



**Bhutan**

# Expanding Tradable Benefits of Inland Waterways

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## *Case of Bhutan*

*Published By*



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Tel: +91.141.2282821, Fax: +91.141.2282485  
Email: cuts@cuts.org, Web site: www.cuts-international.org

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## Abbreviations

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CSO	Civil Society Organization
DoFPS	Department of Forest and Park Services
DoT	Department of Trade
MoAF	Ministry of Agriculture and Forest
MoEA	Ministry of Economic Affairs
MoIC	Ministry of Information and Communication
NEC	National Environment Commission
NGO	Non-Governmental Organization
RGP	River Guides of Panbang
RMNP	Royal Manas National Park
RSPN	Royal Society for Protection of Nature
WA	Water Act
WMD	Watershed Management Division



## Contributors

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### Kinga Wangdi

Mr. Kinga Wangdi who serves as a Division Coordinator for Conservation and Sustainable Livelihood Division under RSPN. He started his carrer in RSPN as Project Officer under which he achieved recognition in implementing Clean Bhutan project and his project also contributed in drafting Integrated Solid Waste Management Act for Bhutan. He is associated with RSPN for last 12 years. He has Bachelor's Degree in Economics from Sherubtse College under Royal University of Bhutan (RUB). He is also country coordinator for Bhutan Water partnership program (BhWP).

### Narayan Ghalley

Mr. Narayan Ghalley has been working with RSPN since 2015 as a Project Officer. He works with project under Conservation and Sustainable Livelihood Division and currently implementing REDD+ capacity building project. He has bachelors in Life Science form Sherubtse College, under Royal University of Bhutan.

### Phurpa Dorji

Mr. Phurpa Dorji who recently joined RSPN serves as Deputy Chief Program Officer in RSPN. He mostly works for proposal Development under Program and Development Division (PDD) under RSPN. Prior to joining RSPN Mr. Phurpa worked as lecturer at Sherubtse College under Royal University of Bhutan for almost 8 years. He has Masters in Biotechnology and number of publication on bees and wasps of Bhutan. He also worked as Senior Research Officer under Green Public Procurement Project (GPP) implemented by RSPN supported by European Union.

### Rinchen Wangmo

Ms. Rinchen Wangmo currently serving as a position of Program Manager with RSPN. She has been working with RSPN for last 14 years in various capacity. She has Masters in Environment Management from London

### Sangay Dorji

Mr. Sangay Dorji who departed from RSPN after working as Program Manager with Green Public Procurement Project (GPP) for past 3 years and currently work as consultant and is also a member of RSPN Consourtium Expert.

### Tsheten Dorji

Mr. Tsheten Dorji work as Sr. Project Officer with RSPN. Mr. Tsheten is with RSPN for last 11 years working as Project Officer in number of projects. Mr. Tsheten studied Bachelors in Business Management

## Executive Summary

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Topographically Bhutan rivers are categorized into four major basins which are fed by glaciers and watershed and exist into Indian state of West bangle and Assam and finally into Brahmaputra basin than to bay of bangle. Rivers support sectors which Bhutanese economy heavily relay on this include hydropower and agriculture. Besides those river tourism is also a growing potential business among handful of private players. However, rivers are also habitat for terrestrial and aquatic biodiversity.

Historically rivers in Bhutan has not been used for any kind of navigation either at national boundaries or at transboundary level. The current project aimed at collecting stakeholder perception on trade and navigation prospects of inland rivers of Bhutan given the growing trade links maintain by Bhutan with south Asian countries. The report presents the synthesis findings from series of interview conducted with experts, government officials, policy makers, local government, CSOs and community representative. In the same report it also gives account of legislations related to rivers in Bhutan, institutions working in river sector and its its roles and responsibility. Report also presents the small scale research on river uses in three localized area in country with agricultural and river tourism as study priority. Study indicates that river tourism is one sector where inland rivers can probably rise in its use in future. However transboundary river navigation prospects are driven by number of challenges including river morphology and geographic conditions.

The report further recommends on need to conduct proper technical studies alone major river basin to establish proper navigation feasibility account and multi-nodal connectivity possibility.



# 1. Introduction

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## Background

Bhutan is a landlocked country in South Asia, situated on the southern slope of the Eastern Himalayas. Rivers form the lifeline for the mountain communities and those living downstream in Bhutan. Environment conservation in Bhutan is widely regarded as the bastion for conservation in the 21<sup>st</sup> century.

Bhutan is also one of the few countries in the world where the constitution mandates the need to keep a minimum of 60 per cent of country's land area under forest cover for all times to come. Bhutan is endowed with abundant water resources in the form of glaciers, snow, lakes, streams and rivers. The per capita availability of water per annum is more than 100000 m<sup>3</sup> (NEC 2014). Bhutan has one of the highest per capita water resource availability in the world with 94500 m<sup>3</sup> per capita per annum (NEC, 2016)

In order to ensure sustainable management of the abundant water resources in the country, policymakers and institutions have developed strong conservation legal frameworks on conservation of water resources.

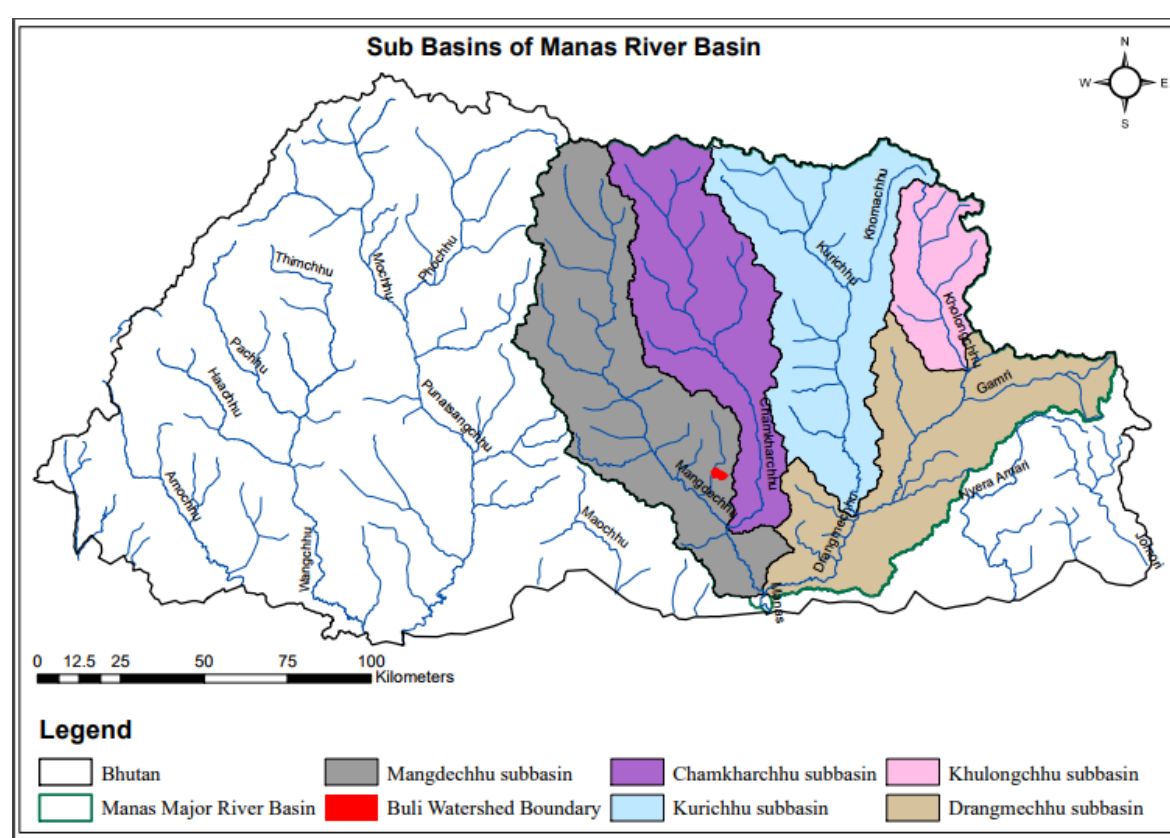
The Constitution of Kingdom of Bhutan 2008, Bhutan Water Act 2011, Bhutan Water Policy, Integrated Water Resource Management Plan and Bhutan Water Vision 2025 are some of the prominent regulatory frameworks that mandate conservation of water resource in country. The institutions responsible to manage and coordinate on the matters relating to the protection and conservation of environment are primarily the National Environment Commission (NEC), Ministry of Agriculture and Forest (MoAF) and other relevant sectors.

