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Towards Sustainable Living: The Evaluation of Livelihood Assets on the Well-Being of Tha Chin Riverine Elderly

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Abstract

Following the The Sustainable Development Goals, this research aims to answer three questions which are: 1) Do 'livelihood assets' (natural, human, financial, physical, and social) have an effect on the level of well-being of reverine elderly?; and 2) What measure can be used to increase the well-being of riverine elderly. The research employed a quantitative method. It collected data from 186 elderly respondents living in Lumphaya Municipality which is located in part of the Tha Chin River of Nakhonpathom. The result revealed that only four of the five aspects are able to predict the well-being of the riverine elderly. The independent variables which show a positive coefficient with the level of elderly well-being at a significant level of 0.05 are 'social capital', 'natural capital', 'physical capital', and 'financial capital' with the coefficient values of .646, .375, .201, and .169 consecutively. This indicates that 'social capital', 'natural capital', 'physical capital', and 'financial capital' are factors which predict the outcome of the response variable, in this case, the level of elderly well-being. This research found no significant relationship between human assets and livelihood outcomes. Human capital refers to job-related abilities and skills, and it is presumed that these skills may be less relevant to the well-being of the riverine elderly, who are less engaged in the workforce. Therefore, to promote the well-being of riverine elderly and increase individual resiliency, the authority must focus on enhancing the livelihood assets relevant to the dependent variables. This could be achieved through the development of a stakeholder engagement plan, a prototype of which is presented at the conclusion of the article.

Keywords: Sustainable Living, Livelihood Assets, Riverine Elderly, Sustainable Community, Sustainable Development Goals

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Introduction

The Sustainable Development Goals (SDGs) established by the United Nations in 2015 (United Nations, n.d.) include 17 goals that serve as guidelines for nations to achieve by 2030. The SDGs are structured around the 5 Ps of sustainability: People, Planet, Prosperity, Peace, and Partnerships. Their mission is to create a resilient world that is inclusive, equal, fair, sustainable, and environmentally friendly for everyone. The year 2015 marked a significant shift toward multilateralism. Other major agreements from that year include the Sendai Framework for Disaster Risk Reduction, the Addis Ababa Action Agenda on Financing for Development, and the Paris Agreement on Climate Change. The SDGs 2030 agenda call for global partnerships from all United Nations countries to address issues ranging from poverty, hunger, and people's well-being, to education, gender equality, clean water, clean energy, economic growth, innovation, reduced inequalities, sustainable communities, responsible consumption, climate action, life below water, life on land, peace and justice, and global partnerships. In this context, Sustainable Development Goal Number 11 aims to build sustainable cities that are inclusive, safe, resilient, and sustainable by providing safe housing, affordable transportation, sustainable urbanization, protecting cultural and natural heritage, reducing the effects of natural disasters and the impacts of cities, and paying special attention to waste management, holistic disaster risk management, and building resilient structures using local materials.

Correspondingly, Sustainable Livelihoods recognizes the importance of individuals' ability to cope with and respond to stresses and shocks from economic, social, environmental, and disaster-related factors. In other words, a livelihood is considered sustainable "when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining natural resource bases" (ESCWA, 2022). The World Meteorological Organization (WMO) has revealed that climate change has materialized and is causing a harmful effect worldwide. The increase in global surface temperature has caused weather abnormalities, initiated more droughts and increased storm intensity. Water-related disasters have increased significantly during the past 50 years. Certain parts of the world had experienced heavier precipitation as the world temperature grew higher. More heat in the atmosphere had led the ocean surface temperature to rise and increase wind speeds in tropical storm which moved to the inland. Storms cause river flooding, coastal flooding, flash floods, and even urban flooding which is a result of prolonged rains or sudden snowmelt. Some of the most recurrence natural disasters in Thailand documented by The National Disaster Risk Management Plan (2015) and the

