

# A Systematic Review of Household Well-Being towards Sustainable Livelihoods

Sukainah Farhah Ador<sup>1</sup>, Nor Diana Mohd Idris<sup>2\*</sup>, Chamhuri Siwar<sup>3</sup>

<sup>1</sup>Institute for Environment and Development (LESTARI), National University of Malaysia, 43600 Bangi, Selangor, Malaysia

Email: [sukainahfarhahador@gmail.com](mailto:sukainahfarhahador@gmail.com)

<sup>2</sup>Institute for Environment and Development (LESTARI), National University of Malaysia, 43600 Bangi, Selangor, Malaysia

Email: [nordiana@ukm.edu.my](mailto:nordiana@ukm.edu.my)

<sup>3</sup>Institute for Environment and Development (LESTARI), National University of Malaysia, 43600 Bangi, Selangor, Malaysia

Email: [csiwar@ukm.edu.my](mailto:csiwar@ukm.edu.my)

\*Corresponding author Email: [nordiana@ukm.edu.my](mailto:nordiana@ukm.edu.my)

## Abstract

Livelihood assets have an important function in how households make decisions to engage in livelihood strategies. An understanding of the assets owned and how they are used ideally is crucial to maintain a sustainable livelihood. This study aims to identify and explain the components in livelihood assets as well as sub-components in each of those assets that are used to improve the well-being of households. The literature review conducted in this paper is based on the Preferred Reporting Items for Systematic Reviews (PRISMA) method to find out the gap in the literature. Past studies considered relevant to the subject were found and categorized using PRISMA and thematic technique from two popular databases, namely Web of Science (WoS) and Scopus. The findings show the five main components of livelihood assets as well as nineteen sub-components are combining of each asset was describes the crucial topics that apply to households and identifies the livelihood assets that play a significant role in households' existence. The findings of this study could be referred to by policymakers and other relevant parties responsible for adaptive capacity to develop and implement sustainable livelihood assets for sustainable development 2030 agenda.

**Keywords:** Sustainable Livelihood Asset, systematic review, PRISMA, Thematic, household, well-being

## 1. Introduction

A combination of different types of assets is needed to obtain a good livelihood outcome. Households need a combination of several types of assets to survive. An understanding of the assets owned and how those assets are used as well as possible is crucial to obtain a sustainable livelihood. This study uses the Sustainable Livelihood Framework developed by the Department for International Development (DFID). The Sustainable Livelihood Analysis Approach is an asset-based form of analysis used by some researchers such as Jansen and Siegel (2005). The types of assets define what households own and how their members choose to use these assets as well as an opportunity to choose their livelihood strategies. The ways in which households and societies make choices on the utilization of their assets determine the outcomes of their lives, with reference to the well-being of households, environmental protection, and community prosperity. Livelihood assets are internal factors which have an important function when decisions are being made by households to engage in livelihood strategies (Li et al., 2014; Wu et al., 2017). According to Chambers and Conway (1992), a life should be prosperous, and it is robust to stressors because it can cope with and

rebound from pressures and shocks, sustaining or improving its properties and capacities, while not undermining the natural capital. Studies on assets using Sustainable livelihood have been conducted extensively and cover various methods, countries, and fields of endeavor. However, a systematic review of the literature on the indicators on each of these assets that drive a positive impact on livelihood has found only a limited number of publications. Consequently, this reason becomes the basis as a guide for selecting appropriate indicators for each livelihood asset systematically. There are no studies using the PRISMA approach for this topic, according to the literature review conducted in this paper. Accordingly, this study gap led to this research regarding livelihood assets using the method of PRISMA. The systematic literature review for this study is based on five main livelihood assets, namely financial, natural, social, environmental, and human assets. The main objective of this study is to identify the elements or subcomponents in each livelihood asset that serves to improve the well-being of households.

## 2. Methodology

The systematic literature review analysis in this study will be driven using the method

of PRISMA (Preferred Reporting Items for Systematic Reviews). To begin, the objectives of the study became the main basis for conducting the literature review. This situation is an advantage of this method because it can lead to a more accurate literature review. In this study, four processes used in PRISMA, specifically identification, screening, eligibility, and inclusion. It makes possible a more thorough and methodical approach procedure. In addition, PRISMA emphasizes the reported reviews that evaluate randomized trials which can also be utilized for systematic reviews that cover other types of research (Moher et al., 2009). In fact, PRISMA can highlight the importance of transparency/full disclosure, consistency and meeting high standards to produce qualitative research reports through proven processes (Flemming et al., 2018). This approach is commonly adopted in the social sciences as well as in integrated study topics. The literature review obtained through this method is based on quality data sources and can explain the limitations of the study with the help of keywords (Okoli, 2015).

### Resources

The systematic literature review analysis was done with the aid of two major sources database, which are Scopus and Web of Science (WOS). Scopus is a bibliographic database that includes abstract and

citation sources for journal articles. This database covers journals from scientific, technical, medical, and social sciences and currently has more than 5000 publishers worldwide and more than 40,000 sources titles. Clarivate Analytics' Web of Science (WoS) database contains articles from 256 disciplines, including science, social science, the arts, and humanities, among others. Articles, reviews, editorials, abstracts, sessions, and book chapters are all available in full text on WoS. More than 33,000 journals have been published in WoS since 1900. Both databases set high quality standards for receiving journals. WoS covers a wide range of areas including scientific and empirical studies. The process was set up with a search string (search string) of the main keywords using available search facilities and the exclusive command (command) that are set up in the database. Accordingly, Younger (2010) suggested that researchers should conduct their search processes using more databases to increase the chance of obtaining the best and most relevant articles. This present study conducted manual searching efforts on several established sources such as Science Direct and Springer, taking into account that they are reliable databases containing journals related to this topic. However, additional databases serve simply to support the studies found in Scopus and WOS (Figure 1).