Bhutan has four major river systems: the Drangme Chhu; the Puna Tsang Chhu, which is also known as the Sankosh; the Wang Chhu; and the Amo Chhu. Each flow swiftly out of the Himalayas, southerly through the Duars to join the Brahmaputra River in India, and then through Bangladesh where the Brahmaputra (in India) or Jamuna (in Bangladesh) joins the mighty Ganges (in India) or Padma (in Bangladesh) to flow into the Bay of Bengal (Figure 1).

The largest river system, the Drangme Chhu, flows southwesterly from Indian State Arunachal Pradesh, and has three branches: the Drangme Chhu, Mangde Chhu, and Bumthang Chhu. These branches form the Drangme Chhu basin, which spreads over most of eastern Bhutan and drains the Trongsa and Bumthang valleys.

In the Duars, where eight tributaries join it, the Drangme Chhu is called the Manas Chhu (Figure 1). The 320 km long Puna Tsang Chhu rises in northwestern Bhutan as the Mo Chhu and Pho Chhu, which are fed by the glaciers and snows from the Great Himalayan Range. They flow southerly to Punakha, where they join to form the Puna Tsang Chhu, which flows southerly into India's state of West Bengal.

**Figure 1: Major and minor rivers in Bhutan**

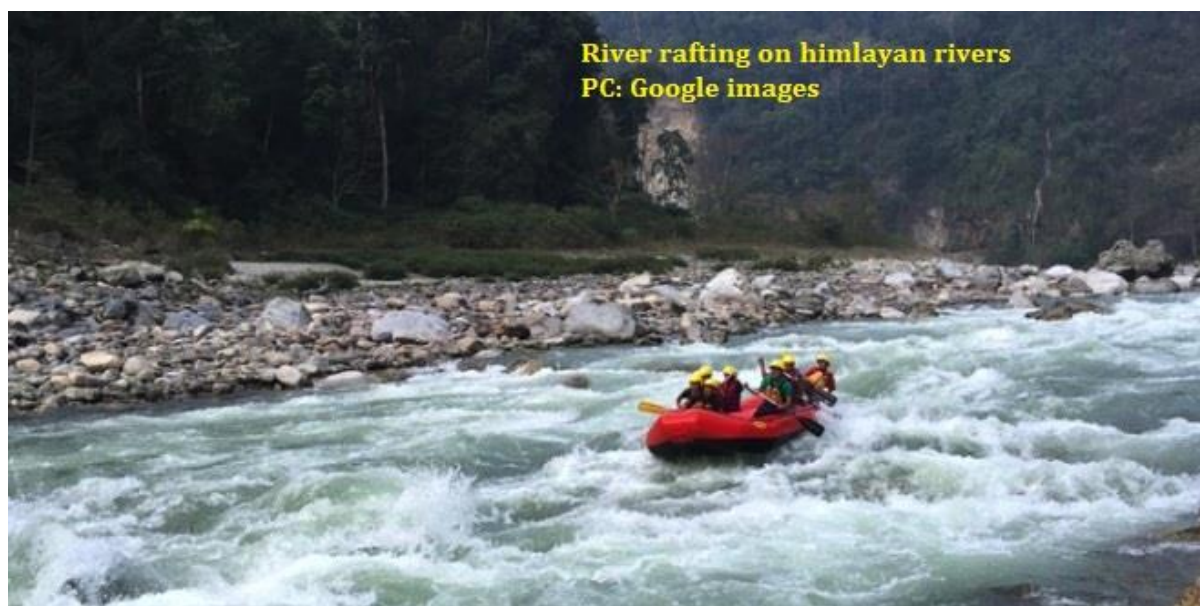


(Source: Watershed Management Division, DoFPS)

The major economic use of rivers in Bhutan is associated with hydropower generation from fast flowing rivers and it is the top most source of revenue generation for country. Rivers in Bhutan are also a source of water for irrigation to farmers, industrial and other multi-purpose uses.

Tourism activities, especially using inland rivers for recreation are also gradually picking up in many parts of the country due to the feasibility of using rivers for short distance rafting. Recreational activities, such as rafting and fly fishing on inland rivers are gaining popular among the river guides of Panbang in Zhemgang.

In general, the rivers in Bhutan are prominently used for irrigating agricultural land, for resource extraction such as sand and boulders, and river tourism which is prominently found in two locations which are in Punakha and Manas.



**Table 1: River basins and their tributaries in Bhutan**

River Basins	Area (ha)	Basin Category	Tributaries
Wangchhu	4,60,176	Major	Haachhu, Pachhu, Thimchhu
Punatsangchhu	9,73,270	Major	Mochhu, Phochhu, Dangchhu, Dagachhu
Manas	15,95,521	Major	Mangdechhu, Chamkharchhu, Kurichhu, Drangmechhu, Kholongchhu
Amochhu	2,21,156	Major	-
Nyera-Amachhu	1,13,970	Major	-
Maochhu	85,783	Minor	Kharchhu, Gongchhu, Gulechhu, Ruthalgongchhu
Jomochhu	75,247	Minor	-

Source: National Environment Commission (NEC)

The inland rivers in Bhutan have immensely benefited the entire economy from drinking water, to hydropower generation and other amenity purposes. Proper assessment of livelihood benefits through inland rivers needs to be studied for communities who are dependent on them for their livelihoods. Moreover, the connectivity via inland rivers can be leveraged to provide better livelihood options.

