Drought Conditions and Management Strategies in Myanmar

Written by

Ms. Tin Yi. Deputy. Director (DMH), tinyisw@gmail.com

Mr.Wai Myo Hla. Director (DZGD)

Mr. Aung Kyaw Htun (DZGD)

Background

The potential drought hazard level of Myanmar is shown in Fig.1 and is described as "**High"** for the regions in dry zone, "**Medium"** in Bago region and eastern mountain ranges, and "**Low"** in the remaining regions except Yangon and Taninthayi divisions. The dry zone, central area of Myanmar is the area vulnerable to drought as compared to other parts of the country. The area of Dry Zone is 67,700 square kilometers and it constitutes 10 percent of the total area of Myanmar. The region is characterized by low rainfall, intense heat and degraded soil conditions, affecting social and economic situations of the communities living in the region. Approximately 35% of the cultivable land is located in dry zone. A map of dry zone is shown in Figure.2. The temperature of the dry zone is very high and April and May are the hottest months. The precipitation in Dry Zone is controlled by the monsoon circulation system. The annual precipitation in dry zone is less than 750mm, while the national average precipitation is 2353.06 mm.

In Myanmar, drought years were observed as 1972, 1979, 1982, 1983, 1986 and 1987. According to the analysis of drought indices of Myanmar (1951-2000) showing in Fig.3, the drought indices of Myanmar is shown the rising trend. According to the Annual Drought Reports (2010-2013) prepared from Drought Monitoring Center of Department of Meteorology and Hydrology (DMH), Myanmar, the drought mostly occurred in dry zone area during Pre and Peak Monsoon period of 2010, the drought slightly occurred in Myanmar during 2011 and the severe drought occurred in dry zone area, the moderate drought also occurred in some region of dry zone area and also other regions and states and mild drought occurred in some regions and states during 2012 and 2013. The droughts in Myanmar mainly impact to the agricultural fields, farmers, drinking water scarcity and livestocks. According to the analysis of the annual lowest water level of the stations along the Ayeyarwady and Chindwin rivers in central Myanmar area (dry zone area) in Fig.4, the annual lowest water levels of

these stations are showing the falling trends and also annual lowest water level recorded in 2010 at Monywa station and Mandalay station.

In Myanmar, the significant drought occurred during 2010. The exetreme temperature also recorded 47.2 °C at Myinmu station in dry zone area on 14 May 2010. The drought risk map of Myanmar during 2010 is also shown in Fig.5. Myanmar was hit by a drought in 2010, which was the most severe in several decades. Temperature has been higher in this year than previous years in Myanmar and rain fall is late, causing severe shortage of water in many parts of Myanmar. In May, temperature has recorded the highest at 20 stations in Myanmar according to the observed data of DMH. In April, temperature has risen as high as 40 degree Celsius, according to the DMH's data observations. In some parts of Myanmar, temperature is as high as 43 degree Celsius. As a result, many streams and water reservoirs were dried up all over Myanmar. Inle Lake, which is the major tourist destination in Shan State of Myanmar, has been dried up in many parts. Water shortage is most severe in Ayeyarwaddy (Irrawaddy), Sagaing, Yangon (Rangoon), Mandalay and Bago Regions and Mon, Rakhine and Shan States. Most of the wells were dried up due to the depletion of underground water supply because of late of Monsoon onset and so the scarcity of drinking water problems occurred in Myanmar. So the droughts impact to social, economic, health, public, livestocks and environment of Myanmar.

Drought monitoring and early warning systems

Drought monitoring work, over the years, has been undertaken mainly by the Ministry of Agricultural and Irrigation. DMH has one center in Mandalay that devotes to drought monitoring and forecasting and this can be further improved. The cooperative efforts between various concerned agencies such as agricultural planning, irrigation, health, dry zone greening, forestry, National conservation for environmental affairs and livestock breeding will also be encouraged for drought management in Myanmar.

