

MALAYSIA

Kelantan Big Yellow Flood 2014: Impacts and Mitigation

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Natural disasters are beyond control of human beings and cannot be predicted accurately. Major natural disasters like floods, earthquake, landslides and droughts, it result in threat of human life, loss of property, affect infrastructure, agriculture and environment. The most severe natural disaster experiencing in Malaysia is flood. There are several factors contributing to the flooding problem ranging from topography, geomorphology, drainage, engineering structures and climate. Most floods are caused by rainstorms in which a lot of precipitation falls in a short period of time. Intensity and duration of the rain are most influencing factors for flood hazards. Two major type of flood occur in this country are monsoon flood and flash flood. The monsoon flood occur mainly during Northeast Monsoon which prevails in the months of November to March with heavy rain over the east coast states of the Peninsular Malaysia, northern part of Sabah and southern part of Sarawak. In December 2014, extreme flood event occurred over the east coast of Peninsular Malaysia was the flood known by locals as the Kelantan Big Yellow Flood 2014. Kelantan was hit by the worst flood ever recorded in history where it reaches up to 10 meters. Some building were inundated up to the 4th floor. At least 21 people died, more than 66 500 people were evacuated and estimated damages cost about 1 billion Malaysian Ringgits (RM). Besides, many people were trapped in their homes and people sheltering in evacuation centres such as school were left helpless due to lack of suppliers and necessities. There were several reasons contributing to the December 2014 flood in Kelantan. One of it is due to prolonged heavy monsoon rain. The rainfall amount recorded was extremely high. Kuala Krai Station recorded 1273.0 mm amount rainfall in 14 days. Combination of annual monsoon season and the global climate patterns contributes to the rain enhancement. Particularly, on early December 2014 the land mass in Siberia experienced a very low temperature below average. This contributes to the high pressure at the northern hemisphere. Intense cold dry

air blows out from the continent and absorb water vapour as it crosses the Pacific Ocean and the South China Sea bringing winds carrying large amount of moistures to the east-coast of Peninsular Malaysia. Besides of monsoon influence, Madden Julian Oscillation (MJO) also contribute to the heavy rainfall. The enhanced rainfall phase of the MJO was developed at a belt along Peninsular Malaysia. Malaysia Meteorological Department (MMD) has developed a nowcasting system SWIRLS (Short-range Warning of Intense Rainstorms in Localized Systems) for flood mitigation. The system uses latest radar data to generate weather forecast up to 3 hours of 10 minutes intervals. Department of Irrigation and Drainage (DID) ongoing project on Flood Forecasting and Warning Systems (PRAB). The system is capable to predict flood events seven days earlier based on weather forecast data from MMD. The implementation of the PRAB projects involves the development of flood prediction models for 40 major river basin.