## Rationale

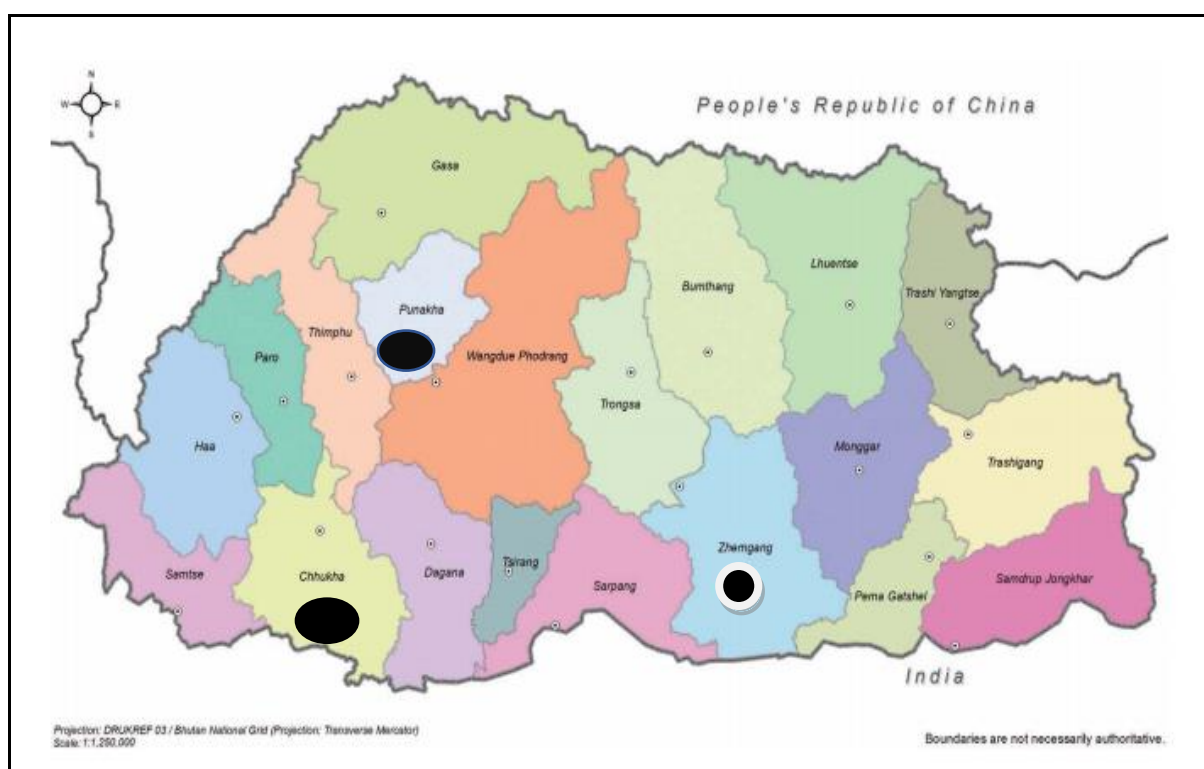
This diagnostic study is an attempt to assess the livelihood benefits derived out of rivers in communities along selected locations and to determine the perception of stakeholders on river navigation in Bhutan. In addition to this, the case studies look at the management of river basin or water resource in general and governance of rivers in particular. The objectives of the study were to:

- Identify and analyse the functions (what they do) and governance (functioning – why and how they do) of existing policies, laws and regulations governing inland waterways in Ganges and Brahmaputra basins in four BBIN countries taking into account their trans-boundary implications and livelihood aspects, especially those on women,
- Understand the ground realities/needs of different stakeholders including civil society and community-based organisations, especially those working on gender issues, whose livelihoods, including business, are connected to inland waterways, and
- Inform and create an alternative policy discourse for enabling reform measures towards better governance of inland waterways for better transport connectivity among the BBIN group of countries and for better options of communities, especially women, dependent on these river basins for their livelihoods.
- The diagnostic study expected the following outcomes:
- The literature review will provide a clear understanding on the governance and regulatory framework of inland waterways within a country/state and also the prospects and challenges of existing institutions in promoting navigational use of waterways for better transport connectivity among the BBIN group of countries and for better options for livelihoods of communities, especially those of women.
- The findings from KIIs and FGDs will inform the alternative policy discourse for enabling reforms in institutions governing the functions (what they do) and functioning (governance – why and how they do) of inland waterways in Ganges and Brahmaputra basins.

## Methodology

The study was composed of two parts given the niche area of research on inland waterways. The first part was composed of extensive literature review which helped recognise and shortlist locations for the field study. The second part consisted of field research comprising key informant interviews (KIIs), and focus group discussions (FGDs) at identified locations followed by a series of consultations and dialogues at subnational, national and basin levels to validate these findings.

**Figure 2: Locations of field consultations**



Three locations were identified for conducting the diagnostic study through extensive literature review and discussions with experts. The locations were: i) Punakha in west-central Bhutan (Punatshangchhu); ii) Phuntsholing in south-west (Amochu); and iii) Manas in central-south, Panbang Drungkhag in Zhemgang.

During the course of this study, Key Informant Interview (KII) with experts and Focus Group Discussions (FGDs) with stakeholders consisting mostly of local government were conducted. Both KII and FGDs were intended to gather information on navigation, livelihood benefits and river management and water resource management. The study also conducted multiple case studies to capture the potential challenges and opportunity of river Manas to community of Panbang in Zhemgang.

## 2. Institutions and Policies in Bhutan

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### Framework of Environmental Legislations

Efforts to protect the biodiversity and forestlands are a constitutional mandate in Bhutan. The 2008 Constitution stipulates that a minimum of 60 per cent of the total land in Bhutan remain forested. According to the 2016 assessment of land cover conducted by the Department of Forest and Park Services, the forest cover is about 72 percent (Kuenselonline, 2016) and nearly 80 per cent of bushes and sparse vegetation are included. Furthermore, about 50 per cent of the land is already designated as protected areas.

With his famous declaration, that “Gross National Happiness is more important than Gross National Product”, the fourth King of Bhutan, Jigme Singye Wangchuck, introduced the distinctive concept of GNH to the people of Bhutan and the world. The four pillars of GNH focus on sustainable development, good governance, preservation and promotion of cultural values and conservation of the natural environment. The framework of GNH is also enshrined in the 2008 Constitution and guides Bhutan’s development and policy formation (Premkumar, 2016).

Bhutan’s efforts to design legislations and implement policies to preserve its vast and diverse natural resources are relatively recent. The main legislations<sup>29</sup> concerning the protection of environment are Forest and Nature Conservation Act 1995, Environmental Assessment Act 2000, National Environment Protection Act 2007, Waste Prevention and Management Act 2009 and Water Act 2011.

Hydropower development is governed by the Sustainable Hydropower Development Policy of 2008. The National Environment Protection Act is the umbrella legislation that “defines roles and responsibilities of key agencies in environment management and sets out requirements for the protection of the physical and ecological environment”. The Environmental Assessment Act stipulates the requirements for conducting environmental assessments and obtaining environmental clearances. The Forest and Nature Conservation Act lays down guidelines for extracting forest resources and protecting Bhutan’s wildlife.

The National Environment Commission (NEC) is an autonomous regulatory authority. It is the highest decision-making body on matters concerning environmental management. The NEC also works to include environmental protection clauses in



various policies & Acts. The Prime Minister chairs the Commission, which has nine members, special advisors and a secretariat. The NEC secretariat is responsible for implementing policies and regulations formulated by the commission.

All development activities in Bhutan are subject to environmental assessment. All projects require an Initial Environmental Assessment (IEA) while some projects such as farm roads do not require Environment Impact Assessment (EIA) and Social Impact Assessment (SIA). IEAs have set guidelines and EIAs are conducted on the basis of project specific ToR that are provided by the NEC. The Commission has guidelines for specific industries and sectors, including hydropower.

The legislations implemented so far outline procedures to ensure the sustainable management of forests, waterways, wildlife and plants but do not cover the whole range of issues, particularly in regard to large-scale hydropower projects. The NEC is making earnest efforts to improve legislative framework for environmental protection but lags behind in effective enforcement of set standards<sup>30</sup>. Bhutan is at an important crossroad in this regard and the strength and quality of the legislations it implements will determine the impact of large-scale projects on the country's environment, wildlife, culture, and people.

