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The Development of a Well-Being Environment and Age-Friendly Communities Assessment Criteria Using the Analytic Hierarchy Process: A Case of Thailand

Sujitra Jiravanichkul[1], Sarin Pinich[2,*], Atch Sreshthaputra[2], Trirat Jarutach[1]

[1] Center of Excellence in Universal Design, Faculty of Architecture, Chulalongkorn University, Thailand
[2] Department of Architecture, Faculty of Architecture, Chulalongkorn University, Thailand

*Corresponding e-mail: sarin.pi@chula.ac.th

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ABSTRACT

Assessment tools that promote well-being, widely used internationally, often focus on general populations, and lack specific indicators for older individuals, whose environmental needs differ from the general population. This paper presents a comprehensive approach to reviewing and selecting indicators necessary for creating community environments that enhance not only the well-being of people in general but also age-friendliness. The approach aligns with international standards while catering to the specific needs of Thailand. A methodology was employed to identify minimum standard indicators, carefully selected by a panel of 15 qualified experts from various fields. Subsequently, the Analytic Hierarchy Process (AHP) technique was used to establish a weighting system among relevant main and sub-categories.

The results indicated that the weight values of the 11 main categories and 43 criteria differ from international well-being community assessment tools because Thailand's Well-being Environment and Age-Friendly Community (ThaiWBAFC) must balance both well-being and age-friendly indicators. The main categories with the highest weights are (1) air quality (17.48%), (2) drinking water quality (17.38%), and (3) healthy food environment (15.47%). Additionally, it was found that indicators for older individuals should differ from those for other age groups due to factors such as age, physical health decline, income levels, literacy levels, and societal changes, resulting in different environmental needs. The experts recommended adding more indicators and eliminating inappropriate ones, such as those that need complex technology. Local government agencies in developing countries can benefit from using these criteria for self-assessment and improving the community's environment for older individuals.

Keywords: well-being environment, age-friendly community, assessment criteria, Thailand, analytic hierarchy process

INTRODUCTION

Currently there are updated data that highlight the rapid aging population globally and particularly in ASEAN countries, including Thailand. According to the World Health Organization (WHO), by 2030, 1.4 billion people worldwide will be 60 years or older, with 80% of these older adults residing in low- and middle-income countries (World Health Organization, 2022). In the ASEAN region, by 2022, 7 out of 10 member countries were classified as "Aged Societies," in which more than 7% of their population was aged 65 years or older (United Nations, 2019). Thailand transitioned to a "Complete Aged Society" in 2023, with over 14% of its population aged 65 and above (Department of Older Persons, 2023). This demographic shift has significant implications for public health, social services, and economic policies, particularly in countries like Thailand, where aging populations may place increased pressure on healthcare systems and necessitate the development of new infrastructure. Specifically, the creation of Age-Friendly Community facilities and environments is essential to support the well-being and independence of older people.

Thailand's local authorities have been tasked with overseeing social care for older populations across four key dimensions: economic, health, social, and environment. However, in the environmental dimension, government officials still face significant knowledge gaps. These include responsibilities such as managing senior centers to improve living quality, creating job opportunities for older adults, and providing healthcare facilities, such as community hospitals (Tailangkha et al., 2022). As a result, efforts are now underway to construct community centers and develop infrastructure specifically designed for senior citizens (Rakbumnet, 2019).

As shown in Figure 1, many communities have made efforts to create environments that integrate natural surroundings with built infrastructure to promote good health and support independent living for older adults. However, if assessed by international standards, it is found that various improvements are still needed in many areas. For instance, numerous municipalities' senior daycare centers lack sufficient amenities to support health and wellness activities. Issues such as thermal comfort, noise pollution, rain leakage, inappropriate locations, and inadequate or underutilized green spaces need to be addressed, as depicted in Figure 2. These findings emphasize the need for local authorities to enhance their understanding of designing and managing environments that effectively meet the specific needs of older individuals.

