

THE IMPACTS OF COASTAL RECLAMATION TO THE QUALITY OF LIFE OF TANJUNG TOKONG COMMUNITY, PENANG

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ABSTRACT

Many studies had shown that coastal area serves the economic functions including supporting aquaculture activities, tourism, transportation, mining, communication and facilitating navigation. These activities resulted in rapid population growth within the coastal areas. A coastal reclamation becomes one of the solutions to overcome the growing population in the coastal area. However, coastal reclamation might have positive and negative impacts to the employment and income of the existing community who are depending on the economic resources of the coastal areas. This paper presents the impacts of coastal reclamation to the community in Tanjung Tokong, Penang which focuses on the aspects of employment and income. It draws literatures from various local and international publications and also from government reports and publications. The data were collected through questionnaire survey and interview. Additionally, the survey questionnaire was analyzed using Statistical Package for Social Science (SPSS). The results show that there are changes in type of profession and difference in mean of salary before and after the reclamation, however statistically there is no significant difference. The findings also suggested that only a minority community involve in profession shifting. As a result, it is recommended that community should take advantage from the coastal reclamation development in terms of tourism and employment provided by the developer as coastal area has a unique character.

Keywords: Coastal reclamation; employment; income; economics; built environment

INTRODUCTION

Knowingly, that most of the population can be found living close to the coastal area as compared to other area (Majid, 1985). This supported by UNEP RRCAP (2004) who stated rapid economic and industrial growth recently have attracted an increasing percentage of the population to live in a coastal area. In relation to

that, Southeast Asian, coastal zones been utilized for a variety of purposes such as tourism, fisheries, transportation, mining and communication (as cited in Swaminathan, 2008). UNEP RRCAP, (2001), supported by mentioning estuaries provide a variety of economic functions including supporting aquaculture activities and facilitating navigation.

Still, evident had shown that human faces shortage of land resources. For example, Xu & Wang (2003) stressed out that in the 21 century, it estimated that the population of China will increase from 200 million to 300 million. However, the total farmland will reduce to 1,800 km². By that time, China will need 400 million to 500 million population's existing spaces. Therefore, coastal reclamation is one of the solutions to increase resources of shoreline and harbor tract. Not only China but Singapore, Hong Kong and many coastal cities in Japan, Taiwan, and South Korea have changed the outlines of their coastlines for a variety of purposes. For example, it estimated that South Korea has reclaimed more than 62,000 hectares of its coastal area since the Second World War and it adopted a National Reclamation Master Plan in the 1980s in order to reclaim more land (Hwang 1999; Moores & Braunlich 1999). In Hong Kong, about a tenth of the country's developed area is reclaimed land and more being planned, including one project that provide space for a Disney theme park (Jiao, 2000). These activities show that coastal reclamation has become one of the main solutions for a land shortage issue.

Nonetheless, reclamation would alter the condition and ecosystem of the coastal area in several aspects thus lead to employment and income problem for the local community living near to the coastal area. In Batam, Indonesia, coastal reclamation had suspended the function of mangrove functioning. If mangrove forest and coral reefs deteriorated, productivity of fisheries reduced and several fish species extinct (Priyandes & Majid, 2009)

Furthermore, Islamic teaching has put forward several perspectives relating to the environmental issues. Spahic (2004) mentioned that one of the important Islamic concepts on the environment is all things created with purpose and in proportion

and measure both qualitatively and quantitatively. He further explained that the Holy Quran and Sunnah of the Prophet (peace be upon him) have explicated the real position and the role of the environment without any doubting or questioning left. This shows that Quran and Sunnah can be used as guidelines in a built environment field.

This paper aimed to highlights the impacts of coastal reclamation to employment and income of the community lives in Tanjung Tokong. In terms of the numbers of the community affected types of profession changes and income changes before and after the reclamation. It also discussed on the Islamic perspectives especially on the concept of khilafah (vicegerent) and amanah (trust) on the issues. It reviews various literatures derived from online database, journals, articles, Environmental Impact Assessment reports, government papers and guidelines from local and overseas.

