



Aging and Environment in Role of Rural Older Adults

P. Iamtrakul* and S. Chayphong

Abstract— Many countries are entering the aging society which is considered a significant population structure change. This aggravating situation challenges for a sustainable solution, particularly understanding the context of the city which could help for suitable recommendations about the elderly care with different forms and patterns of the built environment inaccurate identification and correct understanding. Therefore, this article focuses on rural older adults by conducting the site investigation together with a questionnaire survey of the total 1,200 homes of older people and was investigated at Ban Phaeo district of Samutsakorn Province, Thailand. The results showed there are different characteristics in each community under the context of 4 dimensions: 1) housing characteristics; 2) transportation; 3) public facilities; and 4) social and economic. With different unique characteristics of elderly houses, especially, social, economic, transportation, and housing aspects which allow a variety level of living conditions and access depending on accessibility and the affordability for basic social services. The provision of a suitable environment has become the key issues to provide solutions for effective interventions to support rural healthy aging according to the specific needs of communities.

Keywords— Environment for aging, older adults, aging friendly, rural.

1. INTRODUCTION

Thailand will have 20 million elderly people (aged 60 and over) and about one third of the population [1]. Increased longevity and life expectancy have brought changes in the epidemiological profile of the population, with an increase in the prevalence of non-transmissible chronic degenerative diseases, falls, and functional disability, such as reduced muscle strength and body balance [2]. The increasing life expectancy combined with declining birth rates has caused many concerns about the impact of an aging population. The consideration must be paid to the future generations that will struggle to meet and brings effect in many dimensions. The situation of the rising trend of the elderly is an important issue in the planning of urban ecological systems and the urban environment to support the livelihood of the elderly group of people within the community, moreover the development challenges requiring multiple components. In particular, the integration of planning with the environment needs to be prepared for the built environment and technology adaptation providing to the users that need to have an appropriate and consistent planning with the need of users and form of built environment of the city. As such, to create good health care behaviors and prevent disease-causing behaviors of the elderly together with promoting the elderly to look after and be self-reliant at home by developing an environment that is conducive to self-

living of the elderly.

By creating a framework for urban development to facilitate the livelihood of the elderly is very important in order to meet the aging society and upgrade to a sustainable senior society by using clear policy push integrated with the application of modern innovation, to smartly accept the aging society. This will be step towards becoming an aging, sustainable, integrated society, innovation, in response to the vision of Thailand 4.0 which focuses on the development of an innovative economy to achieve creating an environment for an aging society. Therefore, essential to point out examples of management for adaptation in the context of the area, especially in rural areas. The study attempted to assess the cases of aging group of Samutsakhon province, Thailand which could be representative of the aforementioned situation. When considering the trend of the study area with its demographics change, it was found that the elderly population in Samutsakhon province during 2015 - 2030, has an aging index of 129.92 percent. Sooner, it will become a completely elderly society in 2025 and will increase by another 53.25 percentage in the year 2030. Furthermore, the situation is in the decline stage due to lacking elderly plans to support the aged group both public services and infrastructures together with unemployment situation, high cost of living and the environmental quality problem that are deteriorating from industry sectors in the study area [3].

Therefore, this article focuses on the study of aging and environment in role of rural older adults for the recommendation to create an appropriate environment that is conducive to the elderly living in the context of rural communities. This is due to the reason that it is critical to understand the experiences and social values by rural older adults to be adapted with built

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environmental planning and development.

2. LITERATURE

2.1 Environment Context

Health and well-being are not only determined by our genes and personal characteristics but also by the environment into which we are born and live throughout the life course. An essential environment belonging to the built environment is strongly influence on the quality of life older people in the neighborhood [4]. The condition of the elderly who still have problems in both economy and society environment that lead to the relationship between ageing and morbidity, mortality, disability, perceived quality of life and health expenditures [5]-[6]. The built environment is not only related to health through physical activity, it is also connected to health through other aspects: falls, pollution, social interaction, safety, economical and climate issues [7]-[8]. The elderly requires an environment with special facilities and services that respond to changes in body and society as they age. The development of an elderly-friendly city is therefore important in promoting good quality of life, potential, independence, and economic participation which will lead to sustainability in the development of elderly-friendly cities with 3 main components and divided into 8 points [9] as follows;

1. Built environments that affect living outside home safety and participation in society include housing, transportation, and outdoor spaces and building.
2. Social environment elements reflect good minds and emotions that are social participation, respect and social inclusion and civic participation and employment.
3. Community and health support consists of sanitation and social services that involve community support/health services and communication/information.