Additionally, the community's outdoor public spaces are not facilitative to the needs of older people. Previous research found senior services and transportation connectivity have lower average scores than standard (Ansusinha, 2022). Unaddressed issues include sidewalks, roads, ramps, and restrooms that are not designed for older adults, inadequate maintenance resulting in wear and tear, and insufficient space (Chaloeichanya & Jarutach, 2018). This situation arises from a lack of practical guidelines for designing and managing environments suitable for older people, and stakeholders from the government, private, and civil society sectors still lack knowledge on how to provide environments that promote older people's well-being. Thus, there is an urgent need to establish criteria that serve as assessment methods or guidelines to ensure that government budgets are efficiently spent to deliver optimal value to older residents.

Most of assessment criteria for environments conducive to well-being that are widely used globally provide indicators for environmental conditions suitable for general people but still lack specific guidelines for older people. Additionally, these assessment criteria have been developed by countries with higher incomes and contain some indicators that are inapplicable for developing countries with lower incomes transitioning to a Complete Aged Society. Therefore, there is a need to create criteria, indicators, or assessment tools specifically suited to the Thai context. This proposed tool will help enable local organizations to conduct a preliminary self-evaluation of their communities, to guide improvements and to introduce effective policies.

To address the above-mentioned challenges, we present a methodology for developing a list of criteria for well-being and age-friendly communities based on those criteria suggested by the most relevant and trusted international assessment tools, such as the WELL Community Standard (International Well Building Institute,

2020) and the Fitwel Community Standard (Center for Active Design, 2020). Additionally, we introduce enhanced assessment criteria tailored to the Thai context, considering further aspects of air quality, water supply, sanitation, and environmental management that have measurable impacts on health. This assessment criteria, thus, should also provide added value to urban development investments (Habib et al., 2020). We are confident that these comprehensive assessment criteria will help Thailand take another significant step toward more inclusive, accessible, and supportive communities for all ages.

Figure 1

A Well-Being Environment and an Age-Friendly Community in Thailand

(a) (b) (c)

(d) (e) (f)

Note. (a) Daily air quality indicated by various colored flags; (b) A low–cost drinking water dispenser in a community center; (c) Senior-friendly restrooms in a community's common space; (d) Community herb garden along the perimeter fence; (e) Outdoor exercise equipment tailored for older adults; (f) A community garden with a pavilion for relaxation.

Figure 2

Senior Daycare Centers of a Municipality

(a) (b) (c)

Note. (a) left view; (b) front view; and (c) restroom

LITERATURE REVIEW

This paper aims to propose a comprehensive tool for assessments of well-being and quality of senior communities. It seeks to create a more applicable assessment method tailored to the needs of developing countries, such as Thailand. The literature review outlines global criteria for well-being environments, as presented in Table 1, which lists the requirements for well-being environments. Design standards serve as guidelines for development, well-being indexes are used for measurement and evaluation, and assessment tools are employed to analyze existing conditions.

The literature also includes Age-Friendly Cities (AFC), a well-established set of guidelines for promoting the well-being of active older people, widely used globally (World Health Organization, 2007). The guidelines help cities and communities develop policies and environments that enable older adults to live independently within their communities.

Overall, the literature reviewed covers various aspects of well-being environmental development, focusing on physical buildings, social factors, and the overall friendliness of environments and facilities. However, there are a lack of factors and indicators specifically aimed at promoting the well-being of older people in communities.

In conclusion, while many community design guidelines provide indicators, they lack quantitative indexes. Assessment tools should offer more practical and actionable guidance for evaluation and progress tracking (Ngai & Chan, 2005). Additionally, assessment tools should be applicable across various stages of planning, designing, construction, maintenance, and renovation.

METHODOLOGY

The study design

Based on the literature review, we selected criteria that promote well-being, focusing on existing community assessments. Previous research findings indicate that the majority of older Thai people prefer staying in their own environment and living with their families rather than moving to other communities (Jarutach & Lertpradit, 2020). Therefore, to ensure that older people can age in a place with well-being, we have incorporated indicators of well-being communities into the proposed assessment criteria.