COASTAL ZONES AND ITS ECONOMIC SERVICES

Coastal zones means '*coast within some designated area* (see Zainora, 2011; 102). The importance of the coastal zone can be seen in many ways such as its position between terrestrial ecosystem and aquatic ecosystem, which belong to the most dynamic, complex and productive ecosystem on earth (see Zainora, 2011:102). Zainora (2011) mentioned that coastal area considered risk area because of significant coastal erosion, pollution, flooding, hurricane and tsunami. Coastal area is known to provide service not only to the environment but also to the economic purpose. Majid (1985) claimed that coastal zone is essential to the livelihood of the community living along the coast or on the lowland closed to the coastal zones. Most of the population can be found living close to the coastal area as compared to other area. Because of this, the growing population in world's coastal area creates significant environmental problems (Zainora, 2011:105). The environmental and economic values of the areas are significant as not only resources but the safety measures that they provide to the coastal zone.

Mangrove also found to protect coastal area. Mangrove ecosystem has roles such as to maintain stability of coastal line, protect coastal area from abrasion and intrusion and process the wave, biological function such as nursery and spawning grounds for fishes, shrimps, nesting ground for birds and habitat for many kinds of biotics, economical function-firewoods, salt processing instruments, embankments and building materials (Priyandes & Majid, 2009). According to Mohd Nizam (1995), coastal forest performs important ecological function by supporting coastal fisheries and protects coastline from erosion.

As such, ecosystem service also can be defined as the benefit that nature provides to humans. The provision of these services has economic value. For example, humans benefit from this service when we catch and eat animals that live and breed in the shore area (Raheema, 2011). According to Swaminathan (2008), estuaries provide a variety of economic function, including supporting aquaculture activities and facilitating navigation. In Southeast Asian, coastal zones have been utilized for a variety of purpose such as tourism, fisheries, transportation, mining and communication (UNEP RRCAP, 2001). In addition, rapid economic and industrial growth recently has attracted an increasing percentage of the population to live in the coastal area (UNEP RRCAP, 2004). Therefore, according to Goodland (1995), a continuous development should consider three factors which are the environmental sustainability, economic sustainability and social sustainability.

Coastal ecosystem such as estuaries and wetlands are more valuable per unit rather than other marine or terrestrial ecosystem. As such, destruction of coastal ecosystem qualities translate into losses in the goods and services they provide to human (Olsen & Cristie, 2000). This shows that marine, terrestrial and coastal ecosystem provide ecosystem services that are essential to human survival. Thus, the coastal ecosystems have value either through services that are directly or indirectly consumed by humans.

COASTAL RECLAMATION

Land reclamation is a process to create new land from the sea. As been highlighted by Ge Yu & Jun-yan (2011), reclamation of marine is the important utilization of ocean for mankind to produce goods and provide living space for human. Further reported by Ismail et al. (1991), a number of sites along the coast in Bahrain have been either dredged or reclaimed to serve the industrial and residential purpose. Land shortage usually becomes one of the main solutions in running a coastal reclamation projects. Concerning the needs for landmass, coastal reclamation is increasingly a popular response to the perceived need for more space in many Southeast Asian cities. For example in China, with the extension of non-agriculture land use and shortage of cultivated land, the extension from land to sea has become one of the solutions to buffer the conflict of man and land shortage. Ramly (2008) stated that because of the land limited while the number of the population increased continuously, many of develop country adopted coastal reclamation. Among the countries adopted the coastal reclamation project in Asia are Malaysia, Indonesia, Singapore, China, Japan, Bahrain and Hong Kong.

As coastal area is a very sensitive area, any development needs to be highly evaluated for its possible disturbances. It is because the coastal reclamation comes with its adverse impacts to the land. As argued by Adger (2005), hazard in the coastal area can be found through erosion activity caused by environmental change and human actions. When ecosystem undermined, the ability of the coastal areas to adopt and regenerate eroded.

