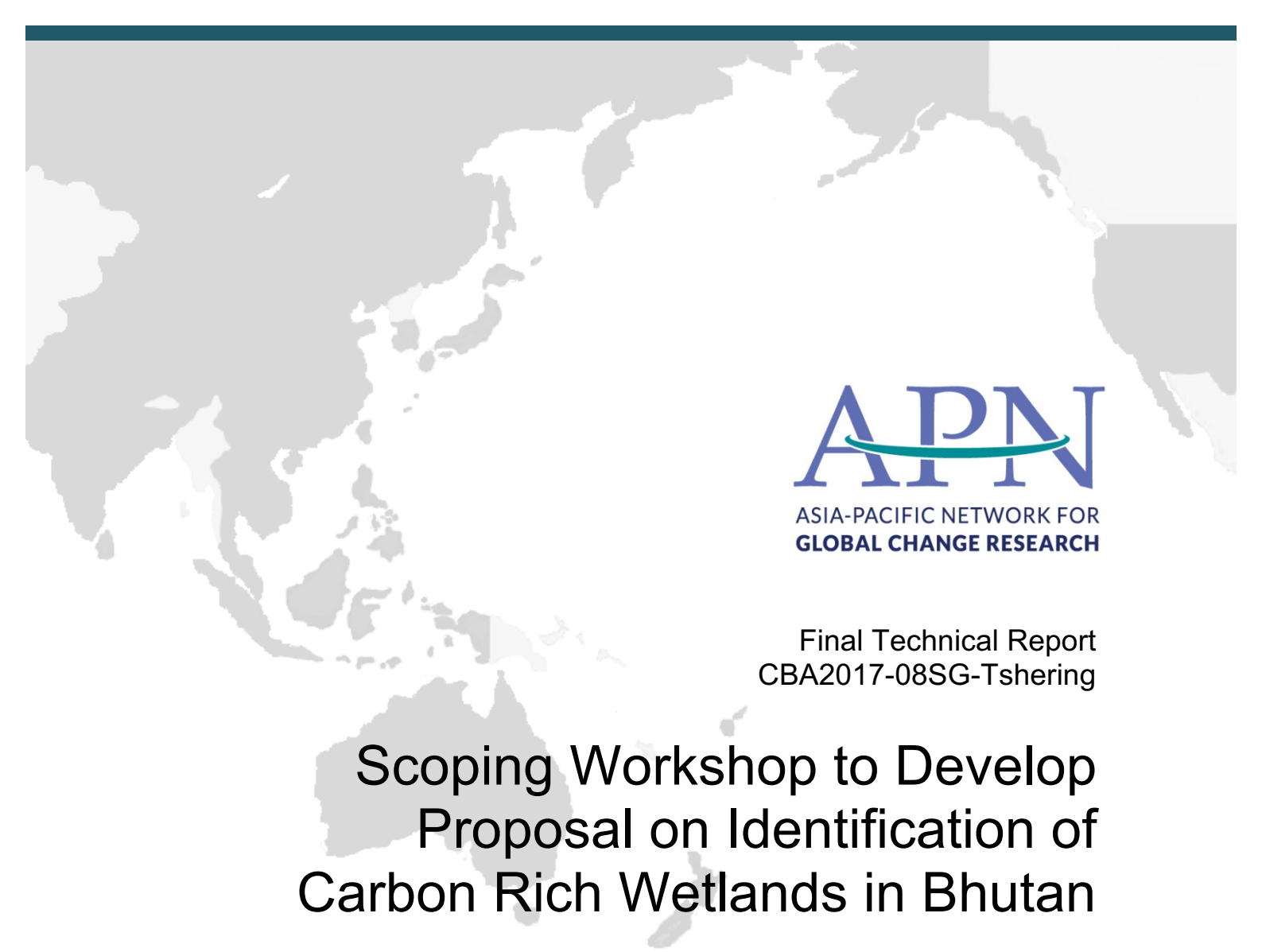

ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

Final Technical Report
CBA2017-08SG-Tshering

Scoping Workshop to Develop Proposal on Identification of Carbon Rich Wetlands in Bhutan

The following collaborators worked on this project:

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Project Overview

Project Duration	**:**	One year
Funding Awarded	**:**	US$ 13,000 for Year 1
Key organisations involved	**:**	1. Royal Thimphu College (Bhutan) 2. Ugyen Wangchuck Institute for Conservation and Environmental Research (Bhutan) 3. Department of Forest and Park Services (Bhutan) 4. Royal Society for Protection of Nature (Bhutan) 5. UNESCO-IHE Institute for Water Education (Netherlands)

Project Summary

Bhutan communicated to the global community through Intended Nationally Determined Contribution (INDC) as per the Decision of 1/CP.19 that Kingdom of Bhutan would remain Carbon neutral by ensuring that our emissions of GHG doesn't exceed the sink capacity of our forests. Thus numerous the importance of mapping and developing a baseline database of Carbon stock has become a priority for the nation. However, in the national environmental policies, wetland ecosystems, though being one of the major Carbon and GHG sink or sources is not considered a key ecosystem type requiring special management regimes. This clearly indicates lack of awareness and lack of data on the potential role a wetland ecosystem can play in emission or sequestration of Carbon.

Recent national policies of promoting rice cultivation at higher altitudes have converted hectares of natural wetlands to paddy cultivation. Many ongoing river course realignment projects have been degrading huge areas of riparian wetlands. Even Ramsar sites like Phobjikha is threatened by heavy grazing pressure and agriculture expansion. Wetlands at higher altitudes in the Himalayas are also under intense grazing pressure, rising temperature and increasing human activities.

Currently, there is also limited national policy documents and literature on wetlands in Bhutan. Few available documents are mostly related to three recently identified RAMSAR sites. While only national wetland inventory was prepared in 2008, it was based on satellite images focusing only on high altitude wetlands. Thus there isn't any information regarding other types of wetlands in the country and no existence of data on Carbon-rich wetlands. Thus one of the main objectives of the proposed study is to conduct scoping workshop to bring on key national agencies working on wetlands issues and challenges, so that a proposal could be developed in studying Carbon-rich wetlands and assessing potential driver change of the wetlands in the country.

Keywords: Carbon, Wetlands, Ramsar, Climate, Marshy area

Project outputs and outcomes

Project outputs:

- Produced technical report, a case study on assessment of high altitude wetlands
- Conducted review of existing literature on wetlands in Bhutan
- Conducted scoping workshop to develop a proposal and build partnership with key agencies

Project outcomes:

- Proposal on assessment of Carbon rich wetlands in Bhutan was developed and will be submitted to APN's 2018 CRRP calls
- MoU signed between two organizations Ugyen Wangchuck Institute for Conservation and Environmental Research; and Royal Thimphu College

Key facts/figures

- Comprehensive nationwide wetland inventory has been already being proposed by Watershed Management Division of Department of Forest and Park Services as one of their key target for the upcoming 12th Five Year National Development Plan (2018 to 2023). Thus, idea for developing methodology for wetland classification was dropped.
- Most high altitude wetlands observed around Thimphu are bogs, marshes and Swamps and details of each parameter recorded during field observation as mentioned in table below.

Parameters	Bogs	Marsh	Swamp
Peat depth (cm)	13	25	13
Water pH	4.9	6.7	7.0
Soil pH	5.2	5.5	5.9
Carbon content/300g soil	21.9	37.4	16.1

- Some of the key drivers of change for wetland ecosystems in country were anthropocentric activities such as tourism, livestock grazing and developmental activities. However, many high altitude wetland during the field observations were still found to be intact with minimum human disturbances.
- Lack of nationwide policy for wetland management calls for proper wetland conservation measures. In order to development of such policy, it was recommended to carry out effective studies on wetlands in the country to build a strong baseline information that is currently lacking at the moment.
- Three research assistant, student of BSc Environmental Management has enhanced their capacity to conduct ecological research and their understanding level of significance of the wetland has increased.
- MoU was signed with Ugyen Wangchuck Institute for Conservation and Environmental Research for future research partnership.

Potential for further work

There is no existence of national policy documents discussing the issues related to wetland management. Partly it could be due to lack of any credible baseline information on potential significance of the wetland ecosystem. With Bhutan's commitment to remain Carbon neutral by ensuring that our emissions of GHG doesn't exceed the sink capacity of our forests, there is a need to explore studies to build in baseline information related to other ecosystems like wetlands which often sequester huge Carbon reserves. Further building such data would enable Bhutan to have credible data for bargaining more resources needed for working towards building climate resilience for vulnerable population around Bhutan.

