

## Climate Change, Socio-economic and Production Linkages in East Malaysia Aquaculture Sector

Rosita Hamdan\*, Fatimah Kari, Azmah Othman and Siti Muliana Samsi

Faculty of Economics and Administration, University of Malaya, Kuala Lumpur, Malaysia

**Abstract.** Aquaculture sub-sector is the largest contributor to the development of the fisheries sector in Malaysia. Due to its potential and ability to enhance the national food production and resolve social problems in Malaysia, the government allocated substantial funds and planned many programmes related to aquaculture development. Climate change impact on aquaculture production is however uncontrollable and damaging to the aquaculture growth. This study is carried out with the objective of identifying the relationship between production, socio-economic and climate change risks in the aquaculture sector in Sarawak, East Malaysia. This research was conducted on 249 aquaculture ponds and cages farmers in Sarawak. To determine the relationship between all factors, cross-sectional multiple linear regression was employed by using socioeconomic and climate risks data. Socio-economic factors such as number of family members, variable cost and technology usage was found to significantly influence the aquaculture production. Hence, bivariate analysis was employed to indicate the relationship between volumes of annual aquaculture production with all climate change risks factors. The results revealed that increase of climate change risks events have low and significant relationship with decrease in aquaculture productivity. In addition, the qualitative information from the interviews did verify that decrease of dissolved oxygen in water, flood and drought events were common production risks to aquaculture in Sarawak. This study suggests adaptation and mitigation strategies need to be taken immediately to overcome the problem of climate change risks that may be increasing in the future.

**Keywords:** climate change, risk, socio-economic, production, aquaculture growth.

### 1. Aquaculture Sector Growth in Malaysia

Aquaculture sector is one of the important sub-sectors in agricultural development in Malaysia. The sector is still developing compared to such sector in neighboring countries like Thailand and China. Aquaculture sector had been developed since 1920's in Peninsular Malaysia. It started off with the freshwater aquaculture and then brackish water aquaculture in the late 1930. While in Sabah and Sarawak (East Malaysia), the aquaculture sector had only started to grow in the early 1990's. Currently, there are three practices of Malaysia's aquaculture; the fresh water, brackish water and marine aquaculture.

The physical and financial drivers are two important aspects that have enhanced the competitiveness of aquaculture sector development in Malaysia. From 1998 to 2010, the aquaculture production in Malaysia has increased from 133,062 tonnes (3.9% of growth) to 500,000 tonnes (36.6% of growth). Starting from the year 2003, a lot of programmes have been announced and commenced by the government to enhance the potential of this sub-sector. The government invested and allocated a huge fund in order to improve and built good facilities especially in aquaculture industrial zone area. The underlying reasons are due to the important contribution of aquaculture sector in increasing national food production and to resolve the insufficient marine fisheries landings and optimal exploitation of marine fish (Malaysia, 2003; Malaysia, 2011). The contribution of aquaculture sector to Malaysia's GDP shows a positive improvement within the years. Aquaculture sector has contributed 0.283 in production value as percent of GDP in 2003 (Lungren et. al.,

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\* Corresponding author. Tel.:+60138025200; fax:+60379673719  
E-mail address: [rositahamdan@gmail.com](mailto:rositahamdan@gmail.com)