

**“Capacity Development to support
National Drought Management Policy”
Hanoi, 6th-9th May 2014
(WMO, UNCCD, FAO, CBD and UNW-DPC)
Country Reports – Malaysia**

1.0 Introduction

The climate of Malaysia generally is characterized by uniform temperature, high humidity, abundant rainfall and light wind. The various regions of Malaysia experience different climate characteristics that are influenced by the summer and winter monsoons, locally termed as southwest and northeast monsoons. These monsoon seasons and their transition periods, the inter-monsoon seasons, account for the various raining and dry seasons. Thus we have the flood seasons, including flash floods season, as well as the dry and hazy seasons.

The annual and monthly rainfall amount and rain day variability in Malaysia is quite large. The wet and dry seasons with variable rainfall amount and rain day, at times extremes, together with episodes of extreme weather pose a great challenge to sustainable water storage and supply management, which generally relies on direct rain water and rain water stored in dams.

Malaysia had suffered series of drought event and the three most recent ones are that of 1992, 1998 and 2014. These drought events gain particular attention because it covers the whole nation. There are other smaller scale episodes that only happen in smaller regions of the country.

In 1998, the drought was associated to El-Nino which affected the whole world, including the South East Asia region, such as southern Vietnam, southern Philippines, Malaysia and Indonesia. In Malaysia, the affected area from Perlis, the northern states of Peninsular Malaysia, up to the state of Negeri Sembilan and Melaka. The worst hit region is the capital city of Kuala Lumpur and part of Selangor where water rationing had to be exercised affecting some 3.2 million users for about 5 months as from April to September. The whole episode was dubbed as the “national water crisis”. The health of the people was also affected as the whole country also experienced severe haze disaster due to forest fire, especially from peat land forest. The economy lost due to this drought episode is estimated to be USD9 billion. The livelihood of thousands of farmers and plantations are most affected, shattered by the recurring drought.

2.0 Drought monitoring systems

Malaysian Meteorological Department (MetMalaysia) also uses the Standard Precipitation Index and rainfall anomalies to reflect the drought severity in Malaysia.

The Standard Precipitation Index (SPI) is a relatively new drought index based only on precipitation. It's an index based on the probability of precipitation for any time scale. Some processes are rapidly affected by atmospheric behavior, such as dry land agriculture, and the relevant time scale is a month or two. Other processes have longer time scales, typically several months, such as the rate at which shallow wells, small ponds, and smaller rivers become drier or wetter. Some processes have much longer time scales, such as the rate at which major reservoirs, or aquifers, or large natural bodies of water rise and fall, and the time scale of these variations is on the order of several years.

The purpose of SPI is to assign a single numeric value to the precipitation that can be compared across regions with markedly different climates. The standardization of the SPI allows the index to determine the rarity of a current drought.

The Standardized Precipitation Index (SPI) was designed to show that it is possible to simultaneously experience wet conditions on one or more time scales, and dry conditions at other time scales. Consequently, a separate SPI value is calculated for a selection of time scales.

Drought disaster in Malaysia is managed according to the standard operating procedure (SOP) which was formulated by all the relevant agencies and was led by the National Security Council of the Prime Minister Ministry. The SOP circular was first circulated in December 2011. The SOP was formulated following several drought events that had happened in Malaysia particularly the one in 1992 and 1998. The SOP provided guideline on matters related to classification of drought, the responsible agencies to monitor drought, severity of drought, line of communication and roles and responsibility of relevant agencies should the drought event be classified to reach danger level. The recent drought event which lasted approximately 2 months from mid-January 2014 to mid-March 2014 was the first time the SOP was put into practice.

MetMalaysia is responsible for issuing drought early warning if there is possibility of drought base on some criteria such as weather and climate forecasting tools including numerical modeling and related index which indicate early signs drought resulted like El-Nino phenomena.

In the SOP, if its deficit for total rainfall for at least 3 consecutive months above 35% from normal and the latest SPI index is less than -1.5, or the deficit for 6 consecutive months above 35% and latest SPI index is less than -1.5 MetMalaysia will issue for drought early warning to the responsible agencies.

MetMalaysia also provide seasonal forecast, long range forecast for relevant ministry, policy maker, disaster management agencies, national related meeting and public, (including north east monsoon, southwest monsoon and national climate forum).