Issues on Coastal Reclamation to Employment and Income

On the positive side, the reclamation of coastal would create temporary and new employment which would invite more people to the area. They might change the traditional profession to more modern and reliable job, and the availability of employment opportunities might encourage younger people who would otherwise migrate out, to remain in their village. In regards to Tanjung Tokong reclamation project, ERINCO (1993) insisted that local community will be equipped with the new job and

business opportunity which has higher income potential. Nevertheless, the area for fishing expected to stop during the reclamation process. On the other hand, fishing results in Tanjung Tokong had begun to decline due to jetty facilities and the work of existing unloading their catch is not enough. After the reclamation, the development of the project will provide terminal or dock for fishing (ERINCO, 1993).

However, pollutants discharged into the sea would affect the regeneration capacity of fishery resources and marine aquaculture industry (Swaminathan, 2008). This would become a problem to the community whom their livelihood and source of incomes depended on the marine and aquaculture industry. Yu Ge & Junyan (2011) added that the reclamation materials and pollutants generated during the reclamation activities pollute the marine environment. This problem is also known to affect the fisheries activities. At some extent pollution can be controlled, but the ecological and environmental impacts of reclamation cannot be restored.

Mangrove and estuarine environments are known as significant areas for a variety of fish species. The lost of natural habitat due to dredging or infilling may have dramatic impacts on fish catch and affected food chain. Apart from dredging and infilling, Hall (2001) stated that removal of mangrove affected other coastal area through the transport of marine sediment. Adger (2005) also stressed that the deforestation of mangrove has reduced the livelihood employment options available for local farming and fishing communities. Given an example tourism development has been responsible for mangrove clearance in countries such as Australia, Hawai'i, Vanuatu and Fiji. In Denarau Island, Fiji, 130 ha of mangrove forest dredged to construct 18 hole golf course and create artificial marina (Hall, 2001).

Corals Reef also becomes a habitat for marine species. The area where the coral reef situated is reclaimed as it is more cost-effective. In Batam, Indonesia, deterioration of coral reefs caused the decrease of the socio-economic situation of fisherman which led to profession shifting. Around 20% of the fishermen shift to another profession (Priyandes & Majid, 2009). Damage of reefs

also occurs along the coast of Thailand where dredging activities have also taken place which led to and conflict with fisherman because the loss of fishing grounds (Bak, 1978; Chansang, 1988). Other example was in Bengkong and Batu Ampar whereby the process of cutting hills around the district for reclamation purpose also had seen the destruction of coral reef. Previously, coral reefs cover 25%-41.35% of the area and after reclamation there was only 0-23.24% coral reef left. There was 55% of fish reduction at the area, due to the loss of coral reef. Deterioration of coral reefs and water quality caused the extinction of various species of fish Snnaper, Grouper and Shrimp (Priyandes & Majid, 2009). Other example was in Batam, Indonesia where coastal reclamation had caused mangrove forest and coral reefs function deteriorated. Because of it, productivity of fisheries reduced and several fish species extinct (Priyandes & Majid, 2009). Apart from the lost of mangrove Yu Ge & Jun-yan (2011), had expressed their concern that the reclamation would have caused the flow outside the channel to slow down, seawater purification declines, frequency and intensity of algae bloom increase which would also affect fisheries activities.

Ismail et al. (1991) stated that the area reclaimed in Bahrain is most productive from a fisheries point of view and the negative effects can be seen in those activities. He added that the dredging activities and directly discharged of sand caused the outslip of silt estimated to be about 250 000m³. It affected the fish barrier traps which turned out to be a fisherman lost in income. As been mentioned by Priyandes and Majid (2009), damage to marine habitat will lead to reduction of fish and shrimp catch thus lead to the reduction in the net annual income of fisherman and increase number of citizen unemployment. In Jiaozhou Bay, China coastal reclamation had caused the pollution to increase every year. Experts point out that if the reclamation allowed to continue Qingdoa Port will become dead port because of sediment deposition. Because of built up sediment, ship could not navigate to the port caused the economic disadvantage (Xu & Wang, 2003) Syamsidik & Koh, (2003) mentioned that, a reclamation project at the eastern of Singapore had caused the tidal velocity change exceed 50% compare to before reclamation occur. Apart from affecting the fisheries, this could affect the ship navigation and

environmental water quality. Abdullah (1993), had warned that a siltation problem caused inadequate water depth for navigation has resulted in serious losses to the local fishing communities.