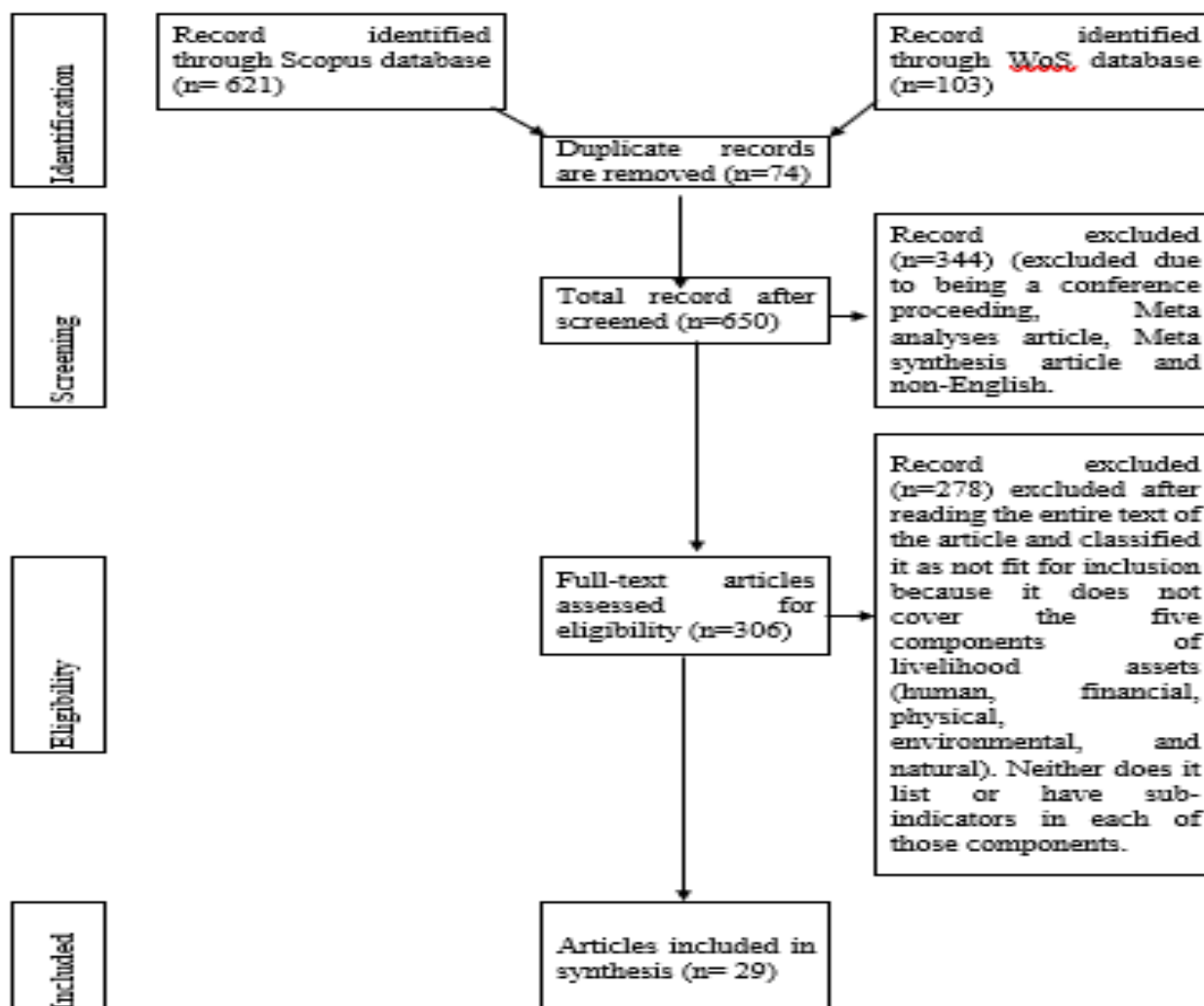


Figure 1: Flow Diagram of the study (adapted from Moher et al., 2009; Shaffril, et al., 2019)

## 2.2. Flow of the study

### 2.2.1 Identification

The process begins by performing a search string of keywords using the available search facilities and exclusive commands set up in the WoS and Scopus databases (Nik et al., 2020). In this process, the

author uses the keyword matching found in a thesaurus and is assisted by the Boolean Operator function (Xiao and Watson, 2019) in both databases. The keywords and search strings used can be repeated to retrieve the latest material and for future research. As a result of searching for those keywords, the author found 724 articles in both databases.

**Table 1 Resources and Search String**

Web of Science (WoS)	TS=(livelihood asset AND asset human AND natural asset AND physical asset AND social asset AND financial asset)
Scopus	ALL (livelihood AND asset AND human AND asset AND social AND asset AND financial AND asset AND physical AND asset AND natural AND asset)

### 2.2.2 Screening

Screening is the second step in the systematic review process. This stage aims to conduct a more detailed selection by separating the overlapping journals from the two main databases. Furthermore, special criteria are devised to obtain the documents relevant to the study. Based on this, a total of 74 similar articles from the two databases were separated. Then, three (3) criteria have been determined at this stage, namely year of publication, medium of instruction and type of document (Table 2). For the year of publication, the author selects journals published from 2000-2020, while for the medium of instruction, the researcher selects only English language, and the type of document used in

this study. The search results of the study documents obtained at this stage include a total of 344 journal articles found in both databases. After separating the same articles from the two databases, a total of 306 passed all the criteria at this stage. Several improvements made to this paper through recommendations by Shaffril (2019) with respect to the flow diagram developed by Moher et al. (2009) based on the article retrieval process for future systematic review. This study removes duplicated articles once the screening process is completed. This process makes it possible for the authors to remove any duplicated articles as the number of remaining articles should be reduced following the screening stage of what to include and exclude.

**Table 2 The inclusion and exclusion criteria**

Criterion	Inclusion	Exclusion
Type of literature	Journal (research articles)	Journal (review article), book chapter, conference proceeding
Language	English	Non-English
Field	Social Sciences, Agricultural, Environmental Science	Other than Social Sciences, Agricultural, Environmental Science
Timeline	2000-2020	Before 2000 and after 2020
Countries covered	All countries	-

### 2.2.3 Eligibility

At this stage, only articles that can answer the objectives of the study will be used and analyzed for more details by reviewing, abstract methods and content. Therefore, only papers comprising all five components of the livelihood asset will be chosen for further review after this phase has been completed.

