# Climate Change, Water Resources and Water Utilization in Myanmar

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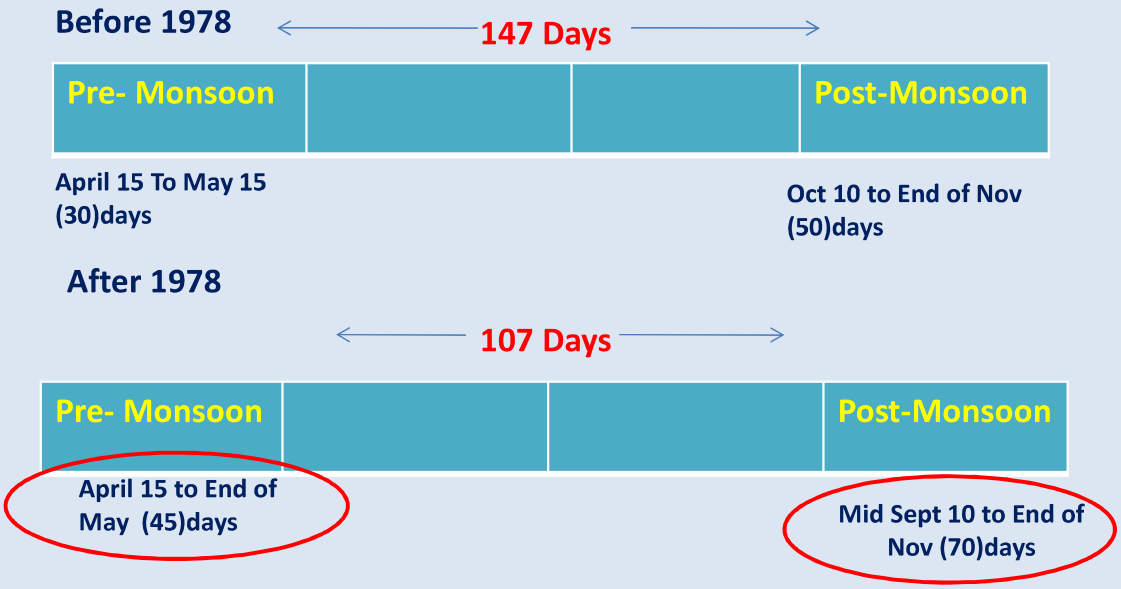
## Introduction

- **Water is essential for life on Earth and of crucial importance for society.**
- **Myanmar - a favorable situation with respect to water resources - more water per capita than all surrounding countries** (19,000 m2 per capita -9 times, China, 16 times-India, 5 times Vietnam and 16 times Bangladesh)
- **With its abundance resources - has great opportunities to achieve a balanced and sustainable development.**
- **Water also plays a major role in affecting climate.**
- **There are three types water recourses in Myanmar such as from rainfall , melting the glaciers (Rivers )and ground water.**