It is found that the most affected employment was from fisheries sector. Even though the economic contribution to the national economy maybe small compared to oil and gas manufacturing, the fisheries sector has a significant role in the social order. Fisheries sector affects the livelihood of over 600,000 people (directly or indirectly) which most of them are artisanal or small scale coastal fisherman (Basiron, 1995).

4. MATERIAL AND METHOD

Case study area

The studied area located in Tanjung Tokong, Penang. As in 2010, the district allocates 17,335 persons. The Tanjung Tokong Land reclamation project which begin on 2004, seems to be strategically located in relation to its proximity to the urban commercial centre in Georgetown, the recreational areas at Batu Ferringhi and Telok Bahang Recreational Park. In addition, the projects located at the interface between the urban commercial land uses demarcated in Georgetown and its outskirts to the south and the recreational area to the north. Because of its unique locality, it has a potential in creating new mixture of socio-economic activities meshed appropriate together when the new township fully developed in the future (ERINCO, 1993). The reclamation development of Seri Tanjung Pinang in Tanjung Tokong had changed the physical and biological coastal, not only affected the environment but also the livelihood of the community nearby.

Data collection and analysis

The survey involved in this research is written questionnaire survey whereby the Tanjung Tokong community completed the form prepared by the researcher. The survey questionnaires in this research serve the purpose of gathering demographic data of the community profiles and their socio economics impacts after the coastal reclamation take place at their area. According to

McIntyre (1999), survey questionnaire are more suitable in gathering demographic data that describe the composition of the sample. He added that survey can also extract information that are otherwise difficult to measure using observational techniques. Glasow (2005) supported by stating that questionnaire survey is capable of obtaining information from large samples of the population. Hence, it is suggested that a good questionnaire should comprise of relevant, meaningful, and easy to understand question. Therefore, this questionnaire survey adopted closed-ended survey questions. Research population and sample.

A small, but carefully chosen sample used to represent the population. The sample reflects the characteristics of the population from which it drawn. According to Sekaran (2000), sampling is the process of selecting a sufficient number of elements from the population. The main reason to study and understand sample and its characteristic is to ensure the possibility to generalize the properties or the characteristics to the population elements. Probability sampling conducted in the study using stratified sampling. Stratified sampling commonly used probability method that is superior to random sampling because it reduces sampling error. With the level of precisions 5% and confidence level 95%, the sample size will be able to reflect the population (Israel, 1992). The eligibility criteria were as follows:

1. Residents lives within 1 km setback from reclamation area;
2. Original community (respondent) lives within the period of reclamation which is before 2004; and
3. Focus only on residential that were reside and existed before 2004.

FINDINGS AND DISCUSSION

Impact of coastal reclamation on the income level

The analyzed data shows that there is difference in the mean of income before and after reclamation whereby mean for 2003 income was 1.45 while mean for 2012 income was 2.06. This shows that, the respondents gained higher income in 2012 compare to income 2003. However, a further analysis was run to determine whether the income difference was caused by Seri

Tanjung Pinang development. The result shows that among 300 respondents, only 6.3% (19) respondents involved in a profession and income change due to the development of Seri Tanjung Pinang.

