

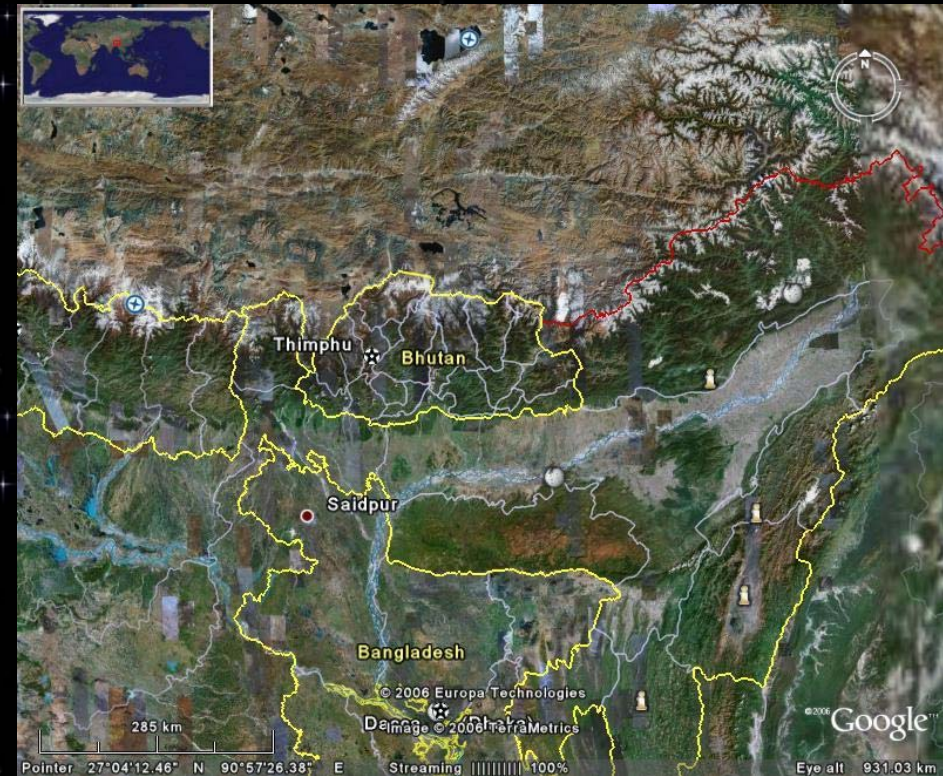


# **Bhutan Presentation**

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Department of Energy  
Thimphu Bhutan**

# Introduction

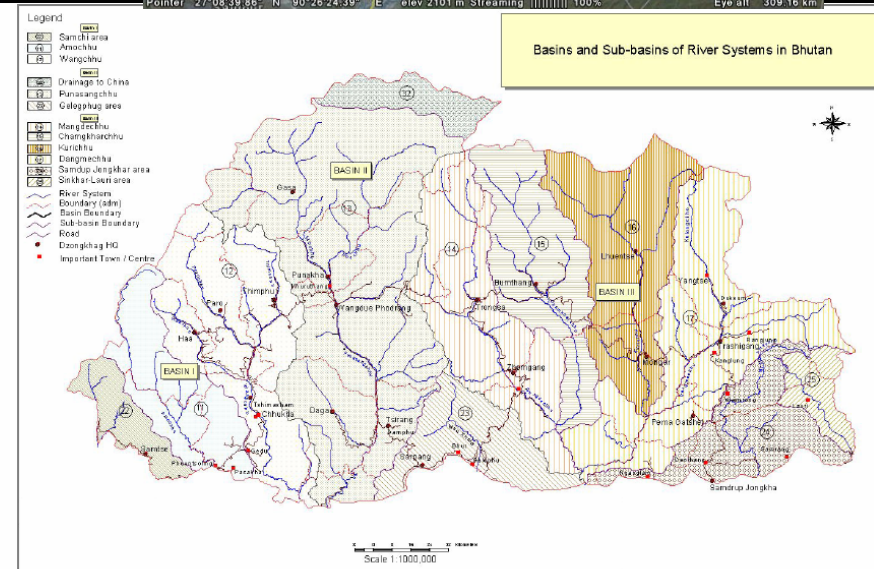
- A small country on the eastern fringe of the Himalayas
- Area – 38,394 sq.km
- Location – TAR (China) in the north, Indian states of West Bengal, Assam and Arunachal Pradesh on the west, south and east
- Population – 668,000
- 20 administrative units



