

Livelihood Assets and Vulnerability Context of Marine Park Community Development in Malaysia

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Abstract This study assesses the community's standard of living using the well-known Sustainable Livelihood Approach (SLA) as an analytical framework within the Marine Park Areas (MPAs) in Peninsular Malaysia. We focus on livelihood sustainability and environmental issues challenging MPAs. In order to protect and conserve vulnerable marine life, our efforts assess the residents' wellbeing and identify major environmental issues associated with MPAs. The major findings of this study indicate that social and physical assets of the societies within the Marine Park Island improved with economic development, but they continue to lack in human capital, and financial and environmental assets. It is expected that this study would assist policy makers to formulate enhanced policies for conserving marine diversity as well as to improve the socio-economic status of the communities that reside therein.

Keywords Livelihood asset · Communities' well-being · Standard of living · Sustainable Livelihood Approach · Marine Park Areas

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1 Introduction

The concept of sustainable livelihoods in rural areas has a broad generic sense. This includes the protection and security of livelihoods for people and society, with current concerns and requirements of sustainable development policy (Singh and Hiremath 2010). A livelihood involves various assets, strategies, activities and other factors commonly required for living (Chambers and Conway 1992). The term livelihood refers to a means of earning a living by an individual or household. It is a combination of the individual or household's assets, including activities and resources and access to these, mediated by institutions and social relations. The Institute of Development Studies (IDS) and the International Institute for Sustainable Development (IISD) developed the sustainable livelihoods analysis (SLA) approach in the mid-1980s (DFID 1999). SLA is defined based on the ability of a social unit to improve its assets under external impacts (Castaneda 2000; Stephen et al. 2009). SLA first seeks to identify the important assets (physical, natural, human, financial, and social capital) related to livelihood.

Since sustainable livelihoods implies that the means of livelihood can be transformed by activities and policies. It is also important to assess the impact of agricultural practices on sustainable rural livelihoods, especially in developing countries. Individuals in rural communities may be either self-employed (typically in farming) or involved in multiple livelihood activities (including casual labour or entrepreneurship) without having steady employment or income (Cherni and Hill 2009). Many scholars have studied different topics based on SLA such as livelihood diversity in rural development (Ellis 2000), poverty alleviation (Barrett and Swallow 2004; Erenstein 2009), and natural resource management (William 2003). In this study, we analysed community sustainable livelihood assets, strategies, and the vulnerability context within MPAs in Malaysia. The focus of this study is to conserve marine resources and community development.

A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain its capabilities and assets, while not undermining the natural resource base (Scoones 2009). The focus of this study is to conserve marine resources and community development. According to Diacon and Guimarães (2003), the aim of community development is to empower marginalised communities. This involves building confidence, building the capacity and sustainability of networks available in the community, and restoring its physical, economic, and social structures. According to Brennan and Barnett (2009), community development is a reflection of the local population's ability to mobilize and manage the resources available to meet the needs of local communities. Both definitions refer to community resources and their importance to community development.

The sustainable development of a community requires adequate consideration of environmental, social, and economic factors. It demands comprehensive policies and regulations, good ecology, excellent breeding, appropriate technology, and governance (Goodland and Daly 1996; Caffey et al. 2000; Biao and Kaijin 2007; Costa-Pierce 2008). In Malaysia, gazetted marine parks started in 1994 under the Fisheries Act 1985, (updated the Fisheries Act 1963). A total of 52 marine parks have been gazetted as marine parks and are under the management of five marine parks, namely, Tioman Island Marine Park, Redang Island Marine Park, Payar Island Marine Park, Mersing Marine Park and Labuan Marine Park (Karim and Ramli 2003). The primary goal of the establishment of marine parks is "to provide an area for the protection and conservation of marine resources and habitats, and to function as a management tool, aiding the drive towards sustainability in the fishing industry" (Department of Fisheries 1996). It has been noticed that the socio-economic conditions of local communities within marine protected areas in Malaysia are

typically low. This is because they have less resources and inadequate capacities. They also face many obstacles in managing their societies and gaining access to the services they require (Cabanban and Nais 2003; Kari et al. 2011).

Due to government policies and political stability, Malaysia has achieved remarkable economic growth as part of its target to become an industrialised nation by 2020 (Sixth Malaysia Plan 1991–1995). However, achieving a high economic growth alone cannot guarantee a decent life for the society if there remains a large number of low socio-economic groups. Likewise, livelihood analyses of local communities within MPAs in Malaysia have thus far not received adequate address by researchers and politicians. Therefore, this study aims to explore the SLA with the vulnerability context of MPAs communities and makes recommendations to assist the local communities to achieve their sustainable livelihoods.

2 Conceptual Framework: A Sustainable Livelihood Approach (SLA)

The SLA has evolved over three decades of changing perspectives on poverty, how poor people construct their lives, and the importance of structural and institutional issues (Ashley and Carney 1999). The concept of livelihoods has become increasingly popular as a way of conceptualizing the economic activities poor people undertake in their communities (Adato and Meinzen-Dick 2003). Livelihoods are a function of assets and structures, and a source of subsistence, income, identity, and meaning (Bebbington 1999; Scoones 1998). Capabilities, assets (both material and social), activities, and access to resources (mediated by institutions and social relations) determine the living gained by the individual or household (Chambers and Conway 1992; Carney 1998; Scoones 1998; Ellis 2000). The SLA has become popular in development thinking as a way of conceptualising rural development, poverty reduction, and environmental management (Scoones 1998; Ashley and Carney 1999; Udayakumara and Shrestha 2011). The SLA is an asset-based conceptual framework that has been widely tested and adapted during research and policy analyses (DFID 1999; Shankland 2000). It has been applied in developing countries in small-scale aquaculture and aquatic resources management (Allison and Ellis 2001; Neiland and Bene 2004; Ahmad and Hanley 2009). The sustainable livelihoods framework encompasses five sections (Fig. 1) that are rendered dynamic due to both external interventions and the activities of the rural residents. The sections are: (1) vulnerability context; (2) livelihood assets; (3) transforming structures and processes; (4) livelihood strategies; and (5) livelihood outcomes (DFID 2000). The vulnerability context encompasses trends, shocks, and seasonality as people's decisions and livelihood strategies can be influenced by both perceived and actual vulnerability.

