Regional Stakeholder Consultation on Climate Services for the Third Pole Region

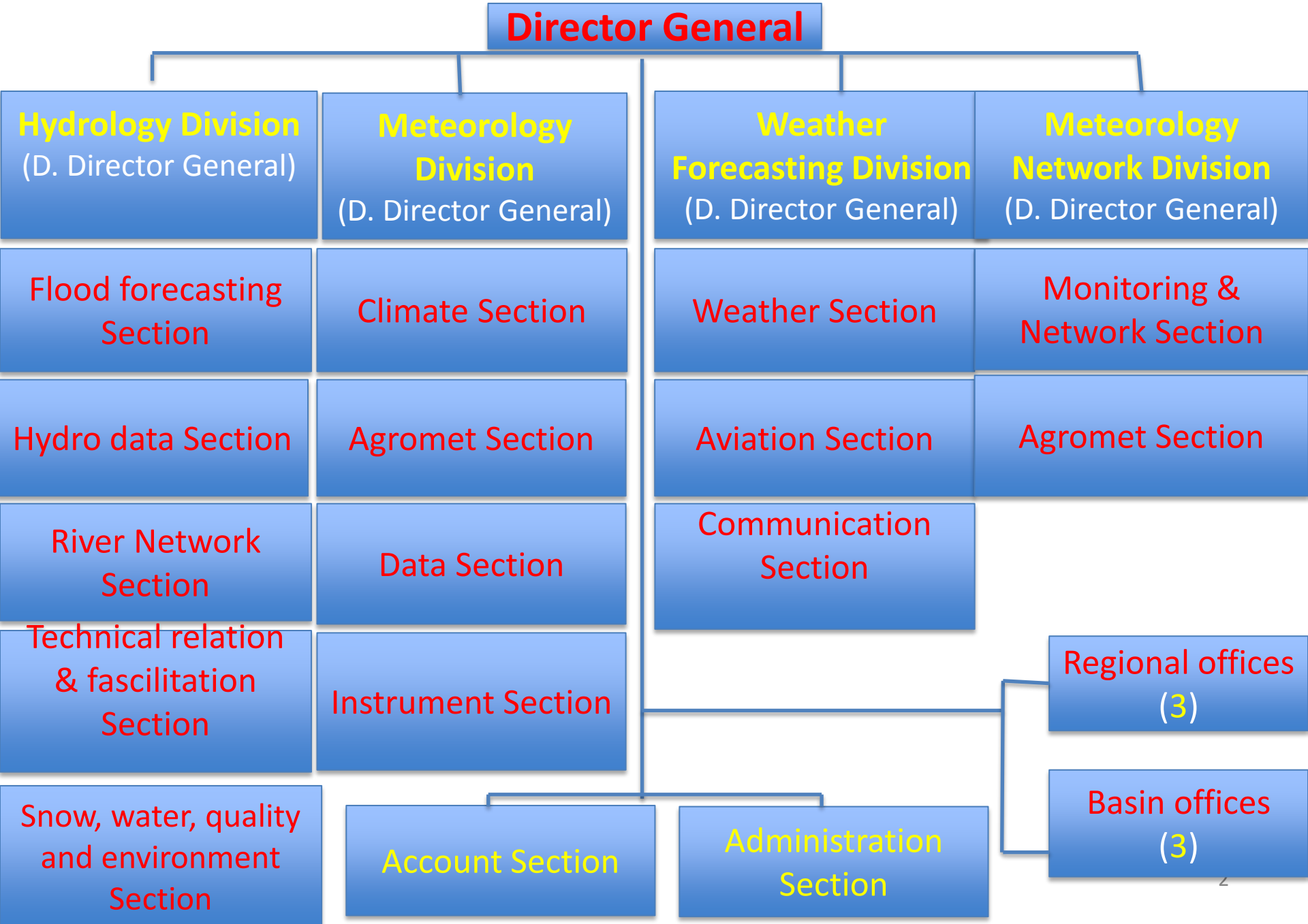
Jaipur, India

9-11 March 2016

NEPAL

National capabilities for production, management, delivery and application of climate services

Organization structure of DHM



Capacities for provision of climate services

- Climate Section

- Total 5 staffs

- 1 Senior Divisional Meteorologist
- 2 Meteorologist
- 2 Assistant Meteorologist

- But currently only 3 staffs (2 Meteorologists, 1 Asst. Meteorologist)

Hierarchies of climate services

- -**Category 1:** A basic range of climate data services and information products;
- -**Category 2:** Essential climate data services and information products;
- -**Category 3:** A comprehensive range of climate data services and information products; and
- -**Category 4:** Provision of advanced climate services.

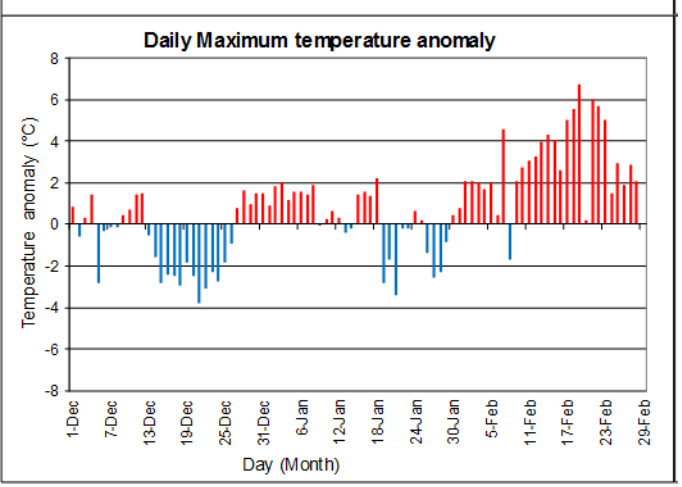
- Presently the climate service of DHM has characteristics of category 1 and 2 climate service

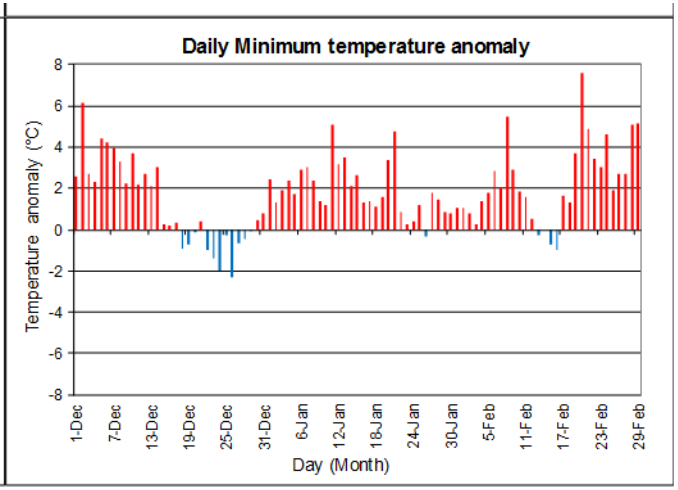
- basic and essential climate services such as basic climate statistics and maps, some climate monitoring products, seasonal outlooks and special studies.

- Interpolated data from observations and downscaled climate scenario from climate data portal (WRF, PRECIS, REG CM4, mid 21st century)

Current status of provision of climate services to sectors and existing user interface mechanisms (e.g. NCOF/NCF)

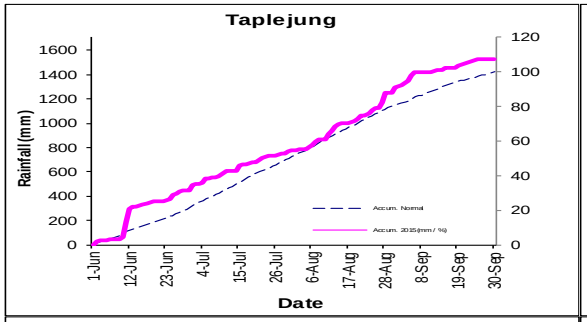
- Normals (data,maps)
- Temperature Monitoring (5)
- Monsoon Rainfall Monitoring (16+ all Nepal)
- Kathmandu valley Rainfall Monitoring
- Preliminary Monthly Weather Report
- Weekly Weather Report
- Extreme rainfall Monitoring
- Extreme temperature Monitoring
- Annual Report, Seasonal Report
- Seasonal forecast (Monsoon Forum)
- Special studies (Climatic classification of Nepal, Climate variabilityof Nepal, Agroclimatic Atlas of Nepal etc.)

