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The Effect of Livelihood Assets on Food Security Achievements among the Coastal Fishermen in Northern Peninsular Malaysia

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ABSTRACT

The study was conducted to analyze the food security achievement among coastal fishermen in Northern Peninsular Malaysia (Kedah and Perlis,) through ownership livelihood assets. Based on Sustainable Livelihood Approach, a structured questionnaire has been designed which consist livelihood assets (human, physical, finance, natural and social assets), government interventions and livelihood outcome. The respondents consists of 400 coastal fishermen from Kedah (Kuala Kedah, Tanjung Dawai and Yan) and Perlis (Kuala Perlis), Malaysia. The smart PLS-SEM 2.0 was used to evaluate the relationship between the independent and dependent variables. The results shows in all 4 out of the 6 hypotheses were supported by the statistical analysis while 2 hypotheses were not supported. Lastly, recommendations were provided with a view to ensuring food security among this group.

1. Introduction

The World Food and Agriculture Organization (FAO) 1998 has defined food security is the ability of every resident to access adequate food for a healthy and active life. Food security will be achieved if the following three elements are met; (1) the guarantee that adequate food exists, (2) a stable food supply and (3) it is easily available to the needy. At the same time, food security also emphasizes the ability of every resident to have physical and economic access to sufficient food to meet dietary requirement at all time. There were four main components assessed in achieving food security, namely food readiness, food access, food consumption, and food stability. The ownership of livelihood assets (human assets, financial assets, natural assets, physical assets and social assets) also has a direct relationship in achieving food security.

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Fishermen communities are vulnerable group that easily exposed to the out of bound risks such as the occurrence of economic recession, monsoon or tsunami disaster due to the low-income group of their economic background and extreme for the hardcore poor category. The effect of these factors contributes directly in achieving food security among fishermen who are fully dependent on fishing activities as their main economic sources and do not have sufficient livelihood assets. Lacking in livelihood assets ownership such as human assets, physical assets, financial assets, natural assets, social assets among fishermen's households will cause entrapment in poverty. This situation also affects food security especially in pattern of spending on food. This causes cascading impact on fishermen who fully relying on fish products as their main source of income. The failure of fishermen's communities to acquire livelihood assets will encourage these groups to be trapped as vulnerable groups, thus preventing the achievement of food security. Lacking on these material assets will surely reduce the source of income and thus will affect spending on food. In fact, Schoch and Campaign [49] also point out that poverty is a major cause in the absence of food and strong indicator for nutritional risk [50].

In this regard, it is clear explanation that food security at household level has a direct relationship and influenced by ownership of livelihood assets. The ownership of livelihood asset will determine the capability of households to acquire sufficient and notorious food to meet the dietary requirements. Most previous studies focus more in discussing the ownership of livelihood assets and less emphasis in achieving the food security through the ownership of livelihood assets. Thus, the measurement of the attaining food security among households cannot be determined effectively. Therefore, this study aims to analyze the achievement of food security among fishermen through the acquisition of livelihood assets with analytical techniques such as simple regression and structured equation models. This paper also defines the strategies taken by fishermen's community in facing a vulnerable situation and thus develops the sustainable livelihood index (SLI) in determining the ability of these groups to deal with vulnerable situations.

2. Literature Review

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their daily dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern. Meanwhile, food insecurity exists when people do not have adequate physical, social or economic access to food as defined above. World Food Summit [53] defines food security concepts in a more complex way, which is when all people, at all times, have sufficient access to safe and nutritious food to meet dietary needs and food reference for a more active and healthy life. The Food and Agricultural Organization [51] conceives food security as a situation in which all households have both physical and economic access to adequate food for all members and where households are not at risk of losing such access. Meanwhile, at the household level, Frankenberger *et al.*, [52] state that food security at the individual level will be achieved when individuals get access to adequate nutrition and diet for the purpose of physical activity, disease preventing and sufficient for growth including during pregnancy and breastfeeding. To achieve food security at household level, livelihood assets are the main factors that contribute to successful food security among households. Thus, Chambers *et al*., [8] proposed the sustainable livelihoods as the combination of capabilities and assets with which households generate livelihoods to meet their basic need or physiological needs and have gone further to identify assets as human, social, financial, physical, and natural which households and individuals need to acquire to meet their livelihood objectives.