MetMalaysia did continuously monitoring the number of consecutive days without rain at selected meteorological stations. The information for the districts in Malaysia that do not receive any rainfall for 5 consecutive days or more was circulated daily via emails to relevant agencies . The agencies that receive these cautionary dry weather remarks include the National Security Council, Department of Environment and the Department of Irrigation and Drainage. As in the recent dry and hot spell, the frequency of e-mail would intensify as more and more districts do not receive any rain. The number of no rain days was also tabulated and circulated to provide the members of the committee of disaster management on the severity of the dry weather event. The most recent drought event saw 17 stations posted record consecutive rain free days with an average 23 consecutive no rain days.

For DID Malaysia, its drought monitoring program was initiated since 2001 as a result of 1998 drought incident. Among its first initiative was to establish a website wholly focusing on drought monitoring. Its objective is to assist relevant agencies to make early preparation to face drought events. In 2013, the website was further improved to include additional features to better reflect the drought situation in Malaysia. DID Malaysia is given the responsibility to report on river water and reservoirs water level. In this web site, 21 water level stations were set up to monitor reservoirs level and another 23 stations for rivers.

DID Malaysia also use the Standard Precipitation Index and water level in rivers and dams as a tool to monitors hydrological drought. Hydrological drought is a term use to define the deficiencies in surface flow into reservoir, stream flow and rainfall. A hydrology drought situation would occur when any river discharges reduces or any dam level decrease continuously. This situation can be defined by the changes as given below :-

a) River Discharges

When the low flow exceed 5 years Average Recurrence Interval (ARI) continuously for 3 months, a drought event is considered as occurring. On a daily basis, DID Malaysia reports the 7- day low flow for ARI of 2, 5 and 20 year for 23 stations throughout Peninsular Malaysia and upload the information via its website known as ***InfoKemarau***.

b) Dam Levels / Storage Dam

Drought event would be considered when a dam levels falls below the normal level for 3 months continuously. DID Malaysia reports the water level in 23 dams and include useful information such as maximum water level, percentage of balance of storage, danger and critical level. This information may also be derived from the ***InfoKemarau***. The website proved to be useful reference during the last drought episode.

DID Malaysia on a monthly basis produce a drought report which is circulated to relevant government agencies.

3.0 Vulnerability assessment:

The monthly and annual variability is quite substantial. Furthermore Malaysia generally receives less rain when El Nino occurs. The most vulnerable sector of economy during drought event is the small farmers, especially for paddy farming. Due to the variability of rainfall during planting season, the government assists the farmers by providing irrigated water for the rice bowl of Malaysia (Northwest of Peninsular Malaysia) as well as others.

During the El Nino year of 1997/1998, many parts of Malaysia experienced many months of water rationing as well as trans boundary haze caused by forest fire due to the extreme dry weather. However last year and early this year is not an El Nino year, but many parts of the country are experiencing extreme dry season for the last few months. This has caused water shortages in many parts of the country, especially in the Klang Valley. There were a lot of local burning resulted haze during that period which limited most of the outdoor activities, some schools had been close for a few days and hospitals reported increasing cases that affected public health. Malaysian Palm Oil Council (MPOC) warning its drought impact on palm oil production could be felt for up to two years. They are expecting a severe reduction (in production) in the next two years.

4.0 Emergency relief and drought response:

In the agriculture sector, there have been many forms of government aid to relieve the impacts of drought. For 2014 drought that had recently happened, it was reported that the Malaysian Government through the Ministry of Agriculture and Agro Based Industries provide cash assistance to paddy farmers with an amount of RM 1,400 was given to farmers for every hectare of crop damage due to drought.

For aquaculture practices, in 2014 the government assisted them by providing fish fries, fish food and equipment to repair the cages. The Ministry of Agriculture and Agro based Industries had been reported to have set up a fund solely for the purpose of providing assistance to the agriculture sector. Initially a sum of RM 10 million was allocated and it was reported that the sum will be subsequently increase to RM 50 million.

It is not known whether any other sector was compensated by the Malaysia Government due to drought incidences.