Therefore, it requires for suitable guidelines for taking care of the elderly to have a good quality of life which must be able to live enthusiastically with their family in the community. These must be incorporated and promoted to have access to various services which is necessary for living both health, economic, social and environmental appropriately. It is important to ensure communities and regions that experience noticeable population aging are prepared and adequately resourced to provide older people with adequate accessibility to the services they need.

2.2 Aging in Rural Area

Aging and old age period is characterized by the intensification of changes to the person's physical state. Urban/rural differences in the proportion of people are that divide different ability in access to essential services, particularly sanitation [10]. The differences in classification of the city from the village can be indicated differences in professions, natural environment, size of community, population density, homogeneity and heterogeneity of inhabitants, social diversity and stratification, spatial mobility and social activity as well

as differences in the nature of social relations [11]. People living in the outskirts areas also face greater difficulties in accessing health and social care services [12]. The remote areas have been at a disadvantage in terms of opportunities for economic development and prosperity that population in this group seeking opportunities for employment in the cities rather than job creation in farther areas. This situation has resulted in many houses left for only the elderly and children living since working people need to travel to the city areas to find job opportunities. The rural area with current access may not sufficiency provide to correspond the needed services for older people who have lived, worked; consequently, they aged in rural areas at risk compared to those living in urban areas. Moreover, it will be considered more serious when focusing on lower-income or poverty, low wages, poor working conditions, lack of health facilities which often scattering in rural areas. This differences in socioeconomic background can also have different needs that require different services, for example, in terms of leisure activities in rural areas, lack of facilities, lack of access to information [13]-[14]. More consideration should be put to improve medi-care for the aged in rural area and establish a medical treatment subsidy system and a medical support system or provide sufficient public facility appropriately for the aged in rural areas.

3. METHOD AND STUDY AREA

3.1 Method of Study

The samples of this study were restricted to respondents living in the Ban Phaeo, Samutsakhon, Thailand. This is due to the potential of level of contribution of this site which achieve practical integration and participation of government agencies, the private sector, the education sector and local communities in the study area together with context of rural communities. Since most of community in sub districts are predominated by a natural environment with a general low density of population. When considering number of elderly people in Samutsakhon Province, it can be illustrated in percentage compared with the total population as shown in Table 1. With the lowest number in term of population, the proportion of elderlies in Ban Phaeo demonstrated the highest trend when compared to other districts.

Table 1. Number of elderly people in Samutsakhon Province, 2018

District	Total population	Number of elderlies	
		N	%
Samutsakhon	246,080	38,152	15.50
Krathum Baen	133,158	20,736	15.57
Ban Phaeo	81,025	16,614	<u>20.51</u>
Total	460,263	75,502	16.40

Source: HDC, 2018

The samples included respondents who were aged 60 years and over. The sample size was calculated according to the number of populations in Ban Phaeo district with a total population of 97,005 persons in 2017 which was determined the sample sizes by using the formula of Taro Yamane [15]. By defining the sampling error of 0.01%, finally, the minimum number of sample groups was received of 400 samples. Therefore, to cover the number of sample groups within this research, the data collection was designed to gather a total of 1,200 samples for better explanation and covering majority of rural respondents in the study area. The face to face interview was conducted together with the site investigation in an exploration of association context to elderly people. The data gathering process was supported by working closely with authorities from Ban Phaeo district of Samutsakorn Province, Thailand.

The framework of the study as depicted in Fig. 1 demonstrated the factors of study which focused on the context of rural aging environment in 4 dimensions: 1) housing characteristics; 2) transportation; 3) public facilities and 4) social and economic. By taking these factors into the analysis, the explanation about the characteristics of the urban environment could be performed through the assessment of accessibility, service area and service characteristics. The detail of analysis will be explained in the next section.