### 2.2.4 Data extraction

The researcher starts extracting data after the other publications were assessed and analyzed. The researcher began by reading the abstract of the paper before moving on to the complete text to discover themes and sub-themes linked to the objective. Themes and sub-themes were then organized to create a typology for the topic.

## 3. Result

This study would explore vital knowledge on the specifics of livelihood assets used by households, farmers, and the community. The discussion in this section is to use thematic analyses addressing the

key components of each livelihood asset in terms of financial assets, human assets, environmental assets, physical assets, and social assets. Furthermore, the sub-components which shape each asset will be discussed in more depth (Table 3).

### 3.1 Sustainable Livelihood Assets

To live a better life, a combination of different types of assets is required. Livelihood assets are not restricted solely to financial ones, but also need a combination of many types to live a sustainable life. It is also important to consider the assets held and how they are best utilized which is crucial to make life better and more sustainable. Failure to enforce this would influence the policy or will adversely affect livelihood assets. The sustainable livelihood framework identifies the five assets as the main core in this framework. These assets encompass social, financial, physical, natural, and human assets.

### 3.2 Financial Assets

Financial assets are the essential assets required by households to sustain and achieve their objectives

(Dulal et al., 2010). These assets also function as a medium of exchange for the acquisition and production of other assets (Baffoe and Matsuda, 2018; Mengistu and Aseefa 2020; Dulal et al., 2010; Mistri and Das 2020). Furthermore, it also plays an important role in addressing and overcoming numerous uncertainties that would be faced, as well as identifying the livelihood strategies implemented by households or those responsible as a transformational structure to enhance their standard of living and sustainability (Swain et al., 2008). In general, households that lack financial assets are more vulnerable (Quandt et al., 2019). Lacking these assets helps explain why people are living in poverty (Li et al., 2014). These financial assets include income, savings and access to credit, whether from formal or informal sources (Mistri and Das, 2020).

### 3.2.1 Income

Household income is derived from various sources and differs from one source to another. These types of income consist of income from agriculture such as the sale of crops, livestock and fish, non-agricultural income such as skilled and unskilled labor, the sale of coal and firewood and small trade (Ding et al., 2018) as well as remittances such as renting out of property and government allowances (Wang et al., 2016; Li et al., 2019). There are also households that diversify income that is not only limited and focused on one source of income only. The total amount of income is usually earned by summing up the entire source of income owned by the household. Referring to Kibria et al. (2018) on the agriculture sector, if the financial position of farmers is reasonably strong or improves, they can expand their farms. For example, this includes the ability to purchase quality input materials, tools, updated machinery and technology, etc. Furthermore, if farmers are categorized as poor, then the priority is on the survival and well-being of the family rather than striving to get ahead with an enhanced production system.

### 3.2.2 Savings

Savings are excess revenue from income following deductions of both expenses and consumption that farmers need to do. The lack of cash liquidity as a problem can be minimized if and when savings are made. Referring to Yuniarti et al. (2018) these savings are intended to be used in the future, particularly when there is an emergency situation for the household. Savings can reduce the risks that will be encountered. Based on Dulal et al. (2010) household micro savings provide access to money in lump sum to help them cope with unexpected problems or even risks that have been predicted and come to pass. They added that savings can restore the situation after facing a disaster or something undesirable and serve for re-investment in the future. The savings they have can reduce the risks faced by low-income households in the event of something causing them to lose income (Yuniarti et al., 2018). Ironically, the poor often find it difficult to save any money because they are faced with the challenge of

living from day to day (Dulal et al., 2010). Based on a study conducted by Swain et al. (2008) group savings are made by the poor on a mandatory basis of 5% of the loans they seek. This mechanism can help these people to have savings and solve their problems if they need to cut other expenses for when emergencies arise.

### 3.2.3 Credit

Access to formal financial services such as banks, microfinance and industry increases adaptive capacity and reduces the risk (Dulal et al., 2010). Access to loans can be classified into two types, namely access to loans from formal sources (banks, cooperatives, suppliers) or from informal sources (family and friends) (Pour et al., 2018). People living in rural areas or households with relatively low incomes find it difficult to obtain loans from formal loan sources. A study conducted by Jakobsen (2013) shows that loans provided by the bank are more concentrated in urban areas while loans to the community at rural area are difficult to get because they do not have a viable financial standing. Li et al. (2014) stated that vulnerable groups can get loans from social financial credit or informal sources that demand higher repayment rates. This situation increases the financial risk borne by the poor.

Yuniarati (2018) states that the reasons for borrowing are different and not limited solely to shocks such as crop or harvest failure and losses in animal husbandry. Some households seek loans for daily needs, to build or repair a house or for health, education and so on depending on their circumstances. Referring to Kuang et al. (2020), the current ability to get loans and financial assistance affects the likelihood of farmers obtaining financial credit in the future, as well as having good financial support to deal with the hazards of making a living and adaptation strategies. Access to financial services helps to further streamline production processes and being able to deal with the risks also makes it possible to generate new income activities and build substantial assets (Jakobsen, 2013).

## 3.3 Human Assets

Human assets are very important assets in the overall scheme of things because they have an intrinsic value to connect one asset with another asset (Chamaratana et al., 2018). This type of asset also play a role in the success of various livelihood strategies according to the ability of people to generate economic value (Singgalen et al., 2019 ) and achieve their livelihood goals (DFID, 1999; Kuang et al., 2020). Based on Mistri and Das (2020), human assets are a way to identify and categorize employable human talent and abilities and further contribute to the economy. Human assets are held by an individual and function to help make a profit. Human assets are defined as the capacity and ability available to the individual based on their knowledge, skills, and health in contributing to productivity, ability to manage land as well as labor capacity (Pour et al., 2018; Kuang et al., 2020; Mistri and Das, 2020).

