Experiences from Bhutan on Early Warning Systems

Bhutan National Adaptation Programme of Action (NAPA)

August 20, 2013
Siem Reap, Cambodia
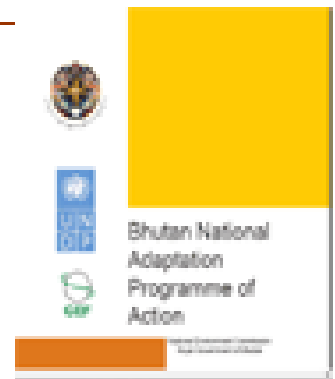
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National Environment Commission
Royal Government of Bhutan

Bhutan's NAPA 2006

- Document prepared by NECS 2004-2006

- 9 Priority Projects

Reducing Climate Change-induced Risks and Vulnerabilities
from Glacial Lake Outburst Floods
in the Punakha-Wangdi and Chamkhar Valleys

Three Components

1. Artificial lowering of water level in Thorthormi Lake

2. Increase capacity for disaster risk management in affected valleys

3. Installing Technical Early Warning System for glacial lake outburst floods

- Funded by LDCF, RGOB, UNDP, Austrian Development Agency and the WWF-Bhutan (USD 8.273 million)
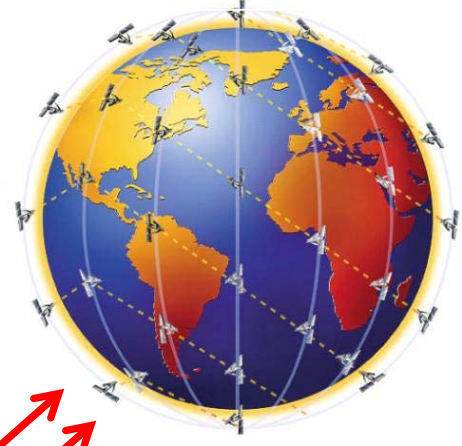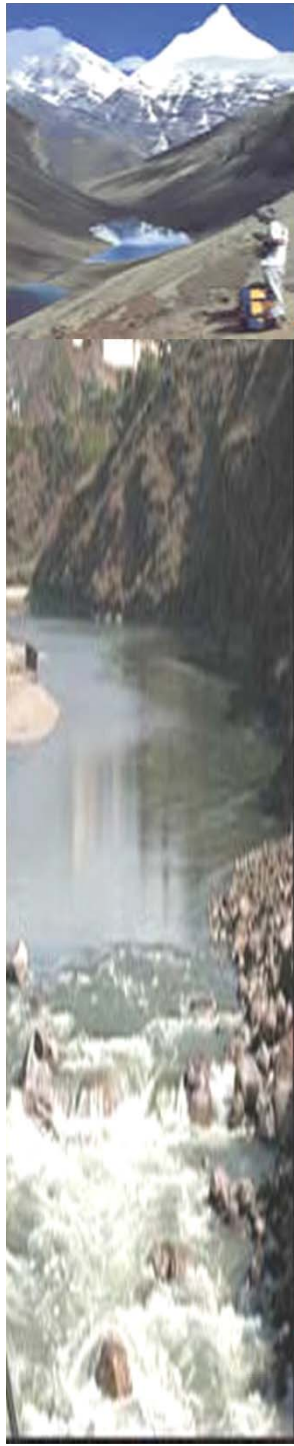
- Project period: 5 yrs (commencing 2008)