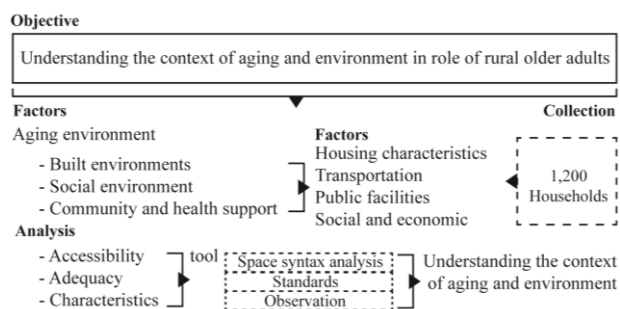


Fig.1. Framework of Study.

3.2 Study Area

When considering its spatial context and urban environment, it was obviously seen relative unplanned situation while most cities in developed countries have neighborhood environment to supports the elderly group. The study area of this study, Ban Phaeo District could be used to represent the context of a rural community which is different from another two districts in the province. The general characteristics of low-density development could be considered with particular reference to agriculture which is the basis of the livelihood of most rural families. This pattern has been causing differences in their lifestyle and social activities as well as accessibility to basic social services to life. With the terrain characteristics of lowlands, the district is divided into two parts with the Damnoen Saduak canal flowing along the east-west direction. The area is characterized by the fertility of the soil and water resources, which are linked by rivers and spread throughout the area both natural canal and man-made waterways for cultivation. The network of irrigation helps to drain water and use for

transportation purpose. It makes the area suitable for cultivating various plants and fisheries, including some coastal aquaculture, as well as industrial and residential businesses.

In addition, the settlement of Ban Phaeo is still a sparse settlement, most of which are agricultural and natural areas which are different from Krathum Baen and Mueang Samutsakhon districts (Fig.2). Both Krathum Baen district and Mueang Samut Sakhon district have been developing their economic characteristics based on prospective natural and cultural tourism as well as industrial growth. While the economic characteristics of Ban Phaeo District is mainly on agricultural development, with the context of those areas affecting the lives of the elderly in terms of access to public health services and social interaction. Their socio-economic activity has been hindered by the lack of people to maintain infrastructure and basic services since their resident population was leaving the area.

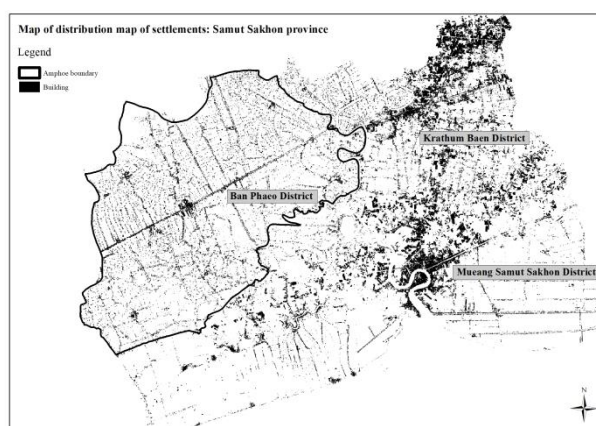


Fig. 2. Distribution of settlements in the study area.

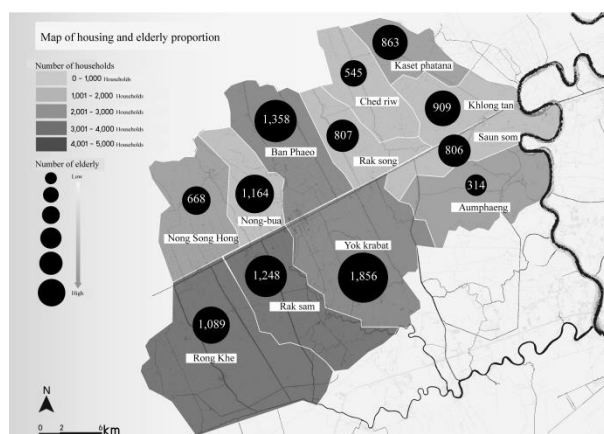


Fig. 3. Housing and elderly proportion.

Especially, when focusing on the distributed settlement in the study area (Fig. 3), it revealed that majority of aging group settled in Ban Phaeo District with approximated about 20.51% compared to others. Most of elderly prefer to stay at home and enjoy farming more than perform other social activities due to long distance and difficult in traveling. Therefore, the living environment is a must to consider for allocating of an

appropriate plan or public infrastructures/facilities that could facilitate the livelihood of the elderly in accordance with their physical, social and economic context.