In the first round of evaluation, 12 categories and 162 indicators were preselected from literature reviews. Indicators used from at least two sources of well-being standards were chosen for expert reviews. Experts from various disciplines, totaling 15 individuals, gave scores to the indicators with degrees of importance. Additionally, these experts were able to provide feedback or suggest additional indicators. In Figure 3, the preselected categories and indicators were those used by the Well Community Standard (International Well Building Institute, 2020) and the Fitwel Community (beta) V2.1 (Center for Active Design, 2020). Additionally, some indicators relating to accessibility from the LEED Neighborhood Development, such as a walkable distance of 400 meters, were added (U.S. Green Building Council, 2014). Another selected resource, the Age-Friendly Cities: A Guide from the World Health Organization, allowed for the incorporation of specific details. For example, primary community services and facilities for older people should be within a 500-meter radius, while secondary services should be within an 800-meter radius (Burton & Mitchell, 2006).

By analyzing the literature, considering all relevant aspects of environmental conditions, management, and maintenance, indicators that are used repeatedly across selected well-being standards were collated and presented in Table 2 below.

Table 1

Community Well-Being Environmental Assessment Tools, Design Guidelines, and Indexes of Well-Being currently in use worldwide

Type	Name	Organization	Year	Country	Details	Reference
Well-Being assessment tool for communities	CASBEE for Cities	Japan Sustainable Building Consortium (JSBC)	2012	Japan	3 categories 10 minor categories 29 subcategories	(Murakami et al., 2011)
	Health and Well-Being in BREEAM (Community)	Building Research Establishment (BRE)	2015	United Kingdom	6 parts 24 features	(Taylor & Pineo, 2015)
	The Well Community Standard Pilot	International Well Building Institute	2020	U.S.A.	10 concepts 700+ requirements	(International Well Building Institute, 2020)
	Reference Guide for the Fitwel Certification System: Community (beta) V2.1	Center for Active Design	2020	U.S.A.	12 concepts 67 features	(Center for Active Design, 2020)
Well-Being Design Guidelines for Communities	A summary of Age UK's Index of Well-Being in Later Life	Age UK Policy and Research Department	2017	United Kingdom	5 domains 40 indicators	(Marcas et al., 2017)
	Community Well-Being Framework	The Conference Board of Canada and DIALOG	2018	Canada	5 domains 18 indicators 48 metrics	(The Conference Board of Canada & DIALOG, 2018)
	Healthy and Age-friendly Cities Best Practices Around the World	Elene Machaidze. Asian Development Bank	2021	China	6 dimensions 3 parts 33 indicators	(Machaidze, 2021)

Table 1 (Continued)

Type	Name	Organization	Year	Country	Details	Reference
Index of Well-Being	Australian National Development Index (ANDI)	Australian National Development Index	1995	Australia	18 indicators	(Australian National Development Index, 2020)
	Canadian Index of Well-Being (CIW)	Atkinson Charitable Foundation (ACF)	2001	Canada	8 domains 35 dimensions 64 indicators	(Canadian Index of Well-Being , n.d.)
	National Performance Framework	Scottish Government	2008	Scotland	11 dimensions	(Scottish Government, 2008)
	The report on equitable and sustainable well-being in Italy	The Italian National Institute of Statistics	2022	Italy	12 dimensions 152 indicators	(The Italian National Institute of Statistics, 2022)
	UK Measures of National Well-Being Dashboard	Office for National Statistics	2024	United Kingdom	10 domains 58 indicators	(Office for National Statistics, 2024)
	Measure of Australia's Progress (MAP)	Australian Bureau of Statistics	2013	Australia	4 domains 26 indicators	(Australian Bureau of Statistics, 2013)
	The National Well-Being Indicators in R.O.C.	Directorate General of Budget, Accounting Statistics (DGBAS)	2013	Taiwan	11 topics 38 domestic indicators	(Yuan, 2013)