Publications

Not Available

Awards and honours

Not Available

Pull quote

Dr. Shiva Raj Bhattarai, Dean of Royal Thimphu College 'The fund has been very helpful in enhancing research capacity of our faculty and also engagement of our students and faculty into policy dialogue with the policy makers from Department of Forest and Park Services was the highlight of the project.'

Kuenzang Tshering, 'Since my graduation in 2011, I have always read about wetlands issues in the country and in Himalayan region in general. This was the first time I had come face-to-face with key persons working on wetland ecosystem. Through this workshop I realized that much needs to be done in order for the agencies to get attention for ensuring sustainable conservation of the wetland'.

Thinley Gyeltshen 'Biodiversity in wetlands are indictors of the health of our ecosystems. I have spent more than a decade on studying dragon flies, and the workshop provided me a platform with perfect combination of audience (academicians, policy makers and students) to share one of the key ecosystem services that we drive from the biological indicators like dragon flies on wetlands. The species are very sensitive to human disturbance'

Tshewang Dorji 'Previously I have worked on the research project dealing with the impacts of climate change on the livelihoods of rural communities in Bhutan. From this APN project, I gained first-hand knowledge on the impacts of climate change on ailing wetland ecosystems which is crucial for me to understand the vulnerability of rural livelihoods. This project was very relevant to my previous project. Above all, it was very enriching.'

Acknowledgments

On behalf of Royal Thimphu College and on behalf of all the core project team we would like to thank Asia Pacific Network for Global Change Research for funding. We also would like to acknowledge the support and generosity of all the agencies and offices mentioned herein. We would like to thank all our valued partner agencies and offices for their kind support and participation in this project. We are very grateful to Watershed Management Division (WMD) of Department of Forests and Park Services, Minister of Agriculture and Forestry, National Environment Commission Secretariat (NECS), Ugyen Wangchuck Institute for Conservation and Environmental Research (UWICER), Royal Society for Protection of Nature (RSPN) for all their kind cooperation and unstinting support. We are deeply grateful to all our esteemed participants and representatives from WMD, NEC, UWICER, wetland focal persons from Ramsar sites like Phobjikha & Bumdeling and wetland biodiversity researchers for their invaluable contribution to the project's overall output and outcome.
We would like to express our heartfelt gratitude to the management of Royal Thimphu College (RTC) for rendering warm amity and support all throughout the period of this project. We would like to thank the final year undergraduate students of BSc Environmental Management for their active participation in the project. We are very grateful to wetland experts at UNESCO-IHE in the Netherlands for the technical support.

1. Introduction

The main driver for wetland management in Bhutan came from protecting water sources and thus it was mandated under Watershed Management Division (WMD) since 2009. Under WMD of Department of Forest and Park Services the wetland management program was created. Over the years WMD was able to strategically engaged with numerous key stakeholders and was able to declare three wetland sites as Ramsar sites. However, one of the main challenge for wetland manages in Bhutan is the lack of baseline information on the wetland ecosystem and also wetlands receiving low policy priority as its key ecological benefits were often no ignored and unaware of.

In the recent past, Bhutan's national policies of promoting rice cultivation at higher altitudes like Bumthang has converted hectares of natural wetlands to paddy cultivation. More wetlands are lost to infrastructure developments like airport construction in Bumthang. Many ongoing river course realignment projects along all major rivers in Bhutan also degraded huge areas of riparian wetlands. Even Ramsar sites like Phobjikha wetland was reported to be threatened by heavy grazing pressure and expansion of potato cultivation. Likewise, wetlands at higher altitudes are also under grazing pressure from yaks, rising temperature and increasing number of collectors of highly valued fungus (*Cordyceps sinensis*).

Despite all those pressures on wetland ecosystems in the county there is limited policy documents on managing wetlands. Few available documents are mainly related to three RAMSAR sites in Bhutan. The only national wetland inventory, that was prepared in 2008, was based on satellite images only and only focused on high altitude wetlands which were mostly lakes (lacustarine), rivers (riverine) and nearby marshes above 3000 m above sea level (asl). So, there isn't any basic information or data related to other types of wetlands in the country.