An asset portfolio is considered natural, physical, financial, human, and social capital as shown in Fig. 2. From the previous literature, we found that these assets are widely used to assess sustainable livelihoods (Harrison 2005; Glavovic and Boonzaier 2007; Tao and Wall 2009; Cinner et al. 2010; Hanim and Salleh 2010; Paul and Vogl 2013; Chen et al. 2013). Transforming structures and processes refer to institutions and organizations that affect how people use their asset portfolios to pursue livelihood strategies. These occur at multiple levels, from the individual to household to community levels. Livelihood strategies are the choices that the rural residents employ in pursuit of income, security, well-being, and other productive purposes. For income enhancement, increased well-being, vulnerability reduction, and resources sustainability, the results of these strategies vary among individual, household, and regional levels. Livelihood outcomes encompass greater income, increased well-being, improved food security, reduced vulnerability, and

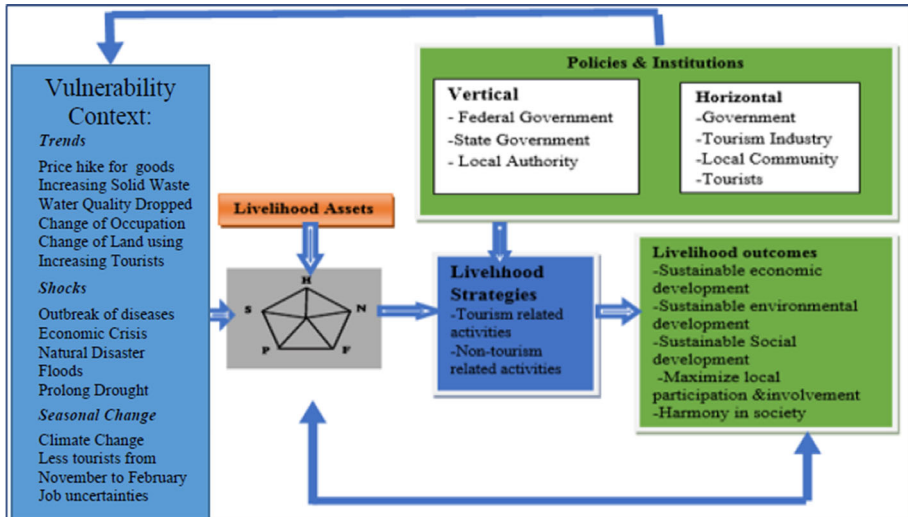


Fig. 1 Sustainable livelihood framework. *Source:* adapted from DFID (2001), sustainable livelihoods guidance sheet

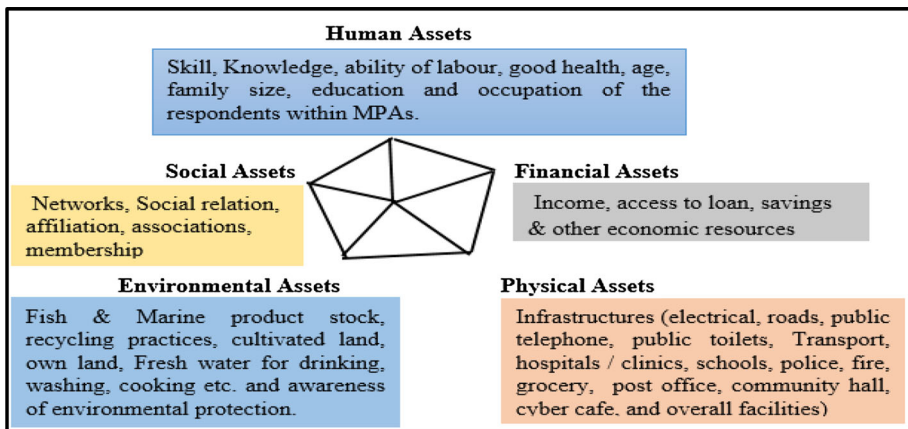


Fig. 2 Livelihood assets. *Source:* adapted from Morse and McNamara (2013)

sustainable use of natural resources. Livelihood outcomes can also have a feedback effect on the vulnerability context and livelihood assets.

3 Methods and Materials

3.1 Mixed-Methods

In order to achieve the research objectives, this study used both qualitative and quantitative research methods. A quantitative research method was conducted using a survey instrument to assess the view of the target population. In contrast, a qualitative research method

is applied to complement the quantitative research method. Thus, the mixed methods were used in a convergent manner to support our quantitative findings. The study did not develop separate qualitative objectives. The three Focus Groups Discussions were conducted, with each group consisting of three to five people as suggested by Myers and Newman (2007). The discussion was based on a structured set of questions, which were open-ended to stimulate respondent's various opinions.

3.2 Study Area

The target population is defined with respect to the sampling unit of the study. The target population was the entire population of the Tioman Island Marine Park (TIMP), the Redang Island Marine Park (RIMP) and Tinggi Island Marine Park (TIMP), as shown in Fig. 3. The Tioman Marine Park, which is situated in the South China Sea, off Pahang, and consists of nine volcanic islands: Tioman, Labas, Sepoi, Gut, Tokong Bahara, Chebeh, Tulai, Sembilang and Seri Buat. Tioman Island is an outstanding tourist destination in Malaysia. It consists of eight islands namely, Kampung Tekek, Kampung Juara, Kampuang Air Batang, Kampung Salang, Kampung Paya, Kampung Nipah, Kampung Mukut and Kampung Genting with approximately 3,440 residents and 800 households (Population et al. 2010). Redang Island consists of eight islands namely, Pinang Island, Lima Island, Ekor Tebu Island, Kerengga Kecil Island, Kerengga Besar Island, Paku Besar Island, Paku Kecil Island and Ling Island with approximately 2,013 residents and 484 households while Tinggi Island was considered as one village with approximately 164 residents and 38 households. Thus, the target population consists of Marine Park residents who were 18 or above and are not tourists.