Table 1 (Continued)

Type	Name	Organization	Year	Country	Details	Reference
Index of Well-Being	Well-Being in Germany	Federal Press Office	2017	Germany	12 dimensions and 46 indicators	(Federal Press Office, 2017)
	New Zealand Implementing the Well-Being Budget	Well-Being Economy Alliance (WEAll)	2019	New Zealand	4 principles	(Well-Being Economy Alliance, 2019)
	Indicator for Measuring Well-Being	Prime Minister's Office Government of Iceland	2019	Iceland	3 domains 13 criteria 39 indicators	(Prime Minister's Office Government of Iceland, 2019)
	Life in the UK: Northern Ireland 2023	Jennifer Wallace and Hannah Paylor, Carnegie UK	2023	Ireland	4 domains	(Wallace & Paylor, 2023)
	Taking the temperature of local communities (The Well-Being and Resilience Measure)	Nina Mguni and Nicola Bacon, Young foundation	2010	Australia	3 domains 9 features 36 indicators	(Mguni & Bacon, 2010)
	OECD Better life Index	OECD Organization	2024	34 OECD countries	11 topics 24 indicators	(Organisation for Economic Co-operation and Development Organization, 2024)
	GNH Happiness Index	The Centre for Bhutan and GNH Studies	2022	Bhutan	9 domains 33 indicators	(The Centre for Bhutan and GNH Studies, 2022)

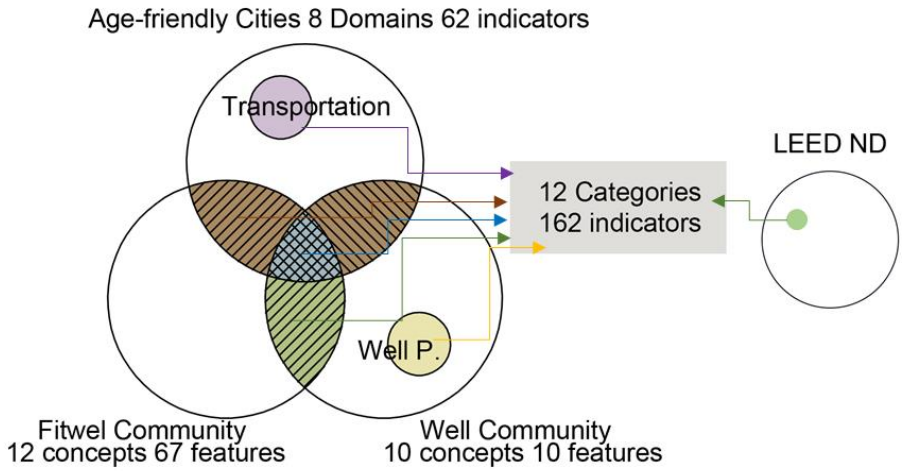
Table 1 (Continued)

Type	Name	Organization	Year	Country	Details	Reference
Index of Well-Being	Well-Being, Sustainability and National Resilience Indicators 2013-2014	Central Bureau of Statistics	-	Israel	9 domains 18 indicators	(Central Bureau of Statistics, n.d.)
Index of Well-Being for Communities	The Community Well-Being Index: People, Place and Relationships	Rebecca Birkbeck, Co-op	-	United Kingdom	3 domains 9 features 44 indicators	(Birkbeck, n.d.)

Note. Adapted from *Matrix: Review of Well-Being measures*, by University of Waterloo (https://uwaterloo.ca/toward-a-global-index-of-wellbeing/sites/default/files/uploads/files/matrix_wellbeing_measures_around_the_world_0.pdf). Copyright by University of Waterloo.

Figure 3

Selected Categories and Indicators Shared by the Selected Resources



Note. Well P. stands for WELL Preconditions

Table 2

Criteria Comparison Between the WELL Community Standard (WELL), Fitwel Community Standard (Fitwel) and Age-Friendly Cities (AFC.

