

## 論 文 要 旨

## Thesis Abstract

(yyyy/mm/dd) 2020年8月3日

※報告番号	甲 第 272 号	氏 名 (Name)	Nadzirah Binti Hosen
主論文題名 (Title) The Role of Traditional Ecological Knowledge in Climate Change Adaptation			
内容の要旨 (Abstract) <p>(1) Introduction Over the past centuries, it has been evident that the average surface temperature of the Earth has considerably increased. Even though natural processes have contributed to this rise throughout history, proven that human activities were the prevailing roots of the rapid warming seen during this time. This action has resulted in persistent changes in all the parts of the climate system, increasing the possibility of severe and permanent impacts on people and ecosystems (IPCC, 2014), such as frequent and intense storms, floods, heat waves, and droughts. Consequently, growing crops is becoming more difficult (Nelson et al., 2009; Rosegrant et al., 2008), potable water supply is becoming scarce (IPCC, 2008), and local livelihoods are deteriorating (Chaplin et al., 2017; USAID, 2008). In essence, those who contribute the least amount of greenhouse gases (GHGs) are the most affected by climate change (Samson et al., 2011), especially rural and indigenous people. Indigenous people have been living and practising “low carbon” traditional ways of life (Nakashima et al., 2012); however, they are the most impacted (Human Rights Council, 2017).</p> <p>Despite the vulnerabilities they faced, indigenous people have their unique ways of adapting to the environmental changes (Maldonado et al., 2014; Nakashima et al., 2012; UNESCO, 2014). This ability is the result of multi-generational experiences of a practical way of life, that makes them aware of what is going on around them (Wildcat, 2014). Such communities have long faced complex environmental uncertainties, resource shortages and exposure to extreme weather hazards (Byg &amp; Salick, 2009). They have a strong connection and relationship with nature, making them more sensitive to the seasonal rhythms and thus enabling them to cope with the variability and changes based on centuries-old knowledge (McLean, 2012), also known as Traditional Ecological Knowledge (TEK). Despite its importance in combating climate change, the TEK of indigenous peoples is often neglected. This study uncovers the potential of TEK from the perspective of indigenous communities in Sarawak, Malaysian Borneo, and explores how TEK helps them to observe and respond to local climate change. Three specific objectives of this study are:</p> <ol style="list-style-type: none"><li>To describe the role of TEK in climate change adaptation context based on typologies of TEK</li><li>To enhance understanding on Indigenous peoples’ adaptation strategies to climate change based on three different case studies</li><li>To provide important insights into the theoretical and practical implications</li></ol>			

## (2) Methodology

The TEK of the Indigenous groups was sampled during three fieldwork visits conducted in three villages in Sarawak between January and February 2019. In-depth interviews with local informants and field observation were conducted. The reasons for selecting these field sites and communities are threefold: (1) communities that still maintained traditional practices or economies, (2) resource-based livelihoods and (3) location of homes in a vulnerable environment. Snowball sampling technique was used to identify key informants and overall, there were 31 face-to-face interviews. Thematic analysis was used to analyse quantitative data and identify themes in each of the research components, built based on the TEK framework.

## (3) Results

The results show the emerging themes from each component of the TEK. First, *forecasting* has helped the community detect changes in its surroundings through local knowledge of the environment and identify appropriate strategies for coping and adapting. For example, the communities have observed a significant increase in temperature, with uncertain weather and seasons. Consequently, drought and wildfires have had a substantial impact on their livelihoods. However, they have responded to this by managing their customary land and resources to ensure food and resource security, which provides a respectable example of the sustainable management of terrestrial and inland ecosystems. These were done through a few strategies such as: (1) *rationing*, a temporal restriction of harvest in response to common shortages; (2) *diversification*, a mixture and selection of various livestock, crop varieties; (3) *mobility*, lands are left for years to rest; (4) *storage*, stockpiling emergency food supplies which contribute to food security; and finally, *conservation*, by protecting healthy habitat. The social networks and institutions of indigenous communities, on the other hand, enable *pooling* that promotes collective action and strengthens the reciprocal relationships that they rely on when calamity strikes. Accordingly, the communities maintain their TEK through *cultural festivals and oral traditions* passed from one generation to another. TEK is a practical tool that helps indigenous communities adapt to climate risks and promotes socio-ecological resilience, which upholds social empowerment and sustainable resource management.

## (4) Conclusion

Overall, this thesis has met the objectives proposed at the beginning of the study. Indigenous people have been living in harsh natural environments for decades and using TEK to adapt to the changes in their local environment. TEK, which comprises the local knowledge of the environment; land and resource management; social networks and institutions; and worldviews and belief systems, help Indigenous communities define climate change and develop local-specific adaptation strategies. More specifically, these strategies are crucial to promoting the resilience of the socio-ecological system. Under uncertain conditions, they improve society's capacity to cope with change and sustain ecosystems, as the knowledge base coexists with socio-ecological systems. As illustrated in this thesis, the four elements of TEK are essential and should be taken into consideration when documenting TEK to understand the overall picture of climate change impacts and local adaptation. However, climate change may also alter the relevance of TEK. Natural signs might become less reliable as the weather and season become more unpredictable. Consequently, TEK documentation could help to understand whether these knowledge systems and experiences accumulated over the centuries can continue to adapt and help communities respond to the current climate. The documentation will also help to preserve this knowledge system, as it is currently experiencing erosion in every part of the world.