Thus a proposal was submitted to APN for organizing a scoping workshop to bring together key wetland managers and organization in Bhutan. The workshop was designed to share experience of the wetland managers and also understand the current status of wetland management policies and also to update on any major plans for wetlands management in upcoming 12th Five Year National Development Plan (2018 to 2023). The other goal for the project was review and analyses all relevant literature available on wetlands in Bhutan and then conducts thorough analysis of any secondary available data. Short field visit was also conducted to meet local people using wetlands for grazing and tourism industry. The field visit was also as a part of ground-truthing to understand ground realities of situation of wetland ecosystems in and around Thimphu.

2. Methodology

The core research team meet with key wetland managers as from Watershed Management Division, Royal Society for Protection of Nature and Bumdeling Wildlife Sanctuary. The managers in these organizations shared their experiences in wetland management focusing on challenges and issues in managing Ramsar sites under their jurisdiction. The organization also provided both e-copy and hard copy of field reports and documents related to wetland in the country.

A review was conducted for all those relevant resources and then a five-day field visit was conducted in high altitude wetlands around Thimphu. The field visit also provided more in depth information through interaction in yak herders, who graze their yak on these natural wetlands. Few tour operators were also interviewed to understand their observation of any changes in wetland ecosystem in the

same area. The findings from all these information sources were presented during the scoping workshop.

The scoping workshop was then organized, where all wetland related issues were presented and discussed. At the end of two-day workshop, potential topic for preparing proposal was agreed. Royal Thimphu College and Ugyen Wangchuck Institute for Conservation and Environmental Research agreed to partner in developing the research proposal to be submitted to APN. MoU as also signed between the two institutes based on numerous collaboration that the instituted had since establishment of Royal Thimphu College in 2009.

A proposal on 'Assessing Carbon Sequestration Potential of Wetlands along Altitudinal Gradient in Bhutan'. The project was envisioned to achieve following expected outcomes:

i. Quantified Carbon content of wetlands at three different agro-ecological zones
ii. Assessed of Carbon sequestration potential of wetlands at different agro-ecological zones
iii. Published two peer-reviewed journals on Carbon sequestration & wetland management issues in Bhutan
iv. Produce a 30-minute documentary on wetland management challenges in Bhutan
v. Highlight the vulnerability of wetlands ecosystems to the impacts of climate change and recommend possible adaptation measures.
vi. Build partnerships between regional and national partners in environmental research

The proposal was reviewed by wetland expert at UNESCO-IHE Institute for Water Education in the Netherlands. The wetland experts were also actively engaged in guiding the research team in Bhutan throughout the project period. The core research team in Bhutan also frequently held face-to-face discussion at all stages of the project. This was to review the technical issues and also at the sometime build last personal and professional relationship which would last beyond the project period.

3. Results & Discussion

The project was successful in brining all key wetland related agencies in the country. It has also forged partnership among academic institutions and decision makers. The two key outcomes; 1) Conducting scoping workshop; and 2) Preparing a proposal with new partners, was successfully achieved.

One of the key activity proposed was to develop a wetland classification methodology for Bhutanese context adapting from international standard procedures. However, during pre-workshop stakeholder meetings with Watershed Management Division and Royal Society for Protection of Nature; it was found that similar activity was already planned for 12th Five Year Plan of the nation. Further, the stakeholders raised the concern of acceptability of such methodology to the government agencies. This would weaken the impact of such studies. Therefore, as suggested by key stakeholder review of available resources was conducted; undertook five-day field visit to high altitude wetlands nearby Thimphu to interact with wetland-user and also collected basic physical characteristics of wetlands. The findings from information collected was prepressed during the scoping workshop. The research team agreed that the feedback and intervention at the early stage of project implementation was key in ensuring timely completion of the project activity.

Year 2018 was an election year for both upper and lower house in Bhutan, thus unsure election dates have significantly affected the project planning. Most of the participants weren't able to confirm their participation, as Government employees are mostly engaged for the election duties around the country.

Seeking feedback from the expert at UNESCO-IHE Institute for Water Education was at times challenging mainly due to limited budget allocated for her service. Next time, when engaging the external experts budgeting as per the rate for their professional in that country would enhance the active engagement.

