

GROSS NATIONAL HAPPINESS COMMISSION  
ROYAL GOVERNMENT OF BHUTAN



# BHUTAN

## STRATEGIC PROGRAMME FOR CLIMATE RESILIENCE (SPCR) UNDER THE PILOT PROGRAMME FOR CLIMATE RESILIENCE (PPCR)

Climate-Resilient & Low-Carbon Sustainable Development Toward  
Maximizing the Royal Government of Bhutan's Gross National Happiness





# OUTLINE



## 1. Country Background

Area: 38,394.00 km<sup>2</sup>, Biological Corridors: 3307.14 km<sup>2</sup> Park: 12922 km<sup>2</sup>, Nature Reserves: 608.51 km<sup>2</sup>, Sanctuaries: 28964.87 km<sup>2</sup> GNI: 8.65%, Inflation: 3.22%, GDP: 7.99 % Arable land: 2.93 %, Population: 768,577

## 2. Rationale - Why SPCR?

The 1994 GLOF event at the Luggye Tsho killed 21 people and damaged 91 houses and 1,781 acres of land. The heavy rainfall brought about by Cyclone Aila in 2009 caused Bhutan to incur an estimated loss of US \$17 million and a loss of 13 lives.

## 3. Objective

Investment generally results in acquiring an asset, also called an investment. If the asset is available at a price worth investing, normally expected either to generate income, or to appreciate in value

## 4. Preparation Process

Country owned and led process ; Developed through inclusive and broad based stakeholder participation; Aligned to NAPAs, NAP, NDCs, SDGs and other national climate policies ; Aligned to national plans and policies – 11th & 12th Five Year Plans

## 5. Pillars & Investments

Four pillars and six potential investments

## 6. Conclusion

How to deal with rainfalls and its consequences



# COUNTRY BACKGROUND











# GNH Integration Framework

Just, Harmonious and Sustainable Society  
Through Enhanced Decentralization

- Education
- Health
- Living Standards
- Ecological Diversity and Resilience
- Time Use
- Culture
- Psychological Well-Being
- Community Vitality
- Good Governance

National Key Result Areas (NKRA)  
and Key Performance Indicators (KPI's)

Healthy Ecosystem Services Maintained	Democracy and Decentralization Strengthened
Macroeconomic Stability Ensured	Culture & Traditions Preserved & Promoted
Infrastructure, Communication and Public Service Delivery Improved	Carbon Neutral, Climate and Disaster Resilient Development Enhanced
Gender Equality Promoted, Women and Girls Empowered	Productive & Gainful Employment Created
Livability, Safety and Sustainability of Human Settlements Improved	Corruption Reduced
Healthy and Caring Society Enhanced	Quality of Education and Skills Improved
Economic Diversity and Productivity Enhanced	Water, Food and Nutrition Security Ensured
Justice Services and Institutions Strengthened	Poverty Eradicated & Inequality Reduced

## 2. RATIONALE...

### WHY SPCR?

Climate Change is a Reality

Highly exposed to hydro-meteorological hazards

Increasing mean Annual Temp (3.5 deg. C)  
GLOFs

Increased but variable rainfall (heavy, scanty, drought)

It impacts our lives, livelihoods and economic development

Economy driven by climate sensitive sectors

Fragile mountain Ecosystem

Climate extreme/variability impacts Productivity of the sectors

Climate risk resilient development is the key

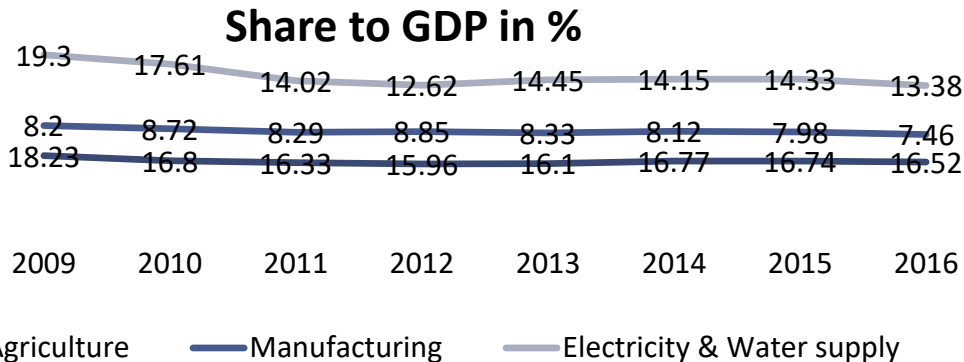
Key priority in Bhutan's Development Planning (12<sup>th</sup> FYP)

UNFCCC Carbon Neutral Pledge Paris Agreements NDC



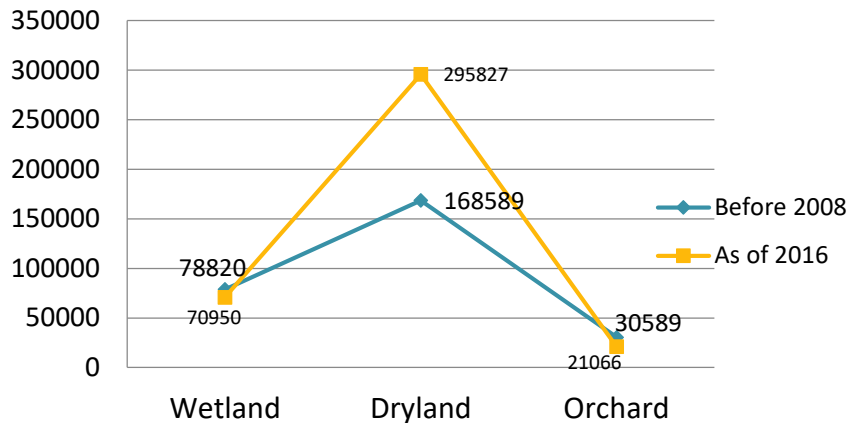


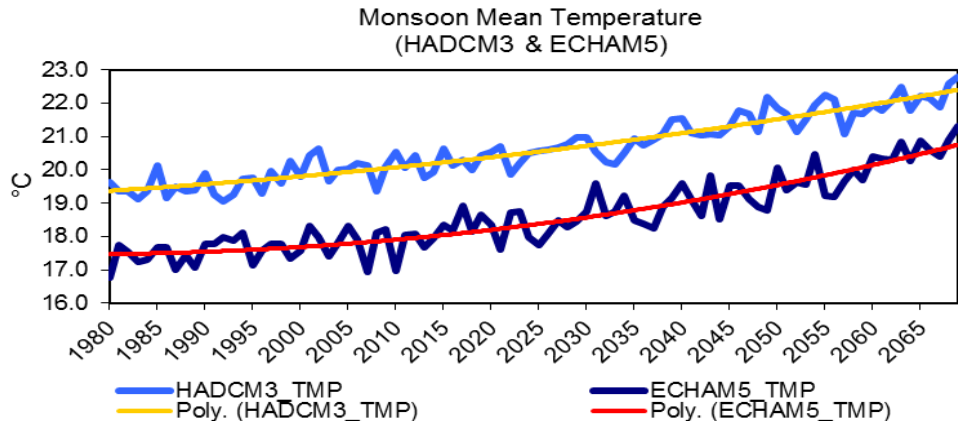
# Impact on GDP contribution and land use type