In Myanmar, there are 63 Meteorological Stations, 28 Hydrological Stations, 39 Meteorological and Hydrological Stations, 17 Agro-meteorological Stations, 8 aviation weather stations and 1 upper air station under the Department of Meteorology and Hydrology (DMH). The early warning system is the main responsibility of DMH for disaster risk reduction in Myanmar. DMH issues the

daily, dekad, monthly and seasonal weather and water level forecasts, news, warnings and bulletins for storms, floods, untimely rainfall and temperature etc. and also issues the Minimum Alert Water level and Bulletin for 7 stations in dry zone area during low flow period. DMH also issues the dekad agro-meteorological bulletins to support the agriculture. In these bulletins, the situation of soil moisture water balance, rainfall, temperature, relative humidity and evapo-transpiration of all regions and states of Myanmar are included. DMH also established the drought monitoring center at the upper Myanmar office (Mandalay office) locating in dry zone area in 2010. This center is now preparing and issuing the seasonal and annual drought reports based on the rainfall conditions. DMH cannot issue the warnings for drought management. So DMH needs to upgrade the drought monitoring center such as capacity building and also forecasting techniques etc. And also DMH is trying to upgrade the data observation networks, the forecast techniques, capacity building and the early warning system cooperating with international organizations.

The other relevant department such as Forest department were carried out Dry zone rehabilitation activities since 1953, Agricultural and Rural Development Corporation (ARDC) was formed and development activities were carried out in central dry zone of Myanmar from 1953-54 to 1963-64 (10-year period). By the year 1963, the Forest Department (FD) succeeded responsibility of the task. Two 10-year working plans (1963-64 to 1972-73 and 1972-73 to 1981-82) were drawn up for the period of 20 years (from 1963-64 to 1981-82) and implemented for the development of central dry zone. At that time activities were mostly concentrated in Meikhtila forest district, particularly for reforestation of watershed areas, establishment of village-owned-forests and model forests in Mount Poppa watershed area.

After constitutional reform of FD in 1982 (withdrawal of district level administration) and after 1988 disturbances, starting from 1994-95 as a first 3-year pilot project, Special Region - Nine District Greening Project was adopted and carried out by FD. In 1995-96 the project had extended from nine districts to 13 districts. Watershed Mountain Greening Special Project of Myingyan district was also started in 1996-97.

In July 1997, Dry Zone Greening Department (DZGD) was constituted under Ministry of Environmental Conservation and Forestry. Its working covers central dry zone of Myanmar including 3 regions (Sagaing, Mandalay and

Magway Regions), 13 districts and 57 townships, covering 21.557 million acres of dry land forests. The headquarters of the department was inaugurated in 18th September 1997 at Patheingyi township, Mandalay division. In accordance with the 2000-2001 amendment, the working area of dry zone greening department was reconstituted as 3 regions, 12 districts and 54 townships (excluding Gangaw District) with a total coverage area of 20.17 million acres.

Vulnerability assessment

The vulnerable sectors of society and economy due to drought in Myanmar are agriculture and food production, drinking water supply, health, livestocks and fisheries, industry and environment. The largest vulnerable area is the dry zone area of Myanmar and the effected societies are farmers, people and livestocks in rural area.

Emergency relief and drought response

The Government of Myanmar has established institutional arrangement and has systems and procedures at National, State/Division, District, Township and sub-township levels for Disaster Management. The National Disaster Preparedness Central Committee under the Vice President (2) has been re-established in May 2013, the 22 members are included and the members are the ministers of (19) concerned ministries, prime ministers of regions and states, deputy minister of ministry of social welfare, relief and resettlement and director general of government office. National Disaster Preparedness Management Working Committee under the Minister of Ministry of Social welfare, Relief and Resettlement has also been re-established in May 2013. Under this, the 10 sub-committees are established. The members of National Disaster Preparedness Management Working Committee are the ministers and deputy ministers of concerned ministries, the ministers from regions and states, Chairmen of 10 sub-committees and director generals of concerned departments. In Myanmar, these two committees, the concerned departments and organizations are cooperating and working for disaster management in Myanmar. These disaster management committees and the Ministry of Social welfare, Relief and Resettlement are the main responsibility of emergency relief and response for disaster and also other concerned departments and organizations are cooperating. So these committees,

concerned ministries and departments and organizations carry out the activities for relief and drought response. The emergency relief and drought response in Myanmar should be upgrade.