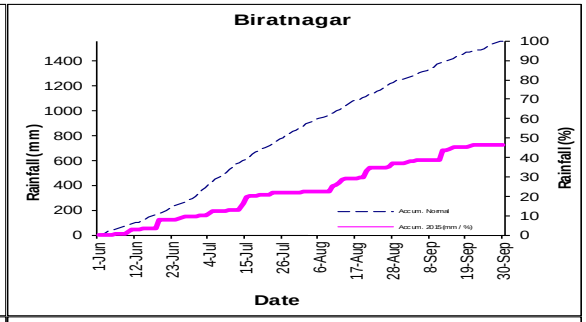


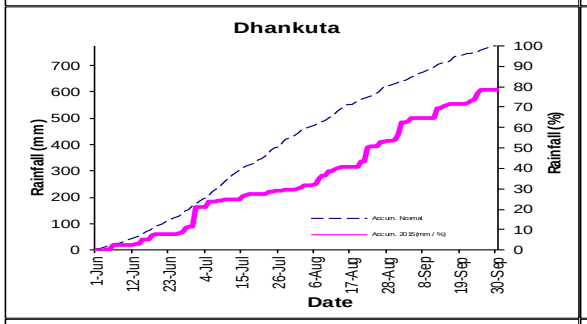


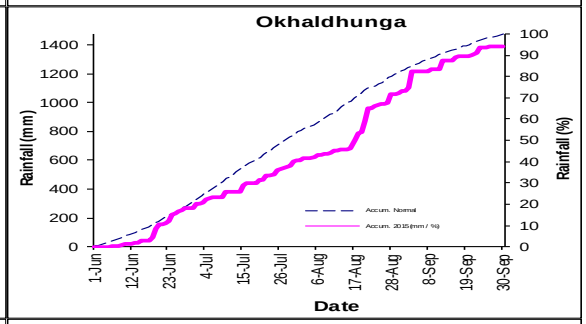
Monsoon Monitoring 2015

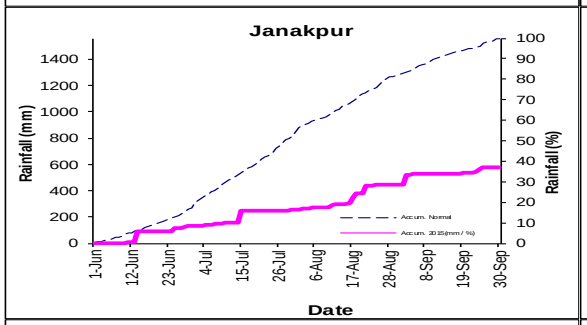
(1 June - 30 September)