### 3.3.1 Level of Education

Education is an indicator intended to help households adapt to social and technological changes. The levels of education a household possesses influence the choice to increase and diversify existing income as well as improve the capacity to adjust to changing circumstances (Dulal et al., 2010). Higher levels of education offer a huge opportunity for better jobs and higher wages. Access to education can raise the ability of households to develop and further expand the human assets they have (Ismail et al., 2018). Various livelihood strategies can be carried out if education is available and helps improve the quality of human assets (Kuang, 2020). The quantity and quality of human assets are very different and lead to different outcomes in terms of livelihood strategies – if they succeed or fail.

Based on Li et al. (2014) most households with low levels of education belong to the category of the poor. This indicates there is a positive correlation between the level of education and income earned in the long run. For example, human assets with a low level of education and skills find it very difficult to get a job with a lucrative salary (Pour et al., 2018). This situation shows that lack of education causes limitations on personal development and has a huge impact on livelihood sustainability (Li et al., 2014). Furthermore, how the household responds, and the results of the training provided are influenced by their level of education (Swain et al., 2008). Level of education has a positive impact on labor productivity. In fact, information on agriculture and related matters is also easy to access and understand. Households with good formal education find it easier to engage with modern technology and management methods compared to households without formal education (Baffoe and Matsuda, 2018). Low levels of education will deter the effective management and of financial assets owned by people (Baffoe and Matsuda, 2018).

In the context of agriculture, education is also associated with access to new information concerning farm production methods and understanding the effects of soil erosion. Educated farmers find it easier to adapt to modern agricultural technologies and have higher technical skills (Udayakumara and Shrestha, 2011). A study conducted by Jiao et al. (2020) shows that education is an important factor in adapting to new technology in agriculture.

Education is a key requirement for human assets development. Human assets are the link between different kinds of assets. Various livelihood strategies can work if a good level of education is evident in human assets (Kuang, 2020). Referring to Chen et al. (2012) one of the ways to overcome a low level of education in households is providing a platform to increase knowledge such as training to improve the knowledge and skills of people in the household.

Referring to Chen et al. (2012) effective mechanisms will need to be taken by the government to achieve

long-term sustainability of people's livelihoods. The government needs to provide and improve access to education, as well as give or build for local communities' better infrastructure such as public libraries, providing training sessions or talks and skills training for local citizens to benefit from.

### 3.3.2 Experience

Experience is one of the subcomponents of human capital and it plays an important role in assisting households to boost productivity, generate income, adopt livelihood strategies, and solve problems. Referring to Jezeer et al. (2019) farmers' experience and encounters with various shocks can help them to predict risks and be prepared to meet the future risks that would arise. This scenario shows that knowledge by itself is inadequate in developing livelihood strategies that are appropriate to the current situation and help to overcome future risks. Furthermore, Zampaligre and Fuch (2019) uses age as a proxy to measure farmers' ability to face the dangers posed by climate change. According to him, the older the farmer, the more experience the farmer has in dealing with various climate change scenarios and its effects on their farms or livestock. A study conducted by Jezeer et al. (2019) also shows that the risk experienced has a strong relationship with the experience of a shock faced in the past. Past experiences serve as lessons on how to prevent potential threats in the future.

Based on a study conducted by Qian (2017) most farmers learn about agricultural practices and routines from experience which are enhanced by knowledge shared among farmers. The findings of the study are supported by Jezeer et al. (2019) who states that the experience of farmers can improve knowledge of agriculture. Based on the study, farmers with extensive experience have high-level technical knowledge and the potential to improve environmentally friendly agricultural practices. Other studies show that agricultural practices are positively correlated with the experience of farmers.

### 3.3.3 Training

The capabilities of human assets can be developed and expand through the medium of training received (Ismail et al., 2018). In fact, the negative impact of low level of education among households can be mitigate with the availability of effective training that can boost the knowledge and capacity of households (Chen et al., 2012). Furthermore, the problem of loss of existing specialist manpower can also be curbed by providing appropriate education and training to new farmers to increase productivity and quality of product. Training is a step to acquire knowledge in accordance with the objectives of training implemented by the authorities (Kuang, 2020).

Referring to the study by Chen et al. (2012), participants' knowledge and skills increased because of the training conducted. Professional farming techniques are also provided in training for project participants. The training provided enables farmers

to refine various planting practices and plans, diversify crop types and increase crop yields. Swain et al. (2008) stated that by following the rules that have been set in the development program conducted and attend training courses, participants are able to increase their productivity and enhance their position in the family and community. According to Tadesse et al. (2017), training increases participants' ability to think of alternative income generation activities such as seedling cultivation, beekeeping, coffee processing, etc., and their awareness of forestry management problems and the solutions; so, in the long-term they will benefit (Ismail et al., 2018). Zacarias (2019) stated that additional training is needed to improve agricultural farming techniques and further diversify the types of crops cultivated. According to the author, most households have never had training in certain areas such as carpentry. This situation further increases the risk of vulnerability to households.

#### 3.3.4 Age and Health Level

Farmers' age is linked to their ability to manage their farm. Young farmers have a high tendency to implement sustainable agricultural practices compared to older farmers (Terano, 2015; Jackson et al., 2012). According to Jackson et al. (2012) young farmers are more apt to accept technological developments needed to manage their estates. Young farmers are also more inclined to accept any need to innovate, invest in new knowledge and knowledge transfer rather than older farmers. In fact, most younger workers often have better health and high energy levels (Mistri and Das, 2020). Older farmers have more experience and skills in farm management matters (Mengistu and Assefa, 2020; Zampaligre and Fuchs, 2019; Jiao, 2020) and are able to deal with various risk factors that emerge (Mengistu and Assefa 2020; Zampaligre and Fuchs, 2019). However, at a certain age, the energy and ability of the household begins to falter and productivity declines (Jiao et al., 2020). Jelsma et al. (2009) stated that as farmers get older, their productivity diminishes, and they are forced to appoint others to carry out their duties (Quandt et al., 2019).