Source: National Accounts Statistics 2017

## Change in land use type (in acres)



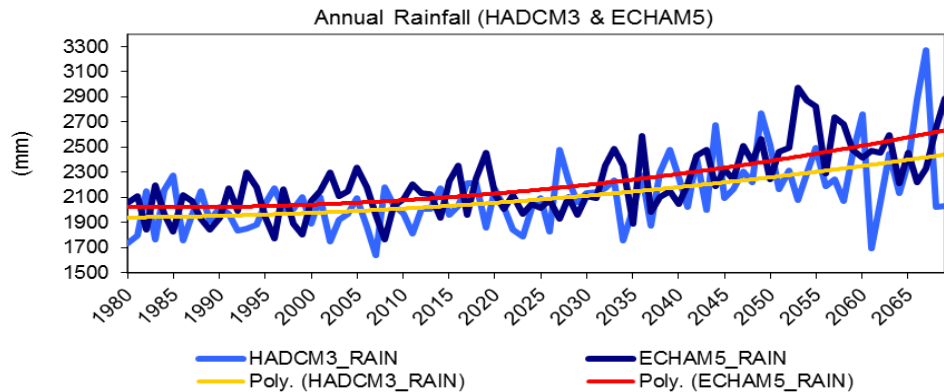


ECHAM5 and HadCM3Q model indicates that mean annual temperature increases by 3.5°C (1980-2069)

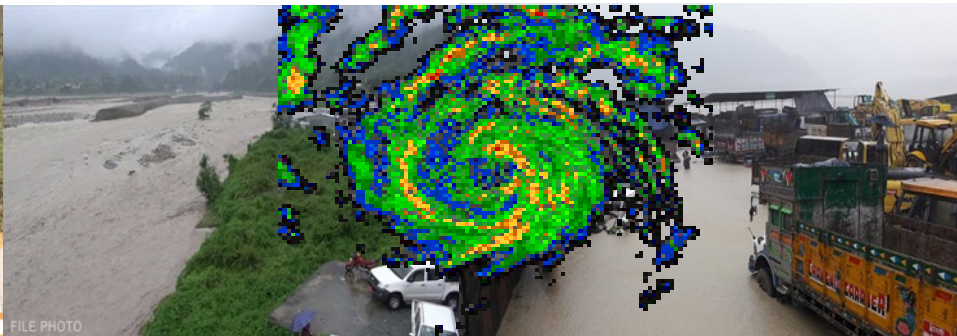


## Melting of Glaciers in High Mountains of Bhutan





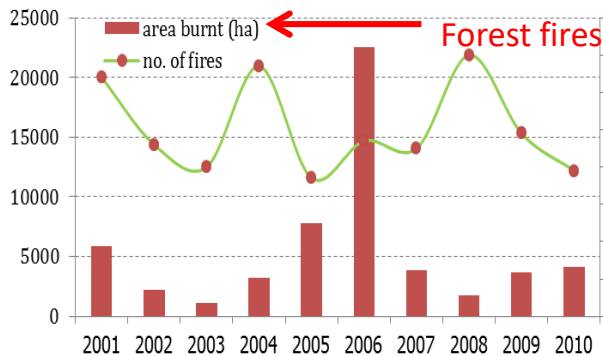
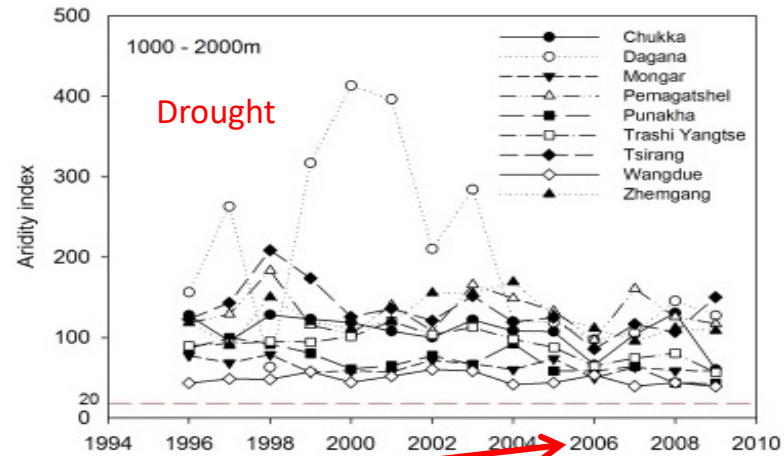
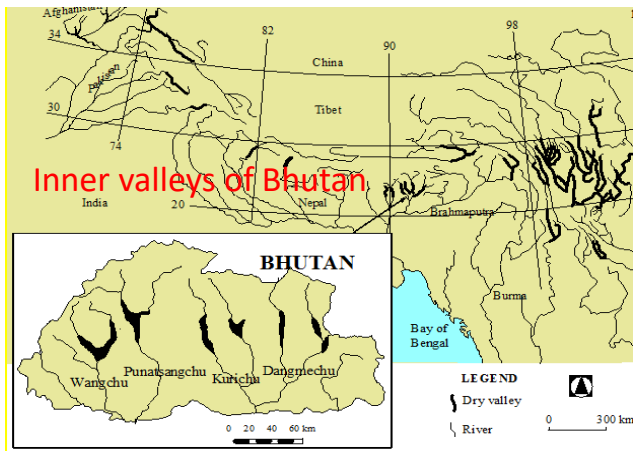
**Increased but variable precipitation trend**