Punakha-Wangdi GLOF EWS, Bhutan

PROPOSED GLOF EARLY WARNING SYSTEM - BLOCK DIAGRAM
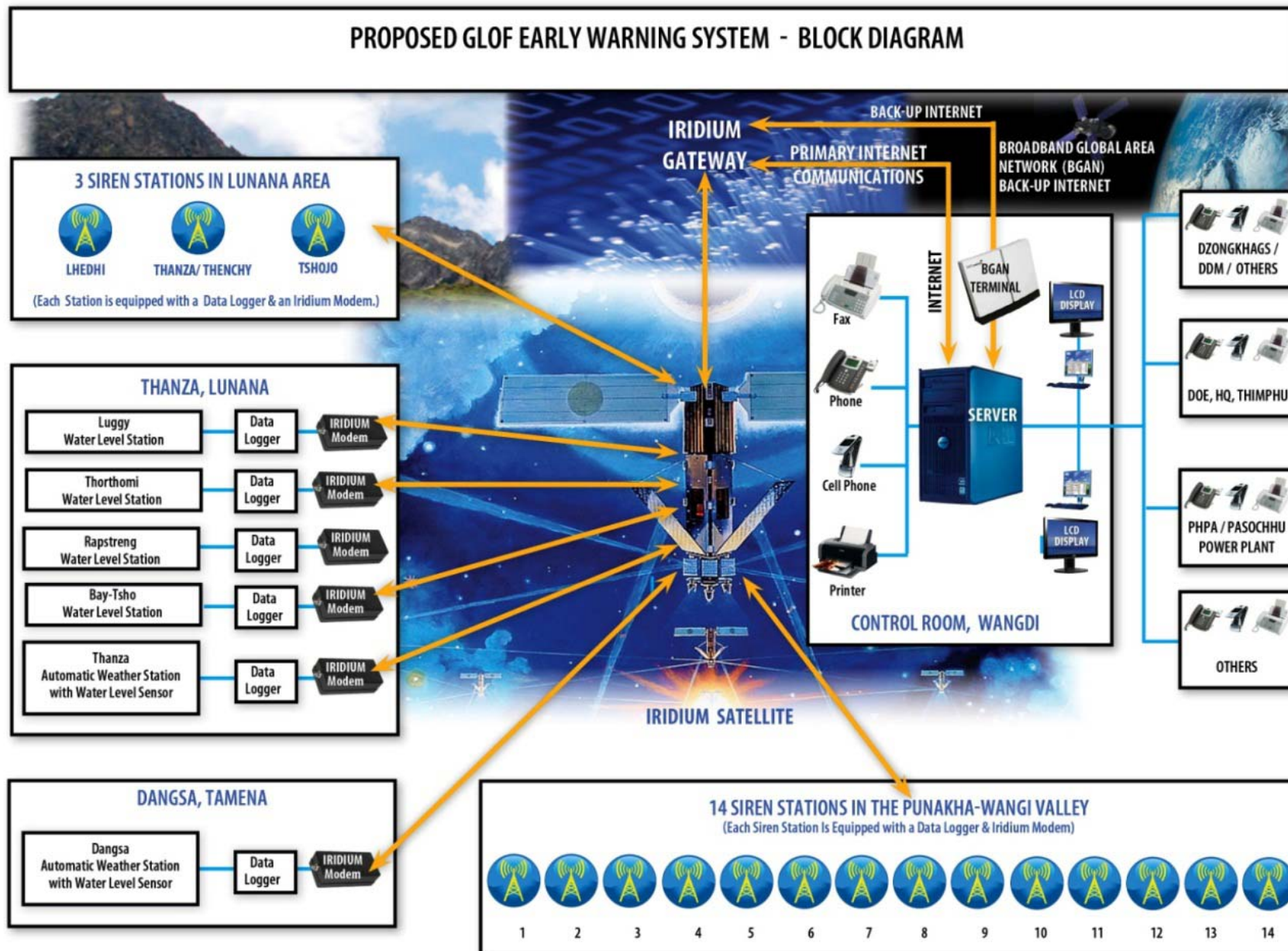
Components of GLOF EWS

Remote Monitoring Stations

Communication

Sirens

Control Room

NAPA II-PPG: Addressing the risk of climate-induced disasters through enhanced national and local capacity for effective actions

1. Risk reduction from climate-induced floods and landslides
2. Enhanced adaptive capacity at community level
3. **Enhanced national capacity for managing climate risks**

3.1 Enhanced quality, availability, and transfer of real time climate data in all Dzongkhags

3.2 Increased effectiveness of National Weather Forecasting and Flood Warning Center (NWFFWC)

NAPA II: Component 3

Automatic Weather Stations (AWS)

- 34 existing "Class C" Manual stations will be up graded to AWS (with real-time data transfer capability);

- 26 new AWS will be installed at new locations (with real-time data transfer capability);

- 11 snow gauge measurement facilities will be added to AWS on selected locations.