3.3 Sampling Technique

This study used a multi-stage sampling technique to collect the data. Using the cluster sampling technique, Tioman Island Marine Park (TIMP) was clustered into eight clusters;

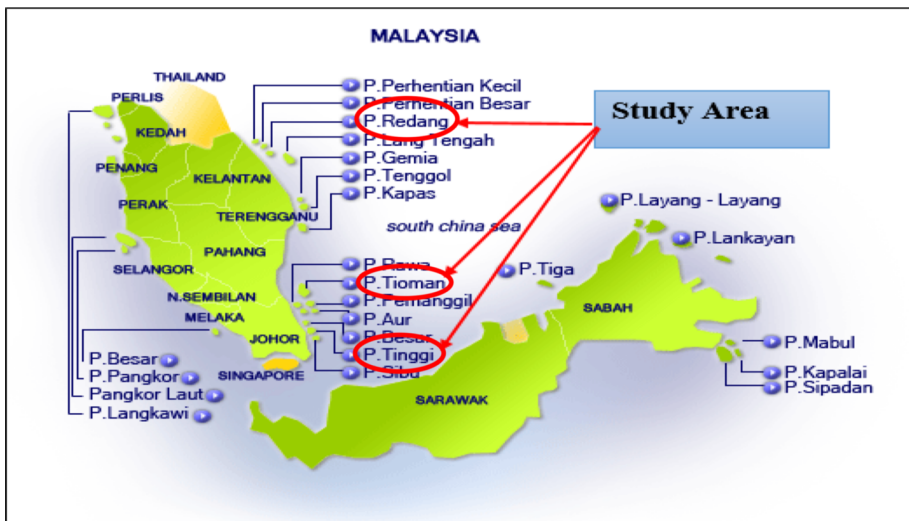


Fig. 3 Map of study area

Redang Island Marine Park (RIMP) and Tinggi Island were considered as two clusters based on geographic location as shown Fig. 4 with approximately 5,617 residents and 1,322 households. This technique was used to cluster sampling the total population based on geographical contiguity.¹ This study utilized simple random sampling in the sampling cluster (i.e. random sampling to five out of the eight villages) after clustering the entire population to collect data. This decision is in line with the benchmark procedure to avoid needless expenses while providing the greatest number of possible samples. As a result, five villages namely, (1) Kampung Tekek, (2) Kampung Juara, (3) Kampung Air Batang, (4) Kampung Genting and (5) Kampung Mukut were selected and followed without the replacement sampling schemes in order to avoid multiple selection of the same cluster. Finally, five villages from TIMP, Kampung Baharu from Redang Island and all of Pulau Tinggi were considered for the survey using systematic sampling technique.²

3.4 Sample Size

The survey was conducted from September to December 2013. All the respondents were Malaysian citizens and the target respondent was the head of the household. The questionnaires were distributed and collected through face-to-face interviews. In order to obtain an appropriate sample size from this population, the following formula was used (Lind et al. 2002):

$$n = \pi(1 - \pi)(Z/E)^2 \quad (1)$$

where, n is the size of the sample, π (0.50) is the population proportion, Z is the standard normal value corresponding to the desired level of confidence, and E is the maximum allowable error. Based on the formula for sample size, $Z = 1.96$ (95 % confidence level), $\pi = 0.5$, and $E = 5\%$. The above equation is appropriate for infinite sampling, but since the number of households is known in our study, the correction for a finite number of households used as follows.

$$nw = \frac{n}{1 + \frac{n-1}{HS}} \quad (2)$$

where, nw = new sample size, HS = number of households. The study area consists of a population of 5,617 with approximately 1,322 households. Thus, we calculated a sample size of 297.83 with the above-recommended guidelines which was rounded up to 300. However, a total of 350 questionnaires were distributed among households and the response rate was about 86 %.³

3.5 Questionnaire Design

The questionnaire is developed based on past relevant studies (Allison and Horemans 2006; Paul and Vogl 2013; Chen et al. 2013). The questionnaire is used as the primary instrument to collect data. The questionnaire was divided into three sections of A, B and C. Section A consists of information pertaining to the demographic characteristics of the

¹ If we did not cluster the entire population, it might be very challenging to cover the whole study area. Without cluster sampling, costs and time would increase exponentially.

² It would be unmanageable to visit each and every household in the selected clusters.

³ There were 50 questionnaires out of 350 that were incomplete questionnaires resulting in only 300 usable questionnaires.

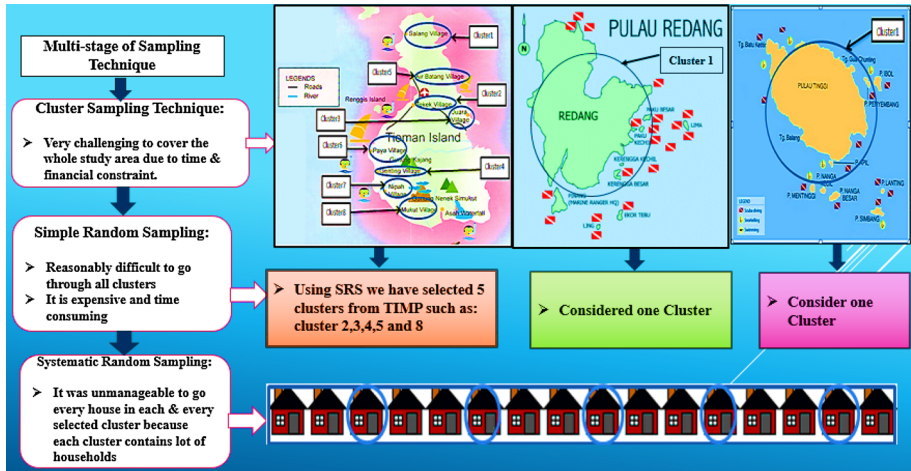


Fig. 4 Sampling techniques of study areas (Masud et al. 2014)

respondents such as gender, age, marital status, occupation, household size etc. Section B consists of information relating to the livelihood assets and strategies of marine park community such as human, social, financial, environmental, and physical assets and livelihood strategies to generate their income. Finally, section C contains information relating to the vulnerability context of marine park community development. Vulnerability context is divided into three type, namely Shocks, Trends, and Seasonality.