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Thailand Disaster Management Reference Handbook (2022) are floods, drought, landslide, earthquake and Tsunami, storm, forest fire, and contagious disease. Another data from the Climate Change Knowledge Portal shows that 'flood' is the number one natural hazard in Thailand in between 1980 to 2020, in particularly from the 2015 onwards. Contextually, this research examines the sustainable livelihoods of riverine elderly individuals, who are particularly vulnerable to economic losses caused by floods. Statistically, recent research shows that Thailand ranked among the top ten countries affected by disasters, losing over 45.46 billion US dollars from the 2011 flood alone. Floods can be deadly as they often come with little to no warning. Their speed can be either gradual or sudden. Floods in Thailand are typically caused by torrential downpours. Flash floods and overbank flow are common, resulting in many fatalities and significant economic losses. These floods are most frequent during the monsoon season, from May to September. Flooding along rivers is common and can be difficult to manage. For instance, in 2021, Lamphaya Subdistrict Municipality experienced a prolonged flood when the water levels of the Tha Chin River rose over one meter and remained high for weeks. Among the 1,958 residents, approximately 18.54 percent were vulnerable individuals aged 60 and above.

Lamphaya Subdistrict Municipality allies its natural disaster prevention and mitigation plan with Nakon Pathom Natural Disaster Prevention and Mitigation Plan B.E. 2564-2570. Following the National Plan, the provincial plan's concept of operations stressed on Awareness-Adaptation-Recovery under resilience framework. Provincial collaboration is with Sook Sala Nukror Foundation, Pranpitaks Foundation, Po Tek Tung Foundation, Ruam Katan Yoo Foundation, and Luang Por Som Wang Wat Klang Bang Pra Disaster Relief Foundation (p.33). The emergency plan stated that all governmental units are required to provide mandatory equipments, support, service, and resources to the fore fronts. The units are to coorporate locally and internationally, and to receive international aid when the serverity reach level 4-critically damging disaster. Nakon Pathom Natural Disaster Prevention and Mitigation Plan B.E. 2564-2570 listed Banglen District as a high-risk area for flood. Therefore, the reponsible agencies must: 1) conduct statistical database to analyse high-risk areas; 2) establish functioal warning system, 3) find the root cause of the disaster; and 4) study impact mitigation in order to formulate effective disaster management regulation. On an operational level, the associate bodies must: 1) build floodwall around the embankments; 2) drill groundwater well; 3) build water drainpipes; 4) establish flood prevention system in the community; 5) build water-control gate; and 6) develop water sources. Other than that, it must create awareness, intitiate effective water planning systems, and establish

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training programs for the community. Moreover, relocation, zoning, and city planning are critical factors which mitigate impacts from natural disasters. Thailand has attained the status of an ageing society. By 2025 and 2040, Thailand is projected to transform into an aged and super-aged society. Therefore, it is crucial to develop support for these communities (Wongboonsin et. al., 2020).

The Disaster Prevention and Mitigation Act B.E. 2550 (2007) and its six subsidiary rules directly address "Flood." Other related laws include the Royal Decree on Provision of Financial Assistance to People Affected By Flood B.E. 2555 (2012), the State Irrigation Act B.E. 2485 (1942), and the Navigation in Thai Waters Act B.E. 2456 (1913) (p. 49). The Thailand Disaster Management Reference Handbook (2022) states that the country's disaster management system consists of both an operational and policy level. The Prime Minister of the nation chairs the National Disaster Prevention and Mitigation Committee, which collaborates with the Department of Disaster Prevention and Mitigation (DDPM) at the policy level. Operationally, the Bangkok Metropolitan Disaster Management Center, the District Disaster Management Center, the Pattaya City Disaster Management Center, the Municipal Disaster Management Center, the Subdistrict Administrative Organization Disaster Management Center, the Central Disaster Management Center, the Provincial Disaster Management Centers, and the National Disaster Command Headquaters (p. 25).

The livelihood assets are part of the sustainable livelihood framework, which highlights the main factors affecting people's livelihoods. "A livelihood comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. While livelihoods are the means of living, well-being is part of the mandatory elements that “set the stage for sustainability, resilience, and adaptability of people to change” (Kofina and Chapin (2009), p.57). Livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource (NR) base" (NCL, n.d.).