The Community Nutritionist Council of British Columbia Canada [48] also defined food security exist when all people get safe food and personally receive the food with a nutritious diet through a sustainable food system that will maximize food choices of healthy, self-reliant community and receiving similar access for all people. This definition also includes: (i).The ability to get food is guaranteed; (ii). The food is obtained by means of holding on to human dignity; (iii). Food secure, adequate and personally acceptable and culturally; (iv). The quality and quantity of food is sufficient to maintain healthy growth and development as well as to ward off diseases; and (v). There is no compromise in terms of production, processing and distribution of food in the use of land, water and air for the next generations. Food security is the outcome of food system operating efficiently. Efficient food system contributes positively to all dimensions of food security.

This widely accepted definition points to the following dimensions of food security [15].

i. Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
ii. Food access: Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources).
iv. Food Utilization: Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.
v. Stability: To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.

However, to achieve food security among household, livelihood asset is one of indicator to achieve this purpose. Livelihood asset is a fundamental condition that affect and reflect the basic livelihood of farmers with the ultimate goal of alleviating and, finally, eradicating poverty [42]. Assets refer to the resource base on people. Assets are often represented as a pentagon in the Sustainability Livelihood Framework (SLF) following five categories: natural resources (also called 'natural capital'- access to land, water, wildlife, flora, forest), physical reproducible goods ('physical capital'- houses, vehicles, equipment, livestock;), monetary resources ('financial capital'- savings, gold/jeweler, access to regular income, net access to credit, insurance). Manpower with different skills ('human capital' such as labor power, health and nutritional status, skills and knowledge. Social networks of various kinds ('social capital'). Social capital refers to those stocks of social trust, norms and networks that people can draw upon to solve common problems. It is mediated through kin networks and group membership.

Previous studies shows physical asset contribute towards attaining sustainable livelihoods which secure livelihood outcomes and help towards meeting the physiological needs for food and other essentials of the households and individuals. Kamaruddin and Baharuddin [24] in their study results revealed that ownership of physical asset affects livelihoods outcomes in particular enhances income, thereby uplifting the well-being of the vulnerable households in meeting the needs of food and other social needs. The results supports affirmed the finding of Seng [39] on the ability of access to physical asset on enhancing income which help in meeting the need of food, for instance, electricity supply which help in economic activities. Accordingly, irrigational facilities were observed to impact on livelihoods outcomes, specifically, aid towards income generation which the household

can use to meet food requirement. In line with the above Kumo [29] suggested in his study that infrastructural facilities market, power supply, and road network contribute livelihood, in particular, income which can be used to meet food demand of the households and individuals. Other empirical studies advocated the effect of physical asset in improving income and livelihood which all relate to food security of households and individual include [2,25,30].

Meanwhile financial asset represents economic sources that enable vulnerable households and individual to earn a means to a good life, make income and meet the physiological needs of the household and individuals [12,37]. Accordingly, empirical studies suggested the significance of financial asset in fighting vulnerability and ensuring well-being of households and individuals. Akudugu [1] in a study asserted that financial asset contributes to well-being in terms affording the bills of medical expenses and food consumption which relate to human asset thereby improving the productive capacity of the households and individuals which in the final analysis enhance food security. Similarly, Kamaruddin and Baharuddin [24] in their study affirmed that increase in income helps vulnerable households to overcome vulnerability to livelihoods and enhance well-being to which food security is ensured. Similar to that, Seng [39] observed that financial asset enhance well-being thereby increasing food security as the vulnerable households and individuals with ownership of financial asset will have sustainable livelihood which empowers them to meet food needs and other essential services.

Human asset connotes capabilities, skills and knowledge, and material health which enable households and individuals to meet livelihoods outcomes [27]. Empirical studies suggested the link between human asset and households' well-being, for instance, studies by Seng [39], and Kamaruddin and Samsudin [25] observed that human asset has impact on the income of vulnerable households and individuals which affect food consumption thereby ensuring food security. Similarly, Lim *et al*., [30] in study confirmed the effect of human asset as it enhances resilience which reduce vulnerability and further safeguard livelihood outcomes of vulnerable households. Consequently, from the results of the previous studies on the impact human asset and livelihood outcomes can be concluded as follows.

