Understanding Poverty and Vulnerability by Utilizing the Sustainable Livelihood Approach: A Comprehensive Study among Rungus Ethnic in Sabah, Malaysia

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Abstract

Livelihood assets have been widely recognized in the recent development literature to have positive consequences on poverty eradication. However, most studies examine the impact of individual livelihood asset on some narrow indicators of well-being. Therefore, it does not really shed light on whether overall livelihood assets are associated with better well-being. This gives rise to the question on whether Sustainable Livelihood Approach (SLA) also leads to poverty eradication. This paper attempts to fill this gap by extending the analysis not only on the impact of six livelihood assets (human capital, natural capital, physical capital, financial capital, social capital and information capital), vulnerability and institutions on poverty, but also to estimate the poverty gap, income gap and time exit poverty for the Rungus people, in Malaysia state of Sabah. Empirical evidence on the links between livelihood assets and poverty is provided by performing logit model. The analysis is carried out using primary data obtained from a survey of 327 Rungus rural households in Kudat, Kota Marudu and Pitas, northern most part of Sabah. The results show that all livelihood assets have a positive significant impact to exit poverty except for vulnerability. The estimation of time needed for the Rungus to exit poverty was 9.78 years with constant yearly financial growth. These results imply that investment in information capital is crucial to achieve poverty eradication objectives.

Keywords: *human capital, natural capital, physical capital, financial capital, social capital, information capital, poverty, logit model, Rungus*

1   Introduction

In 1990s onward, Sabah had shown the highest poverty incident with 34.2 per cent in 1990, 20.1 in 1999 and 19.7 per cent in 2009 (Mat Zin, 2011). However this figure has gone down significantly to 9.6 per cent in 2012 (Kasim Mansur et al., 2012). Poverty in Sabah and Labuan alone occupied one third the amount of poor households in Malaysia, but less than 4 per cent of all households were located there (Malaysia, 2009). There are a total of 43 different ethnics in Sabah, the Rungus is the minority among the ethnics, their population is less than fifteen thousand and most of them are living under the poverty income line (Malaysia, 2010). Economically, overall household income falls under poverty level and populated in the rural area of Sabah

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mainly Kota Marudu, Beluran, Telupid, Kudat and Nabawan. Based on DOSM (2010) report there are 3383 Rungus households living under poverty line (DOSM, 2010). The statistics also show that the Rungus is considered the most deprived ethnics in Sabah due to the highest recorded incidence of poverty with 58.2 per cent (Dullah Mulok et al., 2010, Ragayah Haji Mat Zin, 2007).

In the effort to eradicate poverty, government introduced many poverty reduction projects and at the same time giving subsidies for the poor in order to improve their standard of living. Generally, assistances and subsidies channelled to the poor would be based on income data. However income data cannot fully reflect the support and commitment of the poor in engaging with government poverty reduction projects. Consequently, a given project does not deliver expected result (Zulkarnain and Isahaque, 2013). "One size fits all" kind of project proved to be ineffective. Thus, alternative method is needed in order to assess the capability of the poor through understanding their livelihoods before designing and implementing poverty reduction project on them. The sustainable livelihoods approach (SLA) is one of the methods to enhance understanding of the livelihoods of poor households. Unlike other methods, the SLA is a multidimensional, integrated and rational approach to poverty eradication (Kamaruddin and Samsudin, 2014).

The concept of sustainable livelihoods approach (SLA) was developed by Robert Chambers and Gordon Conway in 1991.The concept of SLA is established based on collective prominent theories and transform into conceptual and analytical to capture the livelihood and the nature of poverty. According to the Department for International Development (DFID), the primary aim of SLA framework was to study in depth the actual condition of the poor and determine the suitable livelihood for the poor by planning new programmes for livelihood sustainability (DFID, 2000b).

SLA is basically derived with three preliminary modes of concept which consist of livelihood assets (LA), modifiers and trends (DFID, 2000a). In 1999, Bebbington introduced the sixth asset, the information asset, into the original assets pentagon. Information became prominent in peoples' lives, it is inconceivable to achieve the overall objectives in eradicating poverty by sustaining their livelihood without people's access to information thus it yields hexagonal livelihood assets (HLA) (DFID, 2000a). The modifiers of this model are institutions and vulnerability. Institution comes from governmental supporting funding poverty reduction projects (Ashley and Carney, 1999). Vulnerability may be varied due to different ethnic, culture, environment and economic activities. Recognizing the vulnerability is important in preparing oneself in facing the worst to come (Ashley and Carney, 1999). SLA offers the prospects of a holistic and integrated approach in combating poverty in this century.

It is evident that the body of knowledge surrounding all the livelihood assets and its influence on poverty and economic development is anything but unequivocal, as is our understanding of the comparative impact of livelihood assets and poverty among the Rungus. In light of the present evidence, the purpose of this study is to: (a) evaluate and compare the impact of SLA in the form of livelihood assets, vulnerability and institutions on poverty; (b) evaluate the livelihood strategies adopted by the poor and the non-poor Rungus; and (c) estimate the expected time for the poor Rungus to exit poverty.

By addressing the above-articulated objectives, this study contributes to the existing literature in the following ways. First, we expand the knowledge base pertaining to the influence of livelihood assets on economic welfare. As noted above, the findings of previous studies pertaining to the relationship between livelihood assets and poverty are mixed, that is, some suggest social capital have greater positively effects on poverty than human and physical capital (Hakim *et al.,* 2011) while others suggest that natural capital (Kamaruddin and Samsudin, 2014) and information capital (Kenny et al., 2001 and Kelles-Viitanen, 2005) carry greater weight on the well-being. Second, we build on previous studies in that we include information capital in livelihood asset of SLAs. Also, to our knowledge, no other study has measured the impact hexagon livelihood assets all at a time on poverty specifically this is the first in Malaysia. Thus, our use of a wide range of livelihood assets allows for a more comprehensive assessment of livelihood assets by providing valuable information on what specific aspects of livelihood assets may promote time exit on poverty. The structure of the paper is as follows. Section 1 reviews on literature review while section 2 discusses on the method employed in this study. The following section presents the result. We conclude the analysis at the end of the paper.

2   Literature Review

In Malaysia, government has implemented various policies to eradicate poverty and assistance offered is largely based on the level of income (Mansur et al., 2009; Roslan, 2004). This inevitably necessary but it is merely for a short term. Therefore understanding the distribution of the livelihood assets among the poor is very important for long term benefits.

In Malaysia, data sources pertaining poverty is collected and compiled from household income survey (HIS) and the household expenditure survey (HES), thus it could also determine the success of the government programmes and policies (Hasan and Hashim, 2001). Poverty in Malaysia is classified as absolute and relative poverty. Gini coefficient and Lorenze curve are used to indicate the disparity within the urban and rural and within ethnic disparity (Mat Zin, 2007). The poor and the non-poor in the sample of the study are segregated by PLI as shown in Table 1.