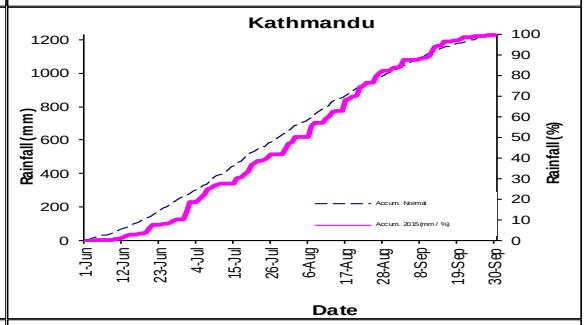


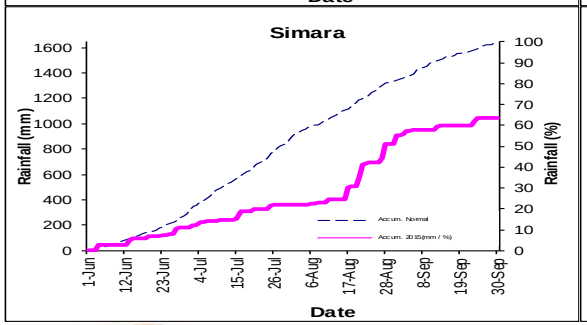


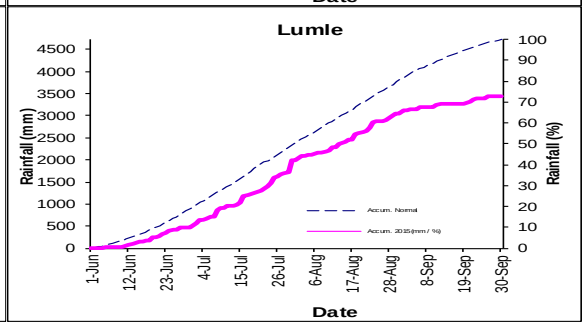


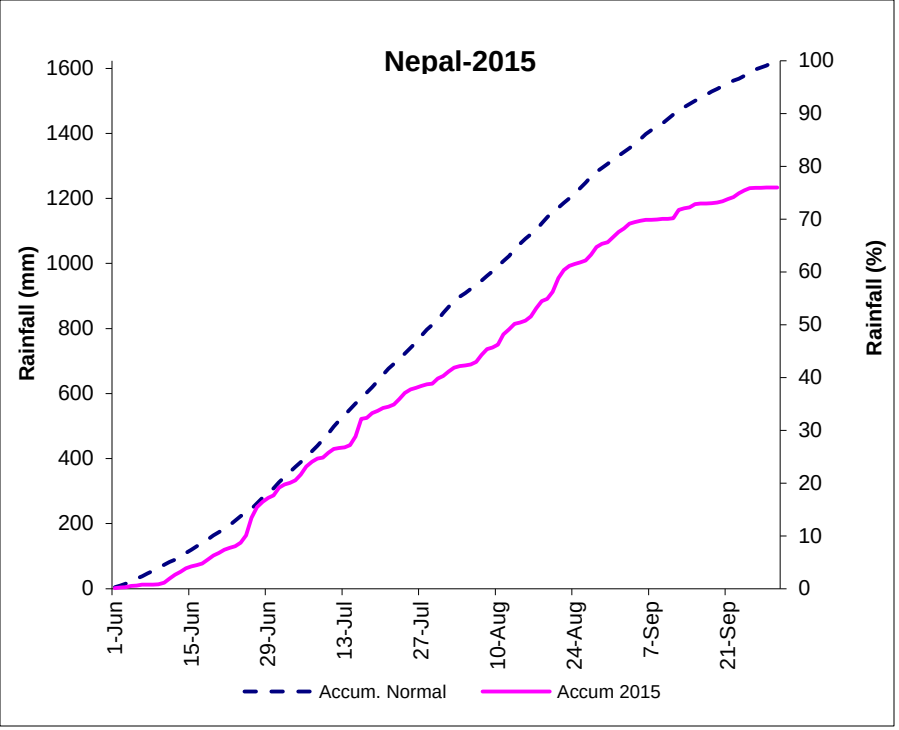


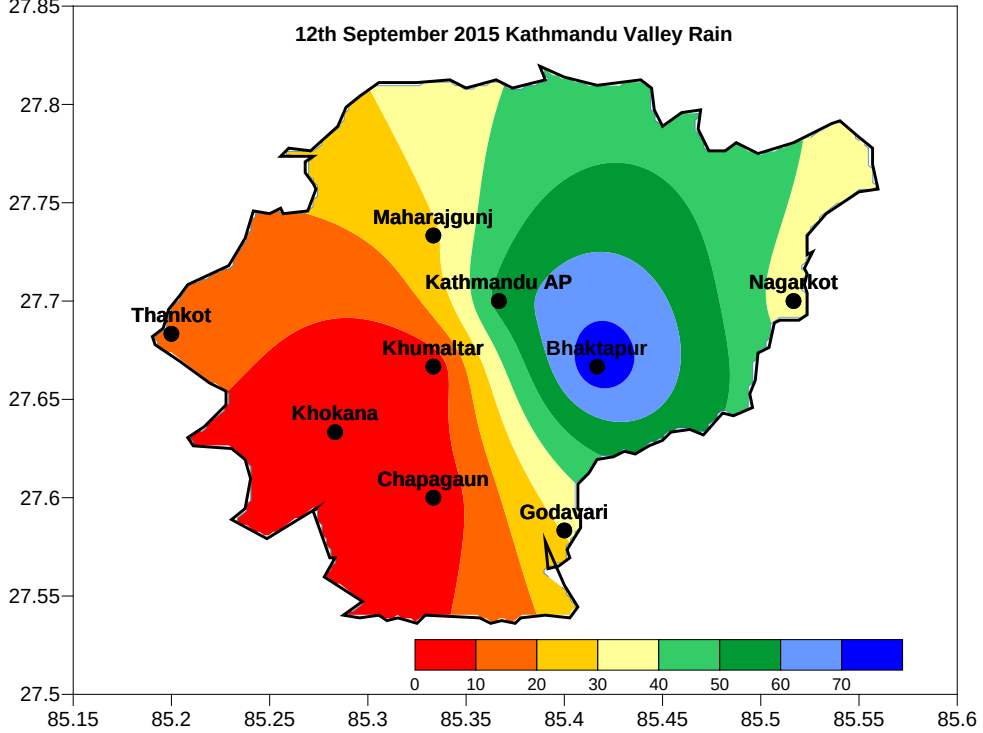


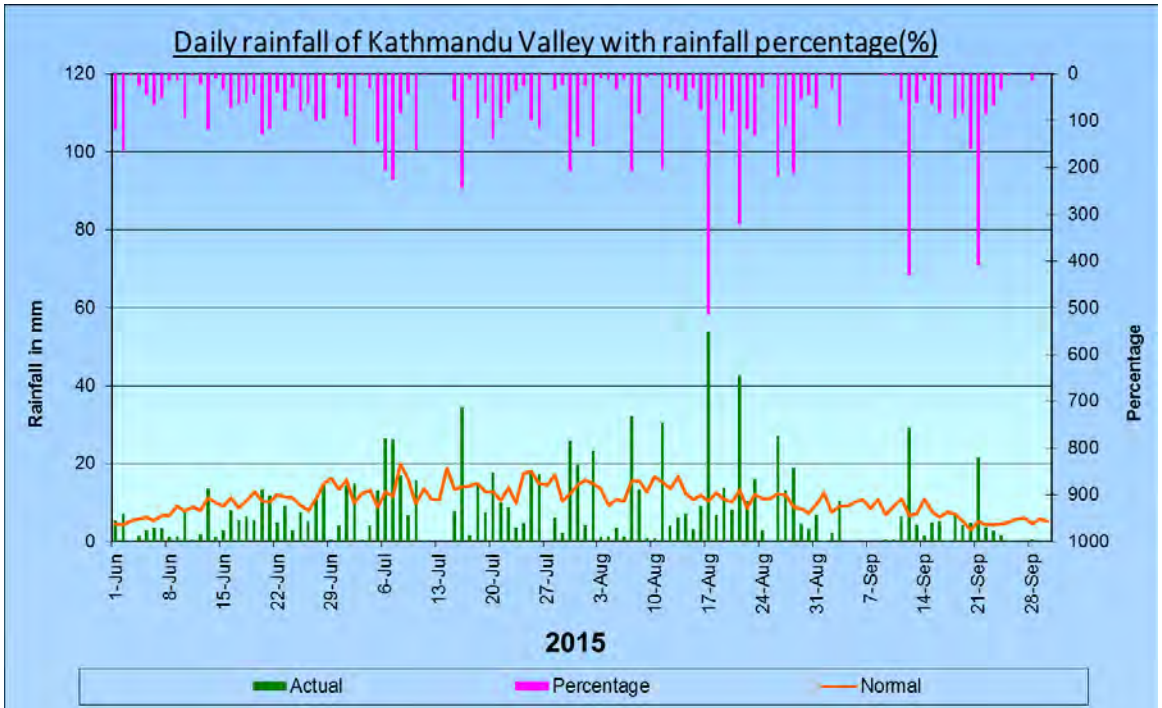


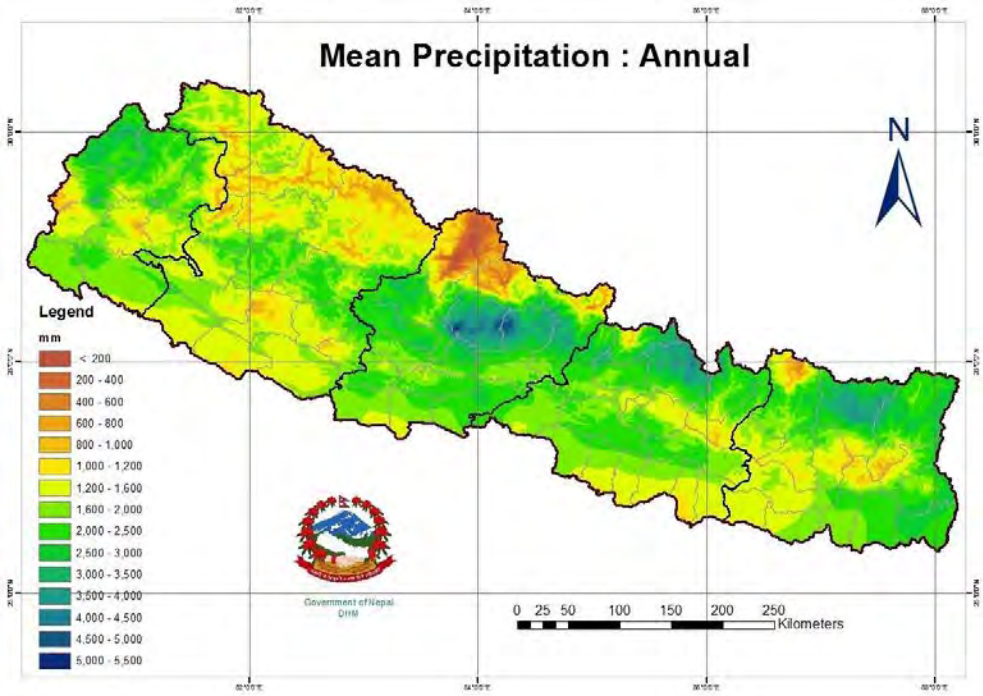


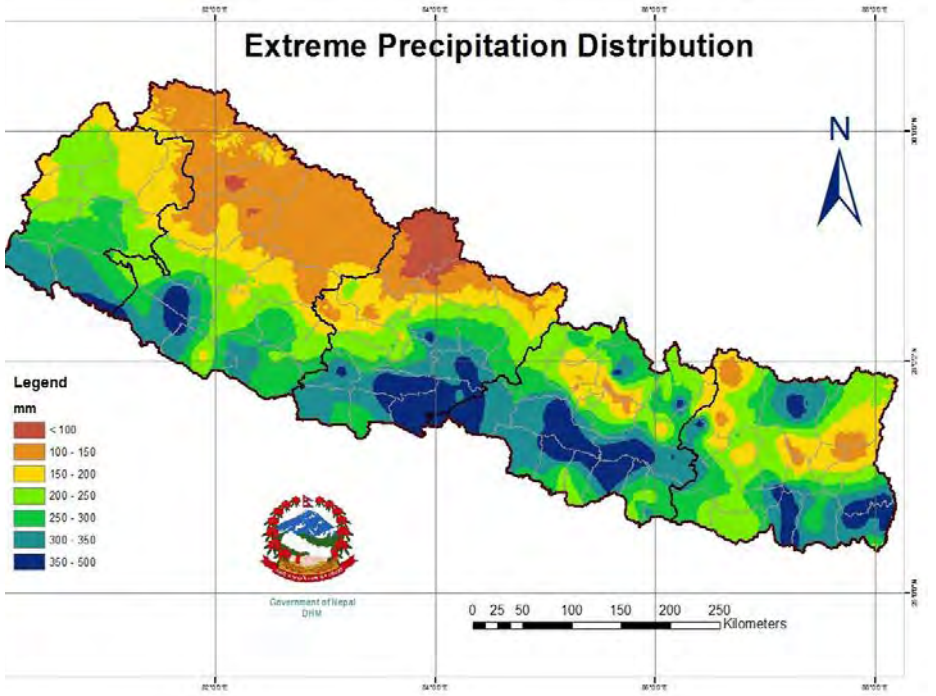


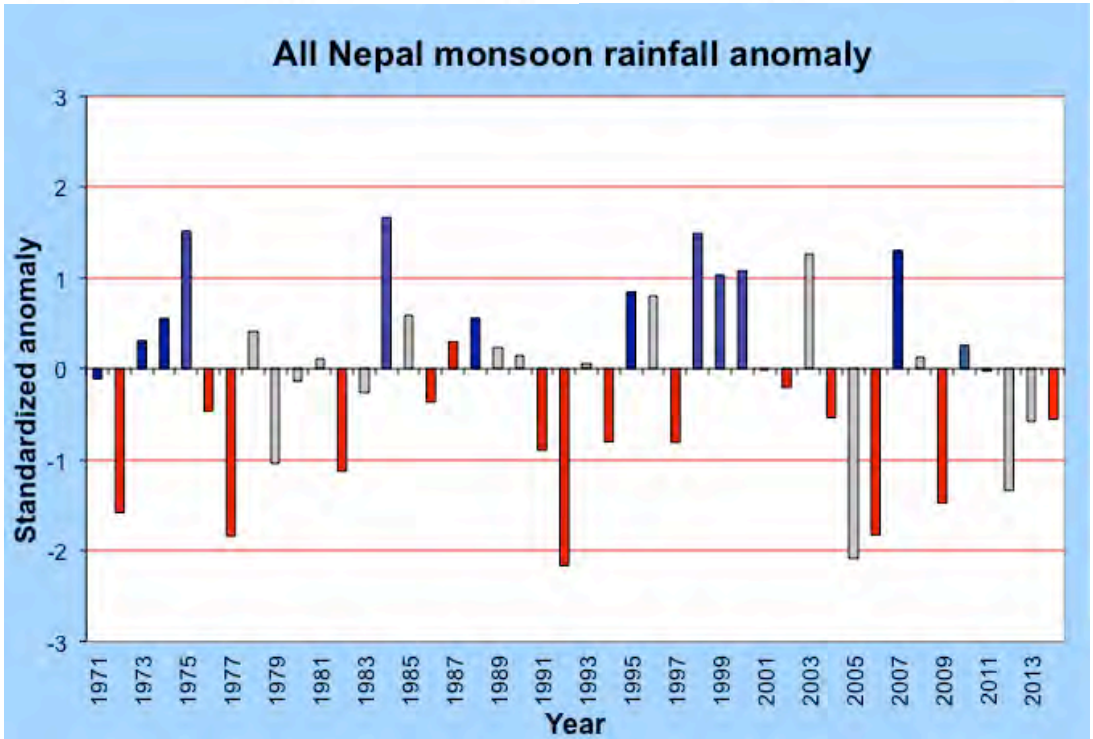

Nepal-2015
Rainfall (mm)
Rainfall (%)
1600
1400
1200
1000
800
600
400
200
0
100
90
80
70
60
50
40
30
20
10
0
1-Jun
15-Jun
29-Jun
13-Jul
27-Jul
10-Aug
24-Aug
7-Sep
21-Sep
Accum. Normal
Accum 2015

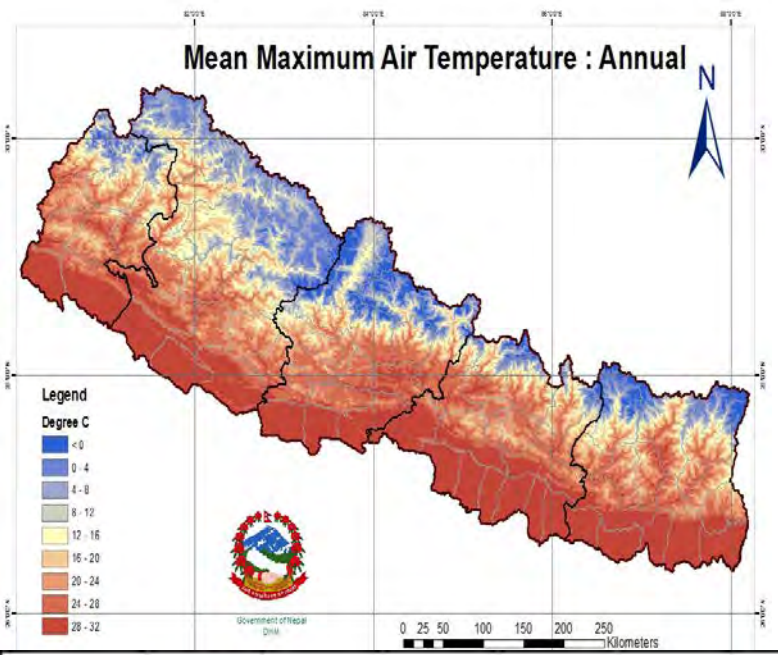

