

## The Potential Benefits of GPS for Small Scale Fishermen in Malaysia

<sup>1</sup>HayrolAzril Mohamed Shaffril and <sup>2</sup>AzimiHamzah

<sup>1</sup>Institute for Social Science Studies, <sup>2</sup>Faculty of Educational Studies,  
Universiti Putra Malaysia, Bangi, Selangor, Malaysia

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**Abstract:** This conceptual study attempts to discover the potential benefits of GPS usage for small scale fishermen in Malaysia. Based on the review of literature and document analyses performed, three main benefits of GPS usage for the small scale fishermen were identified namely to increase their income to strengthen safety aspects and to enhance their technology skills and knowledge. This study has come out with a number of recommendations that can assist the concerned parties in constructing the best strategies to further enhance fisheries technologies usage especially the GPS among the small scale fishermen in Malaysia.

**Key words:** Community development, rural development, technology usage, fisherman, safety

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### INTRODUCTION

The Small Scale Fishermen (SSF) is one of the important groups in Malaysia, particularly on its role in providing continuous protein supply to the public. Although, there is no official statistic on the number of SSF, previous studies done by Shaffril *et al.* (2013), Osman *et al.* (2014), Shaffril *et al.* (2014), Bolong *et al.* (2013) and Omar *et al.* (2012) have consistently proven that SSF constitutes >60% of the total number of fishermen in Malaysia. Similar to other agriculture community, SSF is facing a number of problems and among the prominent ones are poverty and increasing risk of conducting their fishing operation (Shaffril *et al.*, 2014, 2013; Omar *et al.*, 2012). Realizing the problem, the government has taken a number of initiatives to overcome it and one of it is the introduction of fisheries technologies. Although, there are several types of fisheries technologies such as sonar, echo sounder and remote sensing, within the scope of SSF, the Geographical Positioning System or also known as GPS is found to be most suitable for their fishing operation. This conceptual study has much to do with GPS whereby, it concerns on the potential benefits of GPS usage for SSF in Malaysia. Based on review of literature and document analyses on articles and documents from established journal databases such as Science Direct (<http://www.sciencedirect.com/>), Taylor and Francis (<http://www.tandfonline.com/>), Sage Publications (<http://www.sagepub.com/home.nav>) and Emerald Publishing (<http://www.emeraldinsight.com/>), this conceptual study was able to be constructed. On the early part, this study focuses its discussion on the background of fisheries industries in Malaysia followed

by characteristics of the SSF in Malaysia. The study then places its focus on the problems faced by the SSF which leads to the need of GPS usage. The final chapter of the study will discuss on the potential benefits of GPS usage for SSF in Malaysia.

### THE FISHERIES INDUSTRY IN MALAYSIA

Agriculture sector in The Ninth Malaysian Plan (RMK9) has recorded a tremendous achievement and efforts to further develop agriculture sector has been continued in the Tenth Malaysian Plan (RMK10). Among the main contributors to the success of this sector are the industries such as palm oil, rubber, livestock, paddy and not too forget the fisheries industry. The fisheries industry has benefited both the country and the public. For Malaysia, it has consistently generated a huge amount of income in 2013 for example, a total of RM7.9 billion has been generated DOF while within the scope of the public, it benefited them in term of consistent marine supply and employment opportunities.

The current number of registered fishermen in Malaysia is 144,019 and the number has consistently increasing from 2010 (129,622) 2012, (134,110) and 2011 (136,514). There are a number of reasons that gear towards such scenario whereby the introduction of monthly allowance for the registered fishermen worth 300 Ringgit Malaysian (roughly equivalent to USD90) is one of it. Furthermore, all of the registered fishermen are provided with 65 cents subsidy for every litre of fuel/diesel they buy.

The recent statistics provided by Department of Fisheries Malaysia DOF have shown that states such as Sabah (29,440), Perak (17,564) and Sarawak (16,210) are

the leading states with the highest number of registered fishermen while similar states Sabah (16,103), Sarawak (7,157) and Perak (6,301) have come out with the highest number of registered vessels in Malaysia. Furthermore, within the scope of Malaysia, among the fishing tools preferred by the registered fishermen are gill/drift nets, hook and lines and trawl nets.

Registered fishermen in Malaysia are categorized according to their catching areas. Understandably, there are four groups of fishermen which are zone A fishermen (conducting their fishing operation <5 miles nautical), zone B fishermen (conducting their fishing operation between 5.1-12.0 miles nautical), zone C2 fishermen (conducting their fishing operation between 12.1-30.0 miles nautical) and zone C0 fishermen (conduct their fishing operation >30.1 miles nautical). Comparatively, the zone B, C2 and C0 fishermen who are known as deep sea fishermen while the zone A fishermen are known as the SSFM or the coastal fishermen.

