014	Certificate in Natural Resources
Krishna Prasad Gurung	2015	Masters of Tourism Management
Rinzin Phunjok Lama	2016	Masters of International Nature Conservation
Saurav Ghimire	2019	Diploma in Horticultural Management
O Raj	Unknown	Diploma in Parks & Recreation (Ranger Option)

Over the last 50 years, education philosophy and programmes have themselves evolved. In noting this, there are a number of Diploma students who have their dissertations curated by the University, as has been the case for masterate and doctoral theses. Aside from the students listed, when the original Parks and Recreation Diploma evolved into a full degree (circa 1984), and open entry for all students was accommodated, the undergraduate dissertation was no longer seen as necessary. In more recent times, and in keeping with international trends, it has become possible to undertake a 180-credit Master's degree taught by course work.

# **Appendix 3**

**Lincoln University Staff (listed alphabetically)  
who have supervised Nepali students**

Bailey, A	1
Barnes, M. F.	1
Beatson, P. R.	1
Becken, S	2
Bigsby, H	7
Birendra, K. C	1
Brower, A	1
Buhrs, T	1
Cullen, R	3
Daly, G. T.	1
Devlin, P. J	20
Dickinson, N	1
Elvidge, D. G.	1
Espiner, S	5
Field, R. J.	1
Gallagher, J. N.	1
Gan, C	1
Hampton, J	1
Heyes, J. A.	1
Hughey, K	5
Jackson, D. I.	1
Kerr, G	3
Lexer, M. J	1
Lucas, R.	3
Lynch, P	1
Lyne, M	1
MacDonald, I	2

Mansell, Rick	4
Martin, S	2
McArthur, A. T. G.	1
McKenzie, B. A.	1
Memon, A	1
Montgomery, R	1
Moot, D	1
Muhar, A	1
Murray, H	1
Murray, R	2
Nartea, G	1
Nuthall, P	1
Paterson, A	1
Perkins, H. C	1
Rennie, H	4
Roberts, L	2
Rollston, P	1
Ross, J	1
Rowarth, J. S.	1
Safa, M	1
Simmons, D. G	8
Stewart, E. J	2
Swaffield, S	1
Walker, T	1
Wilson, M	1
Wratten, S	1



# **Appendix 4**

**Published journal articles and book chapters**

Full name	Date	Qualification	Publication
Bhattarai, Salil	2013	Doctor of Philosophy	<p>Bhattarai, S., C. Lyne, M., &amp; K. Martin, S. (2013). <u>Assessing the performance of a supply chain for organic vegetables from a smallholder perspective</u>. Journal of Agribusiness in Developing and Emerging Economies, 3(2), 101-118.</p> <p>Bhattarai, S., Lyne, M. C., &amp; Martin, S. K. (2015). <u>Analysing the robustness of spice chains in Nepal from a smallholder perspective</u>. Asian Journal of Agriculture and Rural Development, 5(4), 88-102.</p>
Chand, Narendra B	2011	Doctor of Philosophy	Chand, N., Kerr, G. N., & Bigsby, H. (2015). Production efficiency of community forest management in Nepal. Forest Policy and Economics, 50, 172-179.
Dhakal, Bhubaneswor	2005	Doctor of Philosophy	<p>Dhakal, B., Bigsby, H., &amp; Cullen, R. (2010). <u>Forests for food security and livelihood sustainability: Policy problems and opportunities for small farmers in Nepal</u>. Journal of Sustainable Agriculture, 35(1), 86-115.</p> <p>Dhakal, B., Bigsby, H. R., &amp; Cullen, R. (2007). <u>The link between community forestry policies and poverty and unemployment in rural Nepal</u>. Mountain Research and Development, 27(1), 32-39.</p> <p>Dhakal, B., Bigsby, H., &amp; Cullen, R. (2005). <u>Impacts of community forestry development on livestock-based livelihood in Nepal</u>. Journal of Forest and Livelihood, 4(2), 43-49.</p> <p>Dhakal, B., Bigsby, H., &amp; Cullen, R (2012) <u>Socioeconomic Impacts of Public Forest Policies on Heterogeneous Agricultural Households</u>. Environmental and Resource Economics, 53 (1) 73-95</p>
Dhungana Basanta, R.	2000	Masters of Agricultural Science	Dhungana, B. R., Nuthall, P. L., & Nartea, G. V. (2004). <u>Measuring the economic inefficiency of Nepali rice farms using data envelopment analysis</u> . Australian Journal of Agricultural and Resource Economics, 48(2), 347-369.
Gurung, Ghana Shyam	1993	Master of Parks and Recreation Management	Gurung, G., Simmons, D., & Devlin, P. (1996). The evolving role of tourist guides: the Nepali experience. Tourism and indigenous peoples, 107-128.
Gurung, Hum Bahadur	1993	Master of Parks and Recreation Management	<p>Gurung, H. B. (1992). <u>Environmental education in Nepal: A mechanism for resource conservation</u>. World Leisure &amp; Recreation, 34(2), 18-22.</p> <p>Gurung, H. B., &amp; Devlin, P. J. (1995). <u>Towards an integrative and participatory model for environmental education in developing countries</u>. International Research in Geographical &amp; Environmental Education, 4(2), 20-31.</p> <p>Gurung, H. B. (1999). <u>Towards a sustainable future: Promoting Nepal capacity 21 initiatives for sustainable development</u>. Local Environment, 4(3), 367-376.</p>
Gurung, Mohan, B	2014	Doctor of Philosophy	Gurung, M. B., Bigsby, H., Cullen, R., & Manandhar, U. (2015). <u>Estimation of carbon stock under different management regimes of tropical forest in the Terai Arc Landscape, Nepal</u> . Forest Ecology and Management, 356, 144-152.