3.6 Measurement of Livelihood Assets, Strategies, and the Vulnerability Context

The main purpose of this study is to investigate livelihood assets, strategies, and the vulnerability context of Marine Park Community, in Malaysia. The vulnerability context is divided into Shocks, Trends, and Seasonality. In order to achieve the objective, this study attempted to measure their livelihood assets, strategies, and vulnerability, based on several factors shown in Table 1.

4 Results

4.1 Demographic Characteristics

All 350 questionnaires were successfully distributed among Tioman Island Marine Park residents with a total return of 300 usable questionnaires. This indicates a response rate of 86 %. Table 2 shows that males were 79.3 % while females 20.7 %. It also shows the age distribution of respondents. The age of respondents ranged between 18 and over 60 years. The greatest number of respondents (33.67 %) was from the age group between 46 and 60 years. Most of the respondents are elderly. The second largest group of respondents (25.67 %) was between 31 and 45 years. 23.67 % of the respondents aged between 18 and 30 years while 17 % above 60 years.

Table 1 Measurement of livelihood assets, strategies and vulnerability context

Measurements	Definitions of the measurements	Factors considered for this study
Human assets	Human assets refer to people's competencies, knowledge, capabilities, employment, health social and personality attributes etc.	This study considers the education, occupation and health conditions of the community
Social assets	It includes social networks, group membership, and relationship of trust, associations and affiliations reciprocity and exchange (Pretty and Ward 2001; Vincent 2007)	The relationship among community members, social support and membership with various social associations
Financial assets	Financial capital refers to financial resources such as cash, bank deposits, liquid assets, pensions, and remittances etc.	Income and savings
Environmental assets	Environmental assets refer to the direct fish stocks, areas of seabed leased or accessed by license, land owned, crops cultivated, water sources, forest products, biodiversity, etc., that are owned by local communities	Land ownership, firming, and water source
Physical assets	Physical assets refer to household level which includes boats, house, bicycle etc., and at the community level, it includes access to infrastructure	Infrastructures such as water supply, electricity, roads, transportation, hospitals/clinics, schools, grocery stores/sundry shops etc.
Livelihood strategies	Are likely to focus on activities that generate income. The occupational pattern shows that some of the respondents have more than one livelihood activity	Occupations/employment opportunity
Vulnerability Context Three types of vulnerability context such as trends, shocks and seasonal changes	<i>Shocks</i> refers to some unexpected occurrences that might effects community livelihoods	Price hike for essential goods, increase in waste generation, quality of water dropped and climate change
	<i>Trends</i> refer to changes over time in natural resource stocks and quality, or in other factors unrelated to aquaculture that impact on community livelihood	Change of occupation and use of land
	<i>Seasonality</i> refers to seasonal changes that constrain the livelihood choices of people	Seasonal change

4.2 Human Capital

In regards to human capital, this study considers the education, occupation, and health conditions of the respondents as essential measures to determine livelihood for human capital. As for the educational status of the respondents, 43.3 % have primary education, while 29.3, 15, 2.7, and 1.7 % have higher secondary, lower secondary, diploma, and

Table 2 Demographic variable of the respondents

Variables	Frequency	Percentage (%)
<i>Gender</i>		
Male	238	79.3
Female	62	20.7
<i>Age</i>		
18–30 years	71	23.67
31–45 years	77	25.67
46–60 years	101	33.67
Above 60 years	51	17.0
Total	300	100

Source: field survey 2014

university education, respectively. On the other hand, 8 % of the respondents do not have formal education as shown in Fig. 5.

This finding indicates that the majority of the residents are healthy and satisfactory. The finding also shows that 10 % of the respondents suffer from high blood pressure while 2.7 % bronchial asthma and 1.7 % joint pain due to age etc., as shown in Fig. 6.

4.3 Social Assets

In order to measure social assets, the relationship among community members, social support and membership with various social associations were considered. In order to investigate the relationship between community members, several questions are asked to the respondents and the findings as shown in Table 3. The findings show that the relationships among the member of communities are satisfactory. It is observed that whenever community faces financial, emotional, political, mental depression problems; friends, neighbours give their helping hand to solve their problems as shown in Table 3. It also indicates that they have limited interaction with elected representatives and community leaders.

Social support for marine park communities from different agencies is evaluated. The result revealed that the marine park community is receiving support for financial and food assistance while, not getting satisfactory backing for education, land grants, home care services, training etc., as shown Table 4.

This study found that a large number of respondents are involved with various associations in the study area. Figure 7 shows that 12.3 % of the respondents have membership in farmers associations. Approximately 8 % of the respondents are involved with UMNO youth, while 7 % cooperation, 5 % parent associations, etc., as shown in Fig. 7. This shows that marine park communities are involved in societies while they are busy with their everyday life.

4.4 Environmental Assets

This investigation takes into account the ownership status and sales of land among the respondents in accessing the natural/environmental assets. The majority of the respondents have no land ownership at the Tioman Island marine park. Only 27 % own land at the Tioman Island marine park. This shows that land ownership is low due to limited land and no opportunity to own land as current landowners are not selling. Moreover, most land is

Fig. 5 Education level of the respondents. *Source:* field survey 2014

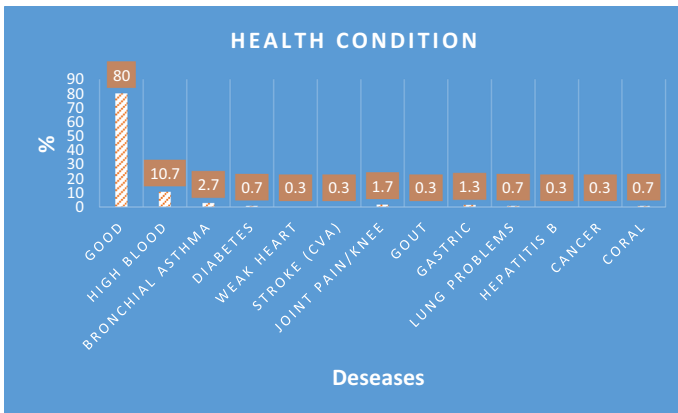
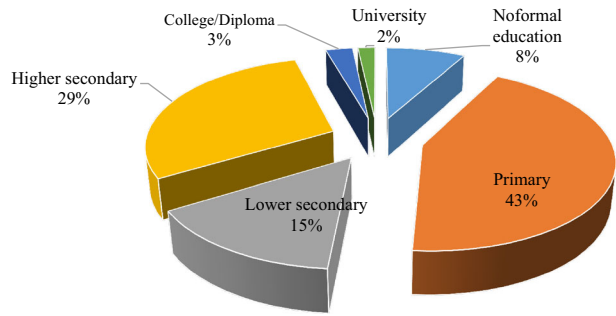