Practices to alleviate drought impacts

The practices to alleviate drought impacts in Myanmar are as follow:

1. DMH is issuing the daily, dekad, monthly weather and water level forecasts, news, warnings and bulletins for storms, floods, untimely rainfall, temperature and minimum alert water level, agro-meterological bulletins and seasonal and annual drought report. DMH likes to upgrade the forecasting and warning system for drought management

2. Agriculture department is also doing in cooperation with international seed research centres for seeking and identifying drought resistant crops in Myanmar, conducting research on cultivation methods to be employed at the time of drought. The Ministry has been importing seeds that can survive with less dependence on water, and trying to nurse the crops and produce them at home.

3. Irrigation Department under the Ministry of Agriculture and Irrigation carry out the construction, repair and maintenance of dams, reservoirs and water supply facilities.

4. The Ministry of Agriculture and Irrigation has been implementing not only dams, reservoirs and the river water pumping project but also helping the people to build drinking water supply works. It does so by feeding water to water tanks from the dams and reservoirs, digging lakes and wells, installing water purifying systems and providing other technology.

5. Ministry of Environmental Conservation and forestry (MOECAF) has been implementing the afforestation and land rehabilitation in dry zone area by the projects.

6. The local governments, public and also NGOs are also implementing the digging lakes for getting the drinking water during drought period, rainwater storage and distributing the drinking water during water shortage

The need for knowledge and skills on drought management

Drought is part of the weather pattern; it has occurred in the past and will continue to happen in future. So, the organizations concerned with drought management of the drought prone areas need to seek comprehensive and complete data to forecast the likelihood of drought. Drought directly affects water, land and geographical conditions and socio-economy of the locality. The difference between drought and other natural disasters is that its duration is longer than that of others. So, the departments concerned need to work in cooperation and coordination to mitigate the drought impact. The measures will include ensuring proper network to be able to gather measurements on meteorology and hydrology and facts that are vital for businesses dependent on weather and water resources; proper exchange of data among the departments to prevent the droughts, mitigate their impact and to respond to them; conducting training of personnel to familiarize them with the data so as to make better use of them in making decisions; making arrangements for farmers and other organizations in order that weather forecasts are useful, clear and simple to understand while minimizing constraints; use of standard rainfall indexes to reliably calculate the beginning and end of droughts; sharing and properly using facts about the drought and weather pattern and working together to be able to have better knowledge about the intensity and the vastness of the areas affected; compiling facts and seeking methods to evaluate the drought impact in order to be able to respond to the ill effect; working harder to see that seasonal weather forecasts reach the local residents and organizatons on time; and seeking ways and means to obtain important local and global data on droughts useful to the NGOs and international NGOs. The needs for drought management in Myanmar are as follow:

(1) To set up the Forecasting and Warning system for drought management

(2) To develop the forecasting techniques and capacity building for drought management

(3) To set up a Task force including authorities and experts of Administration, Relief, water resources, Agriculture, Forestry, Meteorological Agency, NGOs, INGOs.

(4) To conduct Drought risk assessment

(5) To develop a decision support Drought Management

(6) To promote Education and public awareness for drought mitigation.

(7) To encourage community level plans of Drought Mitigation.

(8) To cooperate, coordinate and collaborate the concerned departments and organizations for drought management

(9) To develop the concerned departments's activities for drought mitigation

(10) To develop the drought policy and strategies for drought management in Myanmar