Table 1 Poverty line income for Malaysia

Items	2009			
	Peninsular Malaysia	Sabah and Labuan	Sarawak	Malaysia
Mean PLI (RM monthly)	763	1,048	912	800
Mean per Capita PLI	194	225	208	198

Source: DOSM, 2012

Based on the economic planning unit and statistics for year 2009, the PLI in Sabah was RM1,048, it was the highest as compared to peninsular Malaysia and Sarawak. Household with gross income less than PLI will be recognized as poor whereas non-poor for those equal and above to PLI.

Poverty in Sabah is still persistence but the rate of poverty in peninsular has been reduced successfully. Although many national programmes helped the poor in struggling out from the circle of poverty, they were not fit to account multifaceted poverty that was subjected to location, strata, ethnicity and gender. The failure to recognize the insight of poverty is called as "politicization of poverty", it involves methodological bias in measurement of poverty and its indicators in poverty identification (Berma et al., 2006).

As early as 1964 economist like Harry Johnson identified four types of capitals that important for economic development, these were physical, human, social and intellectual capitals. Human capital was then became very popular when Becker raised it in 1993, whereby in the same year, Townsend introduced social exclusion as a subject of poverty. Natural capital on the other hand was emphasized by Edward Barbier in 1997 as critical for low, middle income even the developing countries to manage and exploit efficiently and sustainably in attainment of sustainable economic development. Another important capital is no other than financial capital, Hulme and Mosley (1996) declared it as an important determining factor of raising income. Financial capital received greater recognition at the end of twentieth century when Elis (2000) described it as bundles of cash or financial assets in term of savings, credits, remittances, pensions and wages. FC is a key to capital investment and a determining factor of raising income (Hulme and Mosley, 1996).The emerging capital of the twenty first century is undoubtedly the information capital. Information and communications technology (ICT) plays a vital role in term of economic, social, cultural and politics. It promotes transparency, facilitates efficient, interact effectively between the people

and the administrators and saves both time and cost of the whole processes (Backus, 2001). ICT is not only a good tool to control the level of bureaucratic abuse and corruptions but also to empowers the poor (Warschauer, 2003; Kenny et al., 2001).

In the contradiction, there are some literatures that arrived at conspicuously different conclusion. Whereby some literature suggests that increasing economic dependence on natural capital correlated negatively to economic performance (Barbier, 2005a). A strategy that relies on natural capital to raise the incomes of the poor will lead inevitably to the sacrifice of wetland, forests and other open spaces (Boyce and Shelley, 2001). In addition there are some overlap result as in social capital having larger effect than human capital on economic well-being (Samsudin and Kamarrudin, 2013), while Rupasingha and Goetz (2007) suggested the opposite. In 2014, Kamaruddin and Samsudin analyzed the distribution of five livelihood assets among the hardcore poor in Kupang, Kedah. Based on the standardization index, they found that the ownership of natural assets having highest impact, followed by financial, social and human assets while physical assets recorded the least impact of poverty exit (Kamarruddin and Samsudin, 2014). Social asset was further analyzed by Weaver and Habibov (2012) as greater impact than human asset. Another finding suggests that frequency in communicating with relatives and friends over the internet had the second and third largest effect on income. These interpersonal interactive functions allow people to go online and communicate with others at a relatively low cost, irrespective of physical distance (Lee and Lee, 2010).

The overall importance of capital today is not very different from what it was in the 18th century; perhaps its form has changed. Capital was once mainly land but is now industrial, financial and real estate. The coming trend is that "information" will become more important than industrial, financial and real estate assets, possibly be the capital of the 21st century and beyond. Therefore, as the evident that the body of knowledge surrounding livelihood capitals or assets and its influence on economic development is anything but unequivocal, our purpose of this paper is to understanding of the comparative magnitude of the effects of each livelihood capital on poverty by utilizing SLAs.

Sustainable Livelihood Approach (SLA)

In 1997 DFID affirmed its prevailing aim for poverty eradication. Due to this recognition, SLA has caught the interest of rural development departments to apply this concept in their poverty reduction programmes (Krantz, 2001). Poverty is not only referred to low income as define in conventional way, this includes lack of education, deteriorating health, life expectancy, poor social services and access to infrastructure. All these essential assets are known as SL assets. Every asset is interdependence, self-

expandable and possessing positive impact on the rest of the assets of life. The poor often know their situation and needs best and must be involved in the design of policies and projects intended to better their lot, they are usually committed to implementation. Thus, participation by the poor improves project performance. SLA is to increase the agency's effectiveness in poverty reduction by seeking, to mainstream a set of core principles and a holistic perspective in the programming of support activities and to ensure that these correspond to issues or areas of direct relevance for improving poor people's livelihoods (Krantz, 2001). The fundamental feature of sustainable framework is an analysis of five different type of assets own by individuals to build their livelihood which consists of human, natural, physical, social, financial and information livelihood assets (Ashley and Carney, 1999).

3   Methodology

This study was conducted in the districts of Kudat, Kota Marudu and Pitas, Sabah. Data was collected using a structured questionnaire. A questionnaire design was based on the Sustainable Livelihood Analysis (SLA) framework as suggested by the (Department for International Development (DFID), 1999). This approach was used to identify asset ownership, strategy implemented and outcome achieved, institution influenced and vulnerability context faced by poor households in sustaining their livelihoods.

For data analysis, logit model was used to estimate the effects of various factors on the rural livelihood. Marginal effects (ME), odds ratio (OR) and preventive fraction (PF) were used to measure the ratio of probability of being poor and the probability of not being poor. The poverty gap (PG) and income gap (IG) were also used to measure based on the given formula. With the results of PG and IG, an estimated tax rate (ETR) was estimated onto non-poor as a way to support financial allocation to eradicate poverty. The time taken to exit poverty was computed based on the given formula to estimate the average exit time taken for the poor to achieve the PLI.

In estimating the effects of various factors on the probability of a rural household being poor, a binary choice model based on the maximum likelihood method was employed. A dummy dependent variable which took the values of 1 and 0 was used. In this research of measuring poverty, the value of 1 was assigned to a poor household with the household income below PLI. On the other hand, the value of 0 was labelled to a non-poor household with the household above the PLI. The logit model in this study was specified as follows:

Latent variable specification:

$$\text{Equation 1: } Y_i^* = \beta X_i + \mu_i$$

where:

Yi = 1 (poor) if Yi* > 0

Yi = 0 (non-poor) if Yi* < 0

β = vector of parameters

Xi= vector of independent variables

μi = error term

The error term, μi, was assumed to be logistically distributed. The probability of household was being poor or otherwise, was postulated to depend on the vulnerabilities faced by each household, where it was measured from its ability to sustain shocks, changes and trends. Institutions could also contribute to the probability a household was poor. The equation shown below is known as Equation 2, it was estimated to examine the probability of the rural household being poor.

$$\text{Equation 2: Prob(Yi} = 1/\text{Xi} = F(\text{Xi }\beta) = \frac{\exp(\text{Xi }\beta)}{1 + \exp(\text{Xi }\beta)'}$$

where Xi' = (HC, NC, SC, PC, FC, IC, vulnerability and institutions)

The sign of the estimated parameter is already sufficient to conclude whether the independent variable has a positive or negative impact on the dependent variable (Wooldridge, 2010).