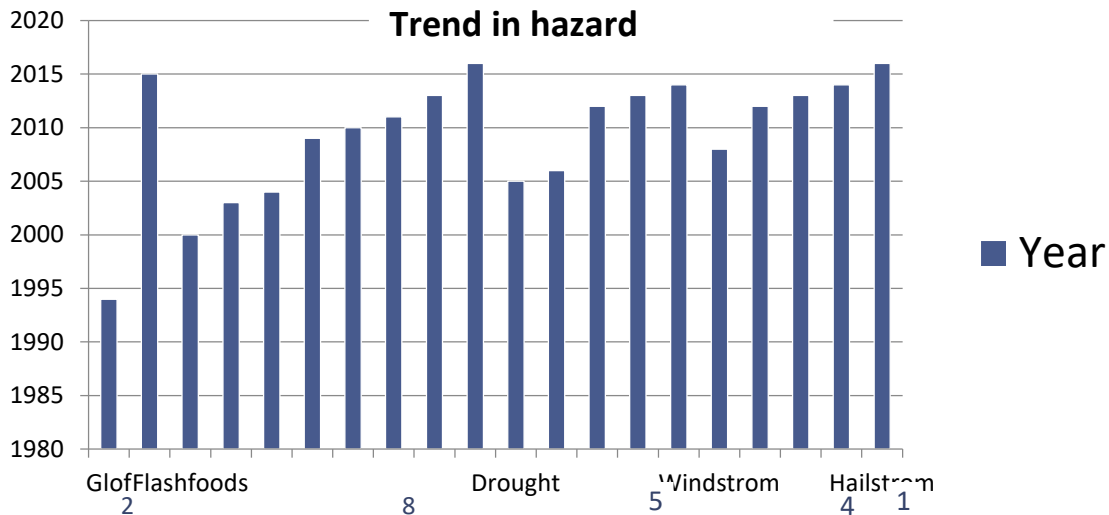


# DROUGHT AND WATER SCARCITY IN THE INNER VALLEYS

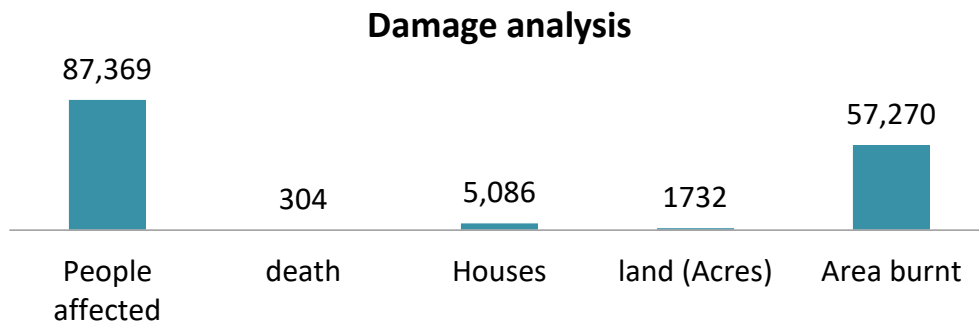
## Drought







## Hazard trends and its impact

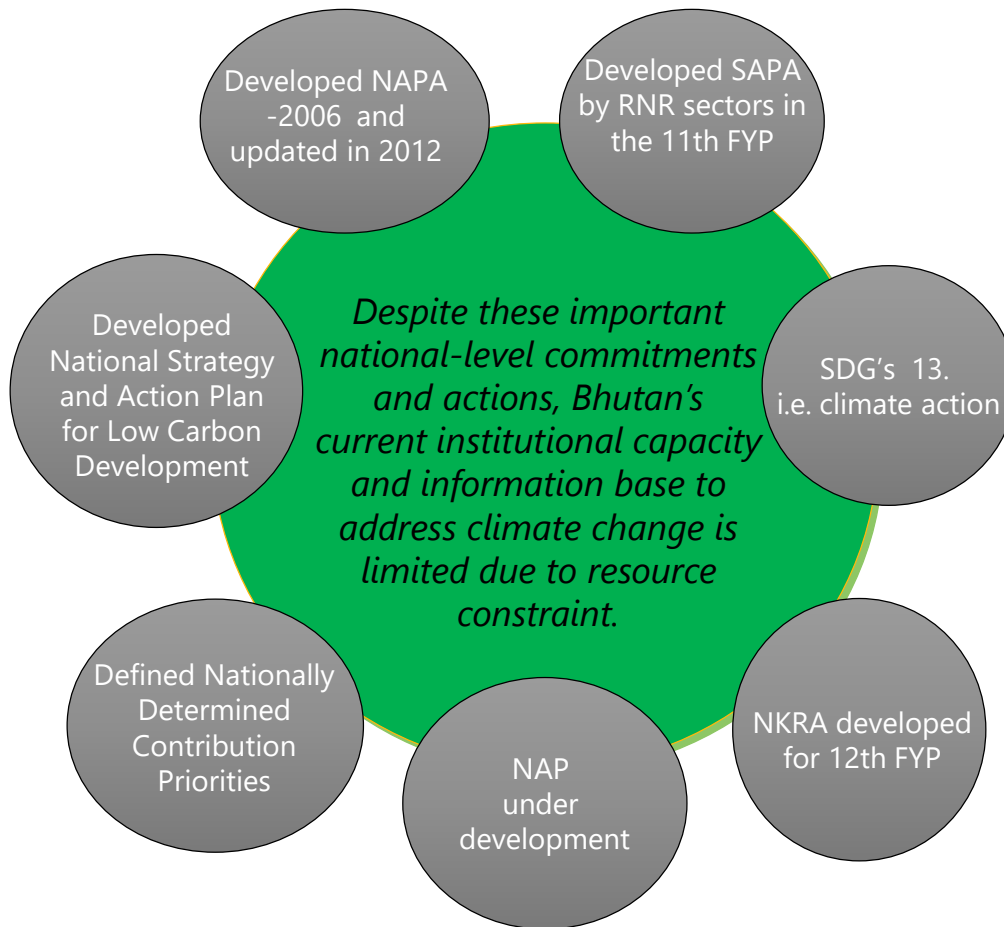








# STRENGTHENING RESILIENCE - PRIORITY OF THE RGOB





## OBJECTIVES

### SPCR

Clearly outlines  
Bhutan's  
development &  
climate risk -  
Identifies a priority  
areas for  
investments

- 1 Integrate Programmatic climate-resilience into development planning
- 2 Put in place a coherent coordination mechanism
- 3 Develop an Investment Plan to address gaps and critical needs of Bhutan