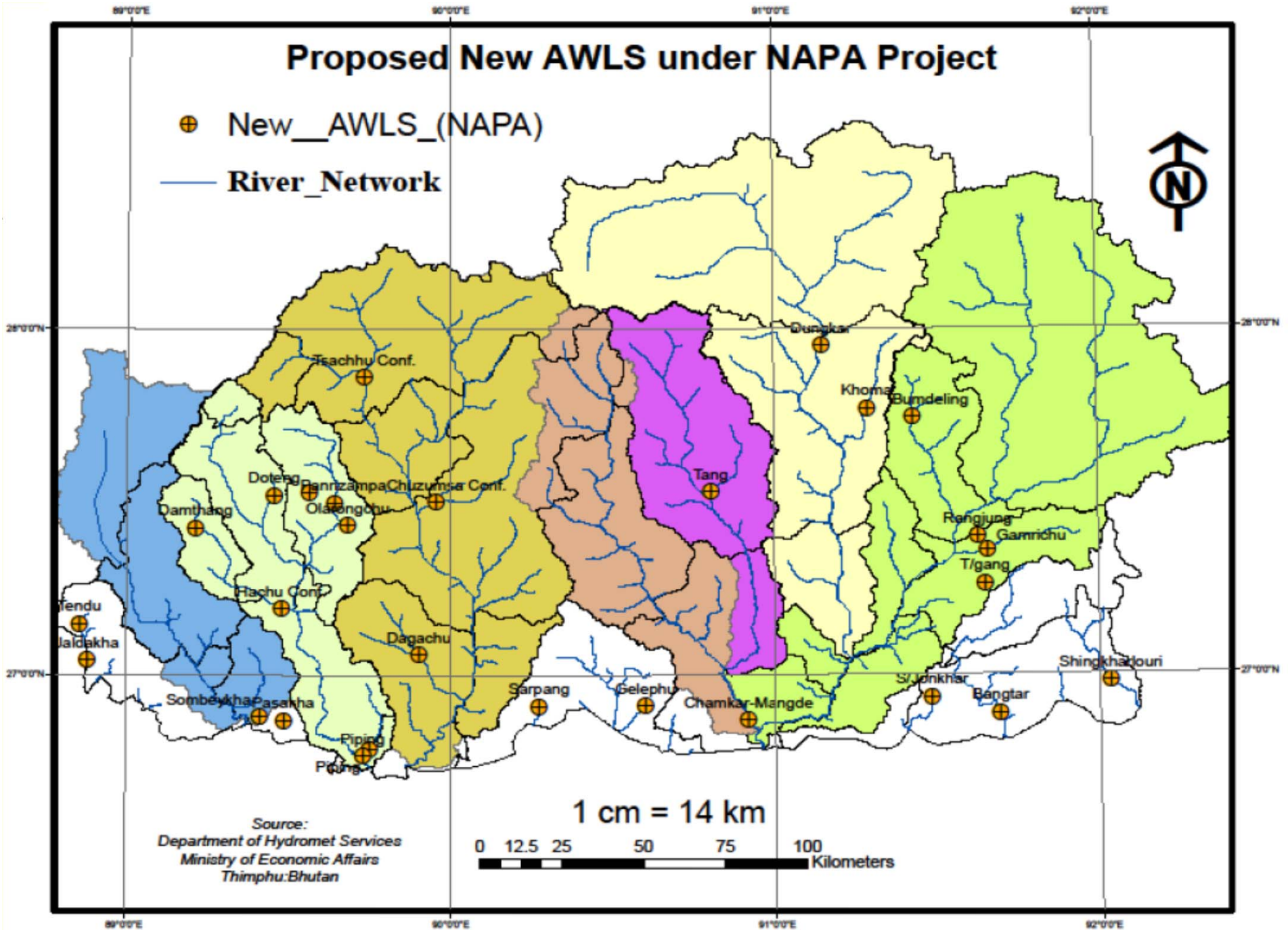**Automatic Water Level Monitoring Stations (AWLS)**

- 11 existing manual water level monitoring stations (AWLS) will be up-graded to automatic AWLS;

- 28 automatic water level monitoring stations (AWLS) will be installed on selected locations;

- On six sites in critical sub-basin outlets a cable system for discharge measurement will be incorporated within the AWLS, to help flood forecasting and modeling works;

6

Map Showing Proposed New AWS under NAPA Project

✳ New_AWS_(NAPA)

Gasa

Dhur

Gephu

Khagtang

Bumthang

Lhuentse

Khoma

Yangtse

Goenshari School

Punakha

Baytangsra

Lingmukha

Metsho

Thimphu

Paro

Nahi School

Wangduephodrang

Damthang

Dagala Gewog office

Athang School

Trongsa

Thumaingla

Shermung Gewog Office

Isakang Gewog Office

Haa

Monggar

Trashigang

Sungkha Office

Jurmey Gewog Office

Bardo Gewog office

Zhemgang

Khar Gewog Office

Martala

Samtse

Tsirang

Dagana

Darainu

Decheling Gewog Office

Langcherphu

Tsiirg

Pasakha

Chhukha

Sarpang

Churagang

Pemagatshel

Samdrupjongkhar

1 cm = 13 km

0 10 20   40   60   80
                                    Kilometers

Proposed New AWLS under NAPA Project

⊕ New__AWLS_(NAPA)

—— River_Network

Tsachhu Conf.

Dungkar

Khoma

Bumdeling

Doteng
Panrizampa Chuzumsa Conf.

Tang

Damthang
Olarongchu

Rangjung
Gamrichu

T/gang

Hachu Conf.

Tendu
Jaldakha

Dagachu

Shingkhaduri

S/Jongkhar

Sarpang
Gelephu
Chamkar-Mangde
Bangtar

Sombeykha Pasakha

Piping

Piping

1 cm = 14 km

Source:
Department of Hydromet Services
Ministry of Economic Affairs
Thimphu:Bhutan

0 12.5 25   50   75   100
                                        Kilometers

Thank you