PG and IG measure the poverty deficit of the whole population in which those with poverty deficit and lack of resources to rescue all the poor out of poverty by using substantial targeted cash transfers (Coudouel et al., 2002; UNDP, 2007). PG is established in Equation 3 as below:

$$\text{Equation 3: PG} = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{z - Yi}{z} \right]$$

where z is the PLI, Yi is the income of individual i and the sum is calculated solely on the poor. IG is established in Equation 4 as below:

$$\text{Equation 4: IG} = \frac{PG}{HI} = \frac{z - Yq}{z} \text{ whereby Yq} = \frac{1}{q} \sum_{i=1}^{q} Yi$$

where Yq is the average household income of the poor.

PG vitally determines the allocation of financial resources to eradicate poverty perfectly tailored to the poor but it is not the only solution, imposing taxation onto the non-poor is another way to solve the problem. Tax computation is multifactorial, but it could be estimated roughly. Based on the method of estimation by UNDP (2007), the estimated tax rate (ETR) is shown in Equation 5 as follows:

$$\text{Equation 5: ETR} = \text{PG} \times \frac{1}{\frac{mi}{PLI}} \times \frac{1}{np} = \frac{\text{PG} \times \text{PLI}}{mi \times np}$$

where mi is the mean income of the non-poor and np is the percentage of population of the poor represented in fraction.

According to the UNDP (2007), the average exit time for the poor could be represented as Equation 6 below:

$$\text{Equation 6: } t^p(y) = \frac{\frac{1}{n}\sum_{i=1}^{q} t_j(y)}{HI} \text{ where } t_j(y) = \frac{In(z) - In(Yi)}{y}$$

where y is a suggested growth per annum, $t^p(y)$ is the average exit time for only the poor based on y and $t_j(y)$ is the time taken for the household i to exit poverty based only. The suggested y is 5 per cent and 7.5 per cent. Average exit time required to leave poverty is substantially important for a poverty eradication project to deliver 5 to 7.5 per cent growth needed by the poor. In other term, it acts like a performance indicator for any government projects to achieve their target. Projects or poverty eradication programmes that could uphold this performance should be continued otherwise should be revised or terminated (UNDP, 2007). Descriptions of the variables are shown in Table 2.

Table 2 Description of the variables

Variable	Definition
Dependent variable	
POOR	(Binary) Yes=1, No=0
Independent variable	
Livelihood Assets HC NC PC SC FC IC	 (Continuous) Index household of HC (Continuous) Index household of NC (Continuous) Index household of PC (Continuous) Index household of SC (Continuous) Index household of FC (Continuous) Index household of IC
Vulnerability Trend (Migration) Shocks (Death of Family member) Seasonality (Insufficient catches, crop disease)	 (Continuous) Index household of Vulnerability
PIP Rules, custom and norms Demographic (age, gender and marital status) Local organization (executive agencies)	 (Continuous) Index household of institutions

Source: Modified from Abdul-Hakim et al., 2010.

4   Results

Based on SLAs, a structured questionnaire has been designed to collect information on the livelihood assets of the poor Rungus ethnic. The population of the Rungus were approximately 3,383 households. There were 327 sets of questionnaires harvested from 345 sets distributed to Rungus community in Kudat, Kota Marudu and Pitas areas. Hence, there were eight hypotheses derived from eight independent variables (HC, NC, PC, FC, SC, IC, vulnerability and PIP). The sample size of a minimum of 300 was adequate to meet the objective and the purpose of the study (Sekaran and Bougie, 2010). Overall, the response rate was 95.0 percent.

The demographic data was classified on age, age of marriage, family size, occupation, income of the husband and income of the wife. In Figure 1, the majority of them about 116 respondents come from aged between 45 to 54 years old and 106 of the respondents (32.4 per cent) are aged between 35 to 44 years old. Figure 2 indicates that female married at much younger age compared to male. Majority of both male and female married at the age of between 20 to 22 years old, with a total of 73.4 per cent female and 46.2 per cent male. In Figure 3, the respondents are not taken from only one family size but from five sizes. Most of them with the family size of within 4 to 6 are 46.2 per cent. According to the family size chart, it presents a normality graph; the family size of within 4 to 6 is commoner in our studies population. In Figure 4, 27.8 per cent of female and 19.9 per cent of male are illiterate. Majority of them only completed their primary education as in 32.4 per cent of female and 35.8 per cent of male. In Figure 5, approximately 67 per cent of them are in agriculture, 3.4 per cent in fisheries and 0.6 percent in farming and poultry. In Figure 6, most of the respondents with monthly income between RM201 to 400 are approximately 27 per cent and the second highest is those monthly income of between RM401 to 600. Most of the women are unemployed because they are full-time housewives of mainly taking care of housewives children and helping their husband in the paddy field. Only 16 per cent of the women are employed, with majority of them are paid less than RM200.
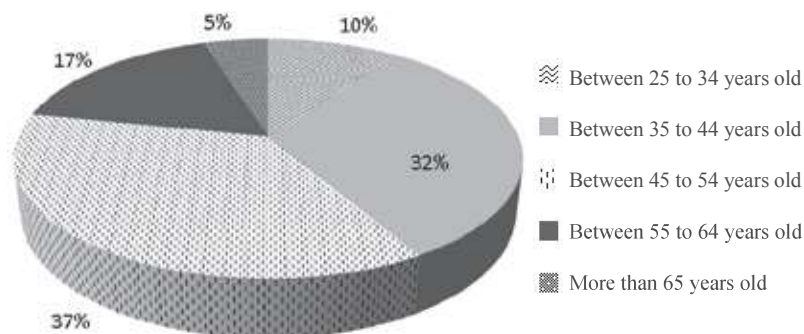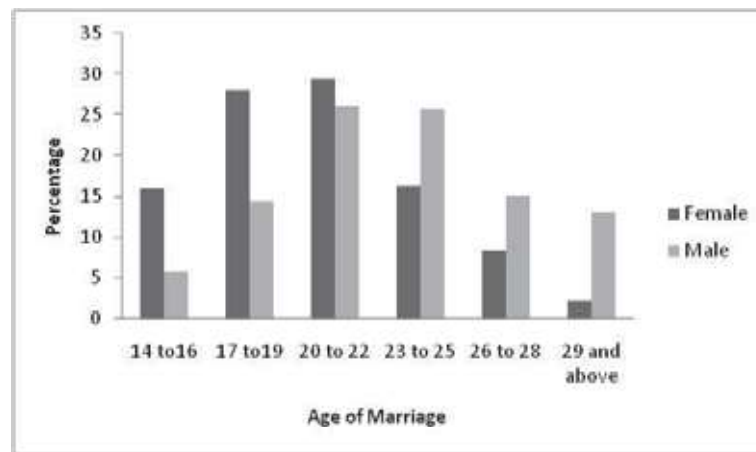