## 4. FORMULATION PROCESS



**COUNTRY OWNED  
AND LED PROCESS**



**DEVELOPED THROUGH  
INCLUSIVE AND BROAD  
BASED STAKEHOLDER  
PARTICIPATION**



**ALIGNED TO NAPAS, NAP,  
NDCS, SDGS AND OTHER  
NATIONAL CLIMATE  
POLICIES**

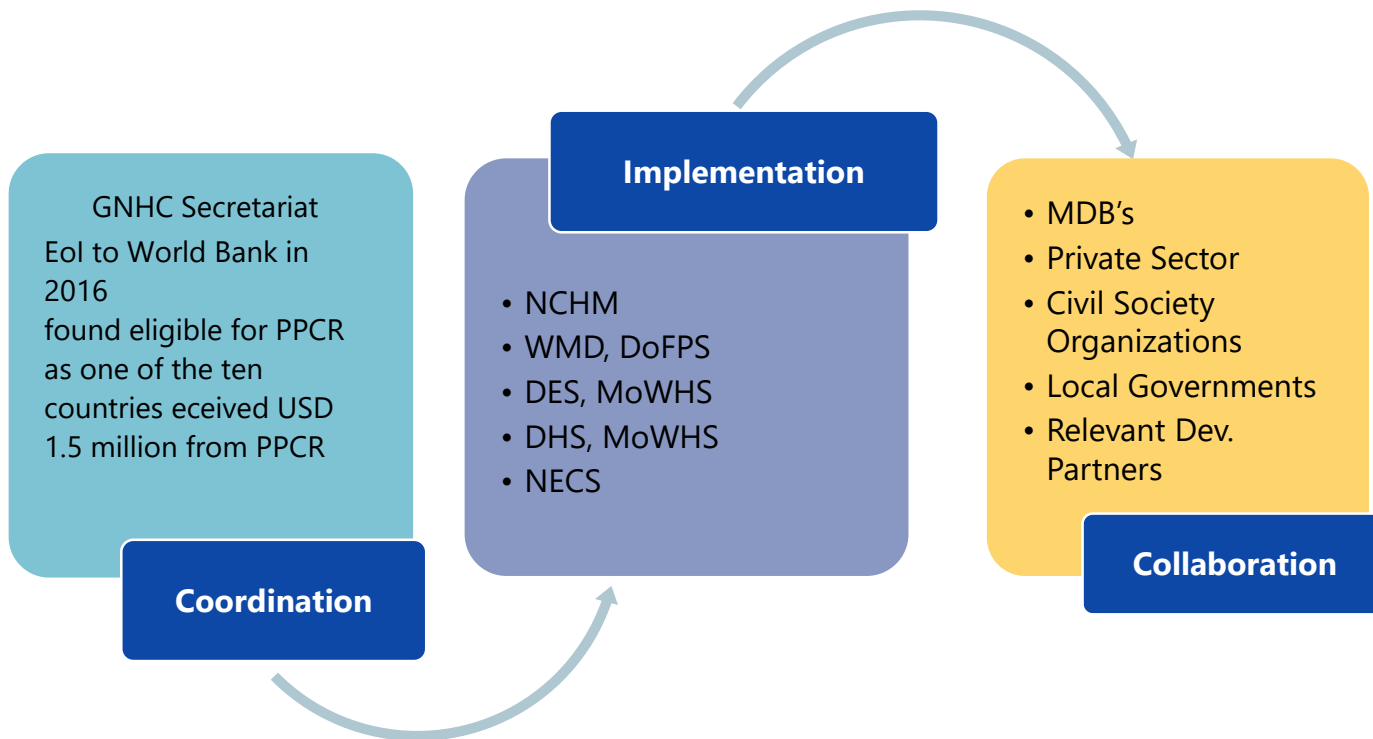


**ALIGNED TO NATIONAL  
PLANS AND POLICIES –  
11TH & 12TH FIVE YEAR  
PLANS**



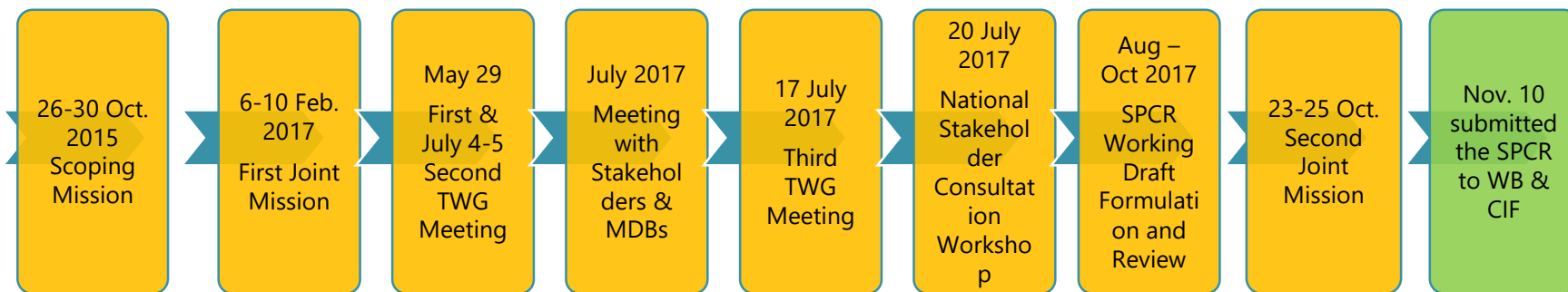


## 4.1 Country owned and led Process...





## 4.2. Inclusive and broad based



**28 consultative meetings conducted during preparation period**

▪ **Involving 401 Central & Local Government Representatives, Technical Specialists, CSOs, Pvt. Sector Representatives, DPs, MDBs & UN Agencies**

▪ **39 Gender Focal persons & Women Leaders from 25 agencies engaged**



## 4.3. Alignment to National & International Plans and Policies

### National Climate Policies

- **National Adaptation Prog. of Action**
  - ✓ *Landslide, Disaster RR, Forest Fires, Water, Harvesting, Flood Protection*
- **National Strategy for Low Carbon Development (2012)**
- **Nationally Determined Contribution**
  - ✓ *10 Adaptation priorities (1, 2, 4, 6, 8, & 10)*
  - ✓ *9 Mitigation priority (9: low emission strategies in urban/rural, climate smart cities)*
- **National Climate Policy**
  - ✓ Under formulation

**SPCR**

**International Goals**

**SDG's goal # 13**  
V Climate action

### 12<sup>th</sup> FYP (2018-2023)

NKRA 6: Carbon Neutral, Climate and Disaster Resilient Development

- ✓ *Maintaining carbon neutral status;*
- ✓ *Geo-hazard risk assessed & reduced;*
- ✓ *Hydro-Metrological, Agro-meteorological, & Cryosphere risks assessed & reduced)*