Figure.(1) The potential drought hazard levels of Myanmar

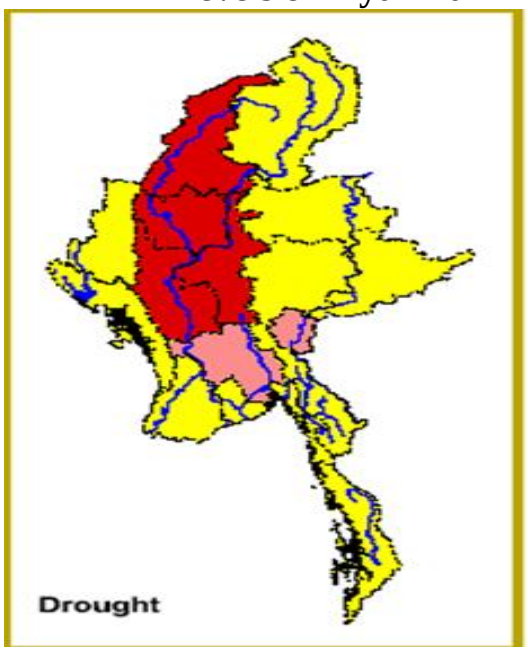


Fig. (2) Map of Dry Zone

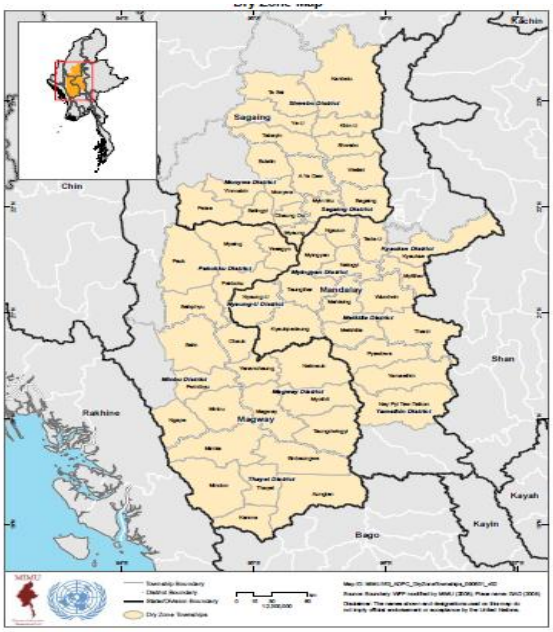


Fig. (3) Annual Drought indices of Myanmar

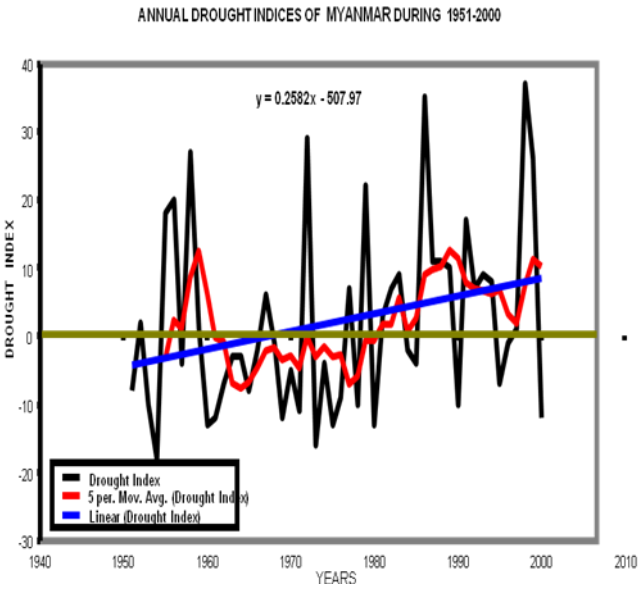
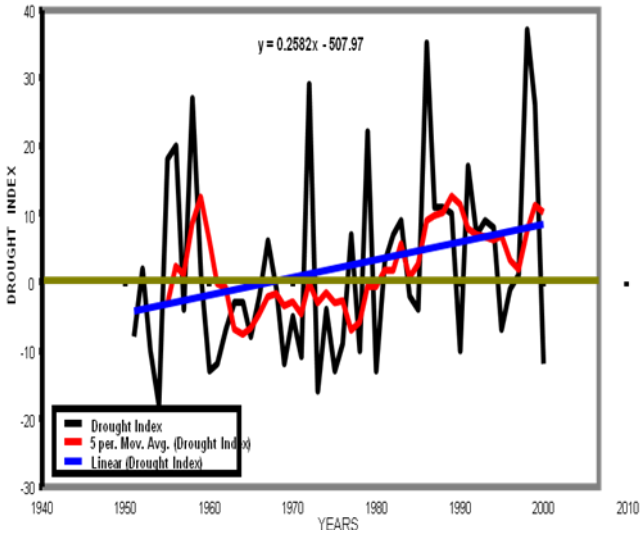
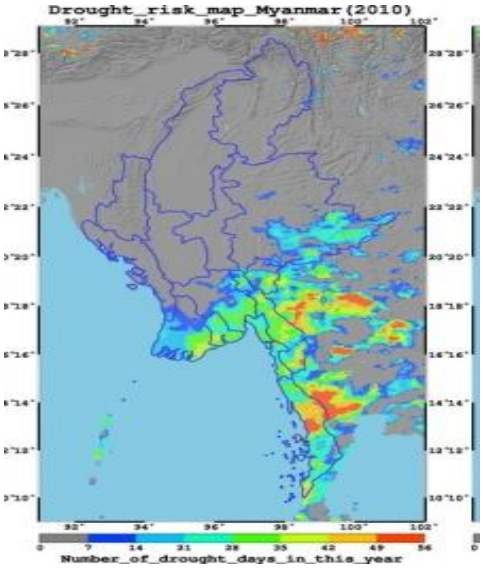
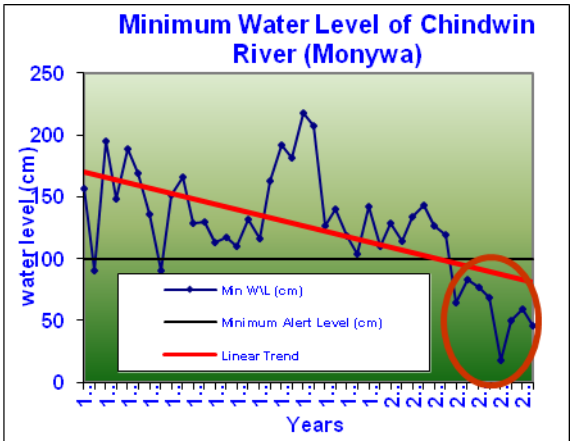