Social asset consists of social resources which empower vulnerable households through social relations and interactions which bring mutual benefit, for instance communal farming, to parties in the social interaction [10]. Accordingly, Oumer *et al*., [34] averred that lack of connection to non-governmental organizations and research bodies impedes livelihood outcomes which guarantee food security and well-being of vulnerable households. The finding of the study concurred with the studies of [4, 23, 43].

Natural asset is a compendium of natural resources in the ecosystem which humans exploit to make livelihoods [19]. The natural endowments include river resources for irrigation and fishing, land for agriculture, forest resources, and solid-mineral [44]. Islam and Yew [23] in a study the findings indicated that harnessing natural asset provides economic benefits to vulnerable households which help in securing livelihoods thereby increasing income, therefore enhance food intake and consumption to households. Similarly, it enhances economic well-being, for instance (water) for fishing, land for commercial farming and economic trees (mango, orange) which provide economic benefit or income which help in meeting the needs of food and other essential needs. Other elements of natural asset, for instance, land for commercial agriculture, enhance income and sustainability of livelihood promotes food security [1]. The result supports the result of Mendez-Lemus and Vieyra (2014) which indicated that lack of land affects the food production and livelihood outcomes. Similarly, Ng'ang'a *et al*., [54] further affirmed the effect of natural asset on livelihoods as land ownership enhances food production and livelihood outcome. In summary, natural asset has been adjudged to be useful in enhancing livelihood outcomes of households and individuals.

Government intervention means how government policy-response to address social-economic problems in the society. It implies whatever government does to intervene or support vulnerable households in ensuring a temporary and long term relief the society free from any specific economic and social problem. Therefore, government intervention has no definite meaning as it address a myriad of social problems [31]. Likewise, Ibrahim and Alam [22] conceived government intervention as policy action by government in terms of subsidizing agriculture via provision of improved seeds and fertilizer with a view to food production and economic well-being of harming farmer. In summary government intervention symbolizes support from government which usually comes in form of incentives, subsidy of policy action that aims at ensuring relief and well-being of the people. Ibrahim and Alam [22] in a study found that subsidies extended by government on fertilizer and improved seedling to paddy farmers enhanced their economic well-being which in turn boost food production and livelihood outcome. Similarly, in a study by Kasim *et al*., [26], finding revealed that government support has positive effect on food production and livelihood outcomes. Other studies that advocated the impact of government intervention on livelihoods include Shehu and Abubakar [41], Unmesh and Narayanan [45], and Kamaruddin and Samsudin [25]. Based on discussion with the results of previous empirical studies this study hypothesized that;

H_1: *There is significant relationship between physical assets and food security.*
H_2: *There is significant relationship between financial assets and food security.*
H_3: *There is significant relationship between human assets and food security*.
H_4: *There is significant relationship between social assets and food security.*
H_5: *There is significant relationship between natural assets and food security.*
H_6: *There is significant relationship between government intervention and food security*

3. Methodology

The study is based on descriptive quantitative survey design. Data for the study was collected from the vulnerability group through self-designed and self-administered questionnaire covering the various variables identified in the literature. Non-probability convenience sampling technique was adopted. This study is based on primary data collected in 2016 from the study in Kuala Perlis, Perlis, Kuala Kedah, Yan and Tanjung Dawai in Kedah Malaysia, consist coastal fisherman which consists 400 respondents. The questionnaire consisted of four parts: Questions concerning demographic information; asset livelihood, vulnerability, coping strategies and government intervention intention to contribute food security among vulnerability group. The collected data were processed and analyzed by partial least-squares (PLS) path modeling with SmartPLS 2.0 M2 software [35].

3.1 Measurement Model

PLS based structural equation modeling was adopted for the data analysis. The method is useful when one dependent variable becomes an independent. Variable in subsequent relationships and it does not involve assumptions of homogeneity in variances and covariance of the dependent variable. It also can simultaneously test the structural and the measurement models, providing a more complete analysis for the inter-relationships. We used PLS because it makes minimal demands on the data distributions, sample size, and measurement scales and as this study were exploratory in nature; it is a better tool to explain the data. The Smart PLS M2 Version 2.0 and two-step analysis approach was used to analyze the data. Also a bootstrapping method was used to determine the significance levels of the loadings, weights, and path coefficients [18].