Figure 1 The overall age range
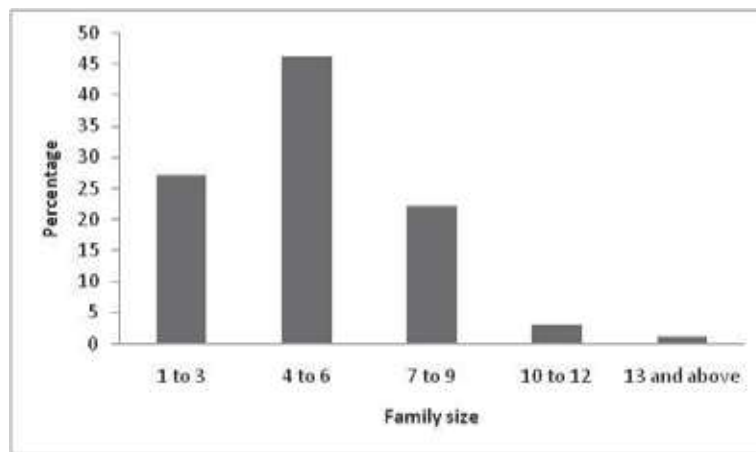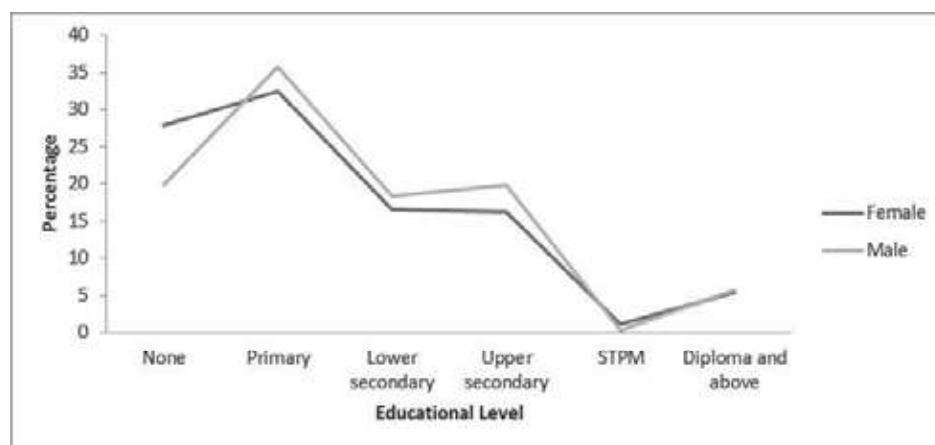
Figure 2 The age of marriage
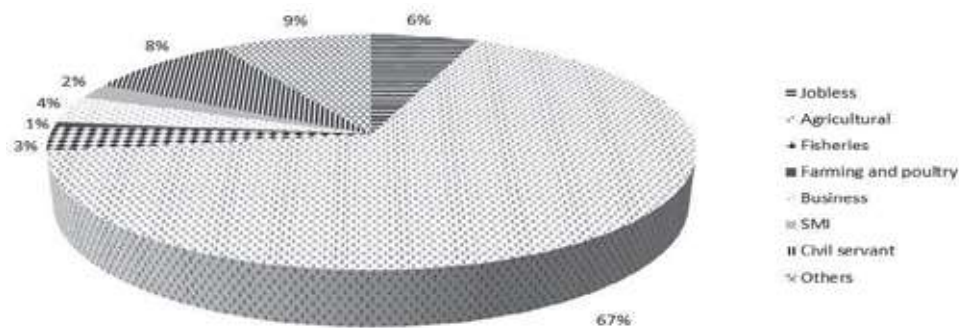

Figure 3 Family size
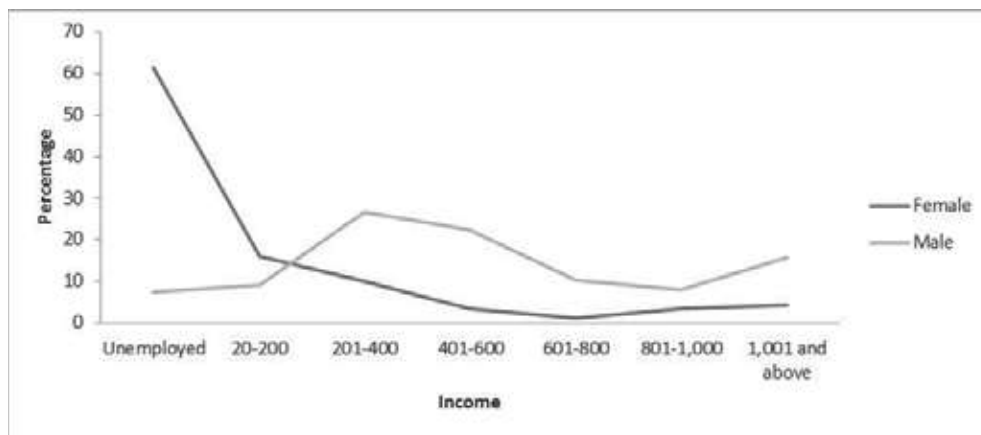

Figure 4 Education level

Figure 5 Occupation

Figure 6 Income

Table 3 Respondents' livelihood assets

5 Likert Scale	Percentage					
	HC	NC	PC	SC	FC	IC
1: No LA	7.825	7.9	7.725	11.325	11.625	12.125
2: Poor LA	28.05	31.425	29.675	40.85	35.85	33.1
3: Neutral	48.275	42.875	43.1	23.825	29.375	34.925
4: With LA	13.275	14.75	17.725	19.2	17.75	14.5
5: Good LA	2.575	3.075	1.75	4.8	5.425	5.275
Total	100	100	100	100	100.0	100

LA: livelihood assets

In Table 3, five Likert scale technique was used in questionnaire to capture the LA as in HC, NC, PC, SC, FC and IC. There were five options of answer and the scale of one indicates of having less AC and scale of five indicates having more AC. The frequency of the answer was then represented in term of percentage. More than 12 per cent of respondents have zero IC. Majority of respondent have poor SC with more than 40 per cent. As for HC, almost 50 per cent of the respondents were neutral

with their answers. Averages of 35 per cent of the respondents possessed either no or poor AC. This indicated that majority of them were lacking in all livelihood AC.

Table 4 Reliability analysis

Variables	Items in questionnaire	Reliability (Cronbach's alpha) scores
HC	Questions 1 to 4	0.831
NC	Questions 5 to 8	0.865
PC	Questions 9 to 12	0.880
SC	Questions 13 to 16	0.891
FC	Questions 17 to 20	0.916
IC	Questions 21 to 24	0.886
Vulnerability	Questions 25 to 28	0.884
PIP	Questions 29 to 32	0.911

Based on the reliability analysis in Table 4, all the Cronbach's Alpha scores are above 0.800. This score simply provides an overall reliability coefficient for a set of variables, it indicates the existence of high level of good internal consistency of each questions.