### THE SSFM IN MALAYSIA

Although, there is no official number of the SSFM in Malaysia, consistent findings by previous studies have shown that the SSFM comprised >60% of the overall registered fishermen (Shaffril *et al.*, 2013; Osman *et al.*, 2014; Shaffril *et al.*, 2014; Bolong *et al.*, 2013; Omar *et al.*, 2012). The SSFM are characteristically with a smaller vessel and a smaller engine power and some of them are still practicing indigenous ways of operating their fishing routines (e.g., referring to the hill to seek fishing location) (Hamzah *et al.*, 2014). Furthermore, they are conducting their fishing operation at subsistence level and most of them use traditional fishing tools (e.g., rawai and bubu) (Hamzah *et al.*, 2014). Moreover, they are operating daily fishing operation usually they start their fishing operation early in the morning and return to the jetty in the afternoon or evening and most of them are equipped with basic communication tool the mobile phone (Shaffril *et al.*, 2013, 2014).

### PROBLEMS FACED BY SSFM

Poverty is one of the problems faced by SSFM. Albeit the income generated by the fishing industry was big for example in 2013, a total of RM7.9 billion has been generated DOF, however, it can be seen that such huge amount of profits only benefited by the commercial fishermen whereby majority of them are the deep sea fishermen, on the other hand, the majority of SSFM are found to live under poverty (Shaffril *et al.*, 2014, 2013; Omar *et al.*, 2012). A number of previous studies have proven on this, Shaffril *et al.* (2014) for example had

concluded that 35.6% of SSFM only earned RM700 and less in a month (roughly equivalent to USD233 and less in a month) while Shaffril *et al.* (2013) found that a total of 45.3% of SSFM only earned RM500 and less in a month (roughly equivalent to USD166 and less in a month). Omar *et al.* (2012) on the other hand had confirmed that a total of 49.0% of SSFM earned between RM501-1000 in a month (roughly equivalent to USD166-33 in a month). A number of reasons such as subsistence level of fishing operation and challenges posted by the changing climate have been associated with this scenario.

**Subsistence level of fishing operation:** A number of reasons might explain why SSFM only able to conduct their fishing operation at a subsistence level and the next discussion places its focus on it.

**Smaller vessel and engine power:** Dissimilar to the deep sea fishermen who are equipped with a bigger vessel and engine power, the SSFM are only equipped with a smaller vessel and engine power, most of them are only able to catch fish at a smaller radius of catching areas which means a smaller productivity for them. Furthermore, unlike the deep sea fishermen who is able to spent days, weeks or even months for their operation, the SSFM only able to spend hours at the sea as their smaller vessel and engine power are not suitable for a longer duration of fishing operation.

**Smaller capacity catching tools:** In addition to smaller vessel and engine power, their catching tools have resulted in a lower productivity for SSFM. Their catching tools such as bubu, rawai and fishing rods for instance have a smaller catching ability which limits the SSFM catching. The usage of bubu for example in 2012 was only able to land a total of 11,669 tone marine productivity compared to 706,080 tone metrics landed by advanced fishing tool such as bottom trawling.

**The old way of doing things:** Moreover, unlike the modern fishermen who are able to land more fish resulted from their usage of superior fisheries technologies such as Sonar, Echo Sounder, Remote Sensing and GPS, the productivity of SSFM on the other hand is not as much as the modern fishermen as they are relying much on their indigenous method in conducting their fishing operation (e.g., referring to the moon, star, hill or mountain in seeking the potential catching areas) which are solely based on their common sense and luck.

**The impacts of changing climate on the economic aspects of SSFM:** Climate change and its impacts, particularly with regard to extreme weather events and disasters have been increasingly felt in recent years. The vulnerability of

developing countries like Malaysia has likewise risen due to the uncertainty and risk that resulted from the changing climate. According to Kwan *et al.* (2011) and Azli (2010), weather elements such as wind velocity, waves, sea level rise, temperature, pattern of the rain and monsoon have changed and eventually such changes have increased the risks associated with SSFM fishing operation.

Compared to other groups of community, the SSFM are predicted to suffer more as their reliance on the environment for conducting their socio-economic routine are high. Due to the weather instability caused by the changing climate, it increases the risks associated with SSFM fishing operation, thus lessen the number of their fishing operation. Furthermore, several studies have looked onto the impacts of the changing climate on fishermen's health as the changes are expected to cause several health problems such as flu, fever, cough, malaria, respiratory diseases, heat stress, skin diseases asthma dengue, allergies, heart disease and mental stress (Lieshout *et al.*, 2004; Pinto *et al.*, 2011). Studies done by CSIRO Australia (2007) and Rijnsdorp *et al.* (2009) on the other hand have concluded on the impacts of changing climates especially regarding the cooler and warmer world on the quantity and quality of the fish. Essentially, increased risks, affected health status caused by the climate change and lesser quality and quantity of the fish are expected to impinge the economic aspects of SSFM as all of these can lead to less productivity among the SSFM.