12th September 2015 Kathmandu Valley Rain
27.85
27.8
27.75
27.7
27.65
27.6
27.55
27.5
85.15
85.2
85.25
85.3
85.35
85.4
85.45
85.5
85.55
85.6
Maharajgunj
Kathmandu AP
Nagarkot
Thankot
Khumaltar
Bhaktapur
Khokana
Chapagaun
Godavari
0
10
20
30
40
50
60
70

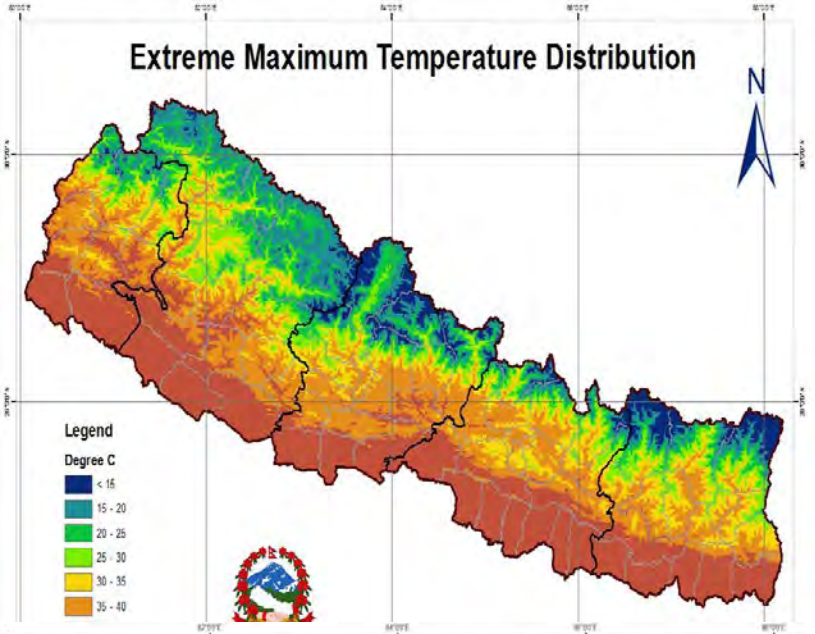

Daily rainfall of Kathmandu Valley with rainfall percentage(%)
Rainfall in mm
Percentage
120
100
80
60
40
20
0
0
100
200
300
400
500
600
700
800
900
1000
1-Jun
8-Jun
15-Jun
22-Jun
29-Jun
6-Jul
13-Jul
20-Jul
27-Jul
3-Aug
10-Aug
17-Aug
24-Aug
31-Aug
7-Sep
14-Sep
21-Sep
28-Sep
2015
Actual
Percentage
Normal