## Governance Bodies and Institutions

The national level bodies and institutions which govern bilateral and multilateral relations on water are:

1. Royal Government of Bhutan
2. National Environment Commission
3. Ministry of Agriculture and Forest
4. Ministry of Economic Affairs

The roles and responsibility of governing bodies are given below:

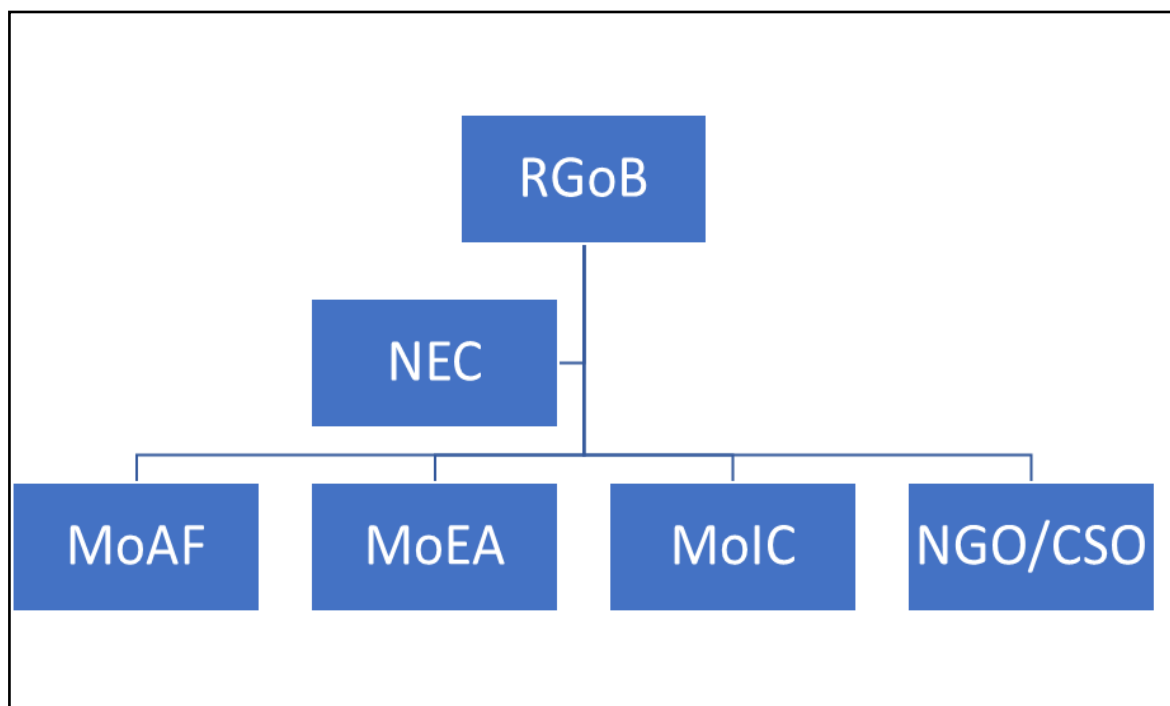
1. The National Environment Commission shall be an independent authority established by an Act of Parliament and shall exercise the powers and discharge the functions conferred under this Act. (Water Act, 2011). The National Environment Commission shall;

- a) Ensure implementation of this Act;
- b) Co-ordinate national integrated water resources management;
- c) Issue directives that are binding on all persons and competent authorities for following purpose pertaining to water and water resources;
  - i. Restorative, corrective or mitigating measures;
  - ii. Planning, protection and management within certain areas, zones, regions or nationwide;

- iii. Promotion of water education, research or studies;
- iv. Promotion of water friendly and water efficient technologies;
- v. Mainstream water into the national Policy, Plan and Program;

2. The Ministry of Agriculture, for land-use and irrigation, watershed management, water resources in forests, wetlands and protection of catchment areas;

**Figure 3: Governance bodies and institutions**



3. The Ministry of Economic Affairs for collection, analyses and dissemination of water resources data and monitoring of water flows including discharge level and sediment for the purposes of the National Integrated Water Resources Management Plan, planning and design of water resource infrastructure including dams and GLOF issues;

## **Water treaties, legislation and acts**

### **1. International treaty on transboundary water**

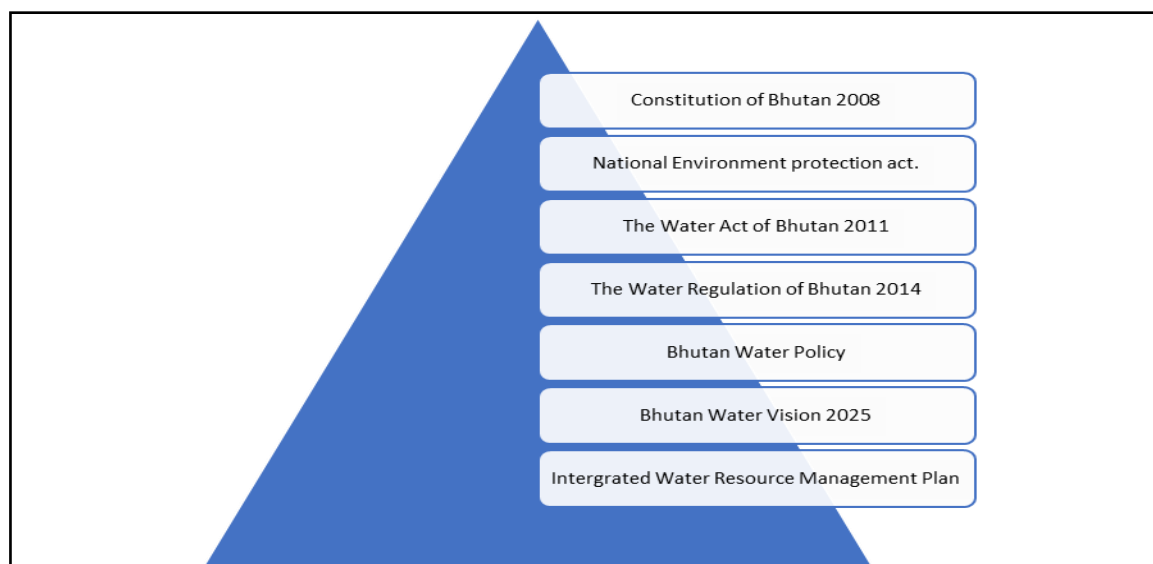
Bhutan is signatory to convention on international laws and convention on transboundary water (Bhutan Water Policy, 2007).

Cooperation in information sharing and exchange, appropriate technology in water resources development and management, flood warning and disaster management shall be initiated at the national, regional and global levels (Bhutan Water Policy)

## 2. Legislation

The National Water Policy of 2003 of Bhutan (Bhutan Water Partnership 2003) also considers water resources management to be based on natural river basins, and hence highlights the need for appropriate institutional structures at the basin level.

**Figure 4: Legislations for water governance in Bhutan**



### i. Constitution of Bhutan

The Constitution defines the Kingdom of Bhutan as a democratic constitutional monarchy belonging to the people of the Kingdom. The territory of Bhutan is divided into 20 Dzongkhags (Districts) with each consisting of Gewogs (Counties) and Thromdes (Municipalities). Dzongkha is the national language of Bhutan, and the National Day of Bhutan is December 17.

The Constitution is the supreme law of the State and affirms the authority of legal precedent: *All laws in force in the territory of Bhutan at the time of adopting this Constitution continues until altered, repealed or amended by Parliament. However, the provisions of any law, whether made before or after the coming into force of this Constitution, which are inconsistent with this Constitution, shall be null and void.*

### ii. National Environment Protection Act, 2007

An Act to provide for the establishment of an effective system to conserve and protect environment through the National Environment Commission or its successors, designation of competent authorities and constitution of other advisory committees, so as to independently regulate and promote sustainable development in an equitable manner.