This study began with the assessment of the reflective measures using both convergence and discriminant validity analysis. As presented in Table 1, the measurement models returned Cronbach's alpha values <0.70. Factor loadings, average variance extracted (AVE) and composite reliability (CR) were used to assess convergence validity. The loadings for all reflective items exceeded the recommended value of 0.6. CR values (see Table 1), which showed the degree to which the item captured the latent construct, ranging from 0.616 to 0.877, which exceeded the critical value of 0.4 [21] The AVE was in the range of 0.54 and 0.71 which exceeded the recommended value of 0.5 [17]. Next, the discriminant validity was tested. It was examined by comparing the correlations between constructs and the square root of the AVE for that construct. As shown in Table 2, the square root of the AVE is greater than the correlation with other constructs indicating adequate discriminant validity. Thus the reflective measurement model demonstrated adequate convergent and discriminant validity.

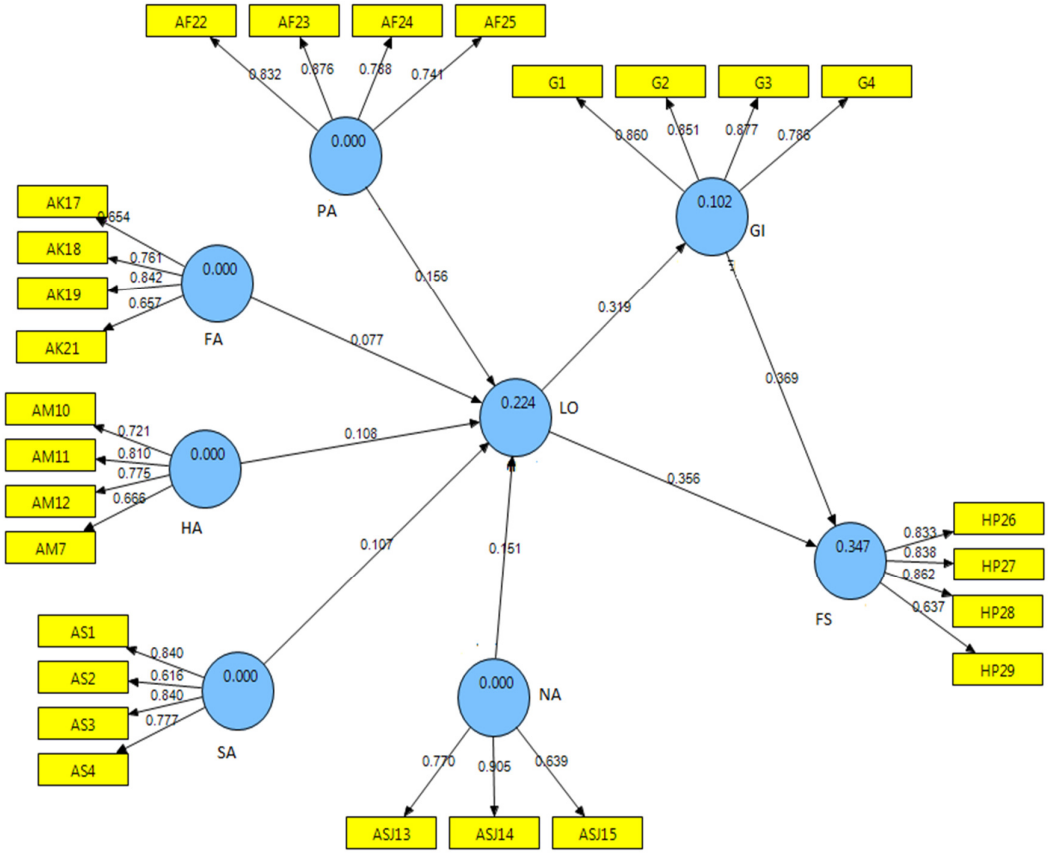

Fig. 1. Measurement Model

Table1
The Convergent Validity Assessment Results

Construct	Measurement Item	Loading	Average Variance Extracted	Composite Reliability