Research Objectives

The main research questions are:

1. Do ‘livelihood assets’ (natural, human, financial, physical, and social) affect the level of well-being of riverine elderly?

2. What measures can be used to increase the well-being of riverine elderly?

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Research Methodology

The research adopted a quantitative design method. The data for this study were collected from respondents in Nakhon Pathom, Thailand. The subdistrict municipality (the most updated data as of 2016 publishhed in 2022) has 589 households with a population of 1,958 people, comprising 947 males and 1,038 females. Out of 947 males, 145 are aged 60 years and above. Out of 1,038 females, 218 are aged 60 years and above. The total population of individuals aged 60 and over is 363 people. Therefore, using Krejcie & Morgan's (1970) method, the population sample for 363 individuals, with a confidence level of 95%, is 186 people. The research employs a non-probability sampling method to collect data from the residents of Lamphaya Subdistrict Municipality. Convenience sampling was used to select participants who were easily accessible, and data were collected through survey. This method was chosen due to the nature of the study, which required access to participants who meet specific criteria and were readily available or willing to participate. It uses Mean, Standard Deviation, and Regression Analysis methods. Independent variables are based on research studying livelihood assets, while the dependent variable is elderly well-being, derived from documentary interpretation incorporating the study of concepts, theories, and research related to the topic.

The questionnaires went through a validity and reliability testing process. First, the questionnaires were presented to the IOC committee, and the Index of Item-Objective Congruence (IOC) was used to assess content validity (IOC = $\sum R/N$). In this process, the questionnaire was reviewed by three experts in the field. The Item-Objective Congruence (IOC) was used to evaluate the items of the questionnaire, with scores ranging from -1 to +1. Items scoring lower than 0.5 were revised, while items scoring 0.5 or higher were retained. Afterward, a try-out was performed with 30 participants using Cronbach's Alpha, which is a reliability coefficient that measures the internal consistency and reliability of the items. In other words, it assesses whether the responses collected are reliable and consistent. A score of more than 0.70 is considered 'acceptable,' and a score of 0.90 or higher is considered 'excellent.

Based on extensive literature review such as from Tan, Wong, and Abdullah (2020), these authors quoted livelihood as a mean of living far beyond the notion of simply having a job for earning a living as it encompasses not only income, social relations and property rights but also access to, and benefits derived from social and public services such as water supply, education, and health services (Ellis, 1998 ed. Tan, Wong, & Abdullah, 2020, p.2). Riverine communities was defined as the community that live around the river basin where people sustain their living related to

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water activities. The economic activities include aquacultue, animal husbandry, and small-medium enterprise. Many also work as labourers in ocnstruction manufactoring and service industries in the same area and nearby town. Therefore, in this research, the five capital assets and its definition include:

1.1. Natural Capital

Natural capital refers to the natural resources which include land and soil, marine, wildlife, biodiversity, air quality, waste disposal, storm protection, food production, carbon storage, and other environmental resources. Therefore, the first hypothesis was proposed as

1.2. Human Capital

Human capital refers to health, nutrition, education, knowledge, skills, information, and ability to labour. Human capital can be developed directly or indirectly. Therefore, the first hypothesis was proposed as

1.3. Financial Capital

Financial capital is the financial resources available such as credit supplies, pensions, income, savings, debt, and remittances. The third hypothesis was proposed as:

1.4. Physical Capital

Physical capital is the basic infrastructure such as water supply, energy, transport, communication, housing, shelter, vehicles, road, equipment, tools, and technology. Relatively, the fourth hypothesis was proposed as

1.5. Social Capital

Social capital refers to social resources such as network, membership, relationship of groups, shared values, common rules, leadership, and trusts. Therefore, the fifth hypothesis was proposed as: The dependent variable in this study is the level of well-being in riverine elderly concerning the Economy, Social, Personal, Physical, Spiritual, and psychological aspect. The research framework, therefore, can be illustrated as follows:

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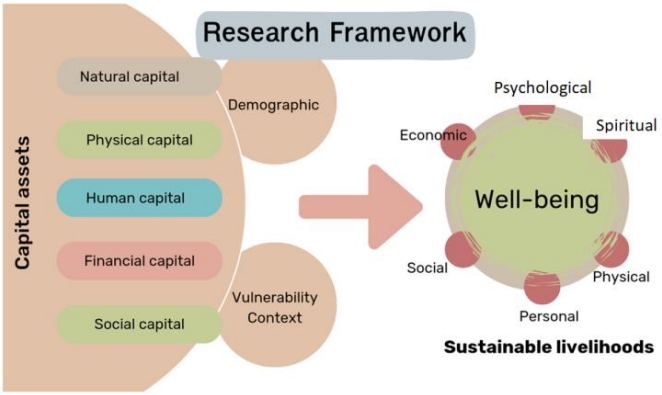

Figure 1: Research Framework

Research Results

The following table shows that 60.8 percent of the respondents are female. Over 50.5 percent are single, 30.1 percent received Grade 1 to Grade 6 level of education, 33.9 percent are freelance, 32.8 percent received a monthly income of 15,001-20,000 Baht, and 46.8 percent experience at least 1 disaster per year.

Table 1 Demographic characteristics of sample (*N* = 186).

Personal factor		**Number**	**Percentage**
Gender	Male	73	39.2
	Female	113	60.8
Marital status	Single	94	50.5
	Married	48	25.8
	Divorced/Widowed/Separated	44	23.7
Education level	No education	23	12.4
	Grade 1-6	56	30.1
	Grade 7-12	52	28.0
	Vocational education	23	12.4
	Diploma	28	15.1

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Personal factor		**Number**	**Percentage**
	Higher education and over	4	2.2
Occupation	Unemployed	12	6.5
	Farming	19	10.2
	Business owner	57	30.6
	Freelance	63	33.9
	Government officer/ government pensioner	23	12.4
	Others	12	6.5
Monthly income	Less than 5,000 Baht	28	15.1
	5,001-10,000 Baht	45	24.2
	10,001-15,000 Baht	43	23.1
	15,001-20,000 Baht	61	32.8
	20,001 and over	9	4.8
Frequency of natural disaster per year	0time per year	83	44.6
	1time per year	87	46.8
	2times per year	10	5.4
	More than 3 times per year	6	3.2

* 1 THB = 0.028 USD

Using Mean and Standard Deviation, it was found that the overall opinion towards sustainable livelihoods is High with a mean of 3.52 and Standard Deviation of .2959. By aspect, it was found that natural capital rank the first out of five capitals with a mean of 3.80, followed by human capital with a mean of 3.76, social capital with a mean of 3.71, physical capital with a mean of 3.22, and financial capital with a mean of 3.09. The level of opinions in the three aspects which are natural capital,

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human capital, and social capital are High, and the other two aspects which are physical capital and financial capital are Moderate.

Table 2 Mean and Standard Deviation of Sustainable Livelihoods (N = 186).

Sustainable Livelihood	Level of opinion			
	$\bar{X}$	S.D	Descriptive equivalent	Rank
Natural capital	3.80	.4181	High	1
Human capital	3.76	.4683	High	2
Financial capital	3.09	.7855	Moderate	5
Physical capital	3.22	.6183	Moderate	4
Social capital	3.71	.2959	High	3
Total	3.52	.2959	High	

The result shows that the level of elderly well-being is at a High level. By aspect, it was found that 'You have support from friends and neighbours' and 'You are satisfy with your life and you have positive outlook towards your future' are at the Highest at a mean of 4.26; followed by 'You have no debt' and 'You have freedom to live and to vote' with a mean of 4.04; and 'You have a healthy physical health' and 'You have a healthy mental health' with a mean of 3.94. All aspects are at a High level except the first two which are 'You have support from friends and neighbours' and 'You are satisfy with your life and you have positive outlook towards your future'