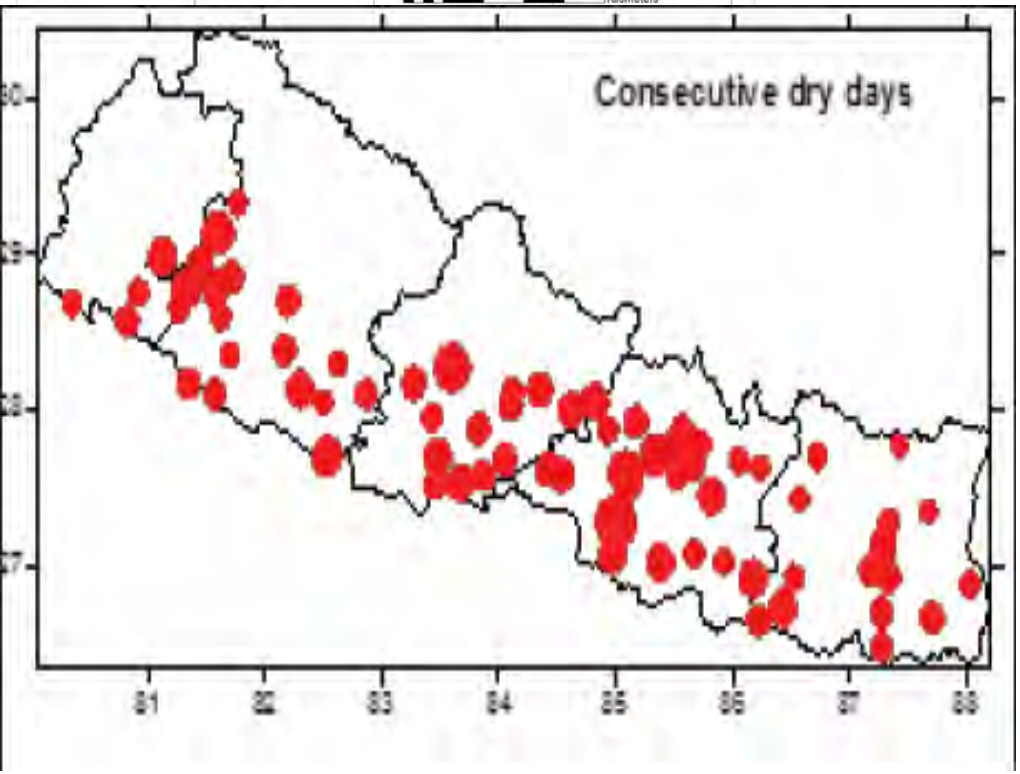

Mean Precipitation : Annual
N
Legend
mm
< 200
200 - 400
400 - 600
600 - 800
800 - 1,000
1,000 - 1,200
1,200 - 1,600
1,600 - 2,000
2,000 - 2,500
2,500 - 3,000
3,000 - 3,500
3,500 - 4,000
4,000 - 4,500
4,500 - 5,000
5,000 - 5,500
Government of Nepal
DHM
0 25 50 100 150 200 250
Kilometers

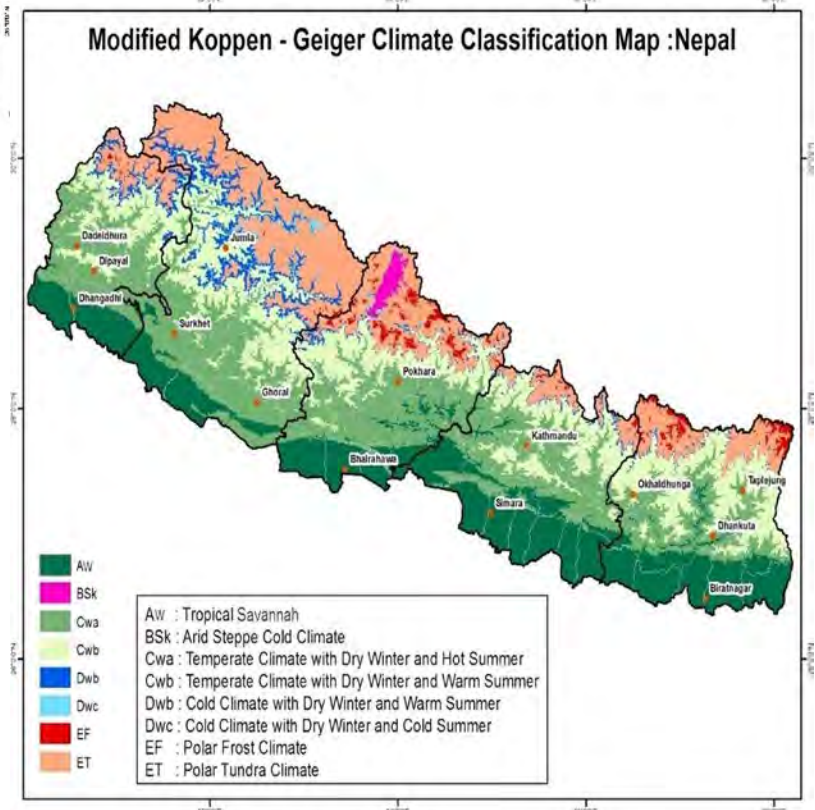

Extreme Precipitation Distribution
N
Legend
mm
< 100
100 - 150
150 - 200
200 - 250
250 - 300
300 - 350
350 - 500
Government of Nepal
DHM
0 25 50 100 150 200 250
Kilometers


All Nepal monsoon rainfall anomaly
Standardized anomaly
3
2
1
0
-1
-2
-3
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Year

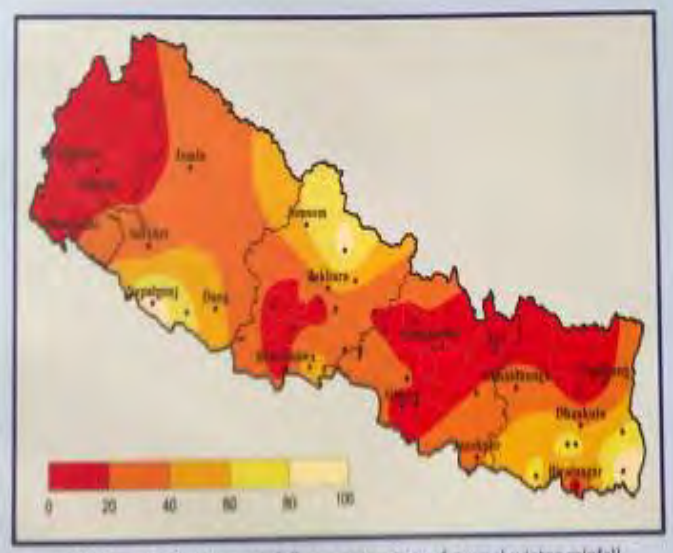

Mean Maximum Air Temperature : Annual
N
Legend
Degree C
< 0
0 - 4
4 - 8
8 - 12
12 - 16
16 - 20
20 - 24
24 - 28
28 - 32
Government of Nepal
DHM
0 25 50 100 150 200 250
Kilometers


Extreme Maximum Temperature Distribution
N
Legend
Degree C
< 15
15 - 20
20 - 25
25 - 30
30 - 35
35 - 40