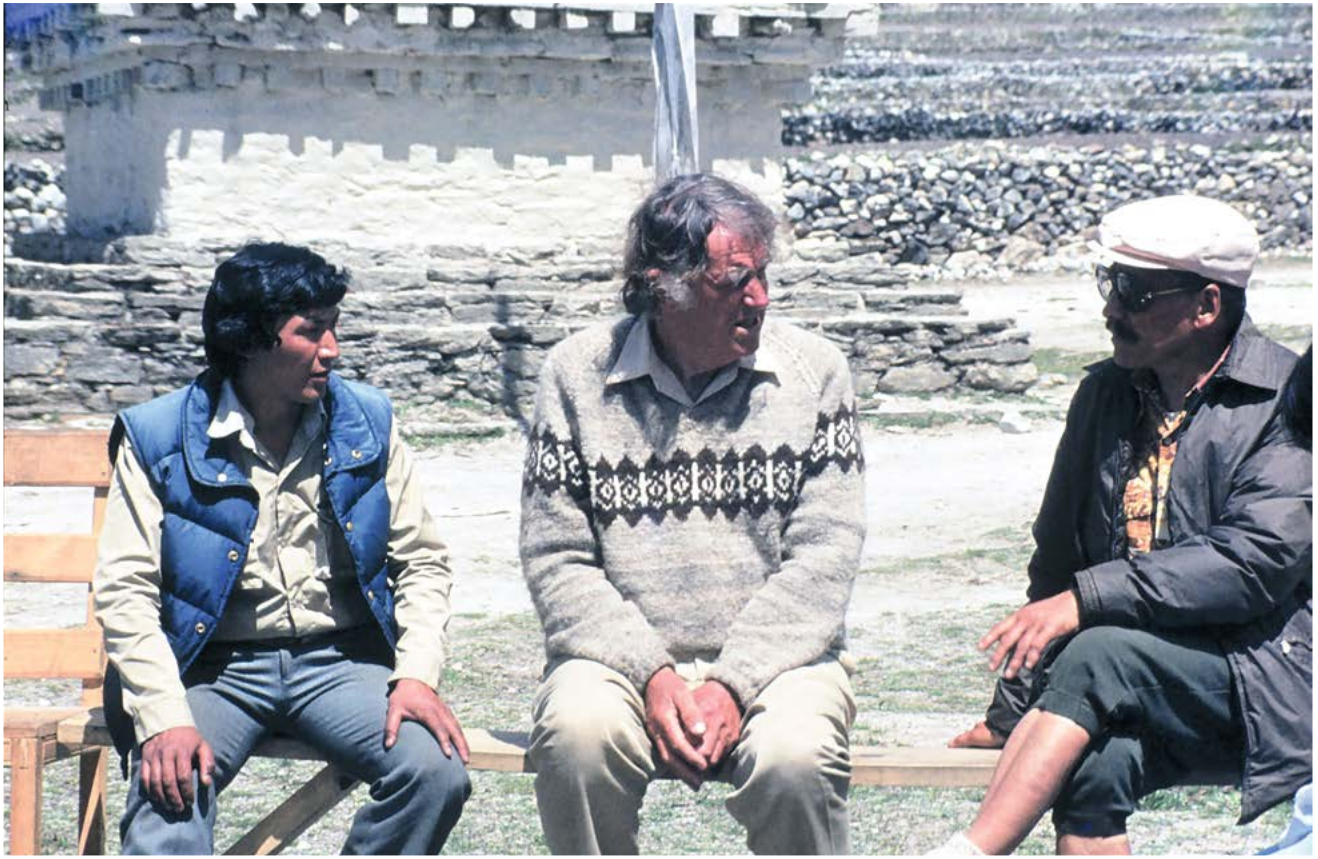
<b>Kaini, Bhairab</b>	1982	Master of Horticultural Science	Kaini, B. K., Jackson, D. I., & Rowe, R. N. (1984). <u>Studies on shoot growth patterns in Lincoln Canopy apples</u> . Journal of horticultural science, 59(2), 141-149.
<b>Khadka, Raju</b>	2021	Doctor of Philosophy	Safa, M., Martin, K. E., KC, B., Khadka, R., & Maxwell, T. M. R. (2019). <u>Modelling nitrogen content of pasture herbage using thermal images and artificial neural networks</u> . Thermal Science and Engineering Progress, 11, 283-288.  Khadka, R., Safa, M., Bailey, A., & Birendra, K. C. (2020). <u>A comparative analysis of CH<sub>4</sub> emission reduction from municipal solid waste (MSW) under different scenarios in Kathmandu, Nepal</u> . International Journal of Scientific and Research Publications, 10(6), 167-184.  Khadka, R., Safa, M., Bailey, A., Birendra, K. C., & Poudel, R. (2021). <u>Factors influencing municipal solid waste generation and composition in Kathmandu Metropolitan City, Nepal</u> . International Journal of Scientific and Research Publications, 11(1), 520-535.
<b>Khanal, Bhoj</b>	2011	Doctor of Philosophy	Khanal, B. R., Gan, C., & Becken, S. (2014). <u>Tourism inter-industry linkages in the Lao PDR economy: an input–output analysis</u> . Tourism Economics, 20(1), 171-194.
<b>Lama, Lhakpa Tenji</b>	2012	Masters of Tourism Management	Espiner, S., Stewart, E. J., & Lama, L. T. (2017). <u>Assessing the effectiveness of 'Appreciative Inquiry'(AI) in Nepali pro-poor tourism (PPT) development processes</u> . Tourism Planning & Development, 14(3), 369-388.