Physical Assets	AF1- Transportation	0.83	0.66	0.88
	AF2- Distance to town	0.88		
	AF3- Clean water supply	0.79		
	AF6- Electricity supply	0.74		
Finance Assets	AK1- Saving	0.65	0.54	0.82
	AK2- Income	0.76		
	AK3- Part time income	0.84		
	AK4- Subsidies	0.66		
Human Assets	AM1-Education	0.72	0.55	0.83
	AM2- Skill	0.81		
	AM3- Age	0.77		
	AM4- Knowledge	0.67		
Social Assets	AS1-Involve in society	0.84	0.61	0.82
	AS2-Involve in non-government organization	0.62		
	AS3-Involve in community engagement	0.84		
	AS4- Relationship in community	0.78		
Natural Assets	ASJ1-Access food from environment	0.77	0.60	0.85
	ASJ2-Impact climate change	0.91		
	ASJ3- Pollution problem	0.64		
Govt. Intervention	G1– Health facilities	0.86	0.71	0.91
	G2- Economic development by government	0.85		
	G3 –Public participation	0.88		
	G4- Subsides delivery	0.79		
Food Security	HP1- Food Access	0.83	0.64	0.87
	HP2- Food Utilization	0.84		
	HP3- Food Availability	0.86		
	HP4- Food Stability	0.64		

Table 2
Discriminant Validity (Fornell-Lacker Criterion)

Construct	1	2	3	4	5	6	7
Physical assets	**0.81**						
Financial assets	0.42	**0.73**					
Human assets	0.64	0.43	**0.74**				
Social assets	0.53	0.45	0.50	**0.78**			
Natural assets	0.58	0.47	0.53	0.55	**0.77**		
Government Intervention	0.39	0.23	0.40	0.25	0.39	**0.84**	
Food security	0.66	0.31	0.57	0.46	0.51	0.48	**0.80**

Discriminant validity is used to assess construct validity of a reflective construct. It determines how a construct is totally different from other constructs of the model in terms of empirical measures [13, 21]. Therefore based on Table 2 the discriminant validity of the study's constructs is attained.

Table 3
Hypothesis Testing (Path Coefficients Estimates)

Path relationship and Direction	Beta	Std. Err	T value	Results
Physical assets -> Food Security	0.16	0.07	2.39	Supported
Financial assets -> Food Security	0.08	0.05	1.48	Not Supported
Human assets -> Food Security	0.11	0.07	1.56	Not Supported
Social assets -> Food Security	0.15	0.06	2.39	Supported
Natural assets -> Food Security	0.11	0.07	1.63	Supported
Government Intervention -> Food security	0.37	0.04	8.52	Supported

Table 3 shows the results of testing the structural model. These show that (physical asset β = 0.16, T value = 2.39; social asset β=0.15, T value= 2.39; natural asset β= 0.11, T value= 1.63; government intervention β = 0.37, T value= 8.52) which means that H_1, H_4, H_5, H_6, are supported positively (see Hair *et al.,* [21]), signifying that the concerned assets are related to food security. Furthermore, financial asset (β = 0.08, T value = 0.48); human asset (β = 0.11, T value = 1.56) were found to be non-significant (see Hair *et al.,* [21]) signifying that the hypothesized relationships (H_2 and H_3) are not supported.

4. Discussion

Finding of this study showed that H_1 is supported signifying the positive relationship between physical assets and food security. This finding is conformity with the finding of Kamaruddin and Baharuddin [24], Lim and Mansur [30] and Kasim *et al*., [26] which all advocated that access to physical assets enhances income and well-being of households and individuals as such has impact on the food security of the households and individual. Therefore this study submits that physical assets correlates positively and significantly with food security.

However, the finding of this study showed that H_2 is not supported signifying that there is no relationship between financial assets and food security. This result is, however, contrary to the finding of previous studies that advocated that increase in income enhances livelihoods and well-being to which adequate food consumption is a component, which includes the studies by Lim and Mansur [30], , Unmesh and Narayanan [45], Shehu and Abubakar [41], Kamaruddin and Samsudin [25], and Kasim *et al*., [26] which asserted that financial assets influences livelihood outcomes. The finding of this study also indicated that H_3 is not supported statistically, which is quite contrary to the finding of previous studies, indicating that there is no relationship between human assets and food security. The finding of this study also did not conform to studies by Chen *et al*., [9], Kamaruddin and Samsudin [25], Kasim *et al*., [26] that the position of human assets as a critical factor to livelihood outcomes to which basic need of sufficiency food is an important component. The mentioned studies indicated that human assets has significant relationship with well-being and income of the household which could be translated to food security of households. In essence, the finding shows that human asset has no effect on food security.