### **iii. Water Act of Bhutan, 2011**

The purpose of this Act shall be: a) To ensure that the water resources are protected, conserved and/or managed in an economically efficient, socially equitable and environmentally sustainable manner; and b) To establish suitable institutions.

### **iv. Bhutan Water Regulation, 2014**

This Regulation is promulgated to: (a) enforce the objectives and purposes of the Water Act; (b) effectively implement and enforce the Water Act by the Competent Authorities; and (c) identify roles and responsibilities of designated Competent Authorities and other relevant organizations.

### **v. Bhutan Water Policy, 2007**

The Water Policy views water resources from a broad, multi-sectoral perspective while recognising the responsibility of the sub-sectors to play their part in meeting the policy objectives. The policy principles are thematically grouped as follows: i) Water user interests and priorities; ii) Principles for water resource development and management; iii) Institutional development for water resources management; and iv) International waters.

### **vi. National Integrated Water Resource Management Plan (NIWRMP)**

The overall goal of this NIWRMP is to establish the framework and priorities for the implementation of IWRM in Bhutan. Specific objectives of the NIWRMP are:

- to assess the current situation and future prospects of water resources in the light of changing climate
- to formulate the principles and framework within which players in the water sector can plan, implement and monitor water resources management in a coordinated manner.
- to propose priority interventions and tools for integrated water resources management in the country.

NIWRMP is not a macro-economic analysis of best development alternatives. The policy recognizes the tremendous potential of hydropower for socio-economic development as well as its potential for earning revenues from exports. As articulated in the policy, trans-boundary water issues are to be dealt with in accordance with international law and conventions to which Bhutan is a signatory and taking into consideration the integrity of the rivers as well as the legitimate water needs of riparian states. Cooperation in information sharing and exchange, appropriate technology in water resources development and management, flood warning, and disaster

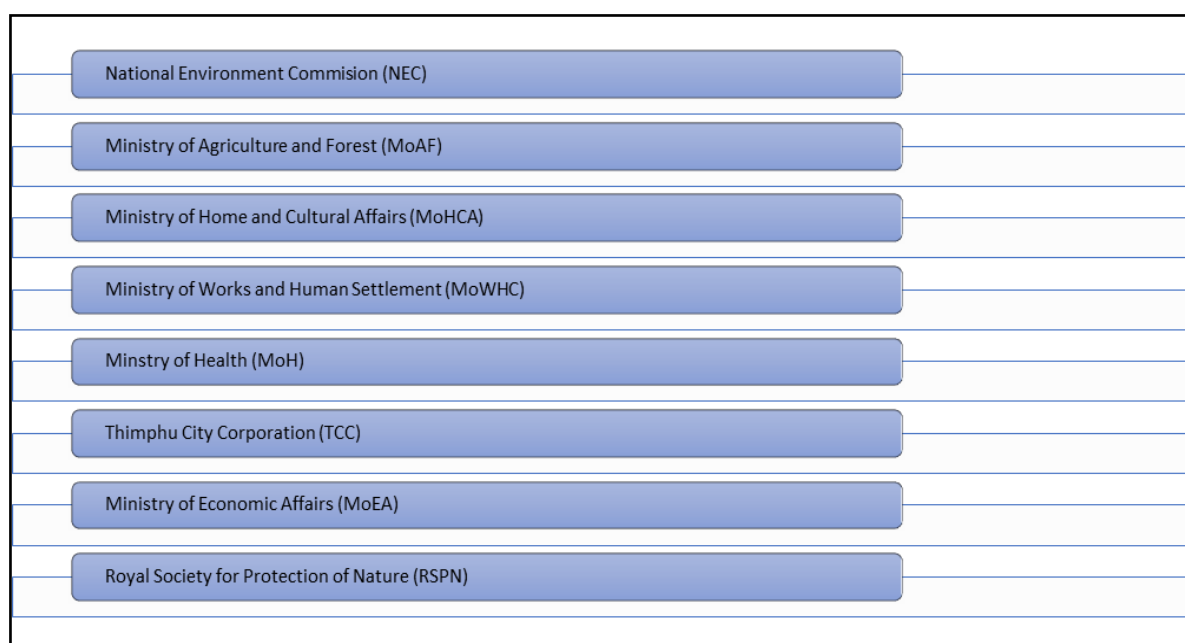
management are to be initiated at the national, regional, and global levels (Salehin, 2011).

### 3. The National Water Resources Board

A National Water Resources Board was constituted on 8 September 2011. The Secretary of the National Environment Commission shall act as Chair and the Head of Water Resources Coordination Division (WRCD) shall act as Member Secretary of the National Water Resources Board, which shall also be comprised of the following members from the different agencies

- MoEA – Director General, DoE, and Head, DGM;
- Thimphu City Corporation – Thrompon (City Mayor),
- MoH – Director, Department of Public Health;
- MoHCA – Director, Department of Local Governance;
- RSPN – Executive Director;
- MoWHS – Director, DUDES;
- MoAF – Director, DoA; Director, Council for RNR Research of Bhutan; Head, Watershed Management Division; Head, Water Department, UWICE.

**Figure 5: Members of the National Water Resources Board**



The Water Resources Board shall be account able to the National Environment Commission and shall:

- i. Act as a technical advisory committee to the National Environment Commission on water resource protection, development and management;
- ii. Facilitate in the process of the National Environment Commission's
- iii. overseeing of the implementation of the Water Act 2011, related regulations and by-laws;
- iv. Submit recommendations to the National Environment Commission to ensure smooth implementation of water resources activities, policies and programmes;
- v. Act as a forum for discussion and coordination of water resources activities and sharing of information to avoid duplication of efforts and resources;
- vi. Coordinate the institutional linkage mechanism within and beyond the water resources sector;
- vii. Make recommendations on matters pertaining to water bodies of national and international importance for consideration by the National Environment Commission;
- viii. Consider issues related to water resources [management] including, but not limited to, the following:
  - Research on water resources vis-à-vis Climate Change;
  - Vulnerability and Adaptation of water resources;
  - Mitigation of adverse impacts of Climate Change;
  - Capacity building and awareness;
  - Technology needs and technology transfer for water resources.

#### **4. Water Resources Coordination Division (WRCD)**

The WRCD was formally formed under NEC on 10 May 2010. The WRCD looks into regular water monitoring, development of appropriate standards and the coordination of the management of water resources as per existing laws. The main functions of the division are:

- Conduct inventory on the water resources of the country;
- Prepare the National Integrated Water Resources Management plan in consultation with relevant stakeholder;
- Monitor the state of water resources; and compile, analyse and disseminate information;
- Coordinate the formulation of the water act;
- Coordinate and prepare action plans for integrated water resources management;
- Act as the national counterpart to consultants involved in policy formulation and management of water resources;
- Act as a coordinator and facilitator on water resources protection, development and management;



- Coordinate and prepare the institutional linkage mechanism within and beyond the water resources sector;
- Review and coordinate the preparation of a comprehensive HRD plan in the water resources sector;
- Monitor and evaluate the programmes on water resources implemented by different sub sectors;
- Develop, review and revise water quality monitoring and management strategy
- Assist, develop, review and update national water quality standard;
- Liaise with other agencies such as Department of Energy, Ministry of Works & Human Settlement, and Ministry of Health & Ministry of Agriculture and Forests on water resources management;
- Inform the public on sustainable use of water resources through education, training, awareness and other public outreach programs;
- Maintain national registry on approval granted and ECs issued;
- Collect and maintain data and information on water resources, including record keeping of all administrative decisions taken;
- With assistance of the River Basin Committee to prepare and periodically update a River Basin Management Plan for each river basin.