Therefore, a further analysis was done to the affected 6.3% (19) respondents. The result shows that the income mean of the affected respondent in 2003 was 0.12 (M=0.12) while the income mean for affected respondents in 2012 was 0.08 (M=0.08). It shows that due to the development of Seri Tanjung Pinang, the affected respondents faced a decrease of income from 2003 to 2012. A paired-samples *t*-test was conducted to evaluate whether the development had significantly affected the Tanjung Tokong community income. The result shows in Table 1, Table 2 and Table 3;

Table 1: Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
salary 2003	.12	300	.510	.029
salary 2012	.08	300	.474	.027

Table 2: Paired Samples Correlations

	N	Correlation	Sig.
salary 2003 & salary 2012	300	.612	.000

Table 3: Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
salary 2003 - salary 2012	.043	.434	.025	-.006	.093	1.728	299	.085

The result indicated that there is a different in the mean for salary on 2003 (M=0.12, SD=0.51) and the mean for salary 2012 (M=0.08, SD=0.47), $t(299)=1.728$, $p=0.09$ (two-tailed) at 0.05 alpha. Although the mean shows that there was a difference, statistically there is no significant difference. The 95% confidence interval was -0.006 to 0.093. The insignificant result might be caused by only minority people which only 6.3% (19) respondents involve in the profession shifting due to the development. Other 94.7% (281) of the respondents are not been

affected. It can be concluded that the overall higher income change was not caused by the Seri Tanjung Pinang development but cause by others factors beyond the study limitation.

Type of profession affected by the reclamation

This research also identified what type of profession change involved due to the reclamation of Seri Tanjung Pinang. The majority 93.7% (281) respondents were not affected by the Seri Tanjung Pinang development. The type of profession shifting which affected 6.3% (19) of the respondents was tabulate in Table 4.

Table 4: Type of profession affected by development

	Type employment												Total			
	Education		Clerk/ technician		Officer		Fisherman		Business		Construction/ services engineering					
	f	%	f	%	f	%	f	%	f	%	f	%	f	%		
Private sector	-	-	1	0.3%	-	-	-	-	-	-	-	-	2	0.6%	3	1%
Self employed	-	-	-	-	-	-	15	5%	-	-	-	-	1	0.3%	16	5.3%
N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	281	93.7
															300	100

Note: f= frequencies, %= percentage

Among 6.3% (19) of the respondents involved in profession shifting, the majority of the respondents previously worked as fisherman 5% (15) followed by services 0.3% (1) and clerk/technician 0.3% (1). Among the respondent, 3% (9) stated that they have more benefit with the new employment. However, the majority 3.3% (10) of the respondent stated that they benefit less from the new employment. The respondents were asked to respond in what term they benefit more or less. The reasons were tabulated in Table 5.

Table 5: More benefit and less benefit of profession shifting

	Distance	Income	Working hour	Working environment	Others	Total	Total respondents
More benefit	2	8	2	1	0	13	9
Less benefit	0	10	0	0	0	10	10

3% (9) respondents who benefit more from the profession shifting stated that they benefit in term of more income, short distance to working place, flexible working hour and healthy working environment. All 3.3% (10) respondents who benefit less from the profession shifting due to the development of Seri Tanjung Pinang acknowledge that they have less income compared to their previous occupation. Figure 1 illustrate the benefit of job shifting