In relation to H_4 results of this study indicated that there is relationship between social assets and food security as the path coefficient suggested that the hypothesis is statistically significant. The finding of the study is not surprising as prior empirical studies advocated that there is relation between social assets and livelihood outcomes through linkage to social connections and non-governmental organization which further secure households of basic needs of food and wellbeing [4,23,34,43]. Similarly, H_5 of this study was supported in consistency with past empirical studies which stressed that natural assets (land for agriculture, water resources for irrigation and fishing) improves income, livelihoods outcomes and livelihood security which all have effect on food security

[1,5,25,30,34,46]. The findings of this study and past studies support and confirm that natural assets is critical to income which support food consumption as such has positive relationship with food security.

Similarly, H_6 which presumed a relationship between government intervention and food security was found to be statistically supported by the empirical data of this study. The result concurs with the studies of [22,26,30] which asserted that government support or intervention in the area of subsidy on agriculture and food production. Accordingly, the finding of the present study confirmed that there is positive relationship between government intervention and food security. The result depicts that support from government has effect on livelihood outcomes of households and individuals which in the end enhances food security.

5. Conclusion and Recommendation

This study based on the empirical data analyzed using PLS-SEM found that, ensuring food security is a function sustainable livelihoods, and government support. In essence, livelihood assets and government intervention as out of the six (6) hypotheses drawn four (4) were found to be statistically supported thus indicating correlation with food security (H_1, H_4, H_5, & H_6) therefore the study posits that ownership of physical assets, social assets, natural assets and government intervention contribute to food security, thus food insecure households and individual who owned the mentioned assets and enjoy government support will become food secure. Similarly, hypotheses H_2 and H_3 were not supported statistically indicating that financial assets and human assets do not have effect or impact on food security, though, surprisingly as literature indicated otherwise.

Consequently, this study submits that livelihood assets and government intervention are critical to ensuring food security, therefore, efforts should be intensified towards making livelihood assets and government intervention accessible to the vulnerable individuals in the society, particularly, rural areas. Considering the importance of food security to households and individuals, this study recommends that Malaysian government should be sustain “Kedai Rakyat 1 Malaysia” (1Malaysia People’s Store), and expand it to the downtrodden areas of the society where the most of the vulnerable live.

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References

[1] Adunga, Eneyew. "Factors influencing income level of (agro-) pastoral communities." *International Journal of Social Economics* 40, no. 3 (2013): 207-219.
[2] Ahmed, Nesar, Max Troell, Edward H. Allison, and James F. Muir. "Prawn postlarvae fishing in coastal Bangladesh: challenges for sustainable livelihoods." *Marine Policy* 34, no. 2 (2010): 218-227.
[3] Akudugu, M. A. "Rural banks' financial capital and livelihoods development of women farmers in Ghana." *Journal of Enterprising Communities: People and Places in the Global Economy* 5, no. 4 (2011): 248-264.
[4] Alfonso, C., Mendoza, S., Czerny, M., Allec, A., Pineda, L., Alonso, O., & Rojas, V. (2015). Miscellanea geographica. Regional studies on development livelihood assessment in district 1 of Medellin–Colombia, 19(4), 9–20.
[5] Ansoms, An. *Rural poverty and livelihood profiles in post-genocide Rwanda*. IOB, University of Antwerp, 2008.
[6] Bajwa, Sara Kamal. "A Study of Status of Livelihood Assets at Household Level: Evidence from Saidpur Village." (2015).
[7] Carney, Diana. *Sustainable rural livelihoods: What contribution can we make?*. Department for International Development, 1998.
[8] Chambers, Robert, and Gordon Conway. *Sustainable rural livelihoods: practical concepts for the 21st century*. Institute of Development Studies (UK), 1992.