According to Udayakumara and Shrestha (2011) as farmers get older their focus on farms decreases. Farmers will concentrate more on short-term investments that are more environmentally friendly rather than long-term ones. When the farmer is too old and no longer able to work due to health problems, then generating income will become an opportunity cost to the farmer due to rising medical bills or healthcare issues. So much of productivity of human capital relies on maintaining good health. Diseases and constantly demanded health services are an obstacle for households and their inability to work forces them to sell the productive assets they own to replace the loss of income (Jakobsen, 2013).

Furthermore, the research hypothesis conducted by Jiao et al. (2020) stated that health problems or

diseases experienced will undermine the process of adaption because it will cause a decline in labor productivity. In fact, the family members involved must divert their time and money to take care of those with health problems. Referring to Jakobsen (2013), health status is also a factor that influences households' ability to manage risk. Ibrahim (2018) shows that vulnerable groups typically have health problems such as diabetes, heart issues and other chronic diseases (Quandt et al., 2019).

### 3.4 Physical Assets

Physical assets are defined as essential assets needed to provide basic facilities and infrastructure (Bunting et al., 2013) to make production possible (DFID, 2001; Mistri and Das, 2020; Pour et al., 2018). These assets are the accumulation of various basic assets and access to those assets can contribute to the economic growth of the community (Singgalen et al., 2019). However, physical assets should be used as best as possible through human assets that can transform those assets to generate other assets or vice versa.

According to Swain et al. (2008), physical assets enable household to increase efficiency which means generating income to support daily life. In fact, these assets also play an important role in risk management (Jakobsen, 2013), while lack of physical assets will increase the failure of resilience (Dulal et al., 2010). Deteriorating conditions in physical capital result in rising unemployment rates and reduced resistance to a myriad of issues (Mistri and Das, 2020). These assets are needed to develop livelihood strategies as well as increase their resilience to crises (Jakobsen, 2013). The physical asset in this study encompasses public infrastructure such as roads and so on which are used as a medium of transformation to generate income, efficiency, productivity as well as improve and maintain their livelihoods (Chamaratana et al., 2018; Mistri and Das, 2020).

#### 3.4.1 Public Infrastructure

Infrastructure is the essential facility provided by the government, including the services and facilities needed to help the economy run smoothly. It generally comprises technical things such as roads, sanitation systems, health facilities, communications, water and energy supplies, internet services, etc., so that a community can survive (Hishe et al., 2019; Bennett and Dearden, 2014). It is used with or without direct payment and good access to these assets will help households improve their livelihoods (Xiao et al., 2020). The provision of infrastructure in agriculture is expected to increase productivity. Referring to Nazari et al. (2015), infrastructure such as good roads and close distances between farms and markets is able to reduce delivery time at the same time maintain the quality of crop yields. In addition, the provision of good infrastructure can reduce transaction costs of supplying products to the labor market. Distance from the market (in terms of travel time) largely

affects the method of interaction between farmers and the market (Zhang et al., 2007).

### 3.4.2 Production Equipment

In addition, other components of physical assets such as production equipment are able to increase income such as agricultural tools and machinery (Dulal et al., 2011). Production equipment is usually owned by the individual. However, some equipment such as larger scale and high-tech agricultural machines are very expensive, and farmers cannot afford them. Agricultural machinery can be rented or used as collateral when paying for services given by suppliers, middlemen, institutions and so on. Many studies show that having inadequate infrastructure will affect the community's source of income. According to Kuang et al. (2020) the number of machines and equipment owned by farmers will shape the mode and efficiency production.

### 3.4.3 House and Household Goods

Personal assets such as housing encompass one of the most important elements of human livelihood (Leah et al., 2013), quality of housing environment and home appliances (Avogo et al., 2017). Housing that is in good condition is one of the basic needs that must be available for the household where the type of house, state of its fabric, number of living rooms, having a separate kitchen, etc., is important (Mistri and Das, 2020). Moreover, housing conditions affect the health of people and how well children develop. The results of the study by Yassin et al. (2012) show that space, number of rooms and home security influence the well-being of people. In addition, durable assets are used to help generate income, facilitate livelihoods, and make life more comfortable. These durable assets consist of mobile phones, televisions, vehicles and so on (Tadesse et al., 2017).

### 3.5 Social Assets

Social assets are directly related to policies, institutions, and processes. Social relationships are ones where people interact with each other to generate income and achieve objectives of livelihood (Pour et al., 2018; DFID, 1999; Chamaratana et al., 2018; Dulal et al., 2010). When the relationship is getting better than it is easier to establish another new relationship. Social assets and human assets are closely linked in the dissemination of knowledge. On the other hand, when a person is isolated from a group, association, or society, due to hierarchical contexts or other reasons, this will hinder the generation of income and livelihood strategies. Referring to Pour et al. (2018) social assets are defined as resources available to individuals and groups through membership of social networks. If the household has a higher position in a group or social institution, individuals in the home generate higher social status and resources (Pour et al., 2018). Long participation in other social groups enables access to information, assets, business opportunities, social strength, and influence (Singgalen et al., 2019). According to Zhang and Fang (2020) these

assets are developed through a formal network and memberships within the group and bind parties involved with certain rules and conditions that are mutually agreed to. Trust-based relationships are built through these assets to facilitate cooperation, reduce transaction costs and assist in devising informal security networks among the poor. The social assets in this study involve several aspects such as the position of households in society, involvement in political parties, associations that are related to the economic activities carried out as well as relationships with other stakeholders.

### 3.6 Natural Assets

Natural assets are assets derived from natural resources that can be utilized in life (Baffoe and Matsuda, 2018; Mistri and Das, 2020; Pour et al., 2018). The variation of resources that make up natural assets is very wide which consists of tangible and intangible public goods. Intangible public goods include oxygen and the atmosphere, while tangible assets can be used directly for production as a source of income such as land, trees, and other landmarks (Mistri and Das, 2020; Qiu et al., 2018). Productivity generated from these assets either declines or increases depending on the skill in human management of these assets (Boateng, 2013).