In terms of Natural Capital, it was found that the respondents have high Natural Capital with a mean of 3.80. By aspect, it was found that "You have effective waste management method" and "You encounter natural disaster frequently" are High with a mean of 3.88. This is followed by "You have access to clean water all the time" and "You have access to fresh air all the time" with a mean of 3.80 and 3.67. Human Capital is also High. By aspect, it was found that „Your physical health is not a barrier to your daily routines and work" rank the highest with a mean of 3.88, followed by "You have access to technology for lifelong learning" with a mean of 3.80, and "You regularly share your knowledge and skills with the community" with a mean of 3.71, and "You have enough knowledge and skills for work" with a mean of 3.67. Opinions towards each of these aspects are High. On the other hand, Financial Capital is

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Moderate with a mean of 3.09. By aspect, it was found that “You have enough income to sustain a healthy living” is at Moderate with a mean of 3.32, followed by “The government has implemented supportive financial regulation” at Moderate with a mean of 3.31, “You have effective financial management” at Moderate with a mean of 3.18, and “You have overdue loans” at Low with a mean of 2.56. Physical capital is also at a Moderate level with a mean of 3.22. By aspect, it was found that “You own and live in your own property” is the highest out of the four aspects at 3.38, followed by “You can commute easily using public transportation in the community” at 3.34, “You have access to up-to-date communication technology at 3.14, and “You have access to clean energy” at 3.02. All aspects are at a Moderate level. Lastly, social capital is at a High level with a mean of 3.71. By aspect, it was found that “You live in a highly networked community” is at the highest with a mean of 3.82, followed by “You live in a harmonious community” at 3.82, “You can easily contact other members in the community” at 3.67, and “You feel a sense of belongingness in the community” at 3.65. All aspects are at a High level.

Table 3 Level of Elderly well-being

Well-being	Level of opinion			
	$\bar{X}$	S.D.	Descriptive Equivalent	Rank
You have healthy physical health	3.94	.642	High	3
You have healthy mental health	3.94	.710	High	3
You have freedom to live and to vote	4.04	.539	High	2
You have support from friends and neighbors	4.26	.664	Highest	1
You have no debt	4.04	.539	High	2
You are satisfy with your life and you have positive outlook towards your future	4.26	.664	Highest	1
Total	4.07	.427	High	

Multiple linear regression was used to test if ‘natural capital’, ‘human capital’, ‘financial capital’, ‘physical capital’, and ‘social capital’ significantly predict the success

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of the elderly well-being. The result shows that the independent variables were able to account for 35.9 percent of the variance in the level of elderly well-being. At the level of significance of 0.05, 'social capital' was able to account for 64.6 percent (p value = 0.000), followed by 'natural capital' at 37.5 percent (p value = 0.031), 'physical capital' at 20.1 percent (p value = 0.001), 'financial capital' at 16.9 percent (p value = 0.009), and 'human capital' at 14.6 percent (p value = 0.390) which was considered not statistically significant at 0.05 (no effect was observed). A predictor coefficient equation is calculated to predict changes in the level of elderly well-being as follows:

$$y = 1.894 + (0.386x_1) + (0.134x_2) + (0.093x_3) + (0.140x_4) + (0.518x_5)$$

The result shows the independent variables which show a positive coefficient with the level of elderly well-being (y) at a significant level of 0.05 are 'social capital' (x_5), 'natural capital' (x_1), 'physical capital' (x_4), and 'financial capital' (x_3) with the coefficient values of .646, .375, .201, and .169 consecutively. This indicates that 'social capital', 'natural capital', 'physical capital', and 'financial capital' are factors which predict the outcome of the response variable, in this case, the level of elderly well-being.

Table 4 Hypothesis testing in Multiple Regression Model

Sustainable Livelihood	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
Natural capital	.386	.178	.375	2.173	0.031
Human capital	.134	.156	.146	.863	0.390
Financial capital	.093	.035	.169	2.643	0.009
Physical capital	.140	.043	.201	.3232	0.001
Social capital	.518	.054	.646	9.526	0.000
)Constant(	1.894	.373		5.084	0.000
R = $.614^a$, R^2 = .376, $R^2_{Adjusted}$ = .359, Sig = .344					

Discussion

The data revealed that the majority of elderly individuals living in Lamphaya Subdistrict Municipality were affected by natural disasters at least once per month.