In Malaysia, there had been many bush and forest fire incidences due to the hot and dry spell. In all, more than 7,000 cases reported between the periods of early February 2014 to mid-March 2014 with an average about 300 calls daily. The Government of Malaysia mandated the Malaysian Fire and Rescue Department as the main agency responsible for combating and managing forest fires. The SOP for forest and plantation fires would ensure coordination among all relevant agencies in effectively responding to the management and control of forest fire occurrence especially during drought season.

5.0 Practices to alleviate drought impacts:

The main effort in times of drought is to create rain from cloud seeding operation. This task is given to MetMalaysia to decide on the suitability of operation following several factors than need to be considered especially the presence of suitable rain clouds, high humidity, and an unstable weather conditions. The Disaster Management Section of the National Security Council will coordinate with the Royal Malaysian Air Force to provide the necessary asset for the operation. The focus is to create rain on water catchment area.

On the community basis, the common form of practices to alleviate the drought impact was to distribute water tanks to support health, community and welfare institution.

In the agricultural sector, the farmers or farmers association are provided with small water pumps to save crops and prevent losses. If the extent of losses is great and covers a sizeable number of farmers or area, then there could be cash assistance to the farmers.

Other avenues to alleviate drought impact is to increase and intensify communication of drought event via national electronic network to the public

Other mitigation measures that are now put into place are to connect pipeline network to allow for cross states/border water supply. What is planned to relieve the present situation is to channel water from the newly completed Triang Dam in Negeri Sembilan to Selangor, Putrajaya and Kuala Lumpur. The deferred planned water transfer from Relau Dam in Pahang to Langat river should be able to relieve water supply situation in Selangor in 2018. The tunnel with a capacity to transfer of about 1800 million litres per day should be able to provide portable water supply for Selangor, Kuala Lumpur and Putrajaya till 2025.

6.0 The need for knowledge and skills on drought management:

Government Agency, statutory body, private sectors and NGOs which involved in disaster management should, alone or cooperate;

- identify, document and monitor and update area that is risky face drought according to drought type and each jurisdiction;
- providing drought early warning system infrastructure according to each jurisdiction;
- develop and stabilize capacity in terms of human resource and competency, equipment, relationship and communication, technology, finance and so on so that response that taken is coordinated and effective;
- implement efforts increase awareness on disaster in every level of society;
- develop expertise and skill in drought management;
- provide Emergency Response Plan(ERP) and Business Continuity Plan respectively;
- provide complete inventory logistics and updated from time to time to fasten disaster response;
- coordinate drought drill to test preparedness level to face drought.

Governments could plan for improve droughts management strategy in view of climate change impacts. Some of the suggestions that have been put forth and should be considered are as below:-

- Conjunctive use of ground water;
- Integrate and build water services to where it is needed most;
- Encourage use and construction of water storage such as low dams, rainwater harvesting systems,
- Utilise water ex-mining pools, flood mitigation ponds and other ponds and provide linkage to rivers;
- Explore use of modular treatment systems using membrane systems.
- Practice demand management of water supply

Other than that, public awareness in making sure that water is used wisely, by applying water restrictions to homes and businesses. Communities also should prepare for droughts, by carefully managing water by not filling up community swimming pools or watering sports fields, planning homes and buildings that use less water and making sure that water is used wisely, by applying water restrictions to homes and business. Families can prepare for droughts, by making sure that water is used wisely in the home and around the garden, looking out for dripping taps, leaky pipes and reducing waste water, installing a rainwater tank and having shorter showers and following water restrictions during water rationing period.

During a drought, a lack of water can cause other hazards. Other drought-related hazards in the country include heat waves, haze and forest fires.

References:

Oron G, Campos C, Gillerman L, Salgot M. 1999. The Asean Users' Manual For The Asean Climatic Atlas and Compendium of Climatic Statistics. *Water Resource Management* 2: 21–45.

Malaysia National Security Council (Majlis Keselamatan Negara) (2011); Standard Operation Procedure for Drought Disaster.

Report prepared by :-

Nor Adawiyah Abdulah	Malaysia Meteorological Department (MetMalaysia)
Juhaimi Jusoh	Department of Irrigation and Drainage, Malaysia (DID)
Dr. Abdul Rahman Kassim	Forest Research Institute of Malaysia (FRIM)