Natural assets play an important role in development and especially in rural areas. Most of these assets function as a source of income to achieve sustainable livelihoods. Households that rely on natural resource-based activities, such as agriculture, fisheries and forest products are exposed to shocks and trends that damage, destroy or endanger the natural resources they possess (McDowell and Hess, 2012). The natural assets in this study comprise topography, soil type and land area. Topography is one natural asset that will affect the management and yield of a crop (Donohue and Biggs, 2015). According to Rieke-Zapp and Nearing (2005), topography refers to differences in height, steepness, and slope shape, and it plays an important role in the genesis and development of soil profile because these topographic factors will affect the growth of trees or crops. The amount of rainwater needed can be absorbed and stored by the soil over a period, the flow of water-soluble material from high places to low places, the amount of erosion that occurs, suitable methods used for crop cultivation, will affect the number of trees or crops that can be planted.

Furthermore, land quality (Hische et al., 2018; Mengistu and Assefa et al., 2019) and land area (Boateng, 2013; Mengistu and Assefa, et al., 2019) owned by farmers are natural assets that influence agricultural management and productivity. According to Johari et al. (2016), continuous land use can affect crop productivity given that farmers depend on the quality of the land, whether it is fertile or otherwise. This soil fertility factor is important because it is able to supply nutrients to crops. Referring to Piggott-McKellar et al. (2020), soil quality and declining land size that result in a reduction in crop yield and having to change what is planted and cultivated. These two issues if managed wrongly can lead to a food shortage.

Besides that, the size of land area (Boateng, 2018) owned affects the basic management as well as

agricultural practices, crop yields, productivity, and incomes of farmers. Farmers who do not have a large amount of land size are at risk of ongoing poverty. The land area owned also affects the number of trees that can be planted. Most farmers who have extensive and well-managed acreages are able to sustain their crops and incomes. Land area also affects the number of trees/plants that can be planted. The larger the land area, the greater the number of trees/plants that can be planted. Pour et al. (2018) used the number of trees owned by a household as a natural asset owned by a household. The number of trees owned indicates how much crop yield is obtained and in turn shows the income earned by households through their use of agricultural assets.

#### 4. Discussion

In this section, the practice of livelihood asset group is divided into two types of relationship in the framework that are related to an asset. First, there is the relationship between the asset and second the

relationship of the asset with another component in the framework. The relationship between assets refers to the combination of assets that exist to produce a viable livelihood outcome. In the SLA framework, the pentagon shape indicates systematically the variations in human access to assets. The center of the pentagon where all the lines meet indicates the least access to assets while the outermost point indicates maximum access to assets. Based on this assumption, different pentagon shapes result from different communities or different social groups within a community (DFID, 1999). Each of these assets is typically unable to stand alone and some assets are only efficient when they are combining with others. For example, access to land has different implications for well-being depending on its location to markets and other infrastructure, access to credit and inputs and the education level of the landowner. Education may have different implications for the welfare of generations depending on the state of the labor market, the wider economy and related institutions (Zezza and Llambi, 2002).