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Specifically, 46.8% reported being affected by floods, 5.4% experienced flooding at least twice a year, and 3.2% were affected by floods more than three times annually. This finding aligns with statistics from the World Bank Climate Change Portal, which confirms that floods have primarily impacted the Thai population, especially since 2015 (Climate Change Portal, 2021). It is likely that the 44.6% of respondents who reported not being affected by floods live in areas not directly adjacent to the Tha Chin River or nearby canals. Additionally, only 15.1% of respondents reported having a monthly income of less than 5,000 baht. These findings are consistent with the data presented in Table 4.5, which shows that the respondents generally had a moderate level of financial capital and a low level of overdue loans.

The result shows that the people of Lamphaya Subdistrict Municipality have high sustainable livelihood on the overall. They have high Natural capital, human capital, and social capital and moderate financial capital and physical capital. Ibrahim, Kamandruddin, Hassan, and Anuar (2017) studied the livelihood assets among the vulnerables in Malaysia of which the result interpreted that the physical asset, the natural asset, and the social asset are significant factors related to the achievement of sustainable livelihoods. These ‘natural capital’ concerned access to clean water, land, and plants variety. Research from Azumah, Muchwa, and Charles (2023) showed that natural capital is a significant livelihood asset to smallholders farmers. Nonetheless, the amount of natural capital in the area had reduced consecutively over time. In this study, 10.2% of the population is engaged in farming. This finding correlates with a study by Tan, Wong, and Abdullah (2020), which suggests that despite Lumphaya District being largely composed of paddy farms, youth, in particular, appear to show less interest in the farming sector. This shift may be attributed to improved road infrastructure, better transportation, and enhanced educational opportunities, which have encouraged young people to seek employment outside the community. Despite this trend, it was found that 'natural capital' was still considered highly important, with the highest mean scores for the statements: "You encounter natural disasters frequently," "You have an effective waste management method," "You have access to clean water all the time," and "You have access to fresh air all the time." The data from the statement "You encounter natural disasters frequently" supports findings in the personal factors section, which indicated that the majority of the Lumphaya community experiences flooding at least once per year.

The people of Lumphaya Municipality have high Human Capital, particularly in relation to the statement "Your physical health is not a barrier to your daily routine and work," followed by "You have access to technology for lifelong learning," "You

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regularly share your knowledge and skills with the community," and "You have access to technology for lifelong learning." A study by Ahmadpour, Alibani, and Shahraki (2020) on factors affecting the sustainable livelihoods of female household heads who are clients of microcredit funds in rural areas (Case Study: Ghaemshahr County, Iran) explored the importance of sustainable livelihoods in the region. Similarly to this research, it found that human capital is a key component of rural livelihoods, along with economic, social, personality, physical, natural, educational, support/services, gender-related, cultural, occupational, and personal factors. In addition to the five livelihood assets, the authors identified educational, support/service, gender-related, cultural, occupational, and personal factors as independent variables. "Educational" refers to knowledge of microcredit activities, access to learning services, the use of modern agricultural technology, social media usage, workshop participation, and training. "Support and service" pertains to family and government support, financial institution assistance, family cooperation in creating new job opportunities, and business start-ups. "Gender-related" factors include women's roles in agricultural activities, their status in the workforce, attitudes towards women as household heads, and social and cultural beliefs regarding women. "Cultural" encompasses ethnic diversity, cultural exchanges with other villages, and access to media. "Occupational" includes membership experience, primary and secondary jobs, and farming experience. Finally, "Personal" factors involve age, education, the number of educated household members, the number of dependents, and the number of working household members.

In contrast to the findings regarding 'natural capital' and 'human capital,' the research revealed that the Lumphaya Municipality community have moderate 'financial capital'. The statement "You have enough income to sustain a healthy living" was ranked highest, followed by "The government has implemented supportive financial regulations" and "You have overdue loans." A study by Azumah, Muchwa, and Charles found that financial capital is one of the livelihood assets that has diminished over time due to a decline in natural capital, particularly because the population in the study area was predominantly composed of farmers. Complementarily, the earlier section of this research had demonstrated that only 15.1% of respondents reported earning less than 5,000 Baht per month, while the majority earned between 15,001 and 20,000 Baht per month. This income range may be sufficient for living if the elderly have no outstanding debts or additional expenses.

