

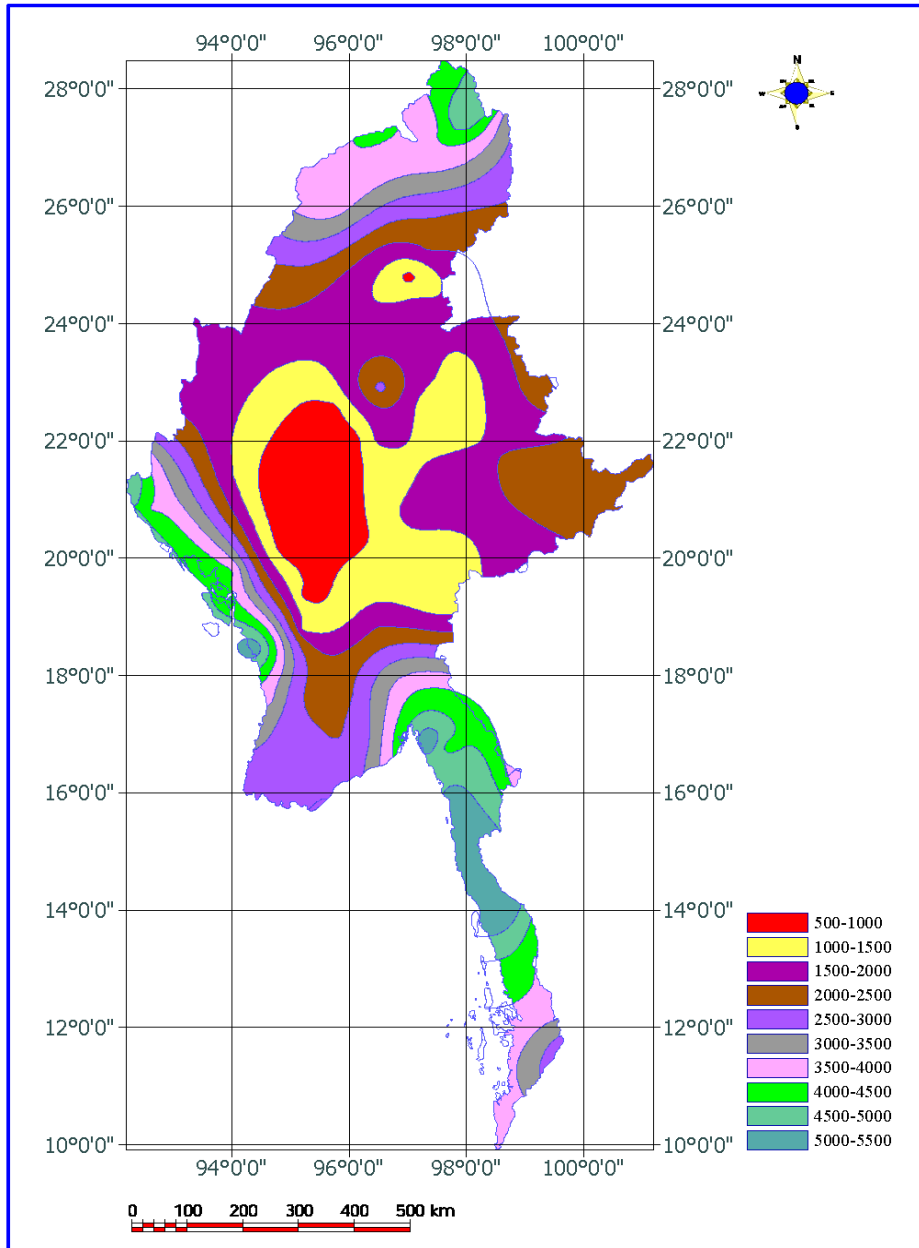
# Adaptation to Climate Change In Myanmar



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<http://www.moezala.gov.mm>

## Normal Rainfall in Myanmar

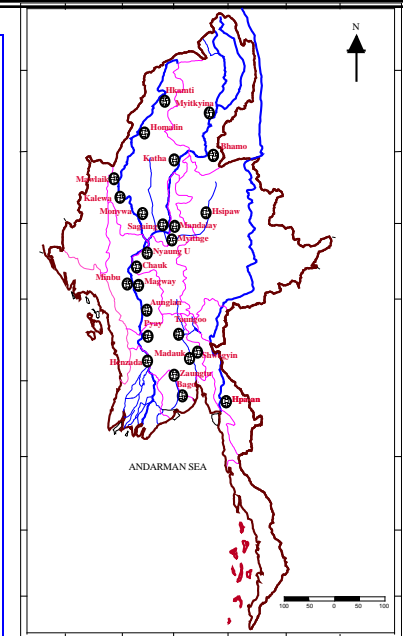


## Department of Meteorology and Hydrology

<b>Meteorological Station-</b>	<b>63</b>
<b>Hydrological station -</b>	<b>30</b>
<b>Met &amp; Hydro station -</b>	<b>39</b>
<b>Agro-Met Stations -</b>	<b>18</b>
<b>Aviation-Met station -</b>	<b>8</b>
<b>Seismological station -</b>	<b>11</b>