NKRA 8: Water, Food and Nutrition Security

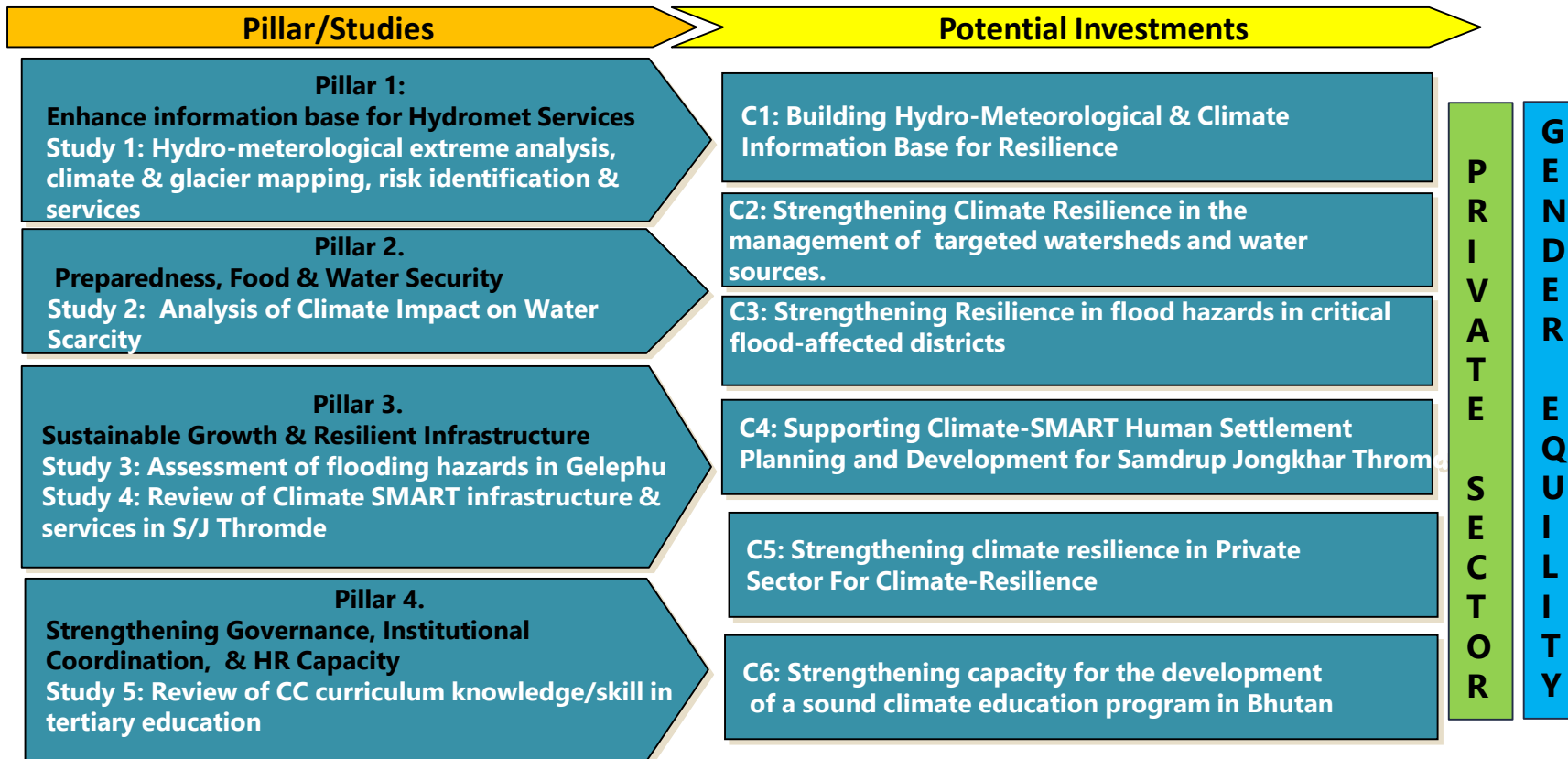
- ✓ *Increasing food production*
- ✓ *Area under assured irrigation*
- ✓ *Water security*
- ✓ *Water accessibility*

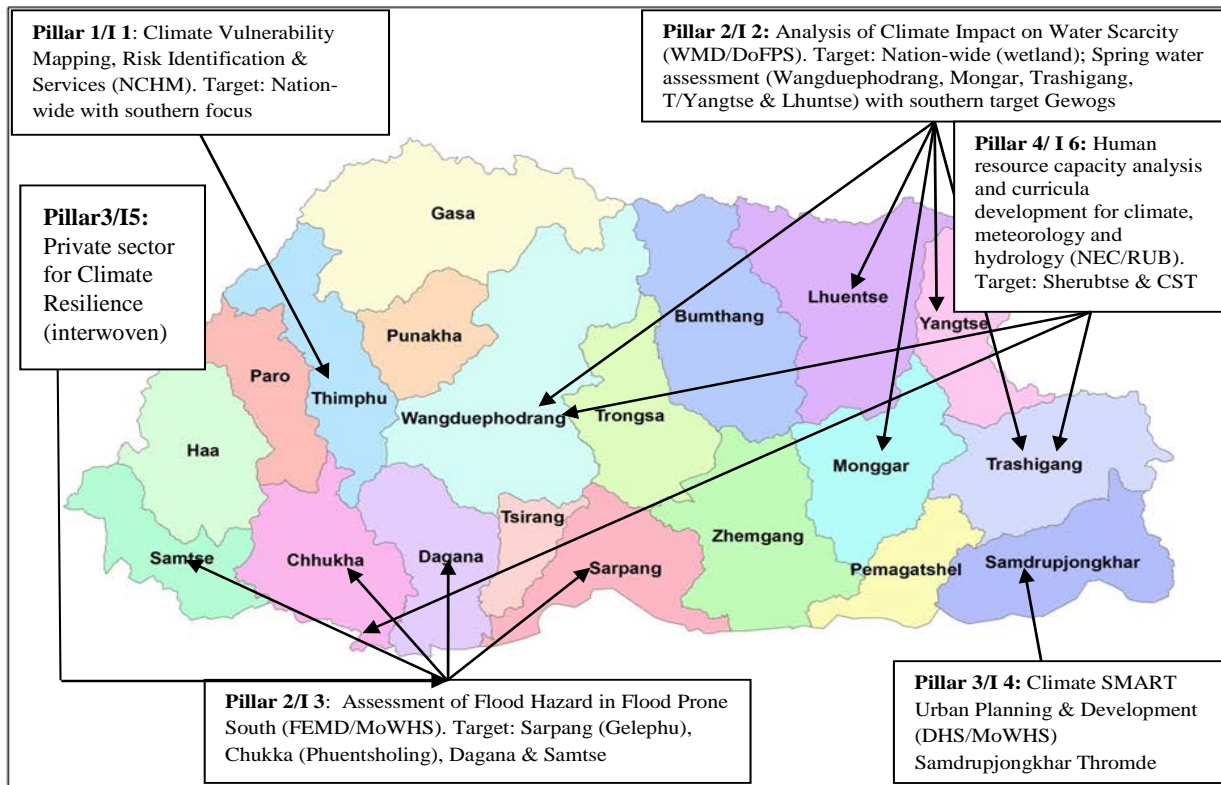
NKRA 16: Livability, Safety & Sustainability of Human Settlements Improved





# 5. PILLARS & INVESTMENTS





# 5.1. PROGRAMMATIC LANDSCAPE OF SPCR

## 5.2. Gist of Investment

Sl. No.	Potential investments	Implementing Agencies	Estimated investment amounts (USD)
1	Building Climate-Resilience Through Enhancement of Hydro-Meteorological & Cryosphere Information	NCHM	6,500,000
2	Strengthening Climate-Resilience in the management of targeted Watersheds and water sources	WMD	10,000,000
3	Strengthening Resilience to Flood Hazards	FEMD	28,000,000
4	Supporting Climate-SMART Human Settlement Planning and Development for Samdrup Jongkhar Thromde	DHS	7,000,000
5	Strengthening climate resilience in Private Sector interventions (interwoven)	GNHC	N/A
6	Strengthening capacity for the development of a sound climate education program in Bhutan	NEC	1,500,000
	Sub total		53,000,000
	PMU	5%	2,650,000
	Total		<b>55,650,000</b>