Consecutive dry days
81
82
83
84
85
86
87
88


Modified Koppen - Geiger Climate Classification Map :Nepal
Dadeldhura
Jumla
Dipayal
Dhangadhi
Surkhet
Pokhara
Ghoral
Kathmandu
Bhairahawa
Okhaldhunga
Taplejung
Simara
Dhankuta
Biratnagar
AW
BSk
Cwa
Cwb
Dwb
Dwc
EF
ET
AW : Tropical Savannah
BSk : Arid Steppe Cold Climate
Cwa : Temperate Climate with Dry Winter and Hot Summer
Cwb : Temperate Climate with Dry Winter and Warm Summer
Dwb : Cold Climate with Dry Winter and Warm Summer
Dwc : Cold Climate with Dry Winter and Cold Summer
EF : Polar Frost Climate
ET : Polar Tundra Climate

WEATHER SUMMARY OF NEPAL
YEAR – 2008



Dry winter: 2008 winter rainfall as a percentage of normal winter rainfall

Government of Nepal
Ministry of Environment
Department of Hydrology and Meteorology
Climatology Division, Climate Section
Kathmandu, Nepal
Asadh 2066 (June 2009)

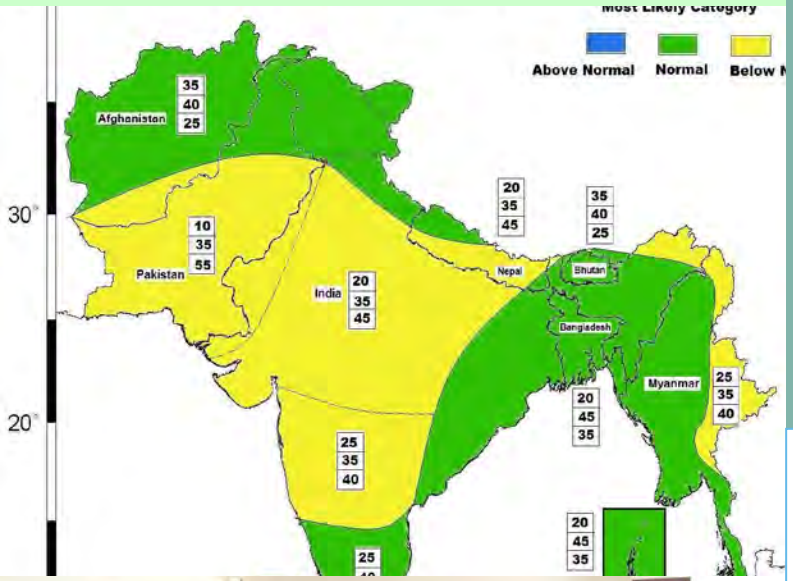
AGROCLIMATIC ATLAS OF NEPAL

Department of Hydrology and Meteorology
Ministry of Science, Technology and Environment (MoSTE)
Government of Nepal (GoN)

CCAFS
Climate Change Agriculture and Food Security
CGIAR-CCAFS Regional(IGP) Program Unit

Monsoon Forum

SASCOF 6- Consensus Forecast for Monsoon 2015



CPT Forecast for Monsoon 2015

Thresholds:

Climatology:
1982 to 2007
Thresholds:

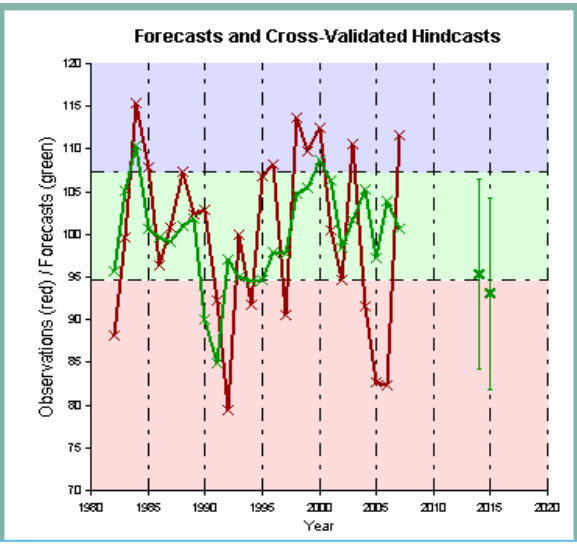
upper	107.400
lower	94.600

above	33%	0.50
normal	33%	0.50
below	33%	0.50

Forecasts:

Probabilities:

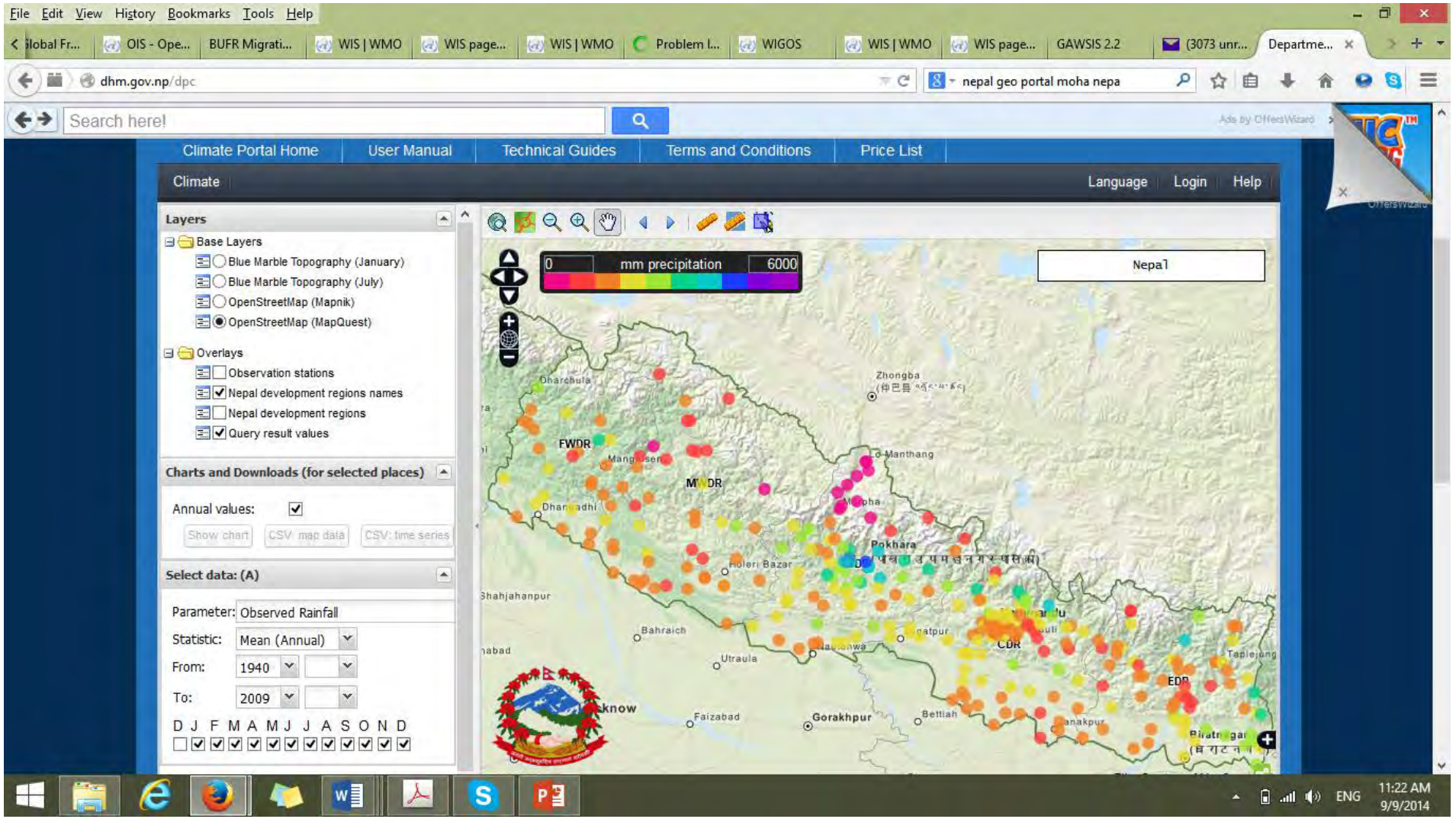
Year	Probabilities			Odds		
	B	N	A	B	N	A
2014	47	39	14	0.90	0.64	0.16
2015	56	34	10	1.25	0.52	0.11



Below average rainfall can be expected during 2015 SW monsoon period in Nepal.