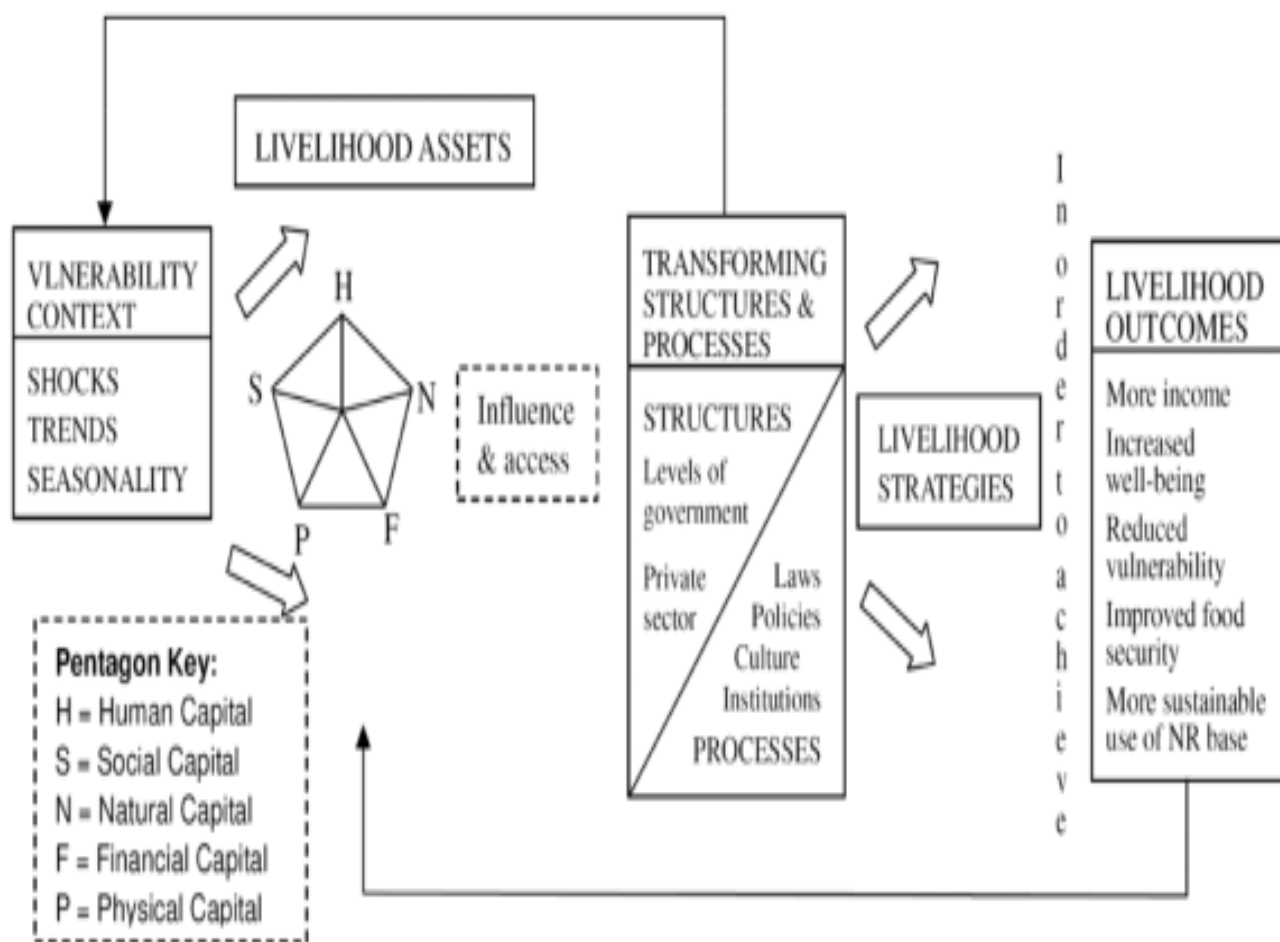


Figure 2: Sustainable Livelihood Framework  
 Source: DFID, 1999

A study conducted by Zacarias (2019) showed that the vulnerability experienced by households is due to the lack of financial, physical, and social assets. The vulnerabilities faced by the community occur because they have no relationship with any agency, organization, or group. This situation reduces the ability to adapt to risk, shock and any problems that occur (Aldrich et al., 2016; Adger, 2003; Zacarias,

2019). The scarcity of one asset affects other assets and so it is necessary to combine various assets to achieve sustainable livelihoods. Meanwhile, You et al. (2019) tried to find the factors influencing household migration from rural areas to urban areas. Households able to transfer their farmlands are more likely to migrate to urban cities. The results show that natural assets, physical assets,

social and financial assets are negatively related to the rate of urbanization, and only physical assets have a positive relationship with urbanization. Furthermore, farmland transfers have different effects on farmland-transferred households' livelihood assets. Benefit of farmland transfer (BFT) has a statistically significant positive influence on financial, social, and human assets. This study shows that the importance and influence of these livelihood assets vary in a community according to how a situation presents itself.

Based on accurately identifying farmers' livelihood risks, this paper investigates the effects of farmers' livelihood assets on their livelihood risks and adaptation strategies. The results show that natural risks and market risks are the main livelihood risks for farmers in agriculture. Farmers' social, financial, and human assets can mitigate their livelihood risks in agricultural production, while natural and physical assets have the opposite effect. Most farmers choose crop variety adjustment, good water and fertilizer management, agricultural finance and agrotechnical support to deal with livelihood risks. Social, natural, and physical assets have significant and positive effects on farmers' adaptation strategies, while human and financial assets have relatively weak influences.

The relationship of assets with other components in the framework refers to the relationship of assets with the context of vulnerability, the formation of structures and processes of livelihood strategies and livelihood outcomes. In the context of vulnerability, assets can be destroyed or built depending on the vulnerability factors encountered. Through structures and processes, institutions and policies have a profound influence on access to assets. The responsible party will build assets or give assistance to improve the assets owned by households through government policies such as investing in infrastructure or technology that will generate human capital, better production methods and asset accumulation. However, this is not only in the form of one-way relationships, since individuals and groups also influence the formation of such processes.

The relationship of livelihood assets with other components is noted in various studies (Table 4 and Figure 3). Many studies have proven that the lack of livelihood assets will cause a community's vulnerability to increase and reduce its adaptive capacity to cope with risk, disaster and other problems that arise (Azam et al., 2019; Gordillo and Santana, 2019; Mengistu and Assefa, 2020; Raaijmakers and Swanepoel, 2019; Zacarias, 2019; Zhang and Fang, 2020). Next, the research regarding relationship between the livelihood strategies implemented is to increase the livelihood assets of households involved and will ultimately increase the livelihood outcomes of the parties when effective development programs are implemented (Jiao et al., 2020; Kibria et al., 2018; Pour et al., 2018; Quandt,

2019; Su et al., 2018; Tadesse et al., 2017; Xiao et al., 2020).

Generally, the more assets households have, the more influence they wield. In terms of the relationship between assets and livelihood strategies, households with more assets will have more options and the ability to change from one strategy to another to improve or save their situation. Meanwhile, the relationship between assets and livelihood refers to the ability of people to get out of poverty, disasters and other problems that depend on their access to assets. Different assets are needed to achieve different livelihood outcomes.

### 5. Conclusions

The findings of the study show the five main components of livelihood assets as well as sub-components in each livelihood asset, namely financial assets (income, savings, credit), human assets (education level, experience, training, age and health level), physical assets (public infrastructure, personal asset includes fixed assets, durable asset and production assets), social assets (position and type of household relationships in society, involvement in political parties and associations) and lastly, natural assets (topography, land quality, land area, number of trees cultivated). The selection of sub-components for each of the main components included here was done according to the suitability of the context. Lacking any of the five components of these livelihood assets made households a vulnerable group. Lack of and difficulty to get access to physical assets, health facilities, housing, education, economic opportunities, and economic resources as well as social relations makes it difficult for them to achieve a sustainable livelihood. This study contributes to the wider literature by describing the livelihood assets that play an important role in households' functioning as well as which assets are still lacking. Indeed, policymakers and responsible bodies have been working on strategies to develop and improve these livelihood assets. The scenario shows the importance of analyzing these livelihood assets towards sustainable development goals 2030 to achieve viable coverage of the poor and vulnerable group.