Under WRCD, Water Resources Coordination Section and Water Quality Monitoring Section also formed to coordinate, review, monitor and evaluate the programs on water resources.

**a) Water Resources Coordination Section (WRSC)**

The functions of this section are as follows:

- Coordinate the formulation of the Water Act, Policy and Vision;
- Coordinate and formulate a broad national water policy along with the required legislation;
- Coordinate and prepare water action plans for integrated water resources management;
- Coordinate and prepare the institutional linkage mechanism within and beyond the water resources sector;
- Review and coordinate the preparation of a comprehensive HRD plan in the water resources sector;
- Monitor and evaluate the programmes on water resources implemented by the different sub sectors;
- Develop, review and revise water quality monitoring and management strategy.

**b) Water Quality Monitoring Section (WQMS)**

The functions of this section are as follows:

- Conduct regular water quality monitoring exercises in all the major river basins; the data thus gathered will be beneficial to implement for the process of integrated water resources management;
- Coordinate with other Agencies/ Sectors to monitor water quality such as drinking water, lakes, wetlands etc.;
- Review and coordinate the preparation of a comprehensive HRD plan in the water resources sector;
- Monitor and evaluate the programmes on water quality monitoring implemented by the different sub sectors;
- Develop, review and revise water quality monitoring and management strategy.

**5. Agreements for regional cooperation on trade and transit**

As Bhutan is member to SAARC countries the following trade agreements currently is the custodian on trade matters:

- i. Agreement on South Asian Free Trade Area (SAFTA)
- ii. SAARC Agreement on Trade in Service (SATIS)
- iii. Agreement on Trade, Commerce and Transit between Bhutan and India
- iv. Agreement between Bhutan and Bangladesh Government on access to port for trade and transport

### 3. Stakeholder Perceptions and Field Findings

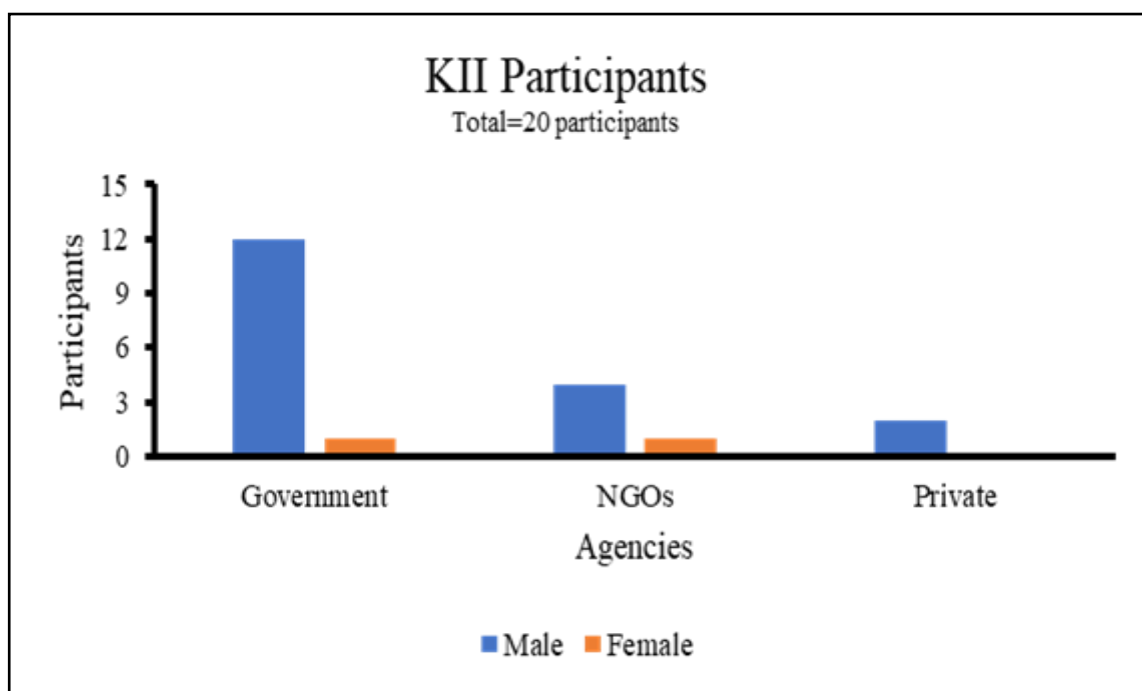
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The area for conducting the case study/diagnostic study for Bhutan was mutually agreed between RSPN and CUTS and the areas recommended were Punakha in west central Bhutan, Chukha in south and finally the Manas in central Bhutan.

As mentioned in methodology, for conducting the diagnostic study essentially Focus Group Discussion and individual interview were carried out at local government and community level. In addition, Key Informant Interview (KII) with key national stakeholder were conducted as a part of study.

The study mostly captures the views of experts on agenda of regional connectivity through inland water in BBIN region, legislations on IWs, concerns, people's interaction with rivers, economic use of river, navigation feasibility, issues and concerns of river navigation and the challenges and opportunity on river management.

**Figure 6: Participants in Key Informant Interviews (KIIs)**



#### Consultations in Punakha district

Guma Gewog consists of five chiwogs (Guma-wolakha, Changyul Tashijong, Phulingsum, Dochu-Ritsa, Lakhu) with 475 households. It covers an area of about 35 sq. km (approximately.) with elevations ranging from 1400 m to 2800 m above sea

level. The gewog experiences an annual rainfall of about 500mm-1500mm (approximately), with the temperature ranging from 5 degree Celsius. The gewog lies in the sub-tropical region and experiences hot and humid summers with heavy rainfall during the monsoon months of June, July, and August. Winters are moderate. The gewog is about 2 km from Punakha Dzongkhag, and is one of the most accessible gewogs.

Paddy is the principle cereal grown in the gewog followed by spring wheat. Most households derive cash income from the sale of vegetables and rice. The fertile Lobesa valley offer promising opportunity for farm mechanisation.

**Table 2: Stakeholders at Punakha**

Location	No. of Participants	No. of Women	Stakeholders Categories
Punakha	12	2	local government representatives
Punakha	11	6	community representatives



### Consultations in Chukha district

The other location for conducting diagnostic study was Phuntsholing area, especially the vicinity of community living around Amochhu river. Amochu river flows from south-western part of country and is the one of Transboundary River flowing from China and finally flows down to bordering town of India. As Phuntsholing town is one

of the major economic zone for Bhutan having trade and export to rest of the country taking place the Amochhu river provides perfect setting for carrying out diagnostic study from trade and connectivity point of view.

**Table 3: Stakeholders at Chukha**

Location	No. of participants	# of women	Stakeholders categories
Phuntsholing gewog in Chhukha	15	2	local government representative

However, for Phuntsholing under Chukha project community interview could not be conducted because there were no households near the Amochu river. Therefore, only FGDs with local government officials were conducted during the visit.



Consultation with local government and few community representatives indicates that most of the participants were unaware of river use for trade and tourism. But many felt that river tourism can be one potential avenue in future if rivers are properly reclaimed and channelized mainly to streamline the present scattered river system. Promoting regional tourism through river tourism in Phuntsholing is also a city plan integrated in tourism manual. However, participants also pointed out the changing river volume and low water volume during winters can pose challenges in river tourism for Ammochu river.



## Case Study from Manas in Panbang, Zhemgang District

The local communities of lower Zhemgang valley have been enjoying the benefits of three main rivers namely Drangmechu, Mangdechu and Lekpathang, which will meet in confluence and called it river Manas. Manas river is one of the major river basin in Bhutan. The tributaries of river Manas flows through several places of Zhemgang Dzongkhag. Drangmechu passes through Thinleygang, Rivati, Yumdang, Laling, Sonamthang, Riwater and Rabati.