<b>Lama, Anu Kumari</b>	2010	Master of Parks and Recreation Management	Becken, S., Lama, A. K., & Espiner, S. (2013). <u>The cultural context of climate change impacts: Perceptions among community members in the Annapurna Conservation Area, Nepal</u> . Environmental Development, 8, 22-37.
<b>Lama, Sonam Tashi</b>	2018	Master of International Nature Conservation	Lama, S. T., Ross, J. G., Bista, D., Sherpa, A. P., Regmi, G. R., Suwal, M. K., ... & Paterson, A. M. (2019). <u>First photographic record of marbled cat <i>Pardofelis marmorata</i> Martin, 1837 (Mammalia, Carnivora, Felidae) in Nepal</u> . Nature Conservation, 32, 19.
<b>Pun, Umed Kumar</b>	2000	Doctor of Philosophy	U. K. Pun , R. N. Rowe , J. S. Rowarth , M. F. Barnes , C. O. Dawson & J. A. Heyes (1999) <u>Influence of ethanol on climacteric senescence in five cultivars of carnation</u> . Crop & Horticultural Science, 27:1, 69-77.  Pun, U. K., Rowarth, J. S., Barnes, M. F., Heyes, J. A., Rowe, R. N., & Dawson, C. O. (2001). <u>The influence of exogenous acetaldehyde solution on the vase life of two carnation (<i>Dianthus caryophyllus</i> L.) cultivars in the absence or presence of exogenous ethylene</u> . Plant growth regulation, 34, 267-272.  Pun, U.K., Rowarth, J.S., Barnes, M.F., & Heyes, J.A. (2001) <u>The role of ethanol or acetaldehyde in the biosynthesis of ethylene in carnation (<i>Dianthus caryophyllus</i> L.) cv. Yellow Candy</u> . Postharvest Biology and Technology 21 (2) 235-239
<b>Rai, Chandra Bahadur</b>	2010	Doctor of Philosophy	Biggsby, H. R., MacDonald, I. A., & Rai, C. B. (2010). <u>Small forests, big ambitions and a hard reality-Community Forestry in Nepal</u> . New Zealand Agricultural and Resource Economics Society (Inc.)