Hypotheses Testing

Based on the results in Table 5, the logit model for poor could be concluded as below:

$$\text{Logit (poor)} = 24.041 - 1.330(\text{HC}) - 1.279(\text{NC}) - 1.065(\text{PC}) - 0.901(\text{SC})$$
$$- 0.873(\text{FC}) - 0.992(\text{IC}) + 0.698(\text{Vulnerability}) - 0.837(\text{PIP})$$

Table 5 Hypotheses testing results

		B	SE	Wald	df	Sig	Exp(B)	95 per cent CI for Exp(B)	
								Lower	Upper
Step 1[a]	HC	−1.330	0.445	8.948	1	0.003	0.264	0.111	0.632
	NC	−1.279	0.343	8.374	1	0.008	0.342	0.157	0.672
	PC	−1.065	0.377	7.971	1	0.005	0.345	0.165	0.722
	SC	−0.901	0.352	6.556	1	0.010	0.406	0.204	0.810
	FC	−0.873	0.325	7.635	1	0.016	0.402	0.217	0.753
	IC	−0.992	0.344	8.314	1	0.004	0.371	0.189	0.728
	Vulnerability	0.698	0.321	4.725	1	0.030	2.009	1.071	3.769
	PIP	−0.837	0.334	6.290	1	0.012	0.433	0.225	0.833
	Constant	24.041	5.958	16.284	1	0.000	2.761×10^{10}		

The result indicates that, *ceteris paribus*, all LA and PIP have negative effect except for the vulnerability has a positive effect on the probability of being poor. Having negative effect indicates that the analyses of LA are in the right track and the historical literatures prove to be still relevant (Becker, 1993; Townsend, 1993; Barbier, 1997; Hulmes and Mosley, 1996; Elis, 2000; Barkus, 2001, Warschauer 2003

and Kenny et al., 2001). Overall HC, NC, PC, SC, FC and IC, they are proposed as an effective intervention for poverty reduction (Brocklesby and Fisher, 2003). Table 6 shows the summary of all the ORs and their reversals. A lower value of OR shows a less likeliness to be poor, whereas a higher value indicates a more likeliness to be poor (Abdul-Hakim et al., 2010).Those households with sufficient knowledge of IC are most unlikely to be poor as compare to those with other LA, a household with IC is only 0.339 time of likeliness to be poor. The second most important LA are NC and SC. This result is quite similar to the findings of Kamaruddin and Samsuddin (2010), where NC found to be most important assets for the poor. The usage of information and communication technology seem to be the latest trend as mentioned in Lee and Lee (2010), where our results show that without IC, a household is approximately 3 times to be poor. The OR for vulnerability is 2.057; a household with vulnerability is 2.057 times likely to be poor. The impact of without LA may cause greater likeliness to be poor is shown in Table 6, a higher value of reversal of OR implies a greater probability to be poor. As for vulnerability, its PF is 1.057, so for every unit increase in vulnerability, the probability of being poor is expected to be increased by 105.5 per cent. PIP's PF is 0.57, so for every unit increase in PIP, the probability of being poor is expected to be reduced by 56.7 per cent. For LA, IC having the highest PF of 67% and FC having the lowest PF of 50%.

Table 6 Summary of ORs and reversals of OR

LA	OR	Reversal of OR	Preventive Fraction (PF)
	Likeliness to be poor (with)	More likely to be poor (without)	
HC	0.414	2.415	0.586 (58.6%)
NC	0.383	2.61	0.617 (61.7%)
PC	0.4	2.5	0.6 (60%)
SC	0.383	2.61	0.617 (61.7%)
FC	0.497	2.01	0.503 (50.3%)
IC	0.339	2.95	0.661 (66.1%)
Vulnerability	2.057	0.486	1.057 (105.7%)
PIP	0.433	2.31	0.57 (57%)

All the probabilities to be noon-poor due to LA can be estimated and explained by using this formula. It is worth to note that the sign of the result is already sufficient to conclude whether any component of LA has a positive or negative impact on the dependent variable (Wooldridge, 2010). All the probabilities are calculated in Table 7.

Table 7 Probabilities to be non-poor due to LA

LA (X_i)	OR $(\exp(X_i'\beta))$	$\dfrac{\exp(X_i'\beta)}{1 + \exp(X_i'\beta)'}$	Probability of non-poor $(F(X_i'\beta))$	Percentage (per cent)
HC	0.881	$\dfrac{0.881}{1 + 0.881}$	0.468	46.8
NC	0.961	$\dfrac{0.961}{1 + 0.961}$	0.490	49.0
PC	0.917	$\dfrac{0.917}{1 + 0.917}$	0.478	47.8
SC	0.960	$\dfrac{0.960}{1 + 0.960}$	0.490	49.0
FC	0.699	$\dfrac{0.699}{1 + 0.699}$	0.411	41.1
IC	1.081	$\dfrac{1.081}{1 + 1.081}$	0.520	52.0
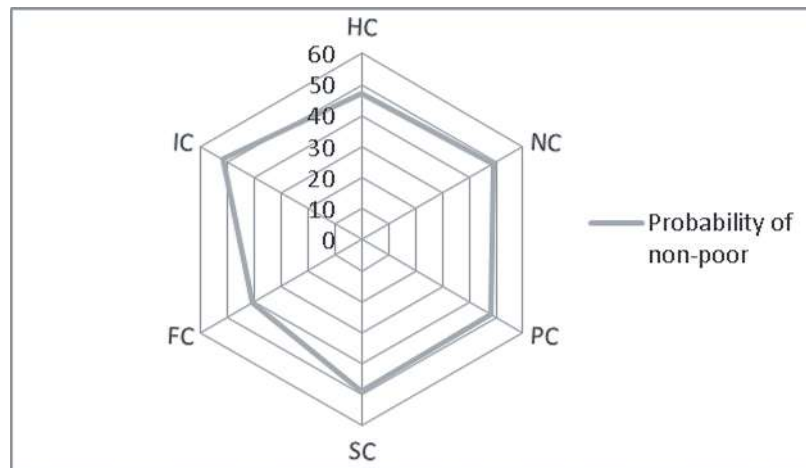
Figure 7 Probablity of non-poor

In Table 7 and Figure 7, our model predicts that 46.8 per cent of households with HC are non-poor. IC is the most important capital among the rest of the capitals. For households with IC, they are approximately 52 per cent of them to be non-poor. NC is also important because 49 per cent of them are non-poor. In Kamarrudin and Samsudin (2014) findings, NC was the most important compare to HC, SC, PC and FC. Since there were six LA inclusive of IC as for this study, IC proved to be the most important followed by NC. Nevertheless, with possessing either one of other capitals, the probability to be non-poor is above 40 per cent. In short, based on our model, IC plays the most important role among all of them, NC and SC are the second vital components, PC comes third, HC is the fourth and FC carries the least weight.

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This also proves that SC is more important than HC as in the finding of Weaver and Habibov (2012).

Table 8 Urban migration and inability to work

Options	Urban migration (Trend)	Inability to work (Shock)
More disagree	8.9	10.4
Disagree	33.6	34.6
Neutral	40.4	34.9
Agree	14.4	15.9
More agree	2.8	4.3

There are three types of vulnerability which classified as trend, shock and seasonality. Table 8 shows that 42.5% of them disagree with urban migration. They prefer agricultural kind of occupation in their village. From Table 8 there are 45% of them disagree and deny that inability to work may affect their agricultural and farming activity.