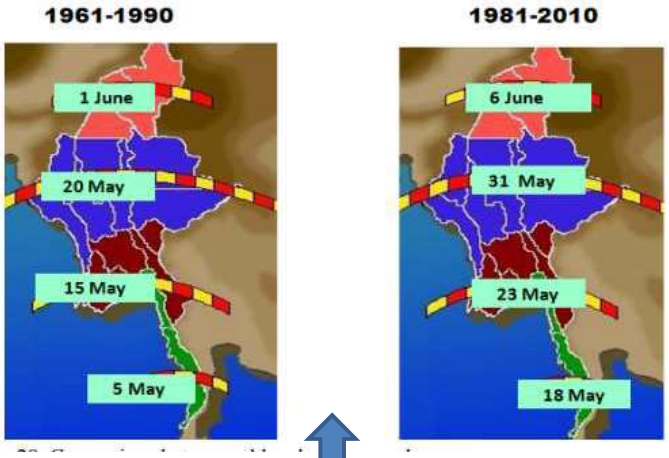
## Climate Change and Rainfall pattern

**Changing the standards of Monsoon from 1978**




Source; Dr. Htun Lwin,

Comparison between Old & New Normal Monsoon Onset Dates

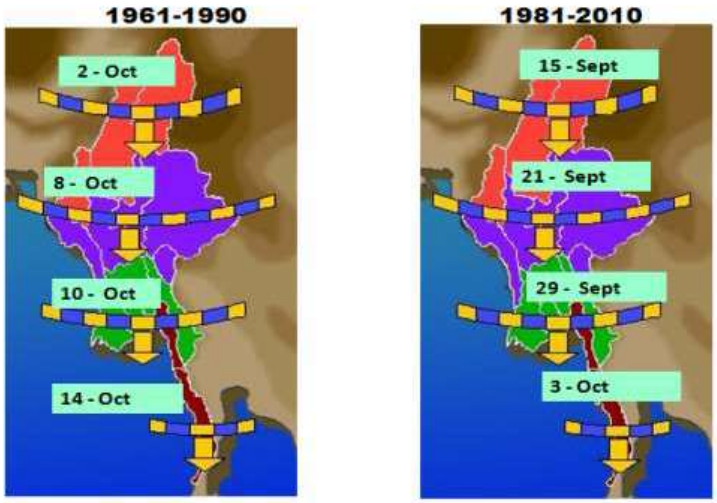



**Myanmar has lost 40 days from its annual monsoon in the past 35 years**

**Normal Onset Dates**

Comparison between Old & New Normal Monsoon Withdrawal Dates

**Withdrawal Dates**




**It effects on the agriculture Activities**

## Climate Change and Water Resources in Myanmar

- **Himalayan glaciers are one of the major source - ice melting**

**Himalayan glaciers are losing ice mass because of decreased snowfall and higher average air temperatures that melt existing ice. Feb 17, 2017**

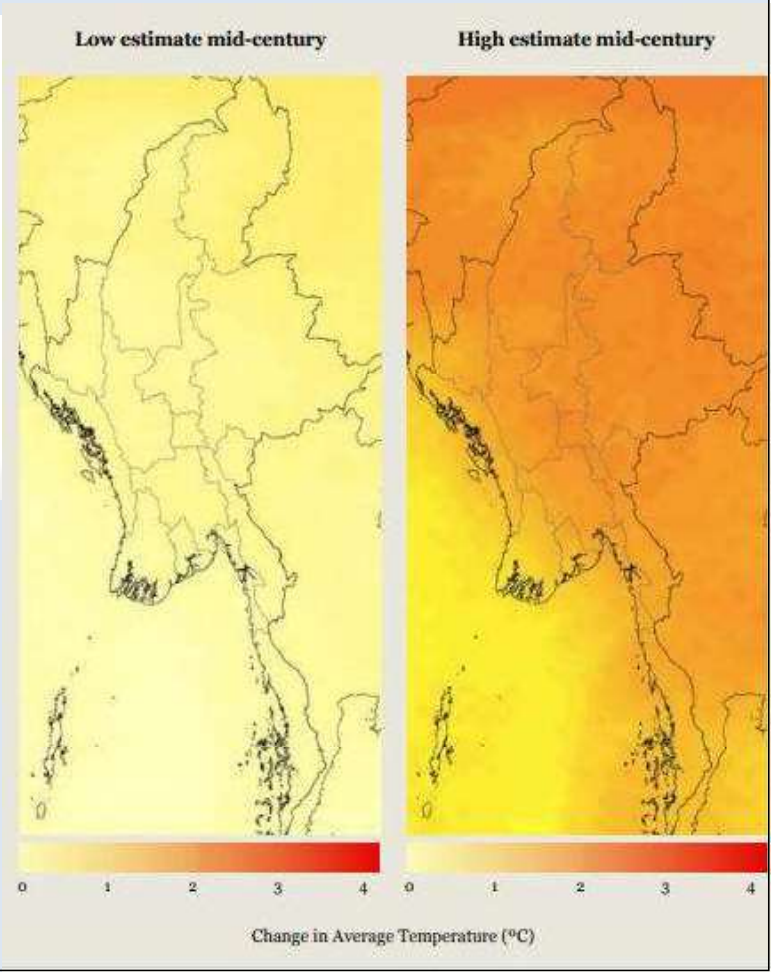
# Changes in Amount of Rainfall in Myanmar