## 5.3. Investment Details

<b>Investment 1</b>	<b>Building Hydro-Meteorological &amp; Climate Information Base for Resilience</b>
<b>Principal Implementing Agency</b>	National Center for Hydrology and Meteorology
<b>Objective of Proposed Activity</b>	<b>Strengthening and enhancing national capacity of the NCHM, Stakeholders, Users and Public to use and apply climate science</b> and downscaled climate impact projections toward formulation of sector-based climate for investment resilience.
<b>Description</b>	<ol style="list-style-type: none"> <li>1. Hydromet capacity enhanced (observation networks, technical capacity through staff and training)</li> <li>2. Hydro-meteorology and Cryosphere research supported and enhanced</li> <li>3. Climate science and services supported and climate lab set-up (Downscaled climate model Dynamical 5-10 km resolution functional)</li> <li>4. Hydromet and climate services developed and delivered (specialized hydromet products for different user sectors, climate services including seasonal and long term predictions, impacts scenarios and risk assessment- for priority sectors and SPCR targeted regions)</li> <li>5. Pool of experts (NCHM, Line Ministries/Civil society) established in climate science, hydrology and cryosphere</li> </ol> <p><i>The above outputs will be achieved through <b>investments in establishment of a climate research lab with adequate facilities, capacity enhancement for modeling and data analysis, strengthening ICT infrastructure, installation of hydromet stations</b> in data scarcity areas, development of SOPs with end users and strengthening of service delivery.</i></p>
<b>Proposed Implementation Period</b>	Five Years (July 2018 – June 2023)
<b>Funding Required (Estimated)</b>	<b>US \$6.5 Million</b>



<b>Investment 2</b>	<b>Strengthening Climate-Resilience in the management of targeted Watersheds and water sources</b>
<b>Principal Implementing Agency</b>	Watershed Management Division, Department of Forests and Park Services.
<b>Objective of Proposed Activity</b>	To <b>sustainably manage watersheds and manage water resources</b> , in the context of climate-induced water shortages.
<b>Description</b>	<ol style="list-style-type: none"> <li>1. Adaptive watershed management plans developed and implemented, and target drying water sources rehabilitated.</li> <li>2. Nationwide wetlands inventory carried out; and Climate Adaptive Wetland Management Guidelines developed.</li> <li>3. Valuation of wetlands carried out; and climate-related Payment for Ecosystem Services (PES) schemes for implementation explored.</li> <li>4. Enhanced climate-adaptive knowledge &amp; capacity of DoFPS and other stakeholders (especially in target Chiwogs in Central &amp; Southern target communities) on wetlands and watershed management.</li> </ol> <p><i>The above outputs will be achieved through investments in <b>strengthening the monitoring systems for wetland and water resource, capacity development</b> for implementation of watershed management plans, capacity enhancement for hydrological data analysis and modeling, <b>strengthening information base</b> such as GIS and satellite monitoring, identifying open source data relevant for Bhutan and ground truthing of regionally and globally available data.</i></p>
<b>Proposed Implementation Period</b>	Five Years (July 2018 – June 2023)
<b>Funding Required (Estimated)</b>	<b>US \$10 Million</b>



<b>Investment 3</b>	<b>Strengthening Resilience to Flood Hazards in critical flood-affected districts</b>
<b>Principal Implementing Agency</b>	Department of Engineering Services, Ministry of Works and Human Settlement
<b>Objective of Proposed Activity</b>	<b>Increase the resilience from extreme climate change events</b> by identifying the factors contributing to catastrophic flooding hazards affecting vulnerable human settlements, public & private sector infrastructure & resources, and agricultural land and properties, through ecosystem-based adaptation measures.
<b>Description</b>	<ol style="list-style-type: none"> <li>1. Flood risk and vulnerability assessment and geotechnical/geo-climatic studies in Bhutan.</li> <li>2. Hazard, risk and vulnerability maps prepared, detailed study and analysis of target catchment &amp; downstream flooding conducted in other southern regions (e.g. Samdrup Jongkhar, Phuntsholing, Samtse, Dagana, Sarpang).</li> <li>3. Implementation of climate-resilient measures along target river-basins against extreme climate events causing flood hazards.</li> <li>4. Strengthened national capacity to respond to climate-induced floods through structured ability to assess, analyze, prepare and apply climate impact science and integrate climate adaptive measures.</li> </ol> <p><i>The above outputs will be achieved through investments in <b>carrying out detailed feasibility studies for mitigation measures</b>, financing of <b>flood mitigation infrastructure</b> including green engineering, <b>capacity building</b> for planning, designing and technical diagnostics, <b>mapping and development of flood risk profiles for critical settlements</b> and strengthening coordination with NCHM and local government.</i></p>
<b>Proposed Implementation Period</b>	Five Years (July 2018 – June 2023)
<b>Funding Required (Estimated)</b>	<b>US \$28 Million</b>





Investment 4	Supporting Climate-SMART Human Settlement Planning and Development for Samdrup Jongkhar Thromde
<b>Principal Implementing Agency</b>	Department of Human Settlements, Ministry of Works and Human Settlements in collaboration with LGs(S/J Thromde & Gelephu and Samtse)
<b>Objective of Proposed Investment</b>	<b>To make Samdrup Jongkhar Thromde climate resilient by increasing its adaptive capacity via Climate SMART Land Use Planning (LUP);</b> and to promote climate resilient urban services and infrastructure.
<b>Description</b>	<ol style="list-style-type: none"> <li>1. Revised climate-oriented Samdrup Jongkhar Thromde Urban Development Plan, and replicable Climate-SMART Land Use Plan.</li> <li>2. Enhanced effectiveness and efficiency of municipal services (e.g. climate-resilient urban roads and storm water drains; climate adaptive drinking water services &amp; infrastructure; climate-resilient waste &amp; waste-water networks), through planning, design and implementation of Climate-SMART municipal services and infrastructure.</li> <li>3. Enhanced livability of peri-urban/rural residents through planning, design and implementation of Climate-SMART dedicated flood-free &amp; land-slide-avoided green zones and climate-resilient family park lands (including hazard-free hill-side footpaths &amp; riverside bicycle lanes).</li> <li>4. Sustainably managed land resources in the target Thromde through identification of potential human settlement areas, and Climate-SMART LUPs.</li> <li>5. Replicable Climate-SMART (Sustainable Mitigation &amp; Adaptation Risk Toolkit) validated for Samdrup Jongkhar Thromde, and for use in other vulnerable southern areas.</li> <li>6. Strengthened governance, institutional coordination, and human resource capacity with Thromde private sector stakeholders, women's groups, and youth CBOs via training workshops and inclusive participatory approach.</li> <li>7. Interests of Thromde private sector stakeholders, women's groups, and youth CBOs fully structured in Climate-SMART LUPs.</li> </ol> <p><i>The above outputs will be achieved through <b>investments in upgrading, rehabilitating or installing climate smart green infrastructure, development of green spaces, strengthening database</b> including mapping and inventory, enhancing service delivery to public users and enhancement of <b>capacity for development</b> and implementation of climate smart urban plans.</i></p>
<b>Level of Funding (Estimated)</b>	<b>USD \$7 million from PPCR and USD\$3-Mn from other sources</b>