Fig. 6 Health condition of the respondents. *Source:* field survey 2014

Table 3 Relationship among community member

Items	Yes (%)	No (%)	No response (%)
Community provides assistance when needed	89	9	2
Are you getting enough support or assistance from your community members, peers, neighbors, colleagues?	77	18	5
Are you depressed by the society around?	4	96	
Do you have any conflict with your neighbors?	5	95	
Overall, are you satisfied with your community members?	87	10	3
Elected representatives often visited here	50	20	30

government owned. As for land sales after the marine park gazettement, there have been limited number of changes in land ownership as only 16.6 and 0.9 % of the respondents at the Redang and Tioman Island respectively, sold their land. Thus, it can be concluded that the locals' assets at the Tioman Island is still intact after the marine park gazettement. We also found that only 17 % of the respondents are involved with rubber tapper while some of them have buffalo farms and goat rearing in Redang Island. There is a substantial lack of water sources within MPAs.

Table 4 Receiving sufficient support of the respondents

	Yes (%)	No (%)
Getting treatment/medication assistance	12.3	10.3
Loan/financial assistance	20	2.7
Food assistance	14	8.7
Unity/peer support	2.3	2.3
Education/training/counselling	7.3	15.3
Home care services	1.7	21
Spiritual support (spiritual)	4.0	18.7
No response	6.3	16.3
Overhaul house	4.7	18
Land grant	1.7	21
Schooling	2.3	97.7

Source: field survey 2014

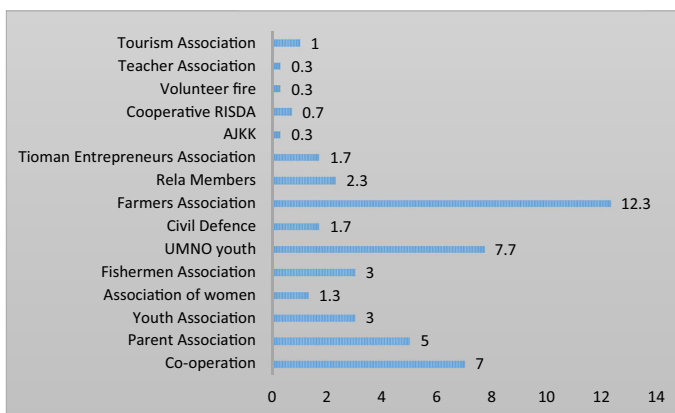


Fig. 7 Membership in the association. Source: field survey 2014

4.5 Physical Assets

Physical assets refer to household level and include boats, house, bicycle etc. At the community or citizen level, it includes access to infrastructure such as harbours, road, networks, clinics, schools etc. The study found that various infrastructures associated with communities' standard of living in MPAs as shown in Fig. 8.

Referring to Fig. 8, most of the respondents agree that infrastructures such as water supply, electricity, roads, transportation, hospitals/clinics, schools, grocery stores/sundry shops, have not improved after the gazettement. The result revealed that merely 9.3, 24.3, 29.7, 34.4, 9.7, 12.6 and 13.4 % of the respondents agreed that water supply, electricity, roads, transportation, hospitals/clinics, schools, grocery stores/sundry shops and overall facilities have improved respectively. The result shows that public telephone (89 %), public toilets (59.4 %), police station (51.6 %), fire services (84 %), post office (74.4 %), community hall (59.7 %), and cyber cafés (78 %) have been improved, as shown in Fig. 8.

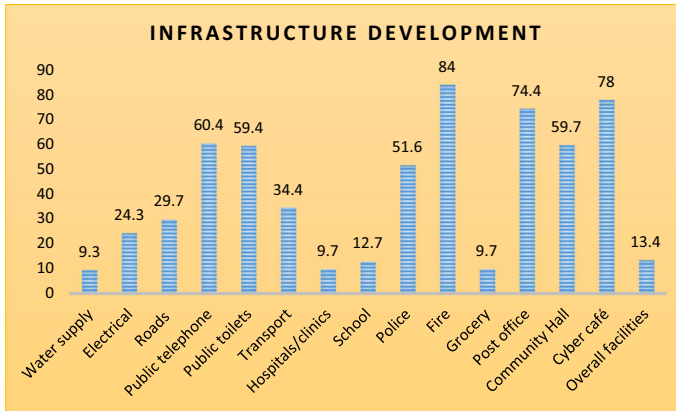


Fig. 8 Perception of the infrastructure after the Gazettement of the Marine Park. *Source:* field survey 2014

4.6 Financial Assets

In order to assess financial assets, the components assessed are respondents' income, and savings. In this study, we found that the majority of respondents' (36.3 %) average monthly income ranged of RM 751 up to RM 1,500 while approximately 25 % of the respondents earn between RM 441 up to RM 750. Of the respondents, 10 % had incomes ranging from RM 0 up to RM 440 per month while 15.7, 8, and 2.3 % of the respondents had an income range of RM 2,001 up to RM 3,000, RM 1,501 up to RM 2,000 and RM 3,001 up to RM 4,000 respectively. Only 1.7 % of respondents had an income range of more than RM 5,000 per month as shown in Fig. 9.

The findings also showed that 48 % of the respondents are saving a specific amount from their monthly income while 52 % are not.

4.7 Livelihood Strategies

Livelihood strategies are likely to focus on activities that generate income. The occupational pattern shows that some of the respondents have more than one livelihood activity. The residents of these marine parks have had numerous employment opportunities since the establishment of the MPAs. Due to being an outstanding tourist destination, MPAs residents are very fortunate to have various employment opportunities due to tourism. They are involved in many tourism related jobs. The study found that 25 % of the respondents are general workers while 14.7 % traders, 11.3 % rubber tapper, 6.7 % tourist boat operators and 6.3 % government employees. This also shows that only 8 % of the respondents are fishermen as shown in Fig. 10.