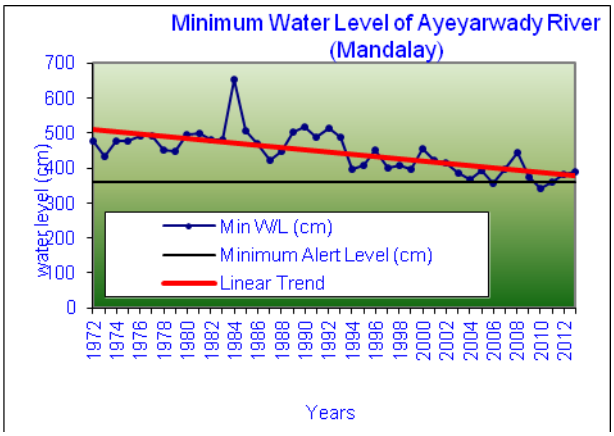
Fig. (5) Drought Risk Map of Myanmar during 2010 (1951-2000)

ANNUAL DROUGHT INDICES OF MYANMAR DURING 1951-2000









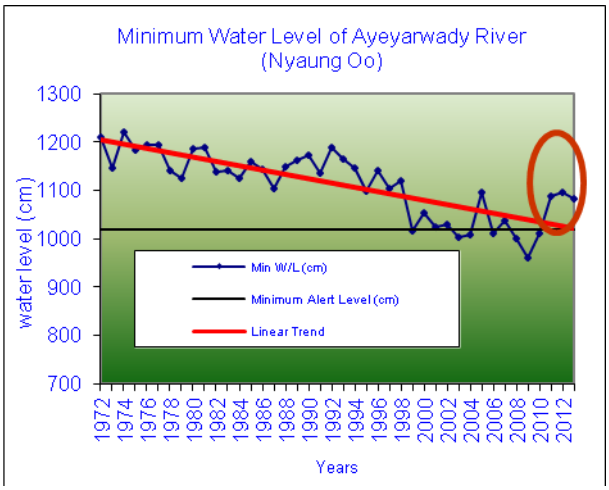


Fig. 4 Annual lowest water levels of stations in Central Myanmar Area