### River Forecasting Stations

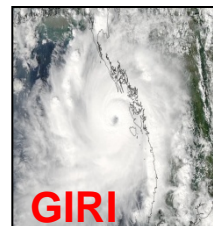
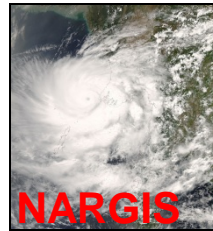
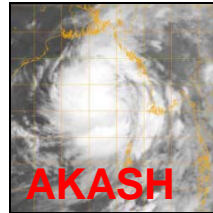
<b>Ayeyarwady -</b>	<b>15 Stations</b>
<b>Chindwin -</b>	<b>5 Stations</b>
<b>Thanlwin -</b>	<b>1 Station</b>
<b>Sittoung -</b>	<b>2 Stations</b>
<b>Shwegyin -</b>	<b>1 Station</b>
<b>Bago -</b>	<b>2 Station</b>
<b>Dokehtawady -</b>	<b>2 Station</b>
<b>Ngawun -</b>	<b>2 stations</b>





# Impacts of Climate Change in Myanmar

- Late monsoon onset after 1977
- Early monsoon withdrawal after 1977
- Shorter monsoon duration after 1977
- Retardation of monsoon advancement increased in 1990s
- The monsoon strength were weak in 1951, 1953, 1957, 1977, 1979, 1996, 1998 and 2003 where the impacts of EL Nino were evident in some years.
- Heat and drought indices increased after 1977
- Annual rain decreased after 1977
- Normal monsoon breaks disappear in 1990s
- The Monsoon depressions become less significantly in 1980s and 1990s
- The abnormal synoptic situations occurred in 1980s and 1990s.
- Sea surface temperatures rise, which is causing storms, including cyclones and hurricanes, to intensify.
- Heaviest rainfalls were recorded during July and Aug 2011 and June and Oct in 2010 and Highest Temps were recorded in March, April and May 2010



# Climate Change impacts to Myanmar Rivers

- The trends of annual peaks in Ayeyarwady river are the falling trends except Hinthada station in deltaic area.
- The trends of annual peaks and lowest W.L in Chindwin river are mostly the falling trends and the range of annual peaks are more wide after 1990.
- In other all rivers, the trends of annual peaks and lowest W.L are also the rising trends.
- The trends of annual lowest W.Ls of the rivers in central Myanmar area are showing the falling trends.
- In 2010, the flood only occurred in two rivers and the annual max. and min. water levels were also recorded the lowest in most of the rivers.
- In 2011, the flood recorded the lowest in Ayeyarwady and Chindwin rivers and the highest in Bago and Thanlwin river.
- In 2011, the flash floods occurred in 4 places in June, July and Oct.