[9] Chen, Haiyun, Ting Zhu, Max Krott, José F. Calvo, Shivakoti P. Ganesh, and Inoue Makoto. "Measurement and evaluation of livelihood assets in sustainable forest commons governance." *Land use policy* 30, no. 1 (2013): 908-914.
[10] Coleman, James S. "Social capital in the creation of human capital." In *Knowledge and social capital*, pp. 17-41. 2000.
[11] DfID, U. K. "Sustainable livelihoods guidance sheets." *London: DFID* (1999).
[12] Department for International Development. (2001). Sustainable livelihoods guidance sheets.
[13] Duarte, Paulo Alexandre O., and Mário Lino B. Raposo. "A PLS model to study brand preference: An application to the mobile phone market." In *Handbook of partial least squares*, pp. 449-485. Springer, Berlin, Heidelberg, 2010.
[14] Ellis, Frank. "The determinants of rural livelihood diversification in developing countries." *Journal of Agricultural Economics* 51, no. 2 (2000): 289-302.
[15] Food and Agriculture Organization (FAO) (2006) Food Security Policy Brief, Issue 2, http://www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf
[16] Food and Agriculture Organization (FAO) (2009) The Livelihood Assessment Tool-kit Analysing and responding to the impact of disasters on the livelihoods of people, FAO: Rome
[17] Fornell, Claes, and David F. Larcker. "Evaluating structural equation models with unobservable variables and measurement error." *Journal of marketing research* (1981): 39-50.
[18] Gholami, Roya, Ainin Binti Sulaiman, T. Ramayah, and Alemayehu Molla. "Senior managers' perception on green information systems (IS) adoption and environmental performance: Results from a field survey." *Information & Management* 50, no. 7 (2013): 431-438.
[19] Guerry, Anne D., Stephen Polasky, Jane Lubchenco, Rebecca Chaplin-Kramer, Gretchen C. Daily, Robert Griffin, Mary Ruckelshaus et al. "Natural capital and ecosystem services informing decisions: From promise to practice." *Proceedings of the National Academy of Sciences* 112, no. 24 (2015): 7348-7355.
[20] Hair Jr, Joseph F., G. Tomas M. Hult, Christian Ringle, and Marko Sarstedt. *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications, 2016.
[21] F. Hair Jr, Joe, Marko Sarstedt, Lucas Hopkins, and Volker G. Kuppelwieser. "Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research." *European Business Review* 26, no. 2 (2014): 106-121.
[22] Ibrahim, Ahmad Zubir, and Md Mahmudul Alam. "Climatic changes, government interventions, and paddy production: an empirical study of the Muda irrigation area in Malaysia." *International Journal of Agricultural Resources, Governance and Ecology* 12, no. 3 (2016): 292-304.
[23] Islam, Gazi Md Nurul, and Tai Shzee Yew. "Property rights and access: The case of community based fisheries management in Bangladesh." *Journal of Agricultural Science* 5, no. 6 (2013): 164.
[24] Kamaruddin, R., & Baharuddin, A. (2015). The importance of good acua-culture in improving fish farmers' income: A case of Malaysia. International Journal of Social Economics, 42(12), 1090–1105.
[25] Kamarrudin, R., and Shamzaeffa Samsudin. "The sustainable livelihoods index: A tool to assess the ability and preparedness of the rural poor in receiving entrepreneurial project." *Journal of Social Economic Research* 1, no. 6 (2014): 108-117.
[26] Kasim, Y., Ibrahim, A. Z., & Din, B. B. H. (2017). Understanding the effect of access to livelihood assets and government intervention on poverty reduction: A partial least squares approach. International Journal of Emerging Trends in Engineering and Development, 7(4), 139-154.
[27] Krantz, Lasse. "The sustainable livelihood approach to poverty reduction." *SIDA. Division for Policy and Socio-Economic Analysis* (2001).
[28] Kataria, Karin, Jarmila Curtiss, and Alfons Balmann. *Drivers of Agricultural Physical Capital Development: Theoretical Framework and Hypotheses*. No. 122. Centre for European Policy Studies, 2012.
[29] Kumo, Kazuhiro. "Research on Poverty in Transition Economies: A Meta-analysis on Changes in the Determinants of Poverty." (2015).
[30] Lim, Gee Nee, and Kasim Mansur. "Understanding Poverty and Vulnerability by Utilizing the Sustainable Livelihood Approach: A Comprehensive Study among Rungus Ethnic in Sabah, Malaysia." *Malaysian Journal of Business and Economics (MJBE)* 2, no. 1 (2015).
[31] Loewen, G. A. R. R. Y. "A compendium of poverty reduction strategies and frameworks." *Ontario: TAMARACK-An Institute for Community Engagement www. tamarackcommunity. ca*(2009).
[32] Méndez-Lemus, Yadira, and Antonio Vieyra. "Tracing processes in poverty dynamics: A tale of peri-urban small-scale farmers in Mexico City." *Urban Studies* 51, no. 10 (2014): 2009-2035.
[33] Jeannette, V., A. Notenbaert, S. Moyo, and M. Herrero. "Household livelihood strategies and livestock benefits dependence in Gaza province of Mozambique." *African Journal of Agricultural Research* 6, no. 3 (2011): 560-572.