4.8 Vulnerability Context of the Marine Park Community

Marine Park Communities identified several problems that increased their vulnerability for livelihood strategies within Marine Park Areas. Communities identified price hike for essential goods as the most important problem within MPAs (96.4 %), followed by the increase in waste generation by restaurants and tourists (88.3 %). Of the respondents, 40.7 % reported that the quality of water dropped, while 60.3 % of the respondents

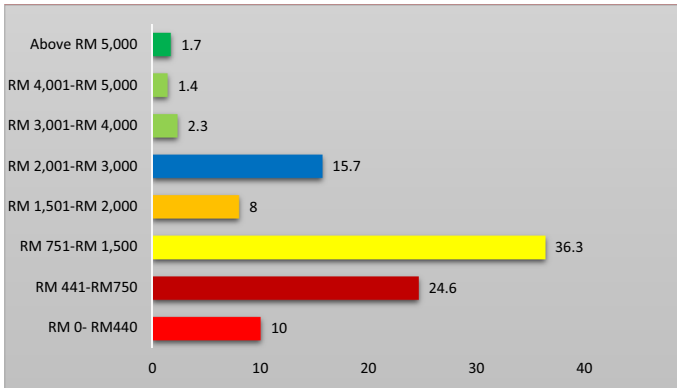


Fig. 9 Monthly average income of the respondents. *Source:* field survey 2014

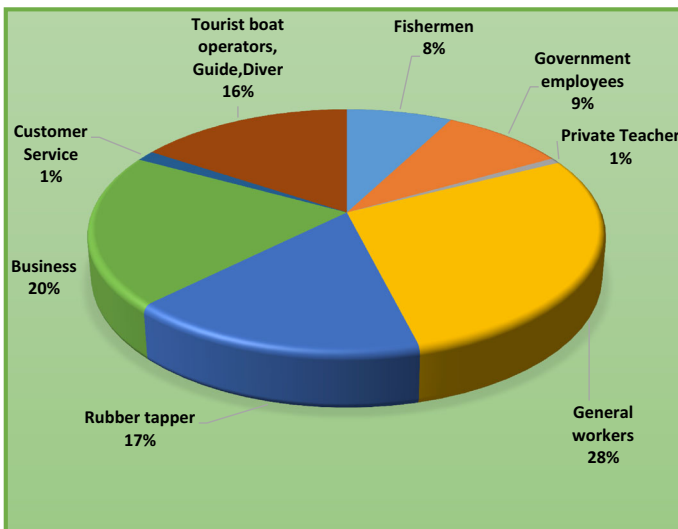


Fig. 10 Livelihood strategies of the respondents. *Source:* field survey 2014

mentioned climate change is a problem such as drought, heat, and haze. A major change, reported by the communities, was that 65 % of the respondents changed their occupation after the establishment of the MPA from fishing to other professions. 56 % of the respondents mentioned that the use of land in the study has also changed. Some forest areas have been converted into chalets areas. Of the respondents, 87.2 % mentioned that the MP community normally observes fewer tourists from November to February because of inconsistent weather. Therefore, local communities often lose income when there is a decrease in the number of tourists, while 39.7 % of the respondents stated job uncertainty was due to seasonal changes, 64.5 % observed fluctuation of prices of goods and services, and 83 % reported that an increasing number of tourists during picked up monsoon (from March to October) (Table 5).

Table 5 Vulnerability context of the Marine Park community livelihoods

Vulnerability context	%
<i>Trends</i>	
Price hike for essential goods	96.4
Increasing solid waste	88.3
Water quality dropped	40.7
Change of occupation	65.0
Change of land using	56.0
Increasing number of tourists	83.0
<i>Shocks</i>	
Outbreak of human diseases	6.7
Economic crisis	34.0
Natural disaster	55.4
<i>Floods</i>	
Prolong drought	
<i>Seasonal change</i>	
Climate change is happening	60.3
Less tourists from November to February	87.2
Job uncertainties according to seasonal change	39.7
Fluctuations in the prices of goods and products according to the season	64.5
Declining of marine products due to change of seasons	52.3

Source: field survey 2014

5 Analysis of Focus Group Discussions (FGD)

The qualitative research method was executed by using focus group discussion (FGD) to enrich the discussion of the findings from the empirical evidences. This study covered three beautiful Marine Protected Areas in Malaysia. In order to support the findings, one FGD was conducted from each Marine Park and a total of three FGD were executed for this study. A total of 10 community members participated in this FGD, all participants' responses are presented verbatim in Table 6. The identically structured questionnaire was used for three Marine Parks. The FGD questions were mainly developed considering one main theme such as the vulnerability context of Marine Park community livelihood, as shown Fig. 11. This issue is analysed in the following section.

5.1 Threats to the Marine Park Community

The results revealed that the MPC is facing three types of vulnerabilities, namely in trends, shocks and seasonal changes, as shown in Fig. 11. *Trends* refer to changes over time in natural resource stocks and quality, or in other factors unrelated to aquaculture that impact on community livelihood. *Shocks* refer to some unexpected occurrences that might effects community livelihoods. *Seasonality* refers to seasonal changes that constrain the livelihood choices of people.

Table 6 Focus group discussion on vulnerability context

Theme	Categories	Verbatim
Vulnerability context	Trends	<i>P1: Very tough la ... price of things going up day by day ... but income not increasing.. Everything expensive ... we don't have enough money. Before we could by lot of goods by 50 dollars but now tak boleh (can't) lah...</i>
	Shocks	
	Seasonal Changes	<i>P2: Price of everything increasing but only alcohol is cheaper this island ... hahaha...</i>
		<i>P3: I don't catch fish ... fishing not allowed ... Now I have restaurant business. Many people change their occupation from fishermen to other professions</i>
		<i>P4: It is good that number of tourists are increasing... so we built more chalets, hotel and resorts cutting our forest hehehehe.... But November to February we have less number of tourists because at that time strong waves, unexpected high tide... This time we face job uncertainty and very limited job scope due to seasonal change</i>
		<i>P5: Some teenagers are addicted to alcohol because very cheap la.... duty free products....we are worried about our children but it is still under control</i>
		<i>P6: I notice, some of us having illegal relation with tourists. But I don't blame anyone, but this thing happened</i>
		<i>P7: Yes, I am aware of environmental problems, for example climate change, haze last year, late raining, monsoon changing, CO₂ emission increasing</i>
		<i>P8: Waste of restaurant is increasing because, there is no proper disposal system lah. They put in the plastic bag... Tourists throw rubbish into the dustbin but no collection on time so monkey take these waste and make dirty the environment la ... we don't have treated water. We drink water from Mountain directly ... water quality is dropping now a days...</i>
		<i>P9: A few cases of disease existed some of us faced such as high blood pressure, bronchial asthma, joint pain and gastric. But the percentage is not high since very few cases and does not cause for death</i>
	<i>P10: We are afraid if 'economic crises' and natural disaster happened then, it can hamper our living standard. We are worried because we don't have multiple sources of income</i>	