Climate Portal

http://dhm.gov.np/dpc/



No sector specific tailored products

Gaps

- Organogram not up to date
- Lack of Human Resource (In many sections only one staff is working)
- Lack of infrastructure (calibration lab, workstations, servers, power backup, fast communication, High power computers etc.)
- Lack of Real time observation Network
- Regular Capacity Building

Gaps

- Lack of capacity for climate research – both basic climate (change) research and multi-disciplinary adaptation research

- Effective tools are needed to prepare variety of climate services and products

- Only few climate experts and lack of expertise on preparation of downscaled climate change scenarios for Nepal

- Lack of sufficient dialogue with users of climate services and lack of customized climate products,

Challenges

- Retaining Human Resource
- Capacity building (Proper training)
- Sustainability
- Service oriented New Organisation Structure

GFCS
GLOBAL FRAMEWORK FOR CLIMATE SERVICES

Pilot Program for Climate Resilience (PPCR)

Building Resilience to Climate Related Hazards (BRCH)

Component A
Institutional Strengthening, Capacity Building and Implementation Support of DHM

Component B
Modernization of the Observation Networks and Forecasting

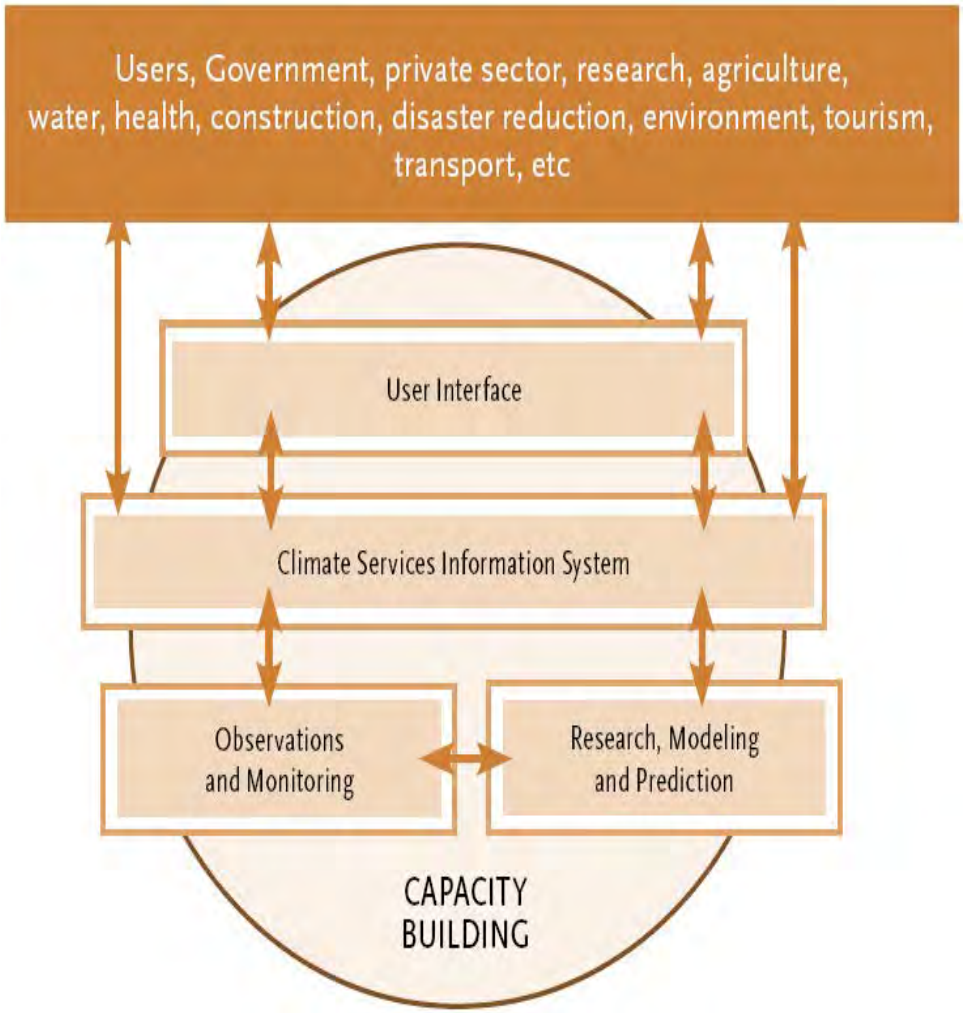
Component C
Enhancement of the Service Delivery System of DHM

Component D
Pilot DHM climate information for users in agriculture Management Information System.