Table 9 Sudden death, failure of crops or farming and expenses on festival

Options	Sudden death (Shock)	Failure of crops or farming (Seasonality)	Expenses on festival (Seasonality)
More unprepared	12.8	18.3	8.6
Unprepared	45.6	34.9	46.2
Neutral	15.0	20.8	20.2
Prepared	23.2	22.0	21.7
More prepared	3.4	4.0	3.4

In Table 9, almost 60% of them have no preparation of any occasion of sudden death or unexpected mishap. About 53% of them have no preparation in the event of failure of crops or farming. Approximately 55% of them have no allocation for extra expenses for festival and celebration.

Table 10 Opinion on belief and custom

| Options | Belief and custom | | |
	Influence livelihood	Punishment for antagonizing	Family planning
More disagree	11.6	12.2	15.3
Disagree	45.3	41.6	28.4
Neutral	17.1	20.5	38.8
Agree	19.6	19.6	12.5
More agree	6.4	6.1	4.9

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From Table 10, approximately 57% of them disagree or more disagree that belief and custom influence their livelihood. More than 50% of them disagree of any sort of punishment if anyone ever violate the belief and custom. There are 43.7% of them disagree with family planning.

Table 11 Opinion on effectiveness of the poverty relieve provision

Options	Poverty relieve provision		
	Awareness	Frequency	Effectiveness
More disagree	10.7	16.5	8.9
Disagree	44.3	38.2	35.8
Neutral	18.3	21.4	33.6
Agree	23.2	17.4	18.3
More agree	3.4	6.4	3.4

Based on the results above, all the LA are very important as they shown a positive effect on poverty reduction. Determining the right asset with the highest impact will definitely be better in customary the cure for Rungus poverty. Other than LA and vulnerability, poverty eradication approach could be strategized by information of poverty and income gap, imposing tax rate and estimation of time exit poverty. These are discussed in the following sections.

Estimation of Poverty Gap and Income Gap

Table 12 Poverty gap and income gap

Sum of individual income of the poor	No. of the poor (q)	Average household income of the poor (Yq)	PG	IG
126,815	230	551.37	0.333	0.474

In Table 12, our PG is 33.3 per cent away from PLI. 33.3, which is about RM349, our targeted population will require at least RM349 per household per month to meet our PLI level. Meanwhile, our IG is 47.4 per cent away from PLI. 47.4 percent of PLI is RM496.75, our population of the poor will require at least RM496.75 per household per month to close up the gap with the non-poor.

Estimated Tax Rate

Based on Equation 5, Table 13 shows a calculation on ETR as follows:

Table 13 Calculation on estimated tax rate

The total income of 97 households of non-poor	Mean income of the non-poor (mi)	Percent of the poor (np)	PG	PLI	ETR
262,651	2,707.74	0.703	0.333	1,048	0.183

In Table 13, our ETR is 18.3 per cent, theoretically 18.3 per cent rate of taxation should be imposed onto the non-poor in order to lift the poor out of poverty. Again, it is subjected to no change in their HLA and lifestyle modifiers. Therefore 18.3 per cent of the mean income for the non-poor is RM495.52.

Estimation on Time Taken to Exit Poverty

Based on Equation 6, Table 14 shows estimation on time taken to exit poverty with the y values of 0.05 and 0.075 as recommended by UNDP (2007) as below:

Table 14 Estimation on time taken to exit poverty

Item	y			
	0.05		0.075	
$t_j(y)$	3371.017		2247.326	
N	327		327	
HI	0.703		0.703	
$t^p(y)$	$t^p(0.05)$	14.66	$t^p(0.075)$	9.78

In Table 14, with y is 0.05, the annual financial growth is 5 per cent, our time taken for our targeted group in this study is 14.66 years more is required before their poverty is eradicated. When y is 0.075, i.e., the annual financial growth is 7.5 per cent, they will need at least 9.78 years to achieve their target.

5   Discussion

Based on the results, the HLA which consists of HC, NC, SC, PC, FC and IC were proven to have impact on the Rungus community. The results show that all the LA has negative value for the ß is statistically significant meaning that having negative effect on the probability of being poor. This implies to our first objective that the Rungus community are generally lacking in all the LA.

As for the second objective, the OR and PF values were referred. The value of OR in Table 6 indicates that IC is the utmost important LA to eradicate poverty among the rural poor in Rungus community. This is further strengthened by the results in Table 6. IC denotes to increase the probabilities to be non-poor by 52 per cent. NC and SC are verified to be important after IC. This signifies that all the LA has different magnitude of impact although they share the similar aim of negatively effect on the probability of being poor.

In identifying the type of vulnerability faced by the poor as for the third objective, there are three types of vulnerabilities as in trend, shock and seasonality. In verifying the trend of vulnerabilities, the impact from the age of marriage and impact from urban migration were used. Both Rungus boys and girls married off too young as early as 14 years old. This may cause serious social problem when 44% of the girls married at a tender age of 14 to 19. Now majority of them disagree with urban migration, so working in town is not good option to eradicate poverty among the Rungus.

In justifying for the shock type of vulnerability, the accountability of in the event of inability to work and sudden death were measured. Based on their justification, majority disagree that inability to work could affect their livelihood. Farming is family activity so it would not be jeopardized in the even a member of the family is able to work. Whilst almost 60 per cent disagreeing with the thought of sudden death occurrence in their family. As for the seasonality type of vulnerability, majority have no allocation in the event of failure of crop and extra expenses. Basically, majority of the poor Rungus married early and having no backup plan.

Our fourth objective is to determine the impact of PIP towards the poor livelihood, the rules, customs and norms were measured. In term of believe and custom almost 70 per cent of the poor denied that their belief and custom influenced their livelihood. This statement was conflicting another 44 per cent of them that disagreed to family planning because this act was strictly against the belief and custom. This verified that the Rungus was still much influenced by their belief and custom. They denied the influence of their belief and custom on their livelihood because they were living in poverty. They practised many restrictions in life due to tradition inheritant. The traditional practice is good but over possession may summon marginalization of life. Moderation in practice may be the best medicine in preserving one's tradition in the age of globalization. Most of them declared themselves as poor, 55 per cent of them have never applied for any poverty relieve provision and majority of them neglected on the existence of these provisions. Many reasons were given such as tedious on application, illiteracy and prolonged process of application, 45 per cent of them denied the effectiveness of poverty relieve provision. Those applied for poverty relieve provision had the successful rate of almost 92 per cent. This is a remarkable result for the effectiveness of poverty relieve provision.