**Table 4: Stakeholders at Manas, Panbang**

Location	No. of Participants	No. of women	stakeholder Categories
Panbang, Zhemgang	8	3	Local government
Panbang, Zhemgang	21	5	Community representatives

A study was conducted in the month of May 2017. It is evident that the Manas rivers in Bhutan are closely linked with the day-to-day livelihood of the communities residing along and nearby the river and its tributaries. About five females and 21 males participated in the data collection consultations.



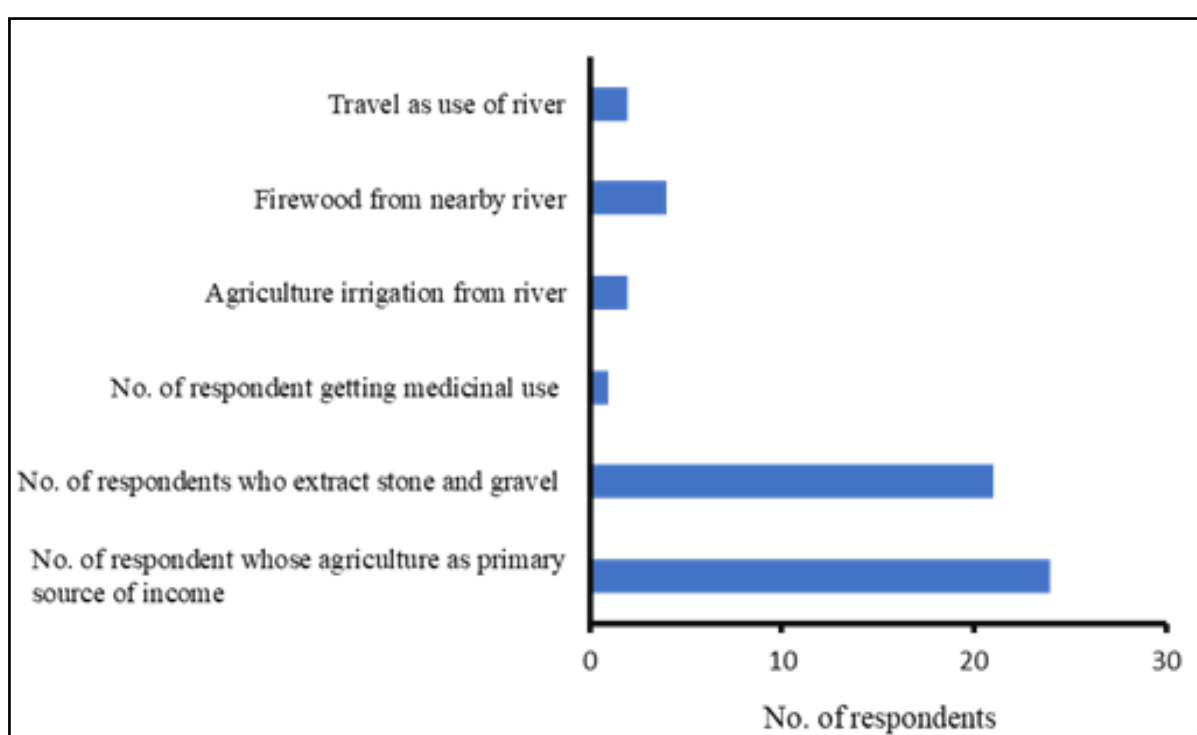
For ensuring the data precision, a validation like consultation was carried out with local Government, community people and river guide association of Panbang. Out of 26 participants attending the questionnaire session, it was found that four were



benefitted from Mangdechu, one from Gedduchhu and 21 from Drangmechu river. The participants are mostly primary and higher secondary school dropouts.

The agriculture is the primary occupation and rivers have contributed significantly to irrigation of the agriculture land. Out of 26 participants, 24 participants were found to rely mostly on agriculture. It was also explored that agriculture is practiced by more than 90 percent of the population living along the river. None of the participants have been benefited from the tourism activities associated with rivers although the interview with the tourist guide association of Panbang reported that there have been some 0.6 million equivalent of Bhutanese currency is generated as income in six months.

**Figure 7: Responses from community consultations**



Apart from the primary benefit of agriculture irrigation, people have economical advantage of having access to collect sand, gravel and stones from the river side. Sand and stone extraction is common in Yumdang, Laling, Thinleygang, Sonamthang, Riwatey and Rabati. Sand and stones are extracted and used in various construction sites like roadways, buildings and infrastructures. Extraction of sand and stones has made it easier for the residents of Zhemgang Dzongkhag to get access to such resources as it is locally available.



The prices of sand and stones are cheaper at such areas that have made it easier for the local residents to afford. The consultation shows that more than 70 percent of participants were collecting sand and gravel for domestic consumption, especially construction of houses and structures and for sale in some cases. Moreover, the collection of firewood is another beneficial for the local residents of Zhemgang Dzongkhag. Water is one of the key elements for the growth of plant. Firewood trees get minerals and water from the river.

Drangmechu being a fast-flowing river, a lot of nutrients are being deposited at river banks, which is vital source for the proper growth of plants. This promotes the maximum number of growth of trees along the river banks and ultimately the source of firewood for the community. Local residents have easy access to firewood in these areas. The major portion of the respondents said that they also collect firewood from the places near the river for their domestic consumption.

**Table 5: Responses from community consultations**

Particulars	Male	Female
No. of respondents	21	5
Age group of respondents	25 to 60	22 to 45
Educational Qualifications respondents	2 monks and rest acquired primary education and Higher Secondary Education drop outs	
Family members of the respondents	7 respondents have more than 5 family members	
Name of river and no. of respondents using particular river	4 respondents use Mangdechu river 1 respondent used Gedduchhu and 21 used Drangmechu	
Agriculture as primary source of income	24 respondents	
Extract stone and gravel	21 respondents	
No. of respondent getting medicinal use	1 respondent	
Agriculture irrigation from river	2 respondents	
Firewood from nearby river	4 respondents	
Travel as use of river	2 respondents	

Another benefit associated with the Drangmechu river is extraction of herbal medicines. Many herbal plants and trees are available in the area. This generates a source of income for the people as they can extract the herbal medicines and export to other places across the nation.

The rivers also have the medicinal benefits although this applies to the few rivers that contains right type of mineral content. The two participants said that they have medicinal benefits (locally known as menchu). This is insignificant if we account the bigger picture as around 90 per cent of the respondents do not have access to nearby rivers with such benefits.

Practice of fishing is illegal in Bhutan with strict monitoring and control procedures in place. It is worth to mention that the Bhutanese rivers are considered of having quality and tasty fish species. Fishing is an opportunity to boost the economic performance of local communities if proper harvesting practices are setup and brought in place.

Although fishing restriction is in place, some of the communities still rely on fishing as important source of their livelihood. For example, Jigmechu near Geddu have

abundant fish in the river and the people practice fishing for the sale and domestic consumption.

Similar is the case with other rivers like Punatshangchu, Sunkush Chu etc. The fishing sector have potential for the alleviation of poverty and enhancing livelihood amongst the Bhutanese community.

The rivers in Bhutan are leading to improvement in infrastructure and this is supported and agreed by 7 participants (25 to 30 percent) and some of the respondents opined that there is potential that government can add up to the infrastructure.

Although there are no visible or significant evidences to show that the tourism is enhanced by rivers, around 10 participants stated that river tourism is an economic benefit for them.