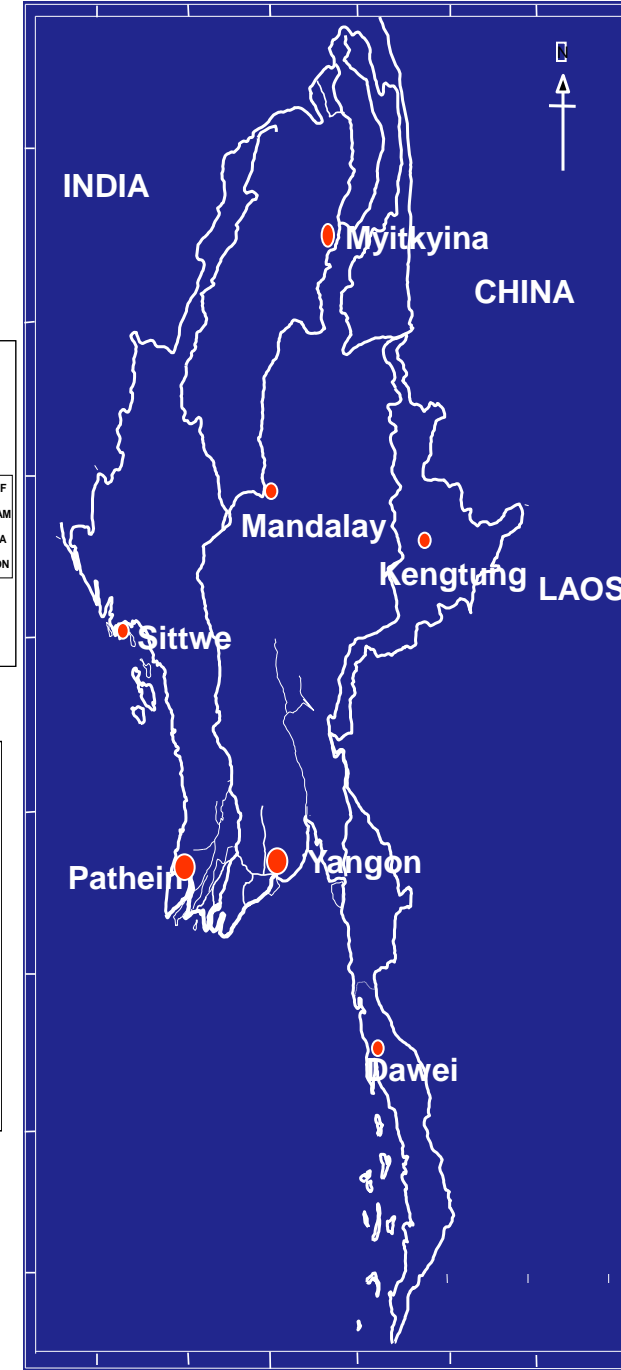
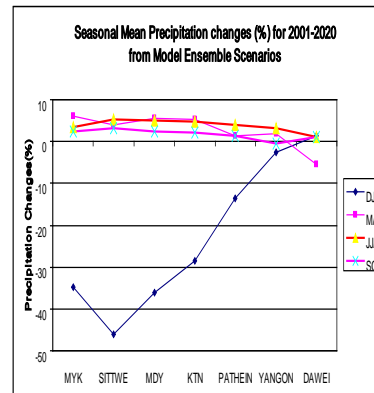
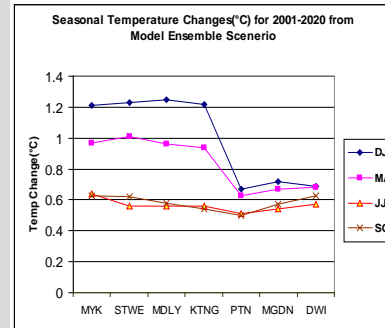
## Activities of DMH for Climate Change and Adaptation

- *Observing Meteorological & Hydrological data*
- *Analyzing data*
- *Issue Warnings and Forecast s in time*
- *Monitoring the changes of climate condition*
- *Cooperating with related organizations and neighboring countries*
- *Researching climate phenomena*
- *Issuing Global and Local Climate Change*
- *Organizing the International & Local seminars, meetings, workshops*
- *Public education for Climate Change effects and adaptation*
- *Cooperating in projects for climate change adaptation*

# Climate Change Scenario for Myanmar (2001-2020, 2021-2050, 2051-2100) (by MAGIC 5.3 model)

• The scenario of **TEMPERATURE** shows slight warming (0.5 C) during June to November in the whole country. In other months warming increases to (0.7-1.2 C) in the country except the delta and southern parts of the country where the warming is (0.6 C)

The scenario of **PRECIPITATION** shows about 5% increase of rain during March- November through out the country but in the remaining months which constitutes only 5-10 % of the annual value, the deltaic areas and the southern region will receive about normal precipitation and it will be deficit up to 45 % elsewhere



# Climate Changes of Myanmar During 21<sup>st</sup> Century By ECHAM5 Model with Global Warming Experiment

## Results

- (Annual, April, May) temperature of Myanmar will be increased throughout the 21<sup>st</sup> century.
- At the same time, Model projected Rainfall for SW Monsoon period also expected to increase for Myanmar during 21<sup>st</sup> Century.
- Late Onset will be at Deltaic area, Central Myanmar and Northern Myanmar and Early withdrawal from Whole country during 21<sup>st</sup> Century.
- Predicted Length of Rainy Season (L.R.S) showed that the L.R.S will be shorter than Normal(144 Days) during Early 21<sup>st</sup> Century, Middle 21<sup>st</sup> Century and End period of 21<sup>st</sup> Century.
- Monsoon Intensity will be generally moderate along Myanmar coast in 21<sup>st</sup> Century.