**Courtesy- Google Earth**

# Water Resources

- All major rivers flow into the Brahmaputra
- Country divided into 4 main rivers basins with sub-basins
  - Amochhu Basin
  - Wangchhu Basin
  - Punatsangchhu Basin
  - Manas River Basin



# Water Resources

- Long term mean annual flow
  - 2,325 m<sup>3</sup>/s (73,000 million m<sup>3</sup>/year)
- Per capita mean annual flow availability
  - 109,000 m<sup>3</sup>
- Minimum 7 days flow of 10 year return period
  - 427 m<sup>3</sup>/s (13,500 million m<sup>3</sup>/year)
- Per capita minimum flow availability
  - 20,000 m<sup>3</sup>



Courtesy – Google Earth

# Hydrological Network

- 13 Principal stations
  - Equipped with cableways, gauges and pressure transducers connected to data loggers
- 19 Secondary stations
  - Equipped with staff gauges

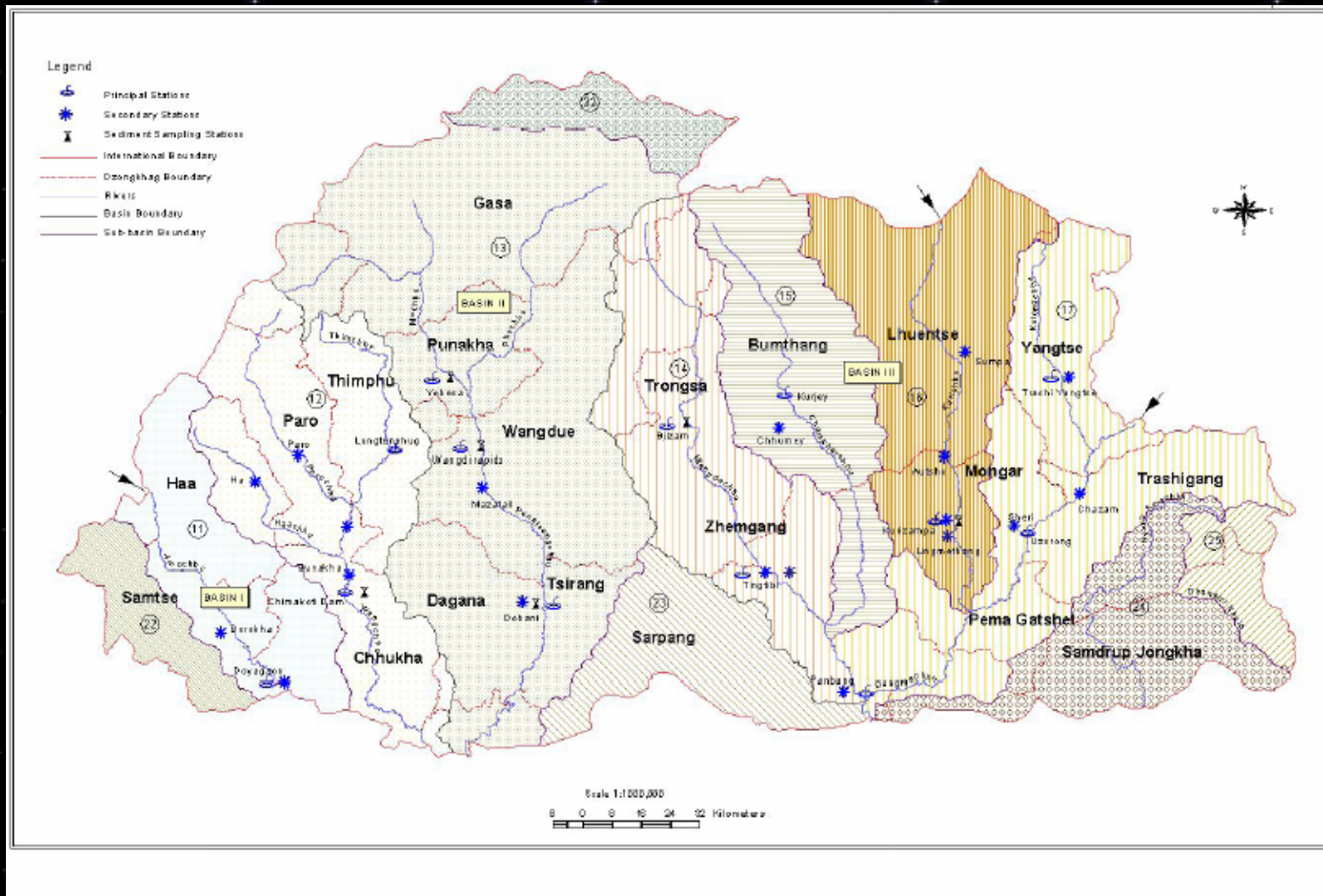


# Present developments

- 13 Principal stations function as flood warning stations
- Radar/ultrasonic sensors are being installed and data will be transmitted through PSTN/GSM network

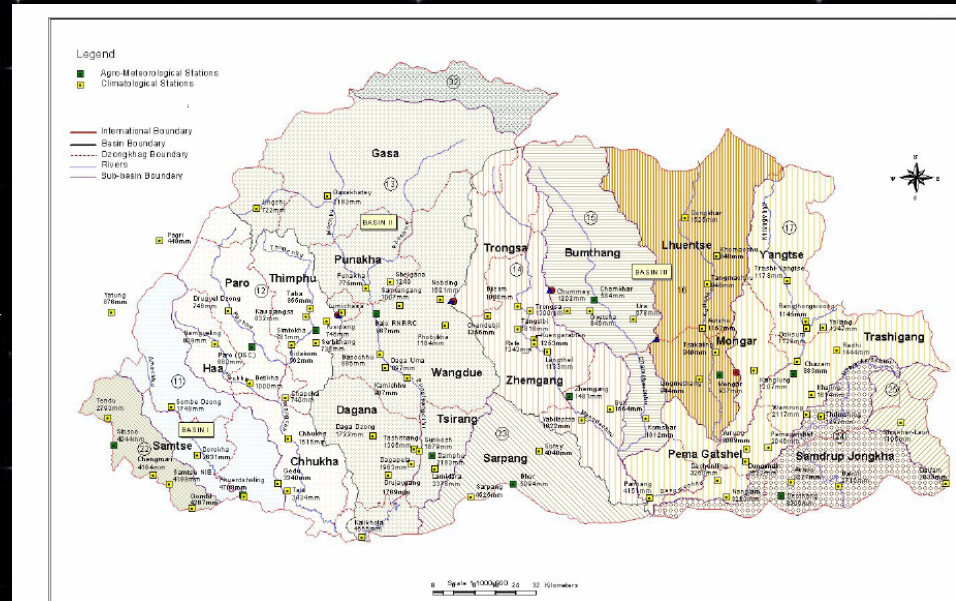


# Hydrological Network



# Climate

- Dominated by the Monsoon from the Bay of Bengal in June, is intense during July and August, petering out in September. November to January is dry with pre-monsoon showers in April and May
- Mean annual rainfall between 500 to 5000 mm. Heaviest along the border with India, decreasing rapidly at first when moving northward and then slowly. No noticeable east-west trend





# Meteorological Network

- 20 Class A stations
  - Full range of weather parameters
- 74 Class C stations
  - Temperature, rainfall and humidity