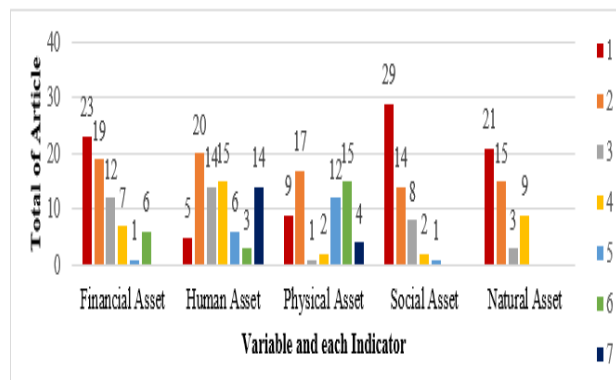


Figure 3: Variables and Indicators used for Sustainable Livelihood Assets

Source: Author's Analysis 2021

Table 3: List of Variables and Indicators used for Sustainable Livelihood Assets

No	AUTHORS/ VARIABLES/ INDICATORS	ASSETS																										
		FINANCIAL					HUMAN					PHYSICAL					SOCIAL			NATURAL								
		INC	CRD	SV	RTM	EXP	GFU	AGE	LED	HT	KNW	TRN	EXC	SKL	TRS	PUNF	URSV	SFIN	HSE	PRDG	DURG	RPLG	RAUT	RSUP	RMMIN	LD AREA	LOUAL	NTR
1	Azam et al. (2019)	/	/					/	/				/	/	/						/	/			/	/		/
2	Baffoe and Matsuda (2018)		/	/	/			/	/				/	/	/					/	/				/			
3	Bennet and Dearden (2014)		/	/	/				/	/			/	/						/	/	/			/			
4	Chen et al. (2012)	/				/			/	/			/	/	/				/	/	/	/	/			/	/	
5	Dulal et al. (2011)		/	/				/				/		/	/					/	/	/	/			/		
6	Dulal et al. (2010)		/					/			/		/							/	/	/	/			/		
7	Gordillo and Santana (2019)	/			/		/						/	/		/				/	/	/	/			/		
8	Guo et al. (2019)	/						/			/							/	/	/	/	/			/			
9	Ibrahim (2018)	/		/			/		/	/	/	/						/	/	/	/	/			/			
10	Ismail et al. (2018)	/	/				/	/	/						/			/	/	/	/	/			/	/		
11	Jackson et al. (2012)	/	/	/	/		/	/	/	/			/	/					/	/	/	/			/			
12	Jezeer (2019)	/		/				/				/		/	/					/	/	/	/			/	/	/
13	Kibria et al. (2018)	/	/	/			/		/	/		/		/	/				/	/	/	/			/			
14	Mengistu and Assefa (2019)	/	/							/					/				/	/	/	/			/	/		/
15	Mengistu and Assefa (2020)	/	/							/					/				/	/	/	/			/	/		/
16	Mistri and Das (2020)	/					/	/	/				/	/		/			/	/	/	/			/			
17	Mukisa et al. (2020)	/	/	/	/		/	/	/	/			/	/					/	/	/	/	/	/	/	/		/
18	Pour et al. (2018)	/	/				/		/										/	/	/	/			/			/
19	Quandt et al. (2018)	/			/		/	/	/				/	/	/				/	/	/	/			/	/		
20	Qian et al. (2017)	/					/	/	/				/						/	/	/	/			/	/		
21	Raaijmakers and Swanepoel (2019)	/	/	/			/	/	/				/	/					/	/	/	/			/	/		/
22	Su et al. (2018)	/	/	/			/	/	/				/	/				/	/	/	/	/			/			/
23	Tadesse et al. (2017)	/	/				/		/				/	/				/	/	/	/	/			/			
24	Udayakumara and Shrestha (2011)	/		/			/		/	/			/	/					/	/	/	/			/		/	
25	Wu et al. (2017)	/	/				/		/				/	/				/	/	/	/	/			/	/		
26	Xiao et al. (2020)	/	/	/	/		/	/	/				/	/	/				/	/	/	/	/		/	/		/
27	You et al. (2019)	/	/				/	/	/				/	/				/	/	/	/	/			/	/		
28	Zacarias (2019)		/					/	/				/	/					/	/	/	/			/	/		/
29	Zhang and Fang (2020)									/			/	/				/	/	/	/	/		/	/	/	/	/

Financial Asset  
 INC=Income CRD= Credit SV=Savings  
 RTM= EXP= Expenditure GFU= Government funds

Human Asset  
 AGE= Age LED= Level of Education HT= Health  
 KNW= Knowledge TRN= Training EXC= Experience SKL= Skills






























Physical Asset  
 TRS= Transport PUNF= Public Infrastructure  
 URSV= Urban Services SFIN= Soft Infrastructure  
 HSE= House PRDG= Production good  
 DURG= Durable good

Social Asset  
 RPLG= Relationship with local group  
 RAUT= Relationship with authority  
 RSUP= Relationship with supplier  
 RMMIN= Relationship with middleman  
 AINF= Access to information

Natural Asset  
 LDAREA= Land Area or Acreage  
 LOUAL= Land quality  
 NTR= Number of trees  
 AWTR= Access to water

Source: Author's Analysis, 2021

Table 4: List of Variables and Indicators used for Sustainable Livelihood Assets by total of articles

VARIABLE/ Financial Assets	Total Journal	Human Assets	Total Journal	Physical Assets	Total Journal	Social Assets	Total Journal	Natural Assets	Total Journal
Income	23 	Age	5 	Transport	9 	Relationship with local group	29 	Land area or acreage	21 
Credit	19 	Education	20 	Public infrastructure	17 	Relationship with authority	14 	Land quality	15 
Savings	12 	Health	14 	Urban services	1 	Relationship with supplier	8 	No. of trees	3 
Remittances	7 	Knowledge	15 	Soft infrastructure	2 	Relationship with middleman	2 	Access to water	9 
Expenditure	1 	Training	6 	House	12 	Access to information	1 		
Government funds	6 	Experience	3 	Production goods	15 				
		Skills	14 	Durable goods	4 				

Source: Author's Analysis, 2021

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## 6. Author contributions

The idea for the article contributes by M.I Nor Diana. The drafted, literature search and data analysis was performed by A. Sukainah Farhah. Critically revised the work was accomplished by M.I. Nor Diana and Chamhuri Siwar. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

## 7. Declaration of conflicting interests

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## 9. ORCID iD

Nor Diana Mohd Idris <https://orcid.org/0000-0002-3849-4101>