4. RESULTS OF ANALYSIS

Considering of aging and environment in the role of rural older adults for the recommendation to create a supportive built environment, this study was conducted to provide an in-depth analysis approach in term of built environment analysis in the different context of rural communities in Ban Phaeo district. The detail of analysis is explained below.

4.1 Housing Characteristics

From the survey of the environment and living conditions of the elderly, it was found that the built environment and residence of the elderly in Ban Phaeo District lack a lot of proper planning for supporting the elderly's living. Due to the rural living context that is demonstrated its characteristics of low density and simple way of living. This social norm has been passed from generation to generation, living in collective manner which is familiar to most of local people in the site. Thus, the current disruptive of social changes to be living alone is one of the main obstacle for this district. Moreover, in the future, the population of the elderly will increase and will step into a complete elderly society soon. It is a must to prepare for a supportive built environmental plan to facilitate and maintain the living condition of this fragile group. By surveying the study area and analyzing the collected data, the problems of housing condition is the first priority to be taken into the consideration. This is due to some of elderly people living alone and most of them are home bound base, thus the layout and facility of housing must be provided in according with the universal design approach to accommodate the physical condition of aged group. There are many types of housing in Ban Pheo, including single houses, apartment, townhouses, including temporary residences. In the case of general residences, the most found are 1-storey residences (62.3%), followed by 2-storey residences (36.8%) and 3-storey residences (0.2%), respectively. Building material can be divided into 4 types comprising of wood (39.8%), cement (35.5%), semi-timber&semi-mortar (24.4%), gypsum (0.3%), galvanized roof/wall (0.1%). The materials of the houses depend on their affordability of community people.

- For the bathroom, there is a high risk of usage which demonstrated in several conditions such as slippery flooring, no handrails and no emergency buttons in the bathroom. However, the various elements in the bathroom includes a shower, sinks, or bathtub, all depends on the limitation of socio-economic of different houses.

- Furthermore, the housing ladder is another important risk factor that should be taken into account and the use conditions that are conducive to the limitations of the elderly's physical performance.

- In each staircase of the elderly house, in the case of

one-story houses, most of the operating conditions was deteriorated but aged people have no problem or difficulty with going up and down. In the case of two-storey houses, most stairs have steep slopes and disrepair (in some cases), including no handrails on the sides of the stairs.

- In terms of access to housing, the important point is that some elderly houses do not have direct access to road networks, only 2-3 bamboo stems lay across the canal or narrow pathways along the canal that required untypical access from neighboring areas including rowing thier boats into the house. All these cases demonstrated the elderly who are living alone and with low incomes are unable to pay for effective living facilities, particularly local transportation.

4.2 Transportation

The elderly requires an assistant in term of built environment, facilities and special services that can respond to their changes in physical health and society as they aged. Therefore, the development of a city to be friendly to the elderly lifestyle is important. Especially, in transportation and related facilities of connectivity, this has a direct effect on quality of living outside their home. The key consideration is to design to be safe and can be conveniently accessed. The built environment must be designed by contributing to the responsive physical condition with universal deliberation to limitations of the elderly condition which must have additional supporting facilities, e.g., seats for the elderly, bus calling system, etc.

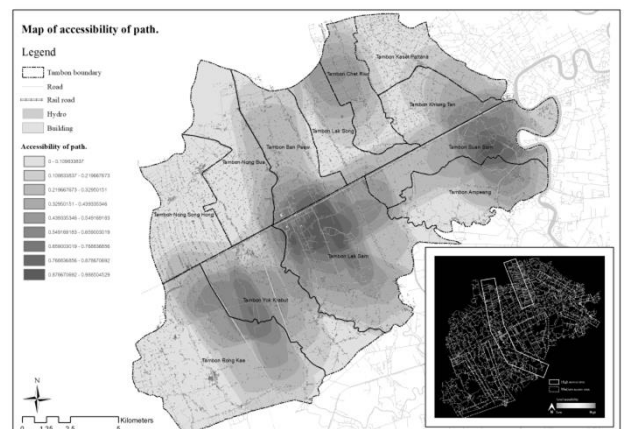


Fig. 4. Accessibility of path.