| | Model baseline* (1980 to 2006) | Precipitation range 2011-2040 | Precipitation range 2041-2070 |
|---|---|---|---|
| Annual | 2000 mm | +1% to +11% | +6% to +23% |
| Hot Season | 300 mm | -11% to +12% | -7% to +19% |
| Wet Season | 1700 mm | +2% to +12% | +6% to +27% |
| Cool Season | 100 mm | -23% to +11% | -12% to +11% |


**Extreme( pattern of rainfall)**
**Ground water –depends on rainfall intensity and inflow**

# Changes of Temperatures in Myanmar

| | Model baseline* (1980 to 2006) | Warming by 2011-2040 | Warming by 2041-2070 |
|---|---|---|---|
| Annual | 23.6 °C | 0.7-1.1°C | 1.3-2.7°C |
| Hot Season | 25.1°C | 0.8-1.2°C | 1.4-2.9°C |
| Wet Season | 25.1°C | 0.6-1.1°C | 1.1-2.4°C |
| Cool Season | 20.5°C | 0.7-1.2°C | 1.3-2.8°C |




**In April 2016, temperatures in Magwe Region reached 46 degrees Celsius, the highest in two decades.**

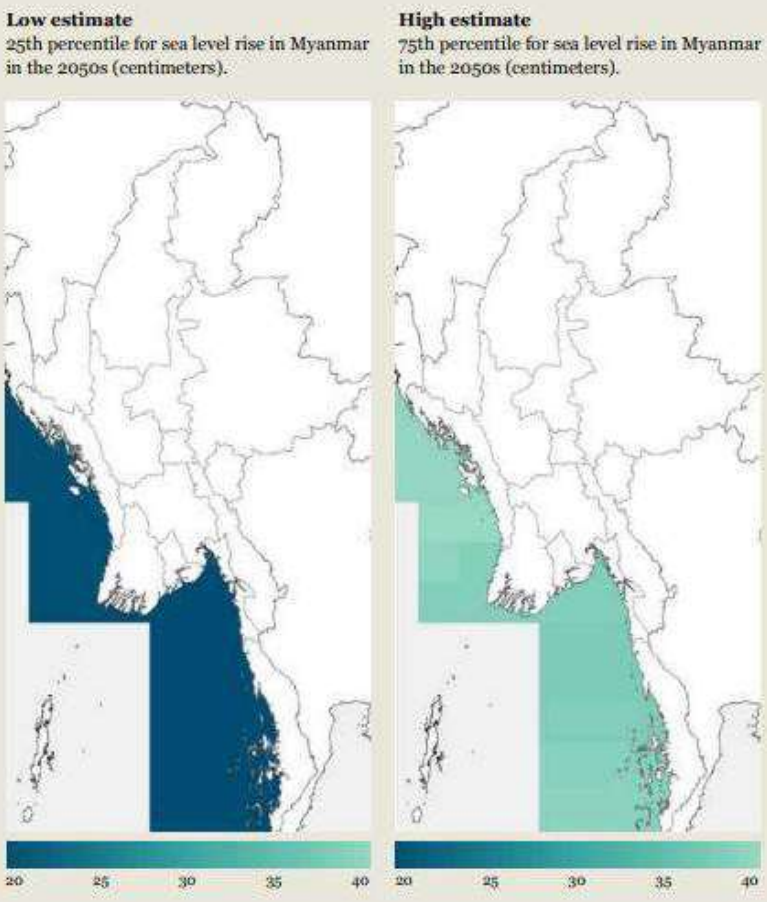
**More than 2,000 villages faced water shortages across the country in 2016 as El Nino hit Myanmar starting from late 2015 until June 2016.**