The fifth objective seeks to understand the various livelihood strategies of the poor and non-poor. The livelihood strategies and activities of the poor are more simple and modest, whilst for non-poor, their livelihood strategies are often complex and diverse. For rural people, agriculture and other natural resource-based activities play an important role. Often the food produced by poor farmers are meant for home consumption but non-poor farmers further diversify into other activities such as agriculture and the natural resource sectors. Their strategies include subsistence production, production for the market and participation in labour markets. Some of them supply handicrafts to market operators in the city. Some farmers trade their agricultural and natural resources production such as sweet potatoes, tapiocas, melons, fruits and coconuts every weekend at highly populated locations. There are a few of them supplied organic vegetables and chickens to chain of small supermarkets, restaurants and organic outlets. Organic vegetables and meats have a great demand in the city with good price. Non-poor farmers are self-reliance, the poor farmers relied on middlemen who often take advantage on them. Non-poor have better soft skill in term of IC. They are more informative and familiar with internet usage. Some of them create their own website and blogs for greater market of their products. Some designated special school holiday programme and propose to the teachers in urban areas. Eventually, they create job opportunities for themselves and this confirms that rural livelihood is not meant to be poor. This is basically about mindset, hardwork and being creative. Internet creates wonders without having to spend money or being there physically. Utilizing the tool of internet creates miracles and business opportunities for those with lower level of literacy. Besides most of job applications are online, so one should never deny the internet usage. IC is further strengthened by the usage of smartphone. The age of smartphone has gradually crept in since the first introduction within the year of 1992 to 1993. Most of the non-poor farmers have smartphone, but smartphone is nothing without internet. Smartphone has various type of application tailored for the user's convenience and cost effectiveness. Applications like viber, skype, line and wechat, messaging and calling are free. The poor should strengthen their IC especially on the usage of internet before the gap of poverty gets wider.

6   Suggestions

According to the first objective, the poor among Rungus community were identified to be lacking in all six LA as in HLA portfolio. Hence the second objective positively confirmed that IC was the greatest impact among other LA on poverty. In the third objective, vulnerabilities faced by the poor were identified. More than forty per cent of them married as early age 14 and this custom is still being practised. Majority of them refused urban migration and would rather work at their parent's farm and hardly left their village. They hardly had any saving in the event of misfortune as in inability to work, sudden death, failure of crops and no allocation for special occasions. An

average household earning was not more than RM600 which is very far behind the PLI of RM1048. The impact of PIP as in fourth objective were measured based on their belief, custom and the effectiveness of poverty relieve provision. The livelihood of the poor was very much influenced by their belief and custom. They were against family planning and hardly 20 per cent of the respondents agreed with the idea. Poverty relieve provision failed to eradicate poverty among the Rungus because majority of poor neither were aware of its existence and function or have applied before. Our results showed that the effectiveness of poverty relieve provision exceeded 90 per cent for those 24 per cent of the applied respondents.

Courage is the key to overcome poverty. The first step is to decide to either stay on or fight against the poverty with unforeseeable victory. There is no easy gateway to exit poverty because migration to urban area and endurance on the hardship of life is inevitable. Courage to simplify their belief and custom creates flexibility and modification in life, practising their tradition in moderation is the way of life among the non-poor Rungus. Nothing worst could happen without the influence of belief and custom when poverty is the worst state of life. Community respected village chiefs with high knowledge on the customs and good intermediary governmental relationship are the key persons to install the right mindset on the Rungus community (Thu, 1977). Their mindset should be in positive mode, competitive and take the challenge to salvage their deprivation life. Migration and seeking opportunities abroad may be beneficial for their family and future generation. The responsibility of rural poverty falls on the sluggish in the growth of the agriculture sector that leads to migration phenomenon (Ragayah Haji Mat Zin, 2008). Willingness to migrate is a good option for encouraging Rungus to exit poverty. Remittance from abroad could help their ageing parents, migration dilutes poverty condition by having migrant remittance as the supplement (Adams and Page, 2003; Le Goff, 2010).

Official continuum effort is given every year with a great amount of allocation for poverty relieve provisions. Nonetheless, poverty still persists in some communities, it is the moment to strategize plan in delivering customize solution by using SLA model. SLA model is a dynamic approach as it compiles three major components to promote better understanding of poverty on any particular community. The vulnerability, LA and effectiveness of institution are important components to tap the voices of the poor. Since IC has the greatest impact on the Rungus community, IC is emphasized in designing appropriate approach to reach the poor. This finding is comparable to one of the proposed plans in coming 2014 Budget (Najib Tun Razak, 2013). This is not mere coincidence but it confirms the feasibility of the SLA model. In promoting digital penetration, free daily 30 minutes internet usage for households earning less than RM3,000 was announced (Najib Tun Razak, 2013). Based on the international statistic, daily usage of computer is 2.2 hours for each person. Hence free 30 minutes

is insufficient for a household. An average family size in rural areas is 6 and it should be 3 hours of internet usage if each member spends 30 minutes, so extending the free internet usage in rural area is a good option. Three hours internet usage may boost academic performance of the children in rural area by learning online. Children from poor families should be given special attention and more chances to improve their sustainable livelihood. School in rural areas should be emphasized with computer and internet lesions to increase the rate of computer literacy in rural areas. Setting up computer in rural area encourages the poor to adopt non-poor complex and diverse livelihood strategy via online marketing and accessing latest information with minimal cost (Kelles-Viitanen, 2005). IC promotes transparency, facilitates efficiency, interacts effectively between people and the administrators (Backus, 2001). This is a good platform for the poor to receive information on various official projects and attract their anticipation (Kenny et al., 2001 and Warschauer, 2003). Indirectly this would eradicate the poor from being labelled as information-poor and communication-poor due to lack of access to IC (Chapman and Slaymaker, 2002).

SC is the second greatest impact toward poverty reduction. According to Abdul-Hakim et al. (2010), SC is an important determinant of poverty in East Coast of Peninsular Malaysia. Most of the villagers possess a low level of confidence due to lack of communication and social interaction with outsiders. Better communication and substantial information create positive mindset with least tradition. They need constant motivation to gain confidence and be competitive. Setting up official multipurpose mobile booth with team of expertise to get in touch monthly with the poor is another good subtle, it functions as motivator, advisor and assistant on online application of poverty relieve provision. With this implementation to the poor, most of the vulnerability should be resolved. SLA reveals the vulnerability of the poor Rungus such as early marriage, refusal of urban migration and no saving for any mishaps. Targeting the issue of early marriage by implementing minimal age of marriage policy is a way to protect children and minimize social problem. Since most of them refuse urban migration, creating more jobs in rural areas by setting up more factories that need unskilled labour is beneficial. Providing relevant courses and training relating to agriculture, aquaculture, food technology and food science for younger Rungus enable them to utilize their knowledge to produce quality crops, increase their production and generates new product. The poor should not focus on highly demanded commodity in their plantation such as coffee beans, groundnuts and cocoa, processing them into final product for consumer is a wiser choice. This avoids exploitation by outsiders and creates more jobs for themselves with better quality of rural livelihood. Insurance plan should be designed to insure the poor in the event of inability to work or sudden death. This creates a shield to protect the children and minimises the vulnerability of the poor. With SLA guidelines and some of these suggestions, there should be no unforeseeable obstacle to eradicate poverty among the Rungus.

7 Conclusion

The findings of this research show that SLA can be used as an analytical and practical tool for guiding studies of environment and development. The approach acknowledges that communities are much knowledgeable about their own both subjects and objects of change, they have situation and can draw strength from this. It supports empowerment rather than welfare, endorses improvement of the productivity of existing livelihood systems as well as the creation of new opportunities. The role of culture has not often been given adequate attention in the literature on sustainable development. The study of the livelihood on the Rungus using SLA has proven to bring benefits to improve people livelihood by identifying people vulnerability and current livelihood strategies. This is one of the first studies in poverty to employ the concept of SLA in Malaysia and to emphasize that LA should be understood in the rural livelihood context in which it takes place. This is also the only study with comparative approach between the poor and non-poor to study poverty among the Rungus in Sabah. The study has led to a deeper understanding on the actual vulnerability and livelihood strategies adopt to sustain rural livelihood.