Rivers also brought in some challenges and concerns amongst the community. Some of the participants pointed out that during summer season, the road blockages and flood are some of the threats associated with rivers.

The rivers in Bhutan opened up the livelihood opportunities for the nation in many ways although the river benefits are not explored to the full potential.

These rivers not only help the local residents but also promote the development of the region. It offers the larger benefits to people in terms of alleviating poverty if explored and utilised optimally.

## 4. Conclusion

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Following points reflects the current stand of Bhutan on inland water navigation and over-all project goals:

- It was found out that there was absence of any legal instrument and policy in place for Bhutan which currently oversees for transboundary river management programs. And more importantly there is no plans on initiating government dialogue on transboundary river management.
- Governments concern over environment degradation especially the aquatic and water bird habitat and more importantly the security concern while promoting transboundary navigation are some of the genuine concern raised by government stakeholders.
- The rivers in Bhutan are not feasible for navigation given the stiff terrain and fluctuation of river volume during summer and winter there for the scope lies very narrow.
- Study also found that rivers in Bhutan are prominently used for agriculture purpose and resource extraction but not for navigation.
- While there is absence of policies and regulatory frameworks directly related to navigation or river management, the study indicates that Bhutan has strong policies, acts and regulatory frameworks that seeks to safeguard water resources. This contributes to maintaining healthy river system which is pollution free and the benefit that transcends across the border towards neighbouring countries. Example in case: - As per the Water Act of Bhutan 2011, the National Environment Commission (NEC) has already initiated and instituted river basin management committee for Wangchu Basin and developed the River basin management plan, and similarly the management plans for other three basins will be developed in future. This can directly contribute to lower riparian country and will benefit the downstream communities.
- The study also found out the for Bhutan there has been also growing interest on river tourism business among private sectors and few initiatives have been already under taken. However, initiating this at the trans-boundary level needs proper study/assessment keeping in mind environmental and social sensitivity, national security and so forth. The

outcome of study could possibly contribute to planning a river system based integrated livelihoods programme for the target areas.

- Recent signing of agreement between Bhutan and Bangladesh government on access to port for trade and transport in April, 2017 may provide a basis for possible up scaling of similar initiative in future especially the transboundary navigation in relation to trade.
- And of late the present government has proposed to establish National Water Commission (NWC) which now after may be mandated with responsibility to look after the transboundary affairs.

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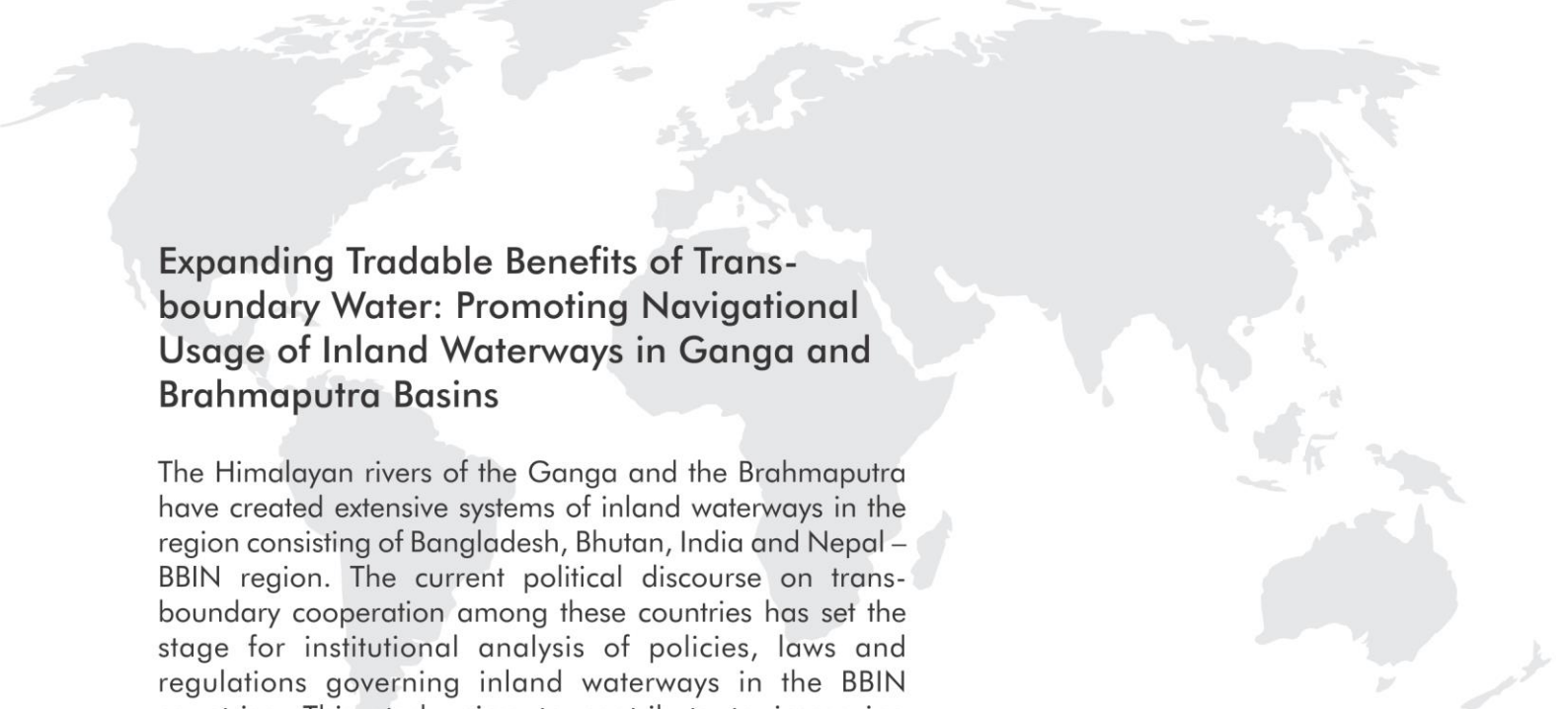
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## Expanding Tradable Benefits of Trans-boundary Water: Promoting Navigational Usage of Inland Waterways in Ganga and Brahmaputra Basins

The Himalayan rivers of the Ganga and the Brahmaputra have created extensive systems of inland waterways in the region consisting of Bangladesh, Bhutan, India and Nepal – BBIN region. The current political discourse on trans-boundary cooperation among these countries has set the stage for institutional analysis of policies, laws and regulations governing inland waterways in the BBIN countries. This study aims to contribute to improving institutions (i.e. policies, laws, and regulations) for inland waterways governance with particular emphasis on transport connectivity and livelihood in the BBIN region. More details about the project can be accessed here: <http://www.cuts-citee.org/IW/index.htm>

## CUTS International

Established in 1983, CUTS International (Consumer Unity & Trust Society) is a non-governmental organisation, engaged in consumer sovereignty in the framework of social justice and economic equality and environmental balance, within and across borders. More information about the organisation and its centres can be accessed here: <http://www.cuts-international.org>.



**CUTS Centre for International Trade, Economics & Environment**

D-217, Bhaskar Marg, Bani Park, Jaipur 302 016, India

Ph: 91.141.228 2821, Fax: 91.141.228 2485

Email: [cuts@cuts.org](mailto:cuts@cuts.org), Website: [www.cuts-international.org](http://www.cuts-international.org)

Also at Delhi, Calcutta and Chittorgarh (India); Lusaka (Zambia); Nairobi (Kenya); Accra (Ghana); Hanoi (Vietnam); and Geneva (Switzerland).