Sanjyal, Sunita	2021	Doctor of Philosophy	Sanjyal, S., Hampton, J. G., Rolston, P., & Marahatta, S. (2022). <u>Teosinte (<i>Euchlaena mexicana</i> L.) Seed Production: Effect of Sowing Date, Seed Rate and Cutting Management on Seed Yield</u> . <i>Agronomy</i> , 12(7), 1646.
Sherpa, Doma Tshering	2014	Master of Natural Resources Management and Ecological Engineering	Sherpa, D. T., & Brower, A. (2015). <u>Equity in Sharing the Potential Benefits of REDD+</u> . <i>Journal of Forest and Livelihood</i> , 13(1), 20-29.  Sherpa, D. T. (2017). Using the "3Es" method to evaluate REDD+ project in Nepal. <i>Case Studies in the Environment</i> .
Silwal, Pratigya	2016	Master of Natural Resources Management and Ecological Engineering	Silwal, P., Roberts, L., Rennie, H. G., & Lexer, M. J. (2019). <u>Adapting to climate change: an assessment of local adaptation planning processes in forest-based communities in Nepal</u> . <i>Climate and development</i> , 11(10), 886-898)
Thapa, Bidur	1956	Master of Agricultural Science	Walker, T. W., Thapa, B. K., & Adams, A. F. R. (1959). <u>Studies on soil organic matter: 3. Accumulation of carbon, nitrogen, sulfur, organic and total phosphorus in improved grassland soils</u> . <i>Soil science</i> , 87(3), 135-140.
Tiwari, Sundar	2019	Doctor of Philosophy	Tiwari, S., Dickinson, N., Saville, D. J., & Wratten, S. D. (2018). <u>Host plant selection by the wheat bug, <i>Nysius huttoni</i> (Hemiptera: Lygaeidae) on a range of potential trap plant species</u> . <i>Journal of Economic Entomology</i> , 111(2), 586-594.  Gyenwali, D., Vaidya, A., Tiwari, S., Khatiwada, P., Lamsal, D. R., & Giri, S. (2017). <u>Pesticide poisoning in Chitwan, Nepal: A descriptive epidemiological study</u> . <i>BMC Public Health</i> , 17(1).  Tiwari, S., Saville, D. J., & Wratten, S. D. (2018). <u>Susceptibility of kale cultivars to the wheat bug, <i>Nysius huttoni</i> (Hemiptera: Lygaeidae) in New Zealand</u> . <i>New Zealand Plant Protection</i> , 71, 351-351.  Tiwari, S., & Wratten, S. D. (2019). <u>Biology and management of the New Zealand endemic wheat bug, <i>Nysius huttoni</i> (Hemiptera: Lygaeidae)</u> . <i>Journal of Integrated Pest Management</i> , 10(1), 34.  Tiwari, S., Saville, D. J., & Wratten, S. D. (2019). <u>Susceptibility of kale cultivars to the wheat bug, <i>Nysius huttoni</i> (Hemiptera: Lygaeidae) in New Zealand</u> . <i>New Zealand Journal of Agricultural Research</i> .  González-Chang, M., Tiwari, S., Sharma, S., & Wratten, S. D. (2019). <u>Habitat management for pest management: Limitations and prospects</u> . <i>Annals of the Entomological Society of America</i>  Tiwari, S., Saville, D. J., Sharma, S., Shields, M. W., & Wratten, S. D. (2020). <u>Evaluation of potential trap plant species for the wheat bug, <i>Nysius huttoni</i> (Hemiptera: Lygaeidae) in forage brassicas</u> . <i>Agricultural and Forest Entomology</i>  Bhattacharjee, A., Anadón, J.D., Lohman, D.J., Doleck, T., Lakhankar, T., Shrestha, B.B., Thapa, P., (...), Krakauer, N.Y. (2017) <u>The impact of climate change on biodiversity in Nepal: Current knowledge, lacunae, and opportunities</u> . <i>Climate</i> 5 (4) Art. No. 80