References

Abdul Rahman Hasan & Sa'idahHashim. (2001). Poverty statistics of Malaysia. *Paper presented at the Symposium on Strengthening Poverty Data Collection and Analysis*. Makati City, Philippines.

Adams, R. H., & Page, J. (2003). *International migration, remittances and poverty in developing countries*. Volume 3179 of Policy Research Working Papers. Washington, D.C.: Development Research Group, World Bank.

ADB. (2003). *Asian development outlook 2003*. New York: Oxford University Press.

Ashley, C., & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience*. London: Department for International Development.

Backus, M. (2001). *E-governance and developing countries: Introduction and examples*. The Hague: The International Institute for Communication and Development (IICD).

Barbier, Edward B. (2005a). *Natural resources and economic development*. Cambridge University Press, in press.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago: University of Chicago Press.

Bene, C. (2006). Small-scale fisheries: Assessing their contribution to rural livelihoods in developing countries. *FAO Fisheries Circular*. No. 1008. Rome: FAO.

Berma, M., Faridah Shahadan, & Salfarina Abdul Gapor. (2006). Alleviating Bumiputera poverty in Sarawak: Reflections and proposal. *Paper presented at The Malaysian Research Conference 4th International Conference*. Salford, England.

Bingen, J. (2000). *Institutions and sustainable livelihoods*. East Lansing: Michigan State University.

Boyce J. K., & Shelley B., (Eds). (2001). *Natural assets: Democratizing environmental ownership*. New York: Russell Sage. Foundation Press.

Brocklesby, M., & Fisher, E. (2003). Community development in sustainable livelihood approaches – an introduction. *Community development Journal*, *38* (3);185–198.

Chapman, R., & Slaymaker, T. (2002). *ICTs and rural development: Review of the literature, current interventions and opportunities for action*. London: Overseas Development Institute.

Coudouel, A., Hentschel, J., & Wodon, Q. (2002). Poverty measurement and analysis. *In the PRSP Sourcebook*. Washington D.C.: World Bank.

DFID. (2000a). *Achieving sustainability: Poverty elimination and the environment.* London: Department for International Development.

DFID. (2000b). Department for International Development. *Eliminating World Poverty: Making globalisation work for the poor*. London: Department for International Development.

DFID. (2001). *Sustainable livelihood guidance sheets*. London: Department for International Development.

Department of Statistics (DOSM), (2010). *Population and housing census*. Malaysia.

DOSM. (2012). *Household income and basic amenities survey 2009*. Malaysia: Author.

Dullah Mulok, Kasim Mansur, Mori Kogid, Ligadu, C. P., & Na'imah Yusof. (2010). Quality of living: Poverty, infrastructure, health and education. In Ramzah Dambul, Marja Azlima Omar & Sabihah Osman (Eds.). *Sabah priority issues: Setting the course for change*. Kota Kinabalu: Universiti Malaysia Sabah Press.

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. New York: Oxford University Press.

Hulme, D., & Mosley, P. (1996). *Finance against poverty* (Volume 1). London: Routledge.

Kamarrudin, R., & Samsudin, S. (2014). The sustainable livelihood index: A tool to access the ability and preparedness of rural poor in receiving entrepreneurial projects. *Journal of Social Economics Research*, *6* (1), 108–117.

Kelles-Viitanen, A. (2005).The role of ICT in Governing rural development. *Paper presented at the IFAD Workshop: What are the innovation challenges for rural development*. Rome.

Kenny, C., Navas-Sabater, J., & Qiang, C. (2001). Information and communication technologies and poverty. *Techknowlogia*, July/August, 7–11.

Krantz, L. (2001). *The Sustainable livelihood approach to poverty reduction: An introduction.* Stockholm: Division for policy and socio-economic analysis, Swedish International Development Cooperation Agency.

Lee, J. & Lee, H. (2010). The computer-mediated communication network: Exploring the linkage between the online community and social capital. *New Media & Society*, *12* (5), 711–727.

Le Goff, M. (2010). *How remittances contribute to poverty reduction: A Stabilizing effect* (Studies and reports No. E 2010. 08). Clermont-Ferrand: CERDI-CNRS University of Auvergne.

Malaysia. (2009). *Database on economic planning unit*. Putrajaya: Economy Planning Unit, Prime Minister's Office.

Malaysia. (2010). *Tenth Malaysia Plan 2011–2015*. Putrajaya: Economy Planning Unit, Prime Minister's Office.

Mansur, Kasim, Dullah Mulok, & Khairul Hanim Pazim. (2012). *Poverty in Sabah: An analytical study on the impact of the transformation economic programs*. Seminar Kepimpinan Dan Dasar Najib, UiTM, Kota Kinabalu, Sabah, Malaysia: Economic Development: Poverty eradication Programmes.

Najib Tun Razak. (2013). *2014 Budget*. Retrieved from http://www.pmo.gov.my/bajet2014/index.php/.

Ragayah Haji Mat Zin. (2007). Understanding the formulation of the revised poverty line. *Akademika, 70* (1), 21–39.

Ragayah Haji Mat Zin. 2008. Explaining the trends in Malaysian income distribution. In K. Medhi & Ragayah Haji Mat Zin (Eds.). *Income distribution and sustainable economic development in East Asia: A comparative analysis* (pp. 158–200). Bangi: Universiti Kebangsaan Malaysia.

Roslan, A. H. (2001). *Income inequality, poverty and development policy in Malaysia.* Sintok: Universiti Utara Malaysia Press.

Rupasingha, A., & Goetz, S. J. (2007). Social and political forces as determinants of poverty: A spatial analysis. *The Journal of Socio-Economics*, *36*, 650–671.

Samsudin, S., & Kamarrudin, R. (2013). Distribution of the livelihood assets among the hardcore poor: Evidence from Kedah, Malaysia. Proceeding book of ICEFMO. Malaysia: PAK Publishing Group.

Sekaran, U. & Roger, B. (2010). *Research methods for business*. (5th ed.). New Jersey: Wiley.

Thu, E. (1977). The Christian encounter with animism: The Christian mission among the Rungus people of Sabah. *South East Asia Journal of Theology, 18* (1), 107–112.

UNDP. (2007). *Malaysia measuring and monitoring poverty and inequality*. Malaysia: Author.

Warschauer, M. (2003). Social capital and access. *Universal Access in the Information Society*. *2* (4), 15–31.

Weaver, R., & Habibov, N. (2012). Social capital, Human capital, and economic well-being in the knowledge economy: Results from Canada's general social survey. *Journal of Socialogy and Social Welfare*, *XXXIX*, *2*, 31–53.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. (2nd Ed.). Cambridge: MIT Press.

Zulkarnain, A. H., & Isahaque A. A. (2013). Poverty reduction policies in Malaysia: Trends, strategies and challenges. *Asian Culture and History*, *5* (2), 48–56.