4. Conclusions

The project was successful in building partnership among key wetland agencies in Bhutan. It was the first time for an academic institution in Bhutan providing the forum for various relevant agencies to have face-to-face discussion on wetland issues in the country. The participants included representatives from National Environment Commission (highest decision making body on environmental matters), Watershed Management Division (mandated organization in overseeing wetland management programmes and Ramsar sites), Royal Society for Protection of Nature (the only environmental NGO in Bhutan), Ugyen Wangchuck Institute for Conservation and Environmental Research (a research wing of Department of Forest and Park Services) and many others.

A MoU as signed between Royal Thimphu College and Ugyen Wangchuck Institute for Conservation and Environmental Research, as result of numerous collaboration the institutes have since 2009. After the scoping workshop representatives from the institute has worked on a research proposal as per recommendation from the workshop and will be submitted to APN call in 2018.

5. Future Directions

As per the recommendations from the scoping workshop and improved partnership with Ugyen Wangchuck Institute for Conservation and Environmental Research, a proposal on 'Assessing Carbon Sequestration Potential of Wetlands along Altitudinal Gradient in Bhutan'. Royal Thimphu College and UWICER would also explore other funding sources for the proposal. The project proposal was envisioned to achieve following expected outcomes:

i. Quantified Carbon content of wetlands at three different agro-ecological zones
ii. Assessed of Carbon sequestration potential of wetlands at different agro-ecological zones
iii. Published two peer-reviewed journals on Carbon sequestration & wetland management issues in Bhutan
iv. Produce a 30-minute documentary on wetland management challenges in Bhutan
v. Highlight the vulnerability of wetlands ecosystems to the impacts of climate change and recommend possible adaptation measures.
vi. Build partnerships between regional and national partners in environmental research

References

Follow a standard format when citing your references

Appendix

Workshop Proceeding is attached

Funding sources outside the APN

Not Available

List of Young Scientists

Include brief detail (full name, involvement in the project activity) and contact detail (name of institution/country and email address) of your scientists involved in the project. Also include short message from the young scientists about his/her involvement in the project and how it helps develop/build his capacity and the knowledge he gained.

Mr. Kuenzang Tshering, Lecturer, Royal Thimphu College *'I have a passion to study Carbon dynamics of wetlands especially, the wetland ecosystem in the Himalayan region. Throughout the project period, I have learnt skills on project management and at the same time successful completion of the project gives me confidence to work for exploring much funding opportunities to undertake research in this untouched wetlands ecosystems of Bhutan'*

Mr. Tshewang Dorji, Lecturer, Royal Thimphu College *'I consider my experience in this project as my eye-opening to future research on wetland ecosystems in Bhutan. It was also my first-ever opportunity to handle some of the key tasks related to the execution of this project. I have gained a new height in terms of co-ordinating workshops and conducting field research.'*

Ms. Pema Eden (Research Assistant), Student, BSc Environmental Management, Royal Thimphu College *'Studying environmental management course for over three years at RTC has given me an immense knowledge and field experiences. Of all these experiences, my research experience of working on wetland ecosystem is the highlight of my student life'.*

Ms. Lhaka Dem (Research Assistant), Student, BSc Environmental Management, Royal Thimphu College *'Never realized that there is a whole world for science just for a single wetland ecosystem. I improved by knowledge on the ecosystem through interaction with policy makers during the past one year'.*

Mr. Jigme Palden (Research Assistant), Student, BSc Environmental Management, Royal Thimphu College *'I undertook course on research methodology but having an opportunity to apply and test my research skills was enriching experience'.*

Glossary of Terms

Include list of acronyms and abbreviations

BWS – Bumdeling Wildlife Sanctuary

GHG - Greenhouse gas

INDC - Intended Nationally Determined Contribution

MoU - Memorandum of Understanding

NEC – National Environment Commission of Bhutan

NGO – Non-governmental Organization

RTC – Royal Thimphu College

UWICER - Ugyen Wanghuck Institute for Conservation and Environmental Research

WMD – Watershed Management Division of Depart of Forest & Park Services

In the Appendix section, the report may also include:

- *Actual data or access to data used in the study*
- *Abstracts, Power Point Slides of conference/symposia/workshop presentations*
- *Conference/symposium/workshop reports*