Department of Hydrology and Meteorology

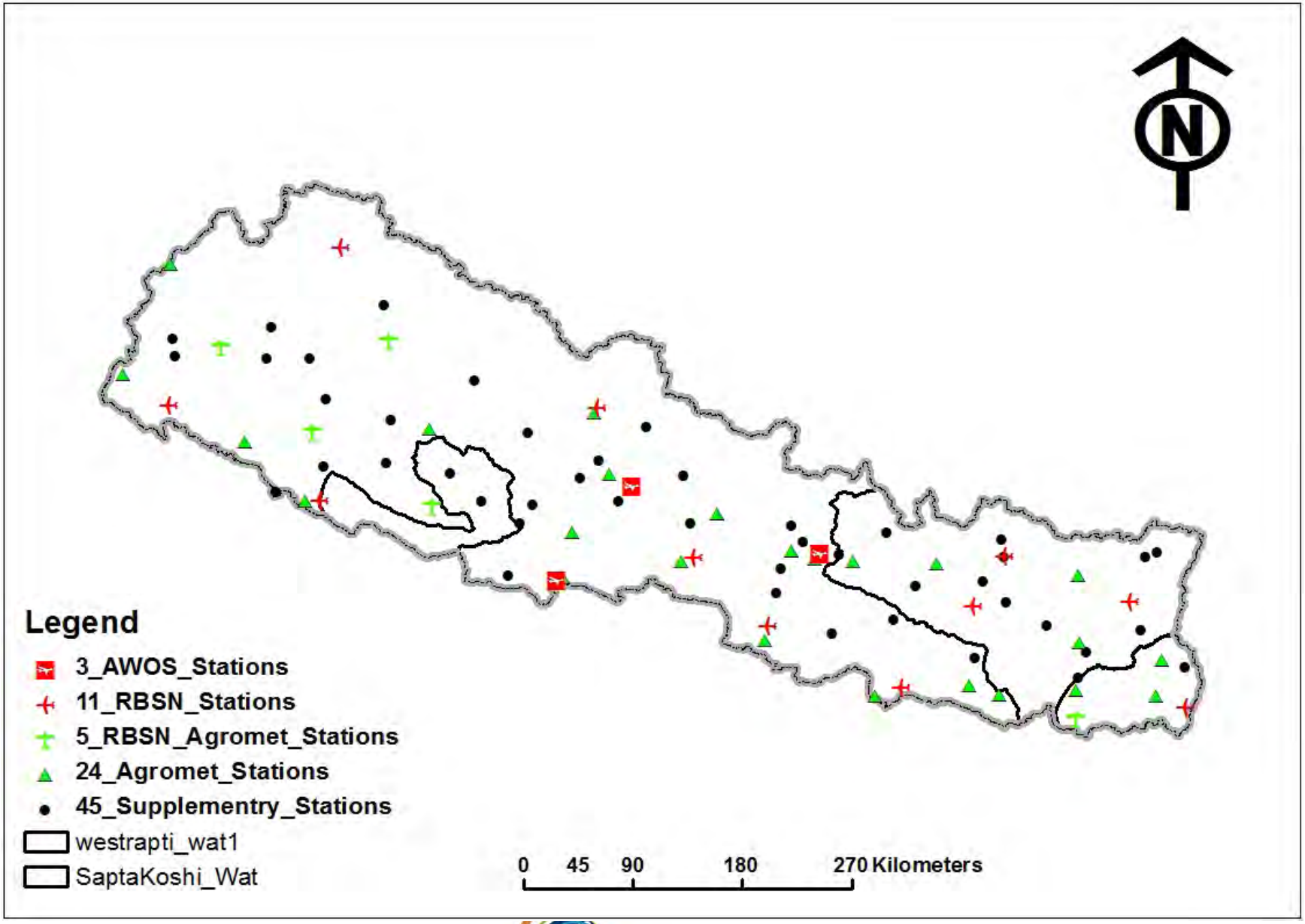
Ministry of Agriculture Development

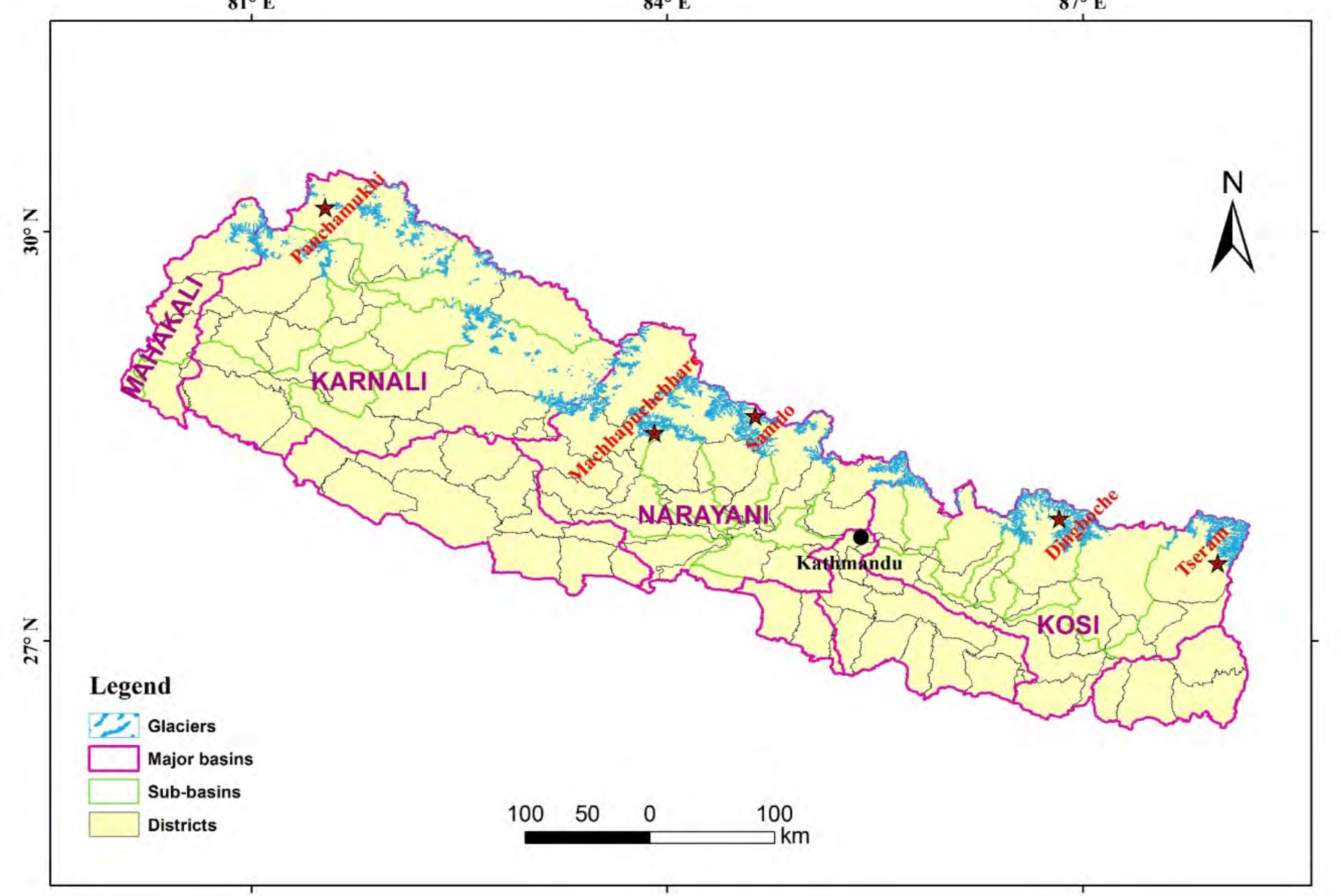
One of the main activities is the establishment of National Framework for Climate Services



- Improved observation Network – 88 Real time AWS
- Organisation Restructuring – Research and Development Division
- Services Division
- Agriculture Management Information System (AMIS), digital library, improved climate portal, apps, TV studio
- Capacity building (DHM, major stake holders)

Observation Network modernization under BRCH Project





Proposed sites to install snow and glacier monitoring equipment from the PPCR

Draft Final DHM Organization structure to be established gradually during the course of the PPCR-BRCH project

Divisio
DG's O
Sectior
Sectior
Sectior
Sectior
Meteo

Director General Secretariat

Observations & ICT

Deputy Director General Secretariat

Engineering
- Know-how on mon. tech.
- Maintenance of systems
- Instrument calibration

Networks
- Hydrological monitoring
- SYNOP, AERO, Agro-Met, Sounding, Lightning detection
- Weather radar

Quality Management
- Obs. QMS management
- Quality Monitoring & Control

Information Technology
- High Performance computing
- Servers & workstations
- Hydro &Met Data management
- Systems control & monitoring
- Personnel IT Help Desk

Research & Development

Deputy Director General Secretariat

Hydrology
- Modelling
- FEWS development
- Sediment & Water quality monitoring
- Snow and glaciers

Meteorology
- NWP & post processing
- MHEWS Development
- Mesoscale applications: Agro-Met -AMIS, Mountains, Air quality

Office for NFCS
- Climate analysis
- Climate change R&D, Services & coordination
- Information portal

GIS Laboratory
- Manage land use info
- Hazard risk and vulnerability analysis

Services

Deputy Director General Secretariat

Public Weather Services & Early Warning
- Multi-Hazard EWS
- Media: www, mobile, press
- Agro-Met - AMIS

Hydrological Services & Early Warning
- Flood Early Warning
- Customer Services: Urban, Hydro-Power, Water Supply

Aeronautical Services
- Tribhuvan airport
- Other airports

Customer Liaison
- Agro-Met
- Civil Aviation
- Tourism/Specialized
- Hydropower
- EWS&DRM– stakeholders
- Air quality

- **Administration**
- **Planning, Monitoring & Evaluation**
- **Communications & Public relations**
- **International Affairs**
- **Accounting**
- **Procurement**
- **Human Resources Management**
- **Training & Education**
- **QMS Management**

Regional Offices ,
Basin Offices
Field Offices
- Station engineering & maintenance
- Special hydro measurements

Future Perspective

- Modernization of DHM's Communication and ICT Systems (Communication equipment, Archiving and data base development; and remote sensing and GIS laboratory)
- Computer systems to access climate information
- Development of a digital library of climate-relevant information from all sectors for Nepal
- Downscale climate forecasts
- Information exchange with stakeholders (Stakeholder engagement)
- Develop climate expertise through training and twinning

Implementation Plan

- National consultation on NFCS and preparation of elaborated implementation plan including several sectoral stakeholder working groups to determine customized climate services

- Implementation of new online climate services (climate products)

- -Designing user dialogue platform(s) such as improved climate portal and digital library for climate relevant information from all the sectors.

- - Designing new customized climate services together with stakeholders - product development in DHM

Thank you