Lumphaya Municipality community have moderate‘Physical capital’. ‘You own and live in your own property’ in ranked the highest, followed by ‘You can commute

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easily using public transportation in the community', 'You have access to up-to-date communication technology', and 'You have access to clean energy.' Research from Afifah, Sumadio, and Rustanto (2021) explained that physical assets are such as state of the house, accessibility, transportation, and distance from economic center. Research by Tan, Wong, and Abdullah (2020) concluded that physical asset is one of the most important livelihood assets in the study of Sustainable Livelihood Strategies of the Riverine Communities at Sadong Jaya, Sarawak, Malaysia. Moreover, that the basic physical and educational amenities were essential to sustainable livelihoods of the riverine community. Therefore, future policy must incorporate these factors to ensure better standards of living

Lumphaya Municipality community have high 'Social Capital'. People who lived along Tha Chin River in Lumphaya Municipality are those who inherited lands from over generations and many of the people in the community had known each other for generations, therefore, they are closely knitted community. The research showed 'You live in a highly networked community' was ranked the highest, followed by 'You live in a harmonious community', 'You can easily contact other members in the community', and 'You feel a sense of belongingness in the community. Ibrahim, Kamanruddin, Hassan, and Anuar (2017) examined the livelihood assets among the vulnerability groups in Malaysia and found social capital, in addition to natural capital, is labeled as the most important livelihood assets. It also found that to increase individual's capability, social assets must be enhanced through social relations and interactions of parties in the community.

The overall level of elderly well-being is High, with 4 aspects being High and 2 aspects being the highest. The questionnaire is constructed to correspond to each of the 6 aspects which are the Economic, Social, Personal, Physical, Spiritual, and Psychological. The surveyed showed that the respondents have high physical health, high psychological health, high economic well-being, high personal well-being, and highest social well-being, and highest spiritual well-being. In this section, the result showed that the independent variables which show a positive coefficient with the level of elderly well-being (y) at a significant level of 0.05 are 'social capital' ($\boldsymbol{x_5}$), 'natural capital' ($\boldsymbol{x_1}$), 'physical capital' ($\boldsymbol{x_4}$), and 'financial capital' $\boldsymbol{x_3}$) with the coefficient values of .646, .375, .201, and .169 consecutively. This indicates that 'social capital', 'natural capital', 'physical capital', and 'financial capital' are factors which predict the outcome of the response variable, in this case, the level of elderly well-being. In alignment with the literature reviewed by Kofina and Chapin (2009), the article emphasized that social processes play a significant role in shaping the dynamics of

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social-ecological responses to change. “Well-being, or the quality of life, is more than just human health and wealth. In the context of ecosystem stewardship and sustainability, well-being also encompasses happiness, a sense of control over one’s fate, and community capacity” (p. 55). Wiliyanarti et al. (2020) conducted a study on the indicators and index of elderly well-being to support the development of age-friendly cities. The research, which involved 400 respondents selected through multistage random sampling, found that social environment, health services, physical well-being, psychological well-being, social well-being, and spiritual well-being are key indicators driving programs aimed at improving the prosperity and meaningfulness of elderly lives. The study suggested that “social changes experienced by the elderly are closely related to the physical and cognitive changes they undergo” (p. 24). Ibrahim, Kamanruddin, Hassan, and Anuar (2017) examined livelihood assets among vulnerable groups in Malaysia. The study found that, to enhance an individual’s capabilities, social assets must be strengthened through social relations and interactions within the community. Consistent with this finding, the present research also identified 'natural assets' and 'social assets' as critical factors that enhance the well-being of vulnerable groups. Our results show that, at a significance level of 0.05, 'social capital' accounted for 64.6% of the variance (p-value = 0.000), followed by 'natural capital' at 37.5% (p-value = 0.031).