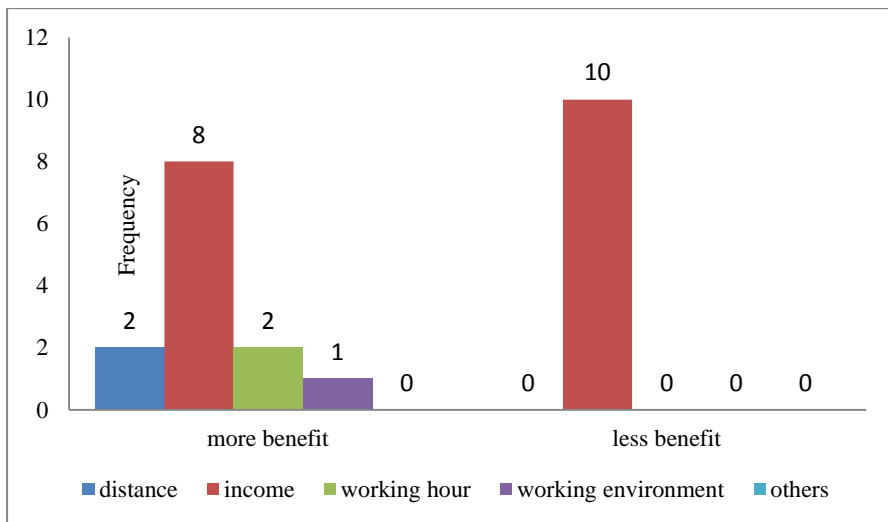


Figure 1: Respondent benefit by profession shifting

There were change in employment and income after the development of Seri Tanjung Pinang. However, the majority changes were not cause by the development. Only minority people involve in income and profession changes due to the development. The respondents involve in the profession shifting, the mean shows that they gained lowered income compared to their previous income. The impact can clearly be seen to the

fisherman who is the major profession affected and faced a reduction in income. Among those who involve in profession shifting, the majority 3.3% (10) of them benefit less with all of them gained lower income. Only 3% (9) of the respondents benefit more in from the changes. The development also found to provide job opportunity to the minority community in Tanjung Tokong.

Islamic view on coastal reclamation issues

There are absolutely no direct guidelines for coastal reclamation in the *Quran* and *Sunnah*. However, Islam has a solution to the range of environmental problems and crises that are facing the mankind, where it involves a good understanding of applying Islamic values and needs (Zainora, 2008). *Quran* and *Sunnah* had been and will continue to be a reliable source in creating and preserving a good environment for all. As a khalifah (vicegerent), humans are responsible to take care of these resources and they should prepare themselves to fulfill god's trust or *amana* (trust). Manzoor (1984) agreed by stated "*The entire Islamic rationale for ecological ethics rest firmly on the Quranic notions of Khilafah (vicegerent) and Amanah (trust)*". According to Zainora (2008), having strong faith, respect and love for nature would lead man in the right direction to safeguard the environment as Allah's gift and sign of wisdom. Islam is more than just faith and belief; it is way of life or *al-Din*.

The obligation as a servant explains the importance concept of vicegerency which every human require to fulfill (Ismawi, 2008, pp.3). A Muslim activity as a vicegerent abides in a very simple foundation of Islamic dynamics which is, the good deed (*amalma'ruf*) and prevention of transgressions of wrongful deeds (*mungkar*) (Ismawi, 2008, pp.4). This way of life is very broad and can be highlight in every aspects of life. To narrow it down to a coastal reclamation context, after taking into account all the possible impacts of reclamation, it is clear that the coastal reclamation seems to have more harm rather than positive. It is clear that if the development of the coastal area brings harm to the environment and man, the development should be re-think, and solutions should be explored to minimize the effects.

Zainora (2008), explains of the ethical issue whereby man as a khalifah on earth responsible for his mischief or virtue. She further added that everything on earth created for man, and it depends on him to use as he pleases. Manzoor (1984) also highlighted that nature is a man's testing ground whereby he is enjoined to read its 'signs'. Therefore, man has to remember that he being watched and tested because he will rewarded or punished according to his acts. The environment created in a proportion, anything that could disturb the balance should be avoided. According to Spahic (2004), man's rights over nature are rights of sustainable use based on moderation, balance and conservation. However, nature's rights over man are to be safe from misuse mistreatment and destruction.

Nature becomes one of the amanah (trust) given by Allah to man. Man has been given a power of free will, intelligence and knowledge, therefore, man is capable of fulfill the task given (Spahic, 2004). Manzoor (1984) also stated that God has expressed his confidence in the ability of man by entrusting a man with this responsibility, that of taking control over the nature. Spahic (2004) explained "*... if the perfectly executed environmental equilibrium sustained, man ought to be commended for that, for he lived up to his reputation as the vicegerent on earth. However, if the same troubled and disturbed, it is man again who must be held responsible for the disorder in that he breached the trust put on him distorting his primordial nature and committing a grave sin against his Lord, himself and the rest of creation*". With that statement, it is clear that, we should not misuse the trust given by Allah as we will be responsible by it.