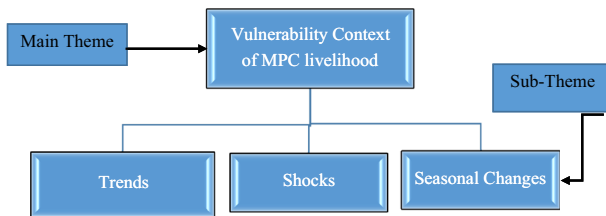


Fig. 11 Vulnerability context to MPC livelihoods

5.2 The Trends

Most of the participants (P1, P2 and P3) in the focus group discussion identified several changes over a period of time such as price hike for essential goods as the most important problem within MPAs, Change in occupation, social problems, increased waste generation; water quality drooped and changes of land use. The statements of the participants are

shown in Table 6. The participants observed the change of occupation after the establishment of MPAs from fishing to other professions. This is because most of the community members were fishermen within these Islands. Due to the establishment of MPAs, the government prohibited fishing within two nautical miles. Hence, they had to change their occupation. Some participants mentioned that the use of land has also changed. They stated that some forest areas have been converted into chalets, hotels, and resorts.

Participants 5 and 6 mentioned that there are social problems in this Island such as addiction to alcohol due to duty free products and involvement in unethical activities. The participants were concerned of the social problems that had emerged in marine park communities. Participants 8 reported that there was increase in waste generation by restaurants and tourists. Participants 8 also reported that the quality of water dropped.

5.3 The Shocks

In order to find major shocks associated with marine park community, participant 9 stated that he did not face an outbreak of diseases within marine protected areas but some of them faced such as high blood pressure, bronchial asthma, joint pain and gastric. Participant 10 considered 'economic crises' and natural disaster such as hurricanes as threats because it can hamper their living standard. If an economic crisis happened, the marine park community became worried because they do not have multiple sources of income. They also worried if the economic crisis affects their ability to repay their monthly debts. With regard to the forms of the natural disaster shocks such as hurricanes, participants showed concern. In the event of natural disasters, the marine park community grew worried because most of them are involved with tourism related jobs.

5.4 Seasonal Changes

Participant 7 mentioned that climate change takes place in the form of delayed rains, temperature increases, and haze. Some participants could not precisely state whether changes that can be attributed to climate change. However, they realized that change is happening in the form of delayed rain, increasing temperatures, rises in sea levels, and strong waves. However, the respondent was unsure whether such changes can be attributed to climate change. Nevertheless, they realized that climate change has occurred by comparing present sea conditions with previous sea conditions. Participant 4 reported that they observed seasonal changes such as MPAs normally observe fewer tourists from November to February because of rough weather. Therefore, local communities often lose income when there is a decrease in the number of tourists. Uncertain employment is the highest form of threat faced by the respondents. This is the threat related to their job uncertainty and reduces job scope due to seasonal change. It has been demonstrated that seasonal variation poses a threat that results in socio-economic changes. Although, it was also reported by participants 4 that the number of tourists are increasing day by day particularly, from March to October.

6 Discussion

In order to assess the livelihoods of MPA communities, popular Sustainable Livelihood Approach (SLA) was adopted. This sustainable livelihood framework identifies five livelihood assets (five standard of living indicators) human, natural, social, financial, and

physical. From the findings of this study, we determined that the local community's standard of living has improved in terms of physical and social assets; but they have a substantial lack of human, financial and environmental assets. One of the main attributes of human assets is a community's education level, yet this study shows that a significant number of respondents do not have formal education, and that only 1.7 % have a university degree, which is inconsistent with the aim of the country to be developed by 2020 (Sixth Malaysian Plan 1991–1995).

A social asset is an economic notion that advocates the association among entities and individuals that could be economically appreciated. Social systems that comprise of societies who trust and support each other would be an influential asset. These interactions between persons and organizations may lead to a nation wherein every individual will think of the other when something needs to be done. Beside economic asset, social asset is an important mechanism for economic development.

The study found a surprising result that 44 % of the respondents are low-income groups. This result is inconsistent with the aim of to be developed nation by 2020. Malaysia has seen much success in its fight against poverty. Previous studies show that approximately 60 % of business operators have an income range between RM 551 and RM 2,000 (Kari et al. 2011). This result shows that their monthly income is very low compared to other places in Malaysia. According to the Department of Statistics Malaysia, more than half of the Malaysian households earn a monthly income of <RM 3,000. The remaining households earn between RM 3,001 and RM 4,000 (12.9 %), RM 4,001 and RM 5,000 (8.6 %), RM 5,001 and RM 10,000 (15.8 %), and above RM 10,000 (4.9 %) (Department of statistics Malaysia 2009). This finding shows that the monthly household income for the marine parks' residents remains very low compared to others.

The economic planning unit (EPU) has classified households based on their monthly income. Those with incomes below RM 440 are classified as hard-core poverty while below RM 750 is classified as poor, and those with incomes below RM 2,000 is classified as low income (EPU 2007). In 2000, poverty was reduced to 5.5 %. The strategy which was employed for reducing poverty led to accommodate an effective poverty reduction enclosure and fast economic growth with a constant improvement of its micro economy (DOSM 2011). Hard-core poverty was reduced from 1.2 % in 2004 to 0.7 % in 2009 and the incidence of overall poverty fell from 5.7 % in 2004 to 3.8 % in 2009. The overall poverty rate is 3.7 % in Malaysia (Hatta and Ali 2013; DOSM 2011).