Additionally, Ahmadpour, Alibani, and Shahraki (2020) examined the factors affecting the sustainable livelihood of female household heads who are clients of microcredit funds in rural areas (Case Study: Ghaemshahr County). The study found that the 'economic' factor, with a coefficient value of 0.344, positively impacted women's sustainable livelihoods at a 99% confidence level. Similarly, in this research, 'financial capital' was also found to have a significant impact on the livelihoods of women. 'Physical capital,' with a coefficient value of 0.201, was identified as a factor that predicts the level of elderly well-being. In line with Tan, Wong, and Abdullah (2020), the study found that infrastructure, such as roads and bridges, water supply, drainage systems, water gates, and educational facilities, enables riverine communities to expand and diversify economic activities, increase job and market opportunities, and encourage out-migration to cities and abroad. The study concluded that basic physical and educational amenities are essential for the sustainable livelihoods of riverine communities. Therefore, future policies should incorporate these factors to improve living standards.

Unlike Kasim's (2019) research, which studied the impact of livelihood assets on the well-being of rural households and found that 'human assets' affect rural

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household well-being, this study found that human capital is not a predictor of elderly well-being in the Tha Chin Riverine community. This finding corresponds with Ibrahim, Kamanruddin, Hassan, and Anuar (2017), who also found no significant relationship between human assets and livelihood outcomes. Human capital refers to job-related abilities and skills, and it is presumed that these skills may be less relevant to the well-being of the riverine elderly, who are less engaged in the workforce at an older population group.

Conclusions

To answer the first research question: Do 'livelihood assets' (natural, human, financial, physical, and social) influence the level of well-being of riverine elderly? The results revealed that only four of the five aspects can predict the well-being of the riverine elderly. The independent variables that show a positive coefficient with the level of elderly well-being, at a significance level of 0.05, are 'social capital' (x_5), 'natural capital' (x_1), 'physical capital' (x_4), and 'financial capital' (x_3), with coefficient values of 0.646, 0.375, 0.201, and 0.169, respectively. This indicates that 'social capital,' 'natural capital,' 'physical capital,' and 'financial capital' are factors that predict the outcome of the response variable, in this case, the level of elderly well-being. 'Human capital' is not a predictor of the well-being of riverine elderly.

To answer the second research question: What measures can be used to increase the well-being of riverine elderly? It is concluded that promoting natural capital, social capital, financial capital, and physical capital is essential to maintain or enhance the well-being of the riverine elderly. The promotion of wooded areas, meadows, commercial plants, and paddy fields, which are crucial to local paddy farmers, should also be promoted to preserve the authenticity of the area. To protect the well-being of the elderly and enhance their resilience, the government should implement policies that prepare the community for the frequent natural disasters in the area. As stated by Guo, Xia, and Xu (2023), "When an individual's livelihood can cope with and recover from shocks, while maintaining or enhancing capabilities and assets to meet current needs and benefit future generations, without undermining the natural and social resource base, it is sustainable." We must also encourage the strengthening of social capital, as networking is vital for communication and information exchange, which are key to the mental and physical well-being of the elderly.

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Recommendations

1. Further qualitative research is needed to explore why human capital does not serve as a predictor of the well-being of the riverine elderly. A mixed-method research is recommend.

2. Some areas of government policies are advised as followed: To protect and restore Natural Capital government policies should consider community-based watershed to reduce environmental degradation and enhance disaster risk reduction efforts through early warning infrastructure, and secure access to clean water and air by promoting green infrastructure. Social capital can be promoted through community-based network especially among the elderly. Intergenerational program can be introduced to encourage knowledge sharing such as knowledge on agricultural from elder generation to another. Moreover, the local government policies should focus on strengthening financial capital by introducing targeted income support schemes and encourage community-based savings group while promoting financial literacy program. Furthermore, physical capital, particularly in terms of transportation, should be enhanced, as it is essential for development. Overall, the local government should consider the following: adopt the WHO aged-friendly cities framework, invest in aged-friendly infrastructure, and encourage active aging program, all of which to promote the better well-being of these elderly. To help existing farmers, the government could support floating gardens, introduce flood-tolerant crop varieties, support agroecological flood control systems such as introducing farming buffer zone to protect crops and fields.

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