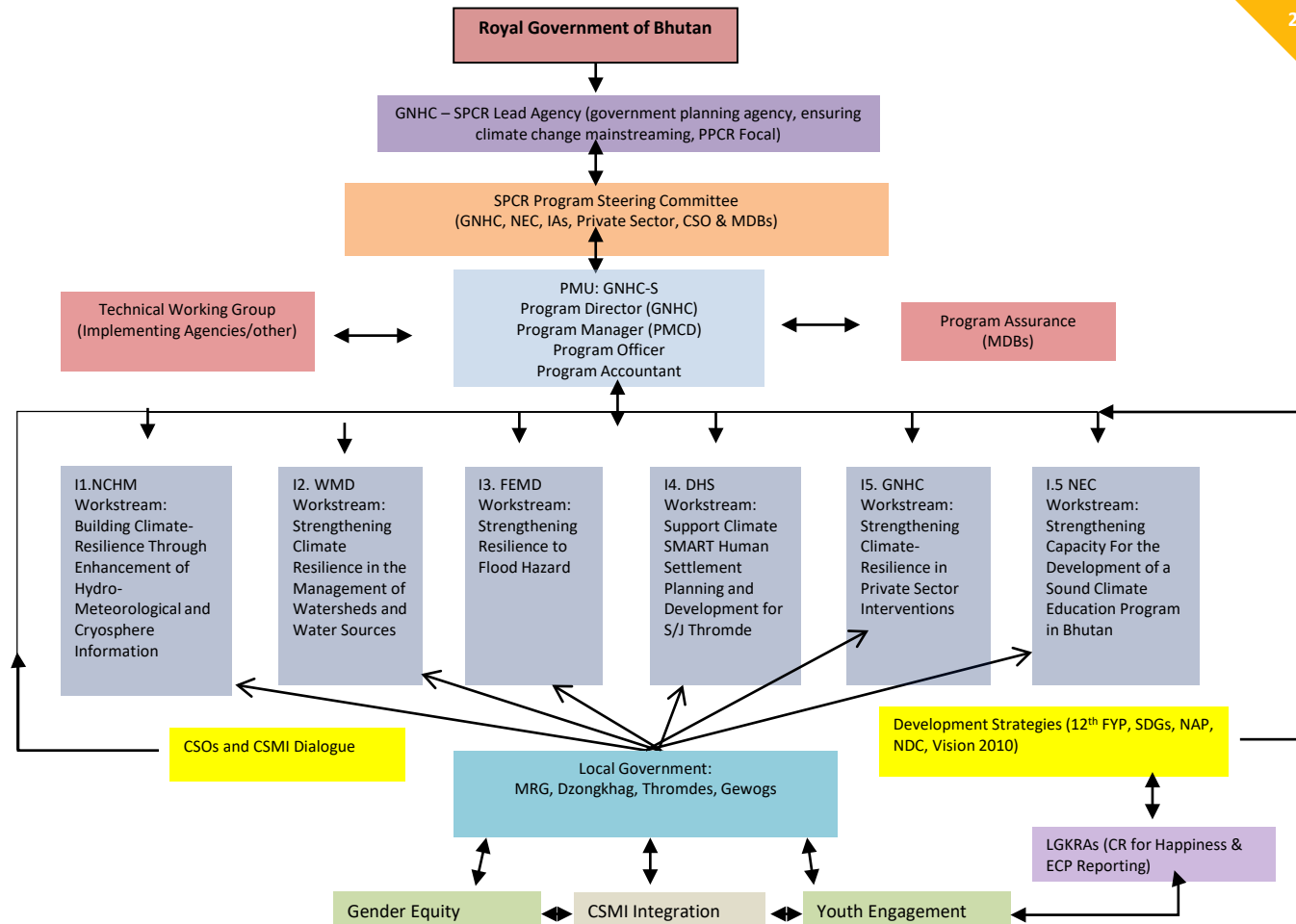


<b>Investment 5</b>	<b>Strengthening climate resilience in Private Sector interventions (interwoven)</b>
<b>Principal Implementing Agency</b>	GNHC
<b>Objective of Proposed Activity</b>	<b>To identify realistic and lasting climate-resilient training and solutions to defend CSMI corporate value chains against repeated disruptions from climate hazards;</b> and, bolster CSMI direct involvement in the development of uniquely competitive climate adaptation products and services for domestic consumption, and external markets.
<b>Proposed output</b>	<ol style="list-style-type: none"> <li>1. Vulnerable CSMIs trained in climate-proofing, to protect property and value-chains.</li> <li>2. Adaptation-related products and services developed and marketed to support diversification of local enterprise and strengthen their revenue base as an adaptive capacity method.</li> </ol>
<b>Key Dates</b>	<ul style="list-style-type: none"> <li>• September 2017 – July 2018: Implementation period for <b>Preparatory Projects</b></li> <li>• July 2018: Full Project <b>Documentation prepared</b> and informed by Phase 1 Preparatory activities and analyses.</li> <li>• July 2018 – June 2023: <b>Phase II implementation period, aligned with RGOB 12<sup>th</sup> FYP and NAP</b></li> </ul>
<b>Proposed Implementation Period</b>	Five Years (July 2018 – June 2023)
<b>Funding Required (Notional)</b>	US N/A ( <b>Inter-Woven throughout SPCR Program Investments</b> )



<b>Investment 6</b>	<b>Strengthening capacity for the development of a sound climate education program in Bhutan</b>
<b>Principal Implementing Agency</b>	<b>NEC/Royal University of Bhutan</b>
<b>Objective of the Proposed Activity</b>	To <b>mainstream climate change adaptation knowledge nationally</b> , through institutionalized education curricula
<b>Description</b>	<ol style="list-style-type: none"> <li>1. Assessment Report of curriculum on environment, climate change, and poverty reduction</li> <li>2. Capacity-Needs Report and capacity enhancement of participating Colleges Faculty</li> <li>3. Revised curriculum of environment, climate change, and poverty reduction</li> <li>4. Curriculum on Environment, Climate-Resilient &amp; Low-Carbon Development, &amp; Poverty institutionalized across Faculty and Royal Civil Service Commission, and extended through practicum's to Southern Region</li> </ol> <p><i>The above outputs will be achieved through <b>investments in strengthening climate research facilities in universities, curriculum revision</b> and development as required, enhancement of ICT infrastructure for research purposes, <b>development of capacity</b> and supporting partnerships between universities and relevant agencies such as NCHM, DDM, urban, etc.</i></p>
<b>Proposed Implementation Period</b>	Five Years (July 2018 – June 2023)
<b>Funding Required (Estimated)</b>	<b>US \$1.5 Million</b>

# 5.4. Implementation Mechanism





## 6. CONCLUSION

- 12<sup>th</sup> Five Year Plan (2013-2018) “Maximization of Gross National Happiness”, NKRA 6,8,16.
- Currently more than 50% of the total land area is under protected areas, biological corridors and natural reserves.
- Emits approximately 1.6 million tones of carbon annually, absorbing approximately 6.3 million tones,
- Continues to restrain its socioeconomic development to maintain more than 71% of its geographical area under forest cover.
- (COP) 15 in Copenhagen, Bhutan voluntarily pledged to remain carbon-neutral. Reaffirmed at COP 21, 2015 with 10 adaptation and 9 mitigation priorities of the NDC’s.