The above statistics highlight the overall poverty reduction in Malaysia. From the Focus Group Discussions (FGD), the study found consistent and similar results with quantitative analysis that marine park community are more concern regarding the following factors such as stress out with hike of prices of goods and services, changing occupation from fishing to other professions, increasing solid waste generation, observing climate change, water quality dropped and increasing number of tourists. The results revealed that a large number of respondents have changed their occupation from fishing to other professions after the establishment of MPAs. However, before the establishment of MPAs, most of the residents were fishermen (90 %) (Ibrahim 2007). This means that the number of fishermen has reduced because of gazettement. Due to excessive number of visitors, marine parks are confronting a large number of environmental issues such as increased water pollution by sewage and garbage, detergents or sun blocks as well as oil residues from tourist boat, degradation of coral reefs, shortage of freshwater, turtles nesting areas on the islands, fish feeding activities and increase domestic waste (Harborne et al. 2000). Poor water quality is one of the biggest concerns in marine parks in Malaysia. It is noticeable that water quality has dropped (MIMA 2012) with an increase in sediment and nutrient loading of water and

by some other tourist's activities (Weng 2009). Scientists are of the view that the climate change was worsening the serious problems facing the marine ecosystem (Weng 2009). With acidification of oceans, altered hydrodynamic events, and warming of the sea, the marine life is heading towards more dramatic consequences (Weng 2009).

7 Suggestions

From the above findings and discussion, the following observations and recommendations are offered. Firstly, we could conclude that the residents' standard of living has been improved in terms of physical and social assets, but they are substantially lacking in terms of human, financial, and environmental assets. Although the Malaysian literacy rate is very high (99 %), this study shows that 8 % of the respondents do not have formal education and only 1.7 % have a university degree, which is inconsistent with the aim of to be a developed nation by 2020. Therefore, policy makers should pay attention to improve the education level of the respondents in the study area.

Secondly, the study found that 44 % of respondents are from low-income groups. Although Malaysia has seen significant success in its fight against poverty, policy makers should pay special attention for generating prospects to raise the incomes of marine park residents. Thirdly, an uncertainty in the price of goods needs to be controlled, despite being a seasonal tourist destination.

Fourthly, this research shows that the gazettement of marine parks has successfully resulted in greater tourism and has provided various high value employment opportunities and extensive infrastructure development. These have effectively boosted the communities' standard of living within the MPAs compared to before gazettement. However, greater government aid in managing important infrastructures is needed. This is because individuals are unable to provide the islands with these costly infrastructures. Fifthly, since the income level is very low for the residents of Tioman Island compared to other places in Malaysia, to increase their income, giving them the opportunity to be engaged with the tourism industry during the peak season and making them involved in income generating activities during the off peak season (during monsoon season), are constructive steps toward increasing the incomes of locals and eventually increasing the sustainability of their livelihoods.

Finally, appropriate activities must be commenced to ensure the sustainability of residents' livelihoods. The government and private sectors must cooperate in guaranteeing the islands' sustainability as marine parks. Such efforts are assisted through the implementation of laws, policies, customs, and institutions. It is expected that once the processes are approved, they will support the management of sustainable resource utilisation. This will eventually increase local incomes and their standard of living.

8 Limitations of the Study

There are some limitations of this study that need to be taken into account. Although there are 42 Marine parks in peninsular Malaysia, this study covers only three MPAs, namely Tioman Island, Redang Island and Tinggi Island. These three marine parks are selected for study for of logistical reasons. Furthermore, Redang Island is recognised as the largest and most beautiful island on the east coast of Peninsular Malaysia while Tioman Island has been hailed as one of the ten most beautiful islands in the world (Tahir 2008). In addition,

all MPAs in Malaysia are not occupied like these three marine parks. Although there are other MPAs with human habitats such as Lembu Marine Park in Lankawi, Perhentian Besar & kecil and Tunku Abdur Rahman (MPA) in Sabah, these are managed by the Redang Marine Park administration (Othman et al. 2011). Thus there is the opportunity for researchers to include the remaining MPAs in Malaysia in some future study.

In order to achieve an inclusive conclusion, this research should have considered all related agencies such as the Marine Park Management Authority, policy makers, Department of Marine Park, Federal and State governments, and Tourism Ministry. However, due to resource limitations, we restricted the scope of our study. Furthermore, we did not consider income distribution patterns within MPAs communities. Thus, future studies should consider this issue together with environmental awareness, attitudes, and environmental conservation behaviour using the Social Exchange Theory and the Theory of Planned Behaviour.

9 Conclusions

The main goal of this study was to explore the socio-economic status of the residents within MPAs. In order to attain the goal, this study employed SLA to assess standard of living indicators as stated in the conceptual framework. The assessments of the community's standard of living, sustainable management with robust provision using SLA was essential to focus on MPAs indicated by Wells and Bradon (1992) to the indigenous people that are examined in this study. Furthermore, the conversion of the top-down approach, consistency, shortened and immediate practices with local-level diversified, flexible and long-standing natural resource conservation practices are considered the most important factors for MPAs. Thus, it is important for policy makers and the relevant authorities to comprehend residents' socio-economic status, and appropriate management policies to formulate the appropriate top-down approach. It is to this end that this study is dedicated. This study assessed communities' livelihood assets and how various social relations, institutions, organizations, policies, and shocks modify access to assets and ability to convert these into livelihood outcomes.

The findings indicate that one of the most important standards of living indicators is level of income, which we found was very low for MPAs residents compared to other places in Malaysia. Thus, policymakers should identify an effective livelihood approach to improve the rural development policies and practices by recognising the complexities of livelihood strategies. Consequently, this study has explored the factors needed for assuring the sustainability of livelihoods on MPAs. Our findings indicate that some social and physical assets of MPAs improved but are still lacking in financial, human capital, and environmental assets. Efforts are to be further maintained by the implementation of effective policies, and management of sustainable resource utilisation. This study would help policy makers to formulate enhanced policies to improve the socio-economic status of the Marine Park communities in Malaysia.

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