## Sea Level Rising

| Timeslice | Middle range of future sea level rise |
|---|---|
| 2020s | 5 cm to 13 cm |
| 2050s | 20 cm to 41cm |
| 2080s | 37 cm to 83 cm |

(Salt intrusion in Costal areas) Ponds and wells have been contaminated by sea water, including (coastal Ayeyawady Region and Rakhine state)
-Farmers lost their products

Salt-tolerant rice –grown




## Processes of Climate Change in Myanmar

- Myanmar -vulnerable to the impacts of climate change (heavy rains, storm surges, severe droughts, floods, cyclones and landslides) - increased over the last 60 years.
- Myanmar is the world's second most vulnerable country to climate change according to the Global Climate Risk Index.
- Weather events and changing weather patterns - attributed to climate change.

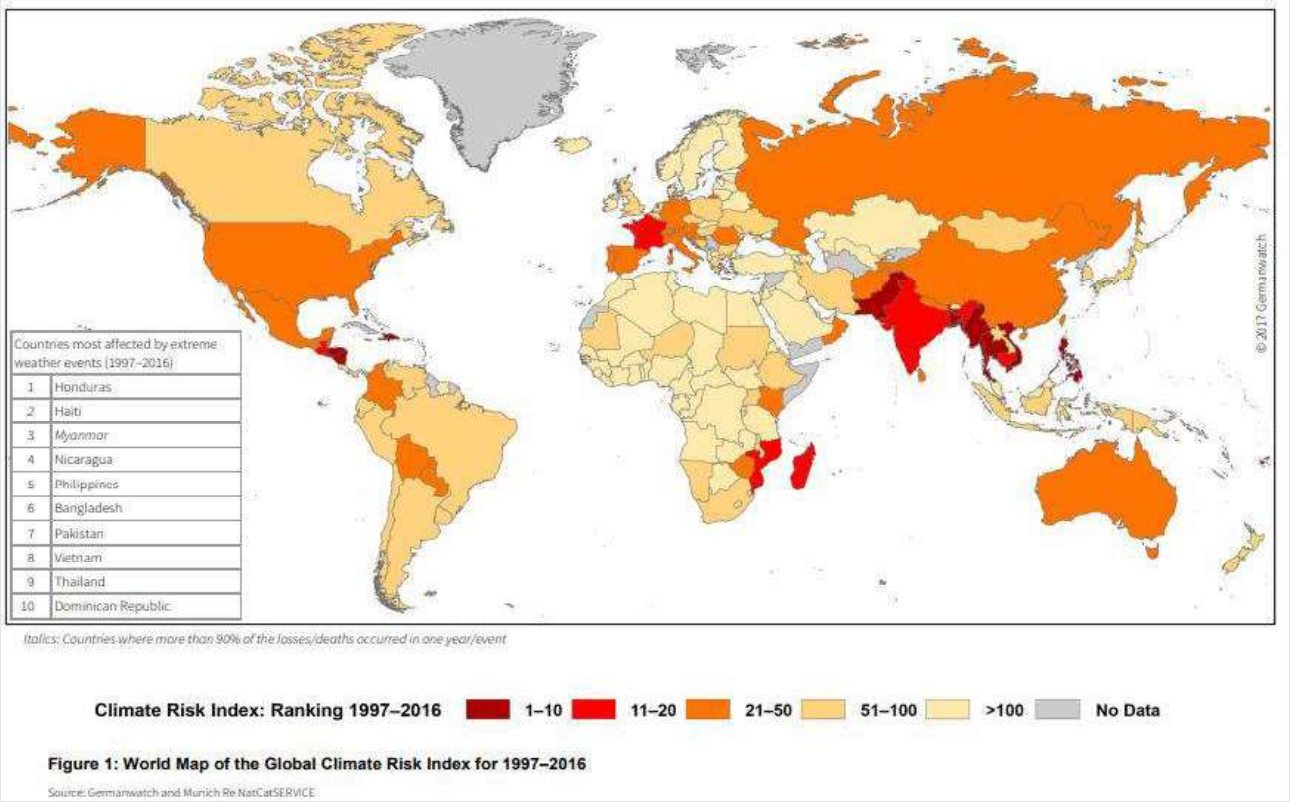



**Figure 1: World Map of the Global Climate Risk Index for 1997–2016**

Source: Germanwatch and Munich Re NatCatSERVICE

**In the past 20 years (1997–2016), it has been exposed to 43 extreme weather events resulting in a death toll of 7,097 (annual average) inhabitants and an annual average of 0.69 per cent loss per unit in GDP – making it the third-most affected country to extreme weather events (Climate Risk Index 2018 , German Watch)**

**The devastation caused by cyclone Nargis in 2008 shows that Myanmar is very vulnerable to water-related disasters.**

## Floods in 2018 ( impacts of Climate Change)

## Distinct Regional Water Differences in Myanmar.

- For example lack of water in the Central Dry Zone
- Salinization in the Ayeyarwady Delta area, flooding in the deltas, flash floods in the mountains and Dry Zone, cyclones and surges along the coast are primary hazards.
- Inadequate rural and urban drainage cause trouble and damage.
- The availability of safe drinking water depends on reservoirs, communal ponds, private collection of rainwater and groundwater.


## Water Utilization in Myanmar

- The percentage of people cover by safe drinking water and sanitation facilities are still very low in the country compared to the global status.
- Formation of saline soil in the irrigated tract due to drainage and water logging problems are found in some localized area in central Myanmar.
- As a result of depletion of forest in the watershed areas ,there is also sedimentation problem in some major river systems in Myanmar.
- People – still use river water for their domestics water used

## Water in Agriculture

- The agricultural sector in Myanmar provides 22% of GDP, employs 60% of the labor force and is the biggest contributor to GDP
- The productivity, intensity of use, and value of land increase with access to water.