For a case of Ban Phaeo District, it was found that there are few options of travel mode which have difficult access in some areas. When considering accessibility to the study area, this study adopted the geographic information system with the space syntax analysis tool by using the axial map to demonstrate transportation networks to show the relationship of the area with the potential access based on network analysis. The most potential path was shown in different level ranging from low to high accessibility value which presents the potential routes for accessible. From the analysis in Fig.4, it was found that the routes with the highest access potential are the main and secondary roads. The route

with the least access potential is sub-roads in the area represented by the lighter grey area. Besides the analysis results correspond to the condition of the networks in the study area, the path characteristics presented complicated connectivity along natural water sources as well as several major roads in some communities demonstrated the transportation routes with the condition of unaccessible to the residences, as the path width is only a 1 meter walkway.

Therefore, in planning of the environment for an aging society, the emphasis should be placed on the comprehensive connectivity plan for all forms of the elderly due to its direct access by affecting social interaction factors and attach to the usage of basic community services, especially public health services. The mode of transportation in Ban Phaeo District is considered to be a relatively few options. By surveying, it was found that the majority of the elderly travel are non-motorization mode (21.6%), motorcycle (11.1%), private car (5.5%), and boat (1.6%). Water transportation in the residential areas along the main canal and sub-lines are popular mode and most of residents still use boats for travel as the common means of transportation. However, these modes of travel which are widely used are not conducive to the elderly's travel. Especially motorcycle taxi and boat taxi are provided with lack of safety systems for traveling.

4.3 Public facilities

When the consideration was provided for public facility, it should allow the elderly to live pleasantly in their own houses and friendly communities design while the government should responsible for facilitating the elderly to live in their communities with sufficient services such as quality hospitals, arranging social activities for the elderly, appropriate health examination. Every community must have access to public health services thoroughly and sufficient and provide appropriate service with efficient and safe level. When considering in terms of spatial use of health care services, the service radius of the hospital unit both Ban Phaeo hospital and health promotion hospitals can be seen the comprehensive coverage in all areas as depicted in Fig.5. But when focusing on traveling and accessibility issues, it can be seen that in some areas of the residence show relatively low access potential due to the unfavorable transportation routes for traveling. However, the various facilities in the government area of Ban Phaeo district has given importance to the elderly but the efficiency of the facilities usage is still under standard and unsafe for connections as it should be in neighborhood distance with friendly environment.

Besides, green spaces is another important factor for seniors. Since most cities have type of constructions that prevent the elderly from using green spaces and recreation areas. The provision of green space is considered as an important aspect of the aging city which should be suitable designed and allocated for both utilization and access to attract the elderly in daily participation. Both daily and recreation usage will help for social interaction in the neighborhood while improve mentality condition of aged group.

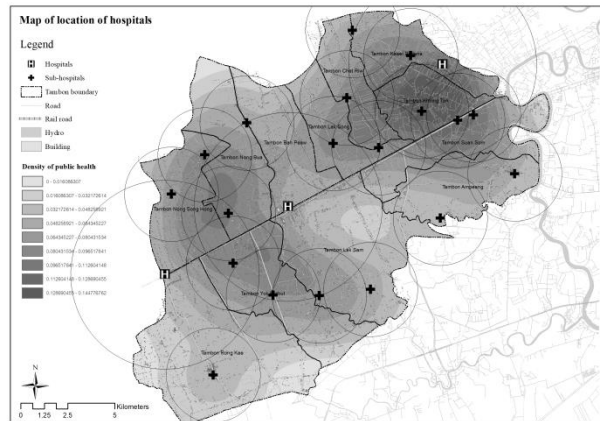


Fig. 5. Density and services areas of public health.

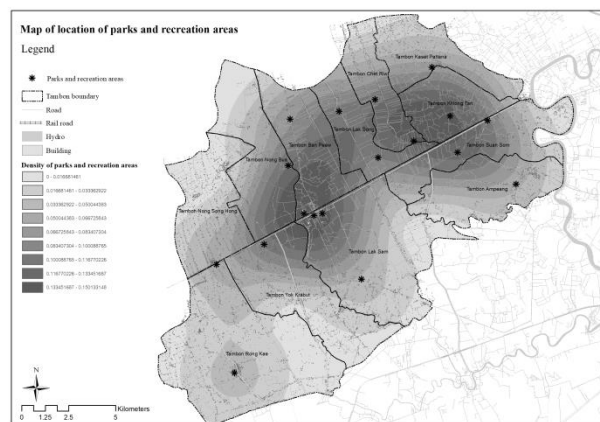


Fig. 6. Density of Public Park and Recreation Areas



Fig. 7. Recreation Areas in the Communities.