**The threats of changing climate:** In addition to its impacts on the SSFM economic aspects, climate change is seen to pose challenges on the SSFM safety aspects. Both, local and international scientists have looked onto the climatic changes in Malaysia such as rising temperature (Kwan *et al.*, 2011; IPCC, 2007), sea level rise wind and waves. Due to their nature of fishing operation, the changing climate increases the risks for SSFM. Their smaller boat and engine power for example make them vulnerable to a range of potential climate change impacts such as storm and severe winds. Furthermore, having only basic communication tool such as mobile phone with them is inadequate in facing the challenging environment posed by the changing climate.

#### **GPS AS THE ANSWER FOR THE SSFM PROBLEM**

Realizing these problems, the government has come out with a number of initiatives and one of it is the introduction of fisheries technologies such as Sonar, Echo Sounder, Remote Sensing and not too forget the GPS. Although, several fisheries technologies are available, due to the nature of SSFM fishing operation and its cheaper price, GPS is most suitable to assist the

SSFM fishing operation. The GPS was believed to be first introduced in the mid 60s, however, it was only in mid 90s, GPS usage started to be popular among fishermen in Malaysia. GPS encompasses a number of functions. First, it navigates the fishermen to marked fishing areas and secondly, GPS functions as the safety tool for the fishermen. Consequently, both of these functions result in a number of benefits for the SSFM such as increasing their income, act as a safety tool and increasing their technology knowledge and skills.

**Increase their income:** The GPS can increase the SSFM income by shortening the duration of their fishing operation. As the GPS is able to navigate the SSFM accurately to the potential fishing areas, it minimizes the duration of the fishing operation. Comparatively, during the previous years, the SSFM spending hours and hours just looking for the potential fishing areas by referring to the hill and mountain which is solely based on their common sense and luck, however with the superior function of GPS nowadays, the SSFM is able to reach accurately at the marked fishing areas which eventually will significantly save their time.

Accordingly, a shorter fishing operation will reduce the SSFM's investment on fuel. Notwithstanding the 65 cents subsidy on every litre petrol/diesel they buy, a large portion of fishing operation cost still arises from the fuel cost and having GPS is expected to benefit the SSFM. Furthermore, a shorter duration of fishing operation resulted in a lesser cost on the crew member salary and other miscellaneous such as ice. Having these entire cut on their cost are expected to increase the net profit of the SSFM.

**Strengthen their safety aspect:** As the climatic changes and unpredictability of weather nowadays have posed a formidable challenge on SSFM, GPS is expected to act as the safety tool for them in several ways. Understandably, bad weathers constraint the SSFM visions at the sea, this however can be addressed by GPS superior functions as it can navigate them accurately to the jetty regardless the weather condition. Furthermore, the ability of GPS to mark dangerous coral assists the SSFM to avoid any threats that might damage their vessel (Osman *et al.*, 2014). Via the longitude and latitude information provided by GPS, the fishermen can inform their colleagues or related agencies which then can lead to expeditious rescue efforts in emergency situation such as engine breakdown. In a study done by Lowrey has demonstrated how fishermen in Ghana have used GPS as their safety tool whereby fishermen over there cooperate with the authority in combating the intrusion of foreign fishermen by informing the coastguards on the location of the intruders which then allow prompt and appropriate action to be taken.

**To enhance technology skills and knowledge:** By using the GPS, the SSFM has the opportunity to learn more about the technology. This then will further narrow down the existing digital gap between the rural people and their counterpart in the urban. Moreover, usage of technology can be fun especially for the first timer which then can encourage the fishermen to involve in technology learning process and constantly motivate them to learn, thus improving their level of skills and knowledge on technology (Hassan *et al.*, 2011).

### CONCLUSION

Based on the analyses done, doubtless that GPS offers superior functions that will deliver abundance of benefits for the SSFM. By using the GPS the SSFM is expected to strengthen their economic and safety aspects while providing them chance to gain more skills and knowledge from the technology usage.

Doubtless, GPS must be used by SSFM as one of the transformation efforts from the subsistence to a commercial fisherman. A number of recommendations are highlighted here to encourage GPS usage among SSFM. Firstly, as there is a need for a wider dissemination of GPS knowledge among the SSFM in order to enhance their technology usage, Omar *et al.* (2012) have suggested the need to offer the SSFM with technology courses and trainings. Ideally, this training can be conducted by either jetty leader or skippers as both have a great influence on the fishermen. Additionally, it is important for the courses and trainings to be conducted constantly and to ensure that every SSFM have access to these courses and trainings.

Second as most of the SSFM are still living under poverty, it is suggested that subsidy can be provided for those who intend to buy GPS. Such practice have been proven to encourage and increase technology usage among the community. Malamud and Pop-Eleches (2011) has provided an example on how the authorities in countries such as Brazil, Uruguay, Peru and Columbia have effectively improved the technology usage among the poor by providing ICT subsidy to this group and doubtless the same can be done in the within the setting of Malaysian SSFM.

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