	WELL	***Fitwel***	***AFC***
1. Air (AI)			
1.1 Smoke Control	✓	✓	n/a
1.2 Air Quality Standard	✓	✓	n/a
2. Drinking Water (DW)			
2.1 Drinking Water Quality	✓	✓	n/a
2.2 Drinking Water Quality Inspection	✓	✓	n/a
2.3 Drinking Water Subsidies	✓	n/a	n/a
3. Street Lighting (SL)			
3.1 Pedestrian Lighting	✓	✓	✓
3.2 Glare Control	✓	✓	n/a
4. Noise Mitigation (NM)			
4.1 Noise Mitigation	✓	✓	✓
4.2 Sound Planning	✓	n/a	n/a
5. Heat Island Mitigation (HI)			
5.1 Heat Island Mitigation	✓	✓	n/a
5.2 Heat Alarm System	✓	n/a	n/a

Table 2 (Continued)

	WELL	***Fitwel***	***AFC***
6. Healthy Food Environment (HF)			
6.1 Market Access	✓	✓	n/a
6.2 Nutrition Education	✓	✓	n/a
7. Housing (HO)			
7.1 Design for Older People	n/a	n/a	✓
7.2 Home Renovation Service and Support	n/a	n/a	✓
7.3 Residential Environment	✓	✓	✓
7.4 Maintenance	n/a	n/a	✓
7.5 Residential Alternative	✓	✓	✓
7.6 Aging in Place	n/a	n/a	✓
7.7 Universal Design	n/a	n/a	✓
7.8 Community Engagement	n/a	n/a	✓
7.9 Social Housing	✓	✓	✓
8. Roads and Sidewalks (RS)			
8.1 Sidewalk	✓	✓	✓
8.2 Crosswalk	✓	✓	✓
8.3 Maintenance	n/a	n/a	✓
8.4 Public Restroom	✓	✓	✓
8.5 Bicycle	✓	✓	✓
8.6 Separate Traffic Lanes	✓	✓	✓
9. Transportation (TR)			
9.1 Public Transportation Station	n/a	✓	✓
9.2 Bus Stop	n/a	✓	✓
9.3 Vehicle	n/a	n/a	✓
9.4 Management	n/a	n/a	✓
9.5 Fare	n/a	n/a	✓
9.6 Special Community Transportation Service System	n/a	n/a	✓
10. Community Assets (CA)			
10.1 Restroom	✓	✓	✓
10.2 Mixed-use Development	✓	n/a	n/a
10.3 Universal Design Facilities	✓	✓	✓

Table 2 (Continued)

	WELL	*Fitwel*	*AFC*
10.4 Wayfinding	✓	✓	✓
10.5 Community Healthcare Facilities	✓	✓	✓
11. Community Open Space (CO)			
11.1 Public Restroom	✓	✓	✓
11.2 Garden	✓	✓	✓
11.3 Exercise Space	✓	✓	✓
11.4 Management	✓	✓	✓

Note. n/a indicates that none of the indicators that belong to each certification is found relevant to the topics.

Data Collection Technique

The selected the factors and indicators are presented in Table 2 and Figure 3. In the initial stage, the researchers selected categories and indicators as a basis for well-being and Age-Friendly Cities assessment. These served as the minimum criteria to be rated by the panel of 15 qualified experts to ensure applicability in the Thai context. Each expert could independently add, remove, and make suggestions concerning the indicators relevant to his/her area of expertise. They were not required to rate all of them. To aid their understanding, a supplementary guide providing explanations and definitions of each indicator was included with the questionnaire.

Ratings were collected using a Likert Scale with five levels: 1 = Least Important, 2 = Low Importance 3 = Important, 4 = Very Important, and 5 = Most Important. After the first round of assessments, the researchers recorded their average scores in Microsoft Excel. During this first round, additional indicators were suggested by experts. The researchers collected these suggestions to be evaluated by other experts in the subsequent round.