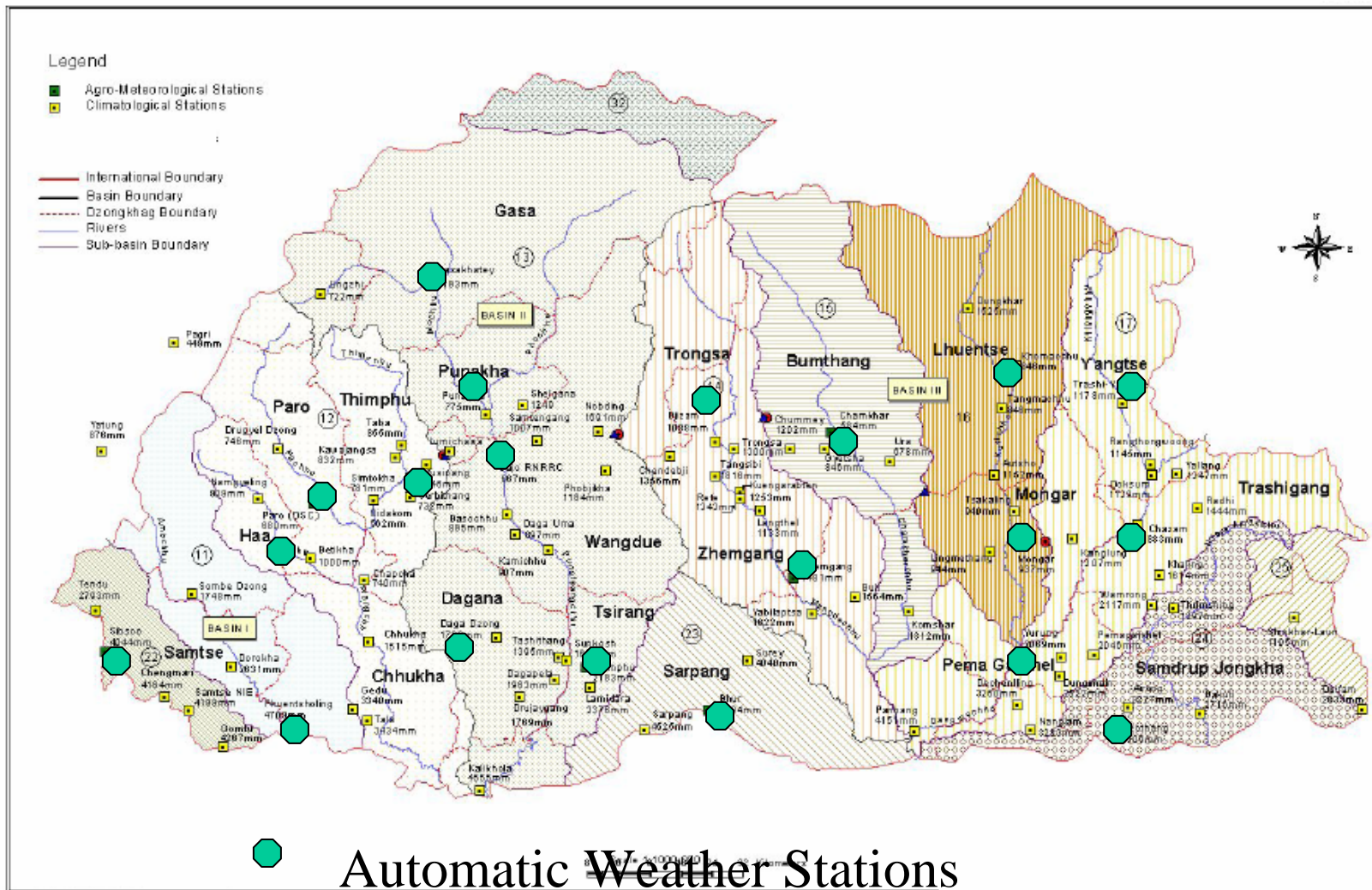


# Present Developments

- 20 Automatic Weather Stations installed
- Working on setting up communication through PSTN/GSM network



# Meteorological Network





# *Tashi Delek*