# Climate Change Adaptation in Myanmar

- Signed UNFCCC on 11 June 1992 and ratified the convention on 25 November 1994.
- Ratified Kyoto Protocol in 2003.
- NCEA is focal point for UNFCCC.

## Initial National Communication (INC)

- A project was implemented by Myanmar with financial assistance from GEF/UNEP (2008-2010)
- Established a Project Management Team (PMT) and National Study Teams (NSTs) which included working groups of
  1. GHG Inventory and Mitigation Options Analysis (GHG)
  2. Vulnerability and Adaptation Assessment (V&A, DMH)
  3. Development and Transfer of Environmentally Sound Technologies (ESTs)
  4. Research and Systematic Observation (RSO,DMH)
  5. Education, Training and Public Awareness (ECODEV)
  6. Compilation of National Communication (ECCDI)
- Myanmar had submitted INC to UNFCCC.



# Climate Change Adaptation in Myanmar

## National Adaptation Programmes of Action (NAPA)

- A project is being implemented by Myanmar with financial assistance from GEF/UNEP (2011 March - Dec)
- Established a Project Management Team (PMT) and Multidisciplinary Integrated Assessment Team (MIAT) which included working groups of
  1. Agriculture and Forestry
  2. Biodiversity
  3. Coastal Zone
  4. Energy , transport and Industry
  5. Public Health
  6. Water Resources
- Under Myanmar National Adaptation Plan of Action (NAPA), Vulnerability Assessment have been done and Measured for reduction of impact and strategy for adaptation were prioritized.

# NAPA Project summary

1. Establishment, composition and mandate of Myanmar NAPA Project Management Team (PMT) and Multidisciplinary Integrated Assessment Team(MIAT) and project inception meeting
2. Literature review of past and ongoing studies on vulnerability and adaptation to climate change in Myanmar and synthesis of available information
3. Participatory assessment of vulnerability to climate variability and climate change, and adaptation measures and selection of criteria by identified stakeholders
4. Finalization of criteria and prioritization of adaptation measures
5. Development of proposals for implementation of priority adaptation activities and preparation of draft NAPA report
6. Public and Government Review of the draft NAPA and Validation Forum
7. Review of NAPA by Government ministries, Inter-ministerial committee endorsement by the GEF focal point and publication
8. Public Dissemination and Public Awareness

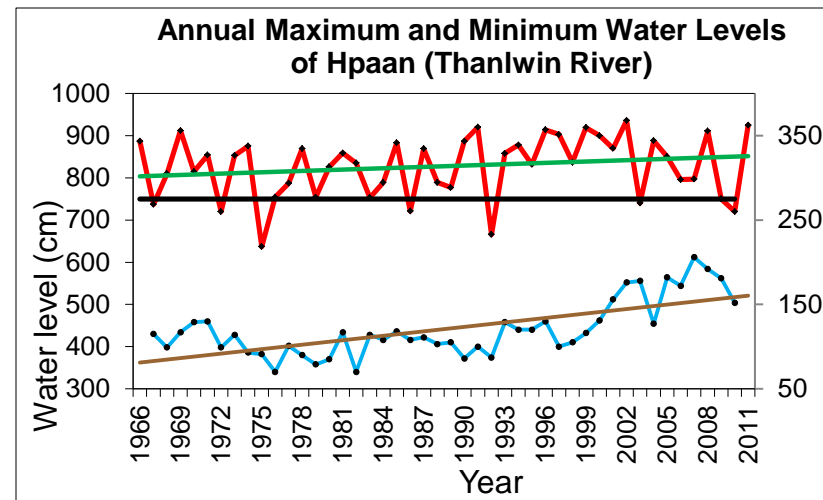
# Transboundary basins in Myanmar



**Thanlwin river**

**- only one reporting station(Hpa-an)**

**Mekong river (about 350 km on Myanmar border)**



## Conclusion

- ❖ Myanmar is one of the most vulnerable countries in ASEAN region to various kinds of natural disaster according to the climate changes.
- ❖ The climate change mainly affects the socio-economic sectors of Myanmar such as agriculture, forest, biodiversity, coastal zone, public health and water resources.
- ❖ Myanmar is an agricultural country and water and agriculture sectors are very important for Myanmar's economy.
- ❖ So the relevant departments and organizations in Myanmar are cooperating in the climate change adaptation activities and also cooperating in the regional and worldwide climate change adaptation.

**Thanks for your kind attention!**