The second draft of the assessment tool was prepared and submitted for the second round of criteria assessment, where the experts assessed the importance and weight of the indicators in the main and sub-categories. The collected scores, then, were to be processed with the Analytic Hierarchy Process (AHP) for further analysis. The researchers conducted interviews and recorded the scores based on the experts' opinions until all 15 experts completed the process.

The Sampling Process

Fifteen individuals were invited to participate in this research as experts from various fields, mainly in social gerontology and community well-being. The panel included as follows: 3 experts who specialized in environmental and architectural designs for older people, 2 experts in landscape architecture, 2 experts in medical and public health, 1 expert in geriatric physical therapy and nutrition, 1 expert in mental health, 2 experts in architectural design for well-being certified by international organizations, 3 experts in well-being specializing in environmental design from private organizations such as Research & Innovation for Sustainability Center (RISC) and the Thai Green Building Institute (TGBI), and finally, 1 expert in urban geography. The diverse expertise of the panel members ensured that the recommendations were more detailed and specific.

Analytic Hierarchy Process

The Analytic Hierarchy Process (AHP) organizes and analyzes complex decisions. It is a decision-making tool that employs multi-criteria decision-making (MCDM) (Thuwawong et al., 2017). It used pair-wise comparison to determine the

relative importance, priority, ranking of the criteria and sub-criteria (Prakash & Barua, 2015). Developed by Thomas L. Saaty in the 1970s (Saaty, 2004), AHP is applied to weighting and prioritizing main categories and sub-categories (Anshebo et al., 2022). It facilitates the resolution of complex and challenging decisions by involving a series of one-on-one comparisons, considering recognized and weighted assortment criteria, and analyzing the collected data to enhance the decision-making process (Ali & Al Nsairat, 2009). Therefore, this research emphasizes prioritization using the Analytic Hierarchy Process (AHP) to enable comprehensive assessment of criteria and indicators.

The Hierarchical Structure

The first step is to define the decision problem and identify the criteria and alternatives by developing a hierarchical structure (Mathew et al., 2020). The goal or main decision objective is placed at the top level, the main category at the second level, and the sub-category at the third level. Following the AHP method, the result is the reduction of indicators from 162 to 43 and the criteria from 12 to 11, as illustrated in Figure 4.

Pairwise Comparison Matrix

The second step of AHP is to perform a comparison between each element of the same level (Mathew et al., 2020). This matrix assists individuals in assigning these relative importance values. The scale for the related importance of main categories includes 1 for equally important, 3 for moderately important, 5 for strongly important, 7 for very strongly important, and 9 for extremely important. Values of 1/3, 1/5, 1/7, and 1/9 are used for inverse comparisons (Saaty, 2001), as shown in Table 4. The experts provide values for each cell of the pairwise comparison matrix. The diagonal elements have a value of one because they represent the same criteria. Fractional values are converted to decimal values, and the sum of each row is calculated.

In this step, there are 15 experts. The researchers distributed a scoring form in three parts. Part 1 involves comparing the importance of the main categories. Each expert scores the level of importance of each pair, with a total of 55 pairs evaluated. All experts are required to complete every comparison. The researchers recorded the scores using MS-Excel, with each expert's scoring table characterized shown in Table 3 as follows:

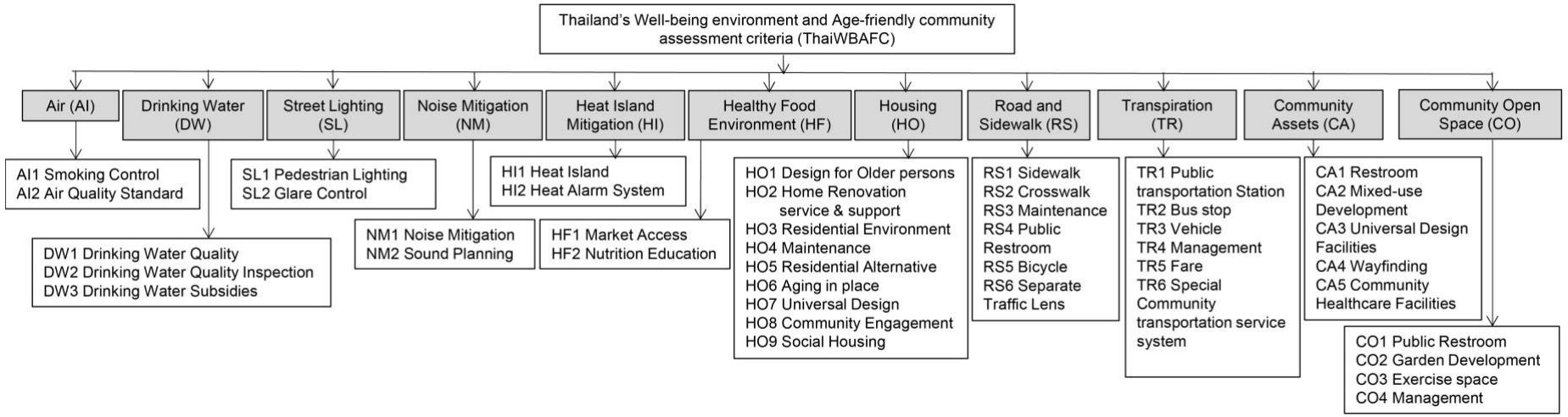
Table 3

Category Pairwise Comparison Matrix

Category Pairwise Comparison Matrix											
	AI	***DW***	***SL***	***NM***	***HI***	***HF***	***HO***	***RS***	***TR***	***CA***	***CO***
AI	1.00	1.36	3.28	4.36	3.31	1.22	1.31	3.47	3.57	4.44	3.83
DW	0.74	1.00	3.05	4.11	3.02	1.47	1.71	3.92	4.34	4.68	4.32
SL	0.31	0.33	1.00	3.36	2.60	0.84	0.56	1.71	2.08	3.14	2.77
NM	0.23	0.24	0.30	1.00	1.23	0.41	0.30	1.17	1.18	1.67	1.70
HI	0.30	0.33	0.39	0.81	1.00	0.54	0.33	1.81	1.84	2.75	2.73
HF	0.82	0.68	1.19	2.44	1.85	1.00	2.30	4.88	5.02	5.50	5.50
HO	0.76	0.59	1.79	3.35	2.99	0.44	1.00	5.50	5.21	5.93	5.79
RS	0.29	0.25	0.59	0.85	0.55	0.20	0.18	1.00	2.51	2.69	5.31
TR	0.28	0.23	0.48	0.85	0.54	0.20	0.19	0.40	1.00	3.12	2.67
CA	0.23	0.21	0.32	0.60	0.36	0.18	0.17	0.37	0.32	1.00	1.44
CO	0.26	0.23	0.36	0.59	0.37	0.18	0.17	0.19	0.38	0.70	1.00
sum	5.20	5.46	12.74	22.31	17.82	6.69	8.22	24.42	27.45	35.62	37.06

Figure 4

The Hierarchical Structure of the AHP Technique for Thailand's Well-Being environment and Age-Friendly Community (ThaiWBAFC) assessment criteria



Calculate Relative Criteria Weight (Normalized Comparison)

After the experts assess the importance level for each pair of main categories, it is necessary to evaluate the relative weights. This requires normalizing the matrix of category results from Table 3.

To normalize the pairwise matrix, all values in each column are divided by the sum of that column. The next step involves calculating the criteria weights. These weights are determined by averaging all values in each row. The sum of every value in the row is divided by the number of criteria, resulting in the criteria weight.

The next step involves calculating consistency to verify the accuracy of the calculated values. This process utilizes the pairwise comparison matrix before normalization. The procedure includes multiplying each value in a column by the respective Criteria Weight Value. This multiplication is performed for all values in the matrix.

Subsequently, the Weighted Sum Value matrix (Table 6) is computed by summing each value in a row, which yields the Weighted Sum Value for each criterion. The next column adjacent to