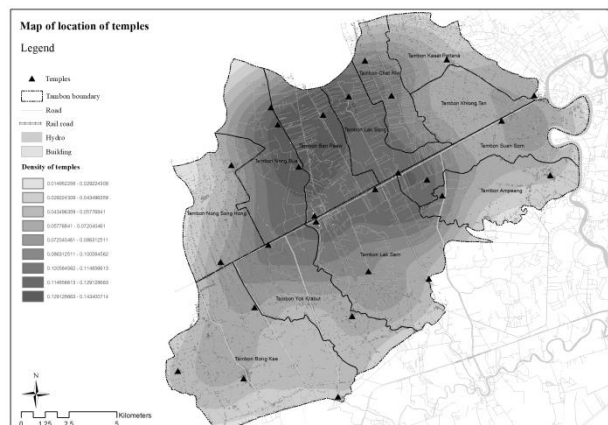


Fig. 8. Density of Temples.

However, public areas for recreational activities or exercise in Ban Phaeo District was found in unsuitable

condition for the safely access and convenient as shown in Fig.6 and Fig.7. The exercise place is located along the secondary roads that is about less than 1 meter from the roadside. Besides, most surfaces are in poor condition for walking and cycling which is a main obstacle for the elderly including deteriorating operating conditions due to the lack of maintenance.

This is also due to the facility location is far from home and the activities are not diverse and attractive. Therefore, organizing public spaces for activities and recreation is a challenge in designing and planning to be better access and more attractive for daily use with variety of activities and facilities. With this consideration, more number of aged group can reach and have changed their behavior of usage to create more healthy society. In addition to public health and recreation area. The temples are also important which is considered as a public area as depicted in Fig. 8. This is the area that provides spaces of activities for the elderly with the main activities being performed such as making merit, paying respect to monks, organizing festivals, etc. The distribution of temples are equally distributed in every district which play a key role on promoting social cohesion for community people.

4.4 Social and Economic Aspects

When considering socio-economic factor, it was shown that most of the respondents of age group in our study area is female which is in the early age group with the age range between 60-69 years. Most of them are considered to be poverty group with income less than 2,000 baht (68.8%). The majority source of income is from elderly fund and low-income fund that were supported by the government. The characteristics of majority of residential areas were in rural communities with the average household members are relatively higher than in the urban area. It presents the average number of household size of 3-5 people per household. This information reflects the limitation of access to basic services due to the relatively low ability to pay. Therefore, planning a responsive environment by considering all socio-economic group in term of social inclusive would help to promote social capital through more interaction of people in the community. The more socializing plays a key role to help stimulate the energetic environment, reducing feelings of loneliness that would help the mental state result in good health. The living conditions of the elderly were found diverse characteristics of the settlement which are related to the participation in social activities as demonstrated in Fig. 9. There are 6 characteristics of communities in Ban Phaeo District which include: 1) *Urban community*: the main activities within the area are commerce and have a variety of activities that are easily accessible, 2) *Suburban community*: characteristics of major activities within the area are agriculture and farming basis which can access by road and canal, 3) *Subcenter community*: characteristics of activities within the area are mixed residential and commercial which can access by road and canal, 4) *Rural community*: characteristics of activities within the area are residential. Social gathering spaces are located in the alley, street of the residence. 5) *Orchard community*: characteristics of activities within the area are agriculture, farming. The social meetings will be conducted within the family. 6) *Isolated community*: characteristics of activities within the area are agriculture, farming in which the settlements are located in their own agricultural areas farther from neighbors.

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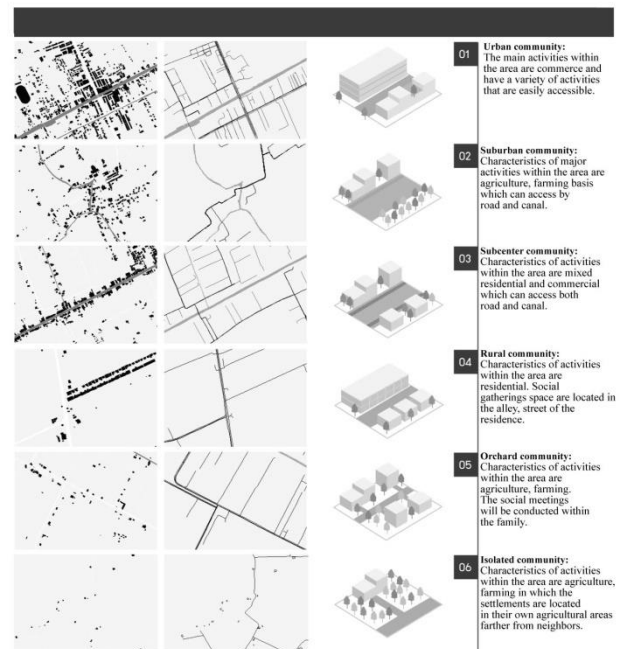