[34] Oumer, Ali Mohammed, and Andreas de Neergaard. "Understanding livelihood strategy-poverty links: empirical evidence from central highlands of Ethiopia." *Environment, Development and Sustainability* 13, no. 3 (2011): 547-564.
[35] Ringle, Christian, Sven Wende, and Alexander Will. "Smart-PLS Version 2.0 M3." *University of Hamburg* (2005).
[36] Samsudin, Shamzaeffa, and Roslina Kamaruddin. "Distribution of the livelihood assets among the hardcore poor: Evidence from Kedah, Malaysia." *Proceeding book of ICEFMO. Malaysia: PAK Publishing Group* (2013).
[37] Scoones, Ian. "Sustainable rural livelihoods: a framework for analysis." (1998).
[38] Sen, Amartya. "Human capital and human capability." (1997): 1959-1961.
[39] Seng, Kimty. "The Effects of nonfarm activities on farm households' food consumption in rural Cambodia." *Development Studies Research* 2, no. 1 (2015): 77-89.
[40] Shaw D.J. (2007) World Food Summit, 1996. In: World Food Security. Palgrave Macmillan, London.
[41] Shehu, Abdulaziz, and Nura Abubakar. "Determinants of Participation of Farm Households in Non-farm Enterprise Activities in Rural Nigeria." *International Journal of Economics, Commerce and Management* 3, no. 6 (2015): 57-71.
[42] Su, Fang, and H. Shang. "Relationship analysis between livelihood assets and livelihood strategies: A Heihe River Basin example." *Sciences in Cold and Arid Regions* 4, no. 3 (2012): 0265-0274.
[43] Dao, Ha Thi Thieu, and Hong Manh Pham. "SETTLEMENT HOUSEHOLD LIVELIHOODS FOR POOR FISHERMEN: THE CASE OF CAM RANH RESERVOIR, KHANH HOA PROVINCE." *AJPS* 1, no. 1 (2015): 1-7.
[44] Twyman, Chasca, and Rachel Slater. "Hidden livelihoods? Natural resource-dependent livelihoods and urban development policy." *Progress in Development Studies* 5, no. 1 (2005): 1-15.
[45] Patnaik, Unmesh, and K. Narayanan. "How effective are coping mechanisms in securing livelihoods against climatic aberrations? Evidences from rural India." *International Journal of Climate Change Strategies and Management* 7, no. 3 (2015): 359-374.
[46] Van den Berg, Marrit. "Household income strategies and natural disasters: Dynamic livelihoods in rural Nicaragua." *Ecological Economics* 69, no. 3 (2010): 592-602.
[47] Weiss, Yoram. "Gary Becker on human capital." *Journal of Demographic Economics* 81, no. 1 (2015): 27-31.
[48] The Community Nutritionists Council of British Columbia Canada. (2004). Making the Connection – Food Security and Public Health. http://www. http://www.healbc.ca /files/Making_the_connection Food_Security_ and_ Public_ Health.pdf
[49] Schoch & Campaign. (2010). Food availability in the poorest households, Report of a Survey in central Jharkhand. http://www.genecampaign.org/Sub%20pages/Food-Availability-in-the-Poorest-Households.pdf
[50] Nnakwe & Yegamina. (2002). Prevalence of food insecurity among households with children in Coimbatore, India. *Nutrition Research* 22:1009-1016.
[51] Food and Agriculture Organization (FAO). (2003). Trade reform and food security: conceptualizing the linkages. Rome: Food and Agriculture Organization.
[52] Frankenberger, T. Frankel, L. Ross, S. Marshall, B. Cardenas, C.& Clark, D. (1995). Household livelihood security. A unifying conceptual framework for CARE programs. In: proceedings of the USAID Workshop on Performance Measurement for food Security. 11-12 Disember.
[53] World Food Summit (1996) ,Rome Declaration on World Food Security. http://www.fao.org/docrep /003/w3613e/w3613e00.HTM
[54] Ng'ang'a , S.K., Jeannette,V., Notenbaert,A., Moyo, S.,&Herrero, M. "Household livelihood strategies and livestock benefits dependence in Gaza province of Mozambique" *African Journal of Agricultural Research* 6 (2011): 560-572.