			<p>Tiwari, S., Sharmam S., &amp; Wratten, S. D. (2020). <u>Flowering alyssum (Lobularia maritima) promote arthropod diversity and biological control of Myzus persicae</u>. Journal of Asia-Pacific Entomology 23 (3) 634-640</p> <p>Rayl, R.J., Shields, M.W., Tiwari, S., Wratten, S.D. (2018). <u>Conservation Biological Control of Insect Pests</u>. In: Gaba, S., Smith, B., Lichtfouse, E. (eds) Sustainable Agriculture Reviews 28.</p> <p>Tiwari, S., Saville, D.J., Wratten, S.D. (2019) <u>Preferences of the wheat bug (Nysius huttoni) for particular growth stages of the potential trap crop alyssum (Lobularia maritima)</u>. New Zealand Plant Protection 72: 237-244</p> <p>Tiwari, S., Pudasaini, R., Kafle, L., Bhattarai, S., Ali, M. P., Babar, T. K., Sharma, S, Shrestha, G., Reddy, G.V.P. (2019). <u>Trap cropping in South Asia: Concepts, limitations, and future strategy</u>. Annals of the Entomological Society of America 112 (4) 340-347</p>
<b>Tripathi, Mira</b>	2016	Doctor of Philosophy	<p>Tripathi, M. I. R. A., Hughey, K., &amp; Rennie, H. (2018). <u>The role of sociocultural beliefs in sustainable resource management: A case study of traditional water harvesting systems in Kathmandu Valley, Nepal</u>. New Zealand Plant Protection 72: 237-244</p> <p>Tripathi, M., Hughey, K. F., &amp; Rennie, H. G. (2018). <u>The state of traditional stone spouts in relation to their use and management in Kathmandu Valley, Nepal</u>. Conservation and Management of Archaeological Sites, 20(5-6), 319-339.</p>
<b>Upadhyay, Gopal Prasad</b>	1993	Master of Parks and Recreation Management	<p>Published but not on specific topic: Karki, J. B., Jnawali, S. R., Pandey, M. B., &amp; Upadhyay, G. P. (2011). <u>Tiger conservation initiatives in Nepal</u>. The initiation, 4, 56-68.</p>
<b>Yadav, Bhagwan Dutta</b>	2013	Doctor of Philosophy	<p>Yadav, B. D., Bigsby, H., &amp; MacDonald, I. (2015). <u>How can poor and disadvantaged households get an opportunity to become a leader in community forestry in Nepal?</u> Forest Policy and Economics, 52, 27-38.</p> <p>Yadav, B. D., Bigsby, H., &amp; MacDonald, I. (2017). <u>Rules of benefit distribution: A dynamic impact on Nepali community forestry organizations</u>. Journal of Sustainable Forestry, 36(2), 177-197.</p> <p>Yadav, B. D., Bigsby, H., &amp; MacDonald, I. (2015). <u>The relative distribution: An alternative approach to evaluate the impact of community level forestry organisations on households</u>. Land Use Policy, 42, 443-449.</p> <p>Yadav, B. D., Bigsby, H., MacDonald, I., &amp; Gautam, M. K. (2016). <u>Does the actor centred power institution of community forestry favour to non-powerful actor in benefit distribution in Nepal</u>. Int J Plant Anim Environ Sci, 6, 114-127.</p> <p>Yadav, B. D., Bigsby, H. R., &amp; MacDonald, I. (2016). <u>Elitism: normative ethics of local organisation in community-based natural resources management</u>. International Journal of Organizational Analysis, 24(5), 932-955.</p>







*Mingma Norbu Sherpa, Ed Hillary, and Tenzing Norgay (Kindly supplied by Dawa Sherpa)*



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