- Construction and rehabilitation of irrigation systems to improve agricultural production (low returns to farmers have meant that this investment has not always brought the expected benefits)

## Ground Water in Myanmar

- Groundwater plays a vital role for domestic water and livestock in Myanmar, and is increasingly being used for irrigation.
- Groundwater currently supplies less than 5% of Myanmar's irrigation, but is the fastest growing irrigation sector.
- Access to groundwater can provide new opportunities and reduce risk in farming systems, but unregulated expansion and use can result in resource depletion and unsustainability.

## Water used of Households

- Only 4.1% of households in Myanmar have piped water into the dwelling.
- In Kayah, Tanintharyi and Yangon, percentages of piped water into the dwelling are 10.6,11.1 and 11.3 respectively.
- The use of unprotected wells is high in Kayah (23.8%), Kayin (43.9%) and Rakhine (37.2%).
- In Magway, 10.6% of the population relies on surface water.
- (UNDP,2015)

## Conclusions

- An Agro- based country - higher demands for agricultural and domestic water, potentially a boom in the demand for industrial water (
- As a large rice producing country and with huge potential in agricultural development, good and sustainable use of water is of major importance
- As a consequent pollution problems, a sharp increase in the demand for hydropower- Water resource management (activity of planning, developing, distributing and managing )- needed (NWP-2014)
- Myanmar's interrelation between water, food, and energy security is key to Myanmar because food and energy production have a large impact on the water resources in Myanmar.

## Challenges and Suggestions on Future Research

- Myanmar faces a significant challenge in lack of technical information and expertise to support planning, management and innovation in the water sector. (MSDGS)
- Basic information on the extent and condition of water resources (surface and groundwater), water use, water quality and aquatic ecosystems is still lacking, or is difficult to access.
- As in many developing countries, there has been a lack of coordination between the numerous government agencies that manage water.

- Integration of Climate Change Curriculum in University Curricula (leading by NEPC)
- University of Yangon- Planed to establish the Water Department
- Adaption and resilience to climate change is needed to do more research and contribute to farmers and local people in effected areas.(Dry Zone, Costal Areas, Mountainous Areas)

**Thank You Very Much for Your Kind Attention!**