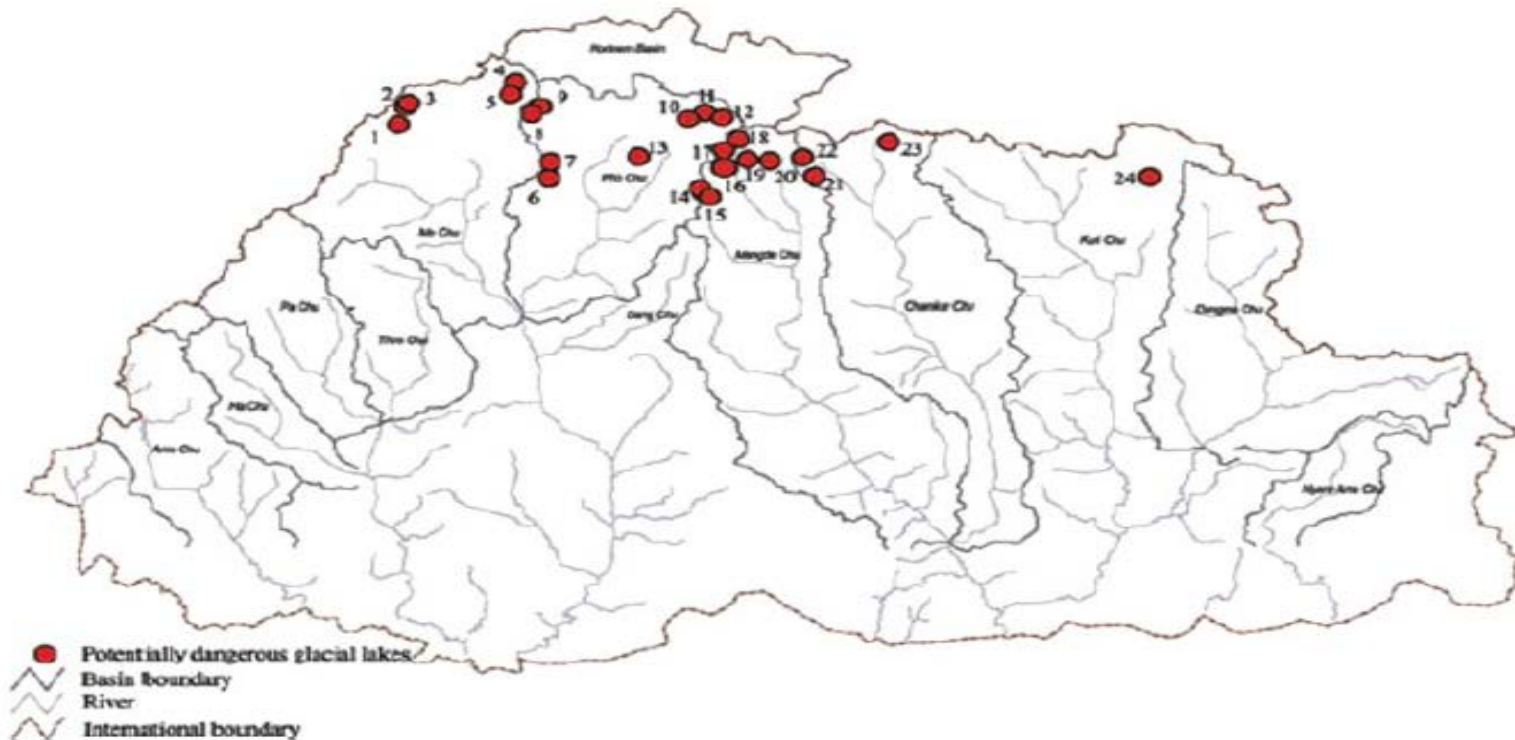


Fig. 5 Twenty-four “dangerous” glacial lakes identified by ICIMOD. Source Ives et al. 2010: 9

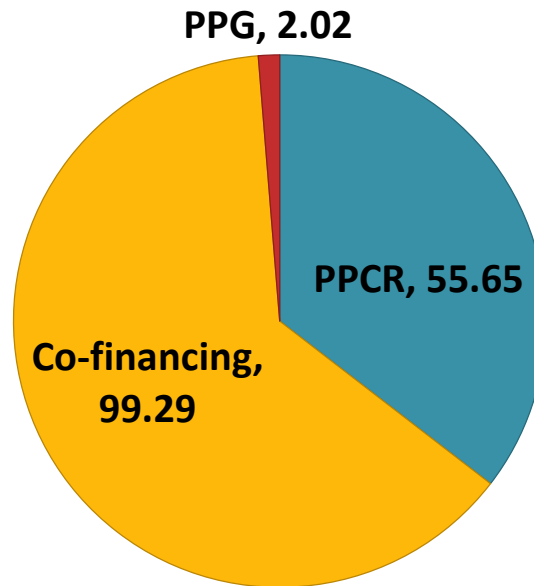


- Climate change and its impact a reality
- Strengthening resilience- priority of the RGoB to come up with Climate-Resilient & Low-Carbon Sustainable Development toward maximizing the Royal Government of Bhutan's Gross National Happiness.
- SPCR- 4 pillars and 5 Investments identified in alignment to National & International Plans and Policies - directly contribute to implementation of 7 of NDC adaptation priorities and 6 mitigation priorities through:
  - Building a strong information base for weather and climate services for resilience;
  - Integrating climate-oriented Watershed Management Plans
  - Innovative eco-system based approaches to Integrated Flood-Based Management (IFBM) of river basins;
  - Climate SMART Human Settlement planning;
  - Integrated; Promotion climate-resilient CSMIs and a strong Gender Equity



PPCR	Co-financing	PPG	Total
55.65	99.29	2.02	156.96 \$

# Fund projection & appeal





# THANK YOU & TASHI DELEK



CLIMATE  
INVESTMENT  
FUNDS



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