Fig. 9. Levels of Interaction of the Elderly in Different Characteristics of Community Forms.

However, in summary, by focusing on social interaction problems, it indicated that the elderly living in concentrated communities tend to participate in social activities regularly such as elderly club, festival on important religious days, make merit, skills development and career promotion activities, exercise, etc. In the opposite way, it is different from the elderly group that is far from the community or areas with difficult access to travel and connect to other public services. Most of which are adjacent to the house or orchard and do not participate in social activities in which most of these groups, according to their physical fitness can fully help themselves [16]. Presently, feeling disconnected from the outside society has become the biggest problem among the elderly, especially the elderly living in the countryside. Nowadays, with the growth of the city which causes the rural population will be driven out of the area due to the economic and social driving force. It can be obviously seen from the phenomenon of working group traveled to the city to get job and searching for good quality of life, resulting in the elderly being alone in the countryside and many houses became abandoned. The quiet neighborhood became an aging society when it was at home [17]. Loneliness is an important factor that can make shorter life, particularly in the context of a rural area with low density of activities. Therefore, planning approach in the provision of facilities allocation together with built environment to promoting the creation and operation of the activities to sustaining

living condition and neighborhood environment must be in low cost solution which integrates all contexts of aging communities.

5. CONCLUSIONS AND RECOMMENDATIONS

Besides, most of the settlement of Ban Phaeo is considered to be a rural settlement, their major land use of an agricultural and natural area which is different from Krathum Baen and Mueang Samut Sakhon districts. With a low concentration of settlements, it resulted in a lower status of the economic characteristics with plenty of natural resources, orchards, tourist attractions of the floating market, and industrial plants. While the economic characteristics of Ban Phaeo are mainly on agriculturally based reflected on land utilization and also living conditions, it affects the livelihood of the elderly in terms of accessibility to public health services and social interaction. Especially the distributed settlement in this study area, most elderly choose to stay at home rather than relocate to the city. More farming activities than participation in social activities (such as elderly club, festival on important religious days, make merit, skills development, and career promotion activities, exercise, etc.) are due to the long-distance and difficulty of traveling. Especially, in the elderly group of home-based, they are considered as a group that can still promote more social activities, although it sometimes requires help from others. In addition, financial insecurity is a barrier for rural populations, and many older adults are burdened by the cost of paying for their housing and access facilities.

Therefore, guidelines for recommending a suitable living environment are necessary to plan and design to accommodate transitions to an aging society. The environment and facilities must be incorporated the universal design in all planning and management levels. Consequently, community infrastructure, e.g., hospitals, temples, public parks, including all services in the community can help to attract more elderly people to enjoy outdoor activities and participating in more social activities. Since the contribution of neighborhood-built environments influences on individual/demographic and psychosocial among older adults to perform physical activity. The physical design of the built environment shapes the everyday life of an aging community, including its buildings, land uses (commercial, residential, agriculture, etc.), transportation system, and recreational features. The results recommend that environmental and policy changes can support physical activity, function, and vitality in older adults. Furthermore, welfare support from the government could also help to facilitate the improvement of community-built environments and provides suitable services for the elderly. Policies to promote and develop professional skills for the elderly in order to generate income and activities are also necessary. Since multiple policy options to access services at affordable rates is to ensure the well-being of the elderly population. Better senior-friendly infrastructures, healthcare facilities, and senior care services play a key role in proactive and early recognition of aging society concerns at the policy level

to enhance the quality of life for seniors. Therefore, more consideration needs to be placed on incentivizing individuals and organizations engaged in elderly services such as assisted living, residences for seniors, assistive devices, etc. that will definitely help with an improvement of the quality of life of the elderly.

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