However, with the coastal reclamation development, there will be degradation of biodiversity. Zainora (2008) agreed that many presents destructions are caused by human science and its application in the modern world. Therefore, our role as a trusted man by Allah is to make a wise decision. Man treatment of the environment relates to his faith. If he truly attached to the teaching of Islam in carrying his daily practice, his relationship with the environment will be healthier (Spahic, 2004). There were one of the Prophet's sayings whereby he stressed that whosoever cuts for no valid reason a Lote-tree (sidrah) in the desert, which

previously both travelers and animal used to shade themselves, God shall direct him to Hellfire (Spahic, 2004). Therefore, it is understandable that any unnecessary damage done by human is not permissible. Spahic (2004) further stressed "... cutting a tree (eliminating or damaging anything on earth) in the manner described in the hadith implies one's de facto detachment from the divinely prescribed code of living as to the relationship between man and God, and between man and nature".

Development and human need have reduced the earth natural resources, and by producing waste and pollution, we continuously put ourselves in danger (Zainora, 2008). Allah had created the environment in balance, which we should not disturb. Each organism on earth has its role in the ecosystems, and Allah had created nature and man as a sign of His power and wisdom (Zainora, 2008). Zainora (2008) stressed that as the khalifah on earth, we are given the power to work in harmony with the natural environment and respects mother nature. Thus, natural resources should be used wisely. Adger (2005) has stressed that the capacity of coastal ecosystem to regenerate after a disaster and to continue to produce resources and service for human livelihood cannot be taken for granted. Even though there are some understanding that the elimination of damage or harm becomes the responsibility of the party whose action caused it, as a Muslim it is everybody role in providing a safe environment and remove harm for the benefit of all.

CONCLUSION

One of the suggested policies is public participation in any decision making done by the developer and authority. Community leader will be elected among the communities and should be invited and represent the community voice and opinion on any of their dissatisfaction. With the public participation, the leader is able to inform his community of any incoming problems or issues on the development. This two ways process helps in understanding not only the issues on communities' side but also the developer and authority interest which therefore can avoid any dispute.

Next, surveys done on the communities can also help in minimizing the impacts of coastal reclamation to employment and income. With surveys, communities' problem and request can be acknowledged in improving their socio-economic. Socio-economic impact Assessment is one of the instruments in analyzing the incoming impact of the development. A statistic result will help in understanding how much the impact will generate. This can assist in decision making and planning for the development.

Apart from it, community can have benefits from the development in terms of tourism and employment provided by the developer. Coastal area has a unique character which usually been utilized in the tourism industry. In terms of employment and income, community should have the opportunity to work in the developed area. As part of socio-economic sustainability, tourism businesses can be promoted by conventional and modern marketing techniques that ensure adequate access of local tourism small and medium enterprises (SMEs).

Observation also should be done from time to time to ensure that the community is well adapted to the new built environment around. As been mentioned by Abdullah (1993) coastal zone is generally rich in resources which can harnessed for the socio-economics growth of the country. He added that it is necessary to recognized that the sustainable development or utilization of these resources must be funded on an approach that gives due consideration to the importance and sensitivity of the coastal process and environment.

This paper had discussed how the coastal reclamation affected employment and income. It is found that there was change in type of employment during the reclamation period. However, a further investigation find out that only 19 respondents among 300 respondents involved in employment change due to the reclamation. Furthermore, the analysis shows that there is change in the mean of income after the reclamation started. However, the paired sample t-test analysis proves that there is no significant different in the mean. This might be caused by only a minority of the respondent which is only 19 respondents out of 300 respondents involved in the profession shifting and most of them

were a fisherman. There are also positive and negatives impact caused by the profession change. The positive impact is in term of income followed by working hour, working distance and working environment.

The impacts of coastal reclamation to employment and income have clearly been outlined. However, it is almost impossible to ensure that environment would not be affected at all by reclamation activities. However, coastal reclaim is quite significant in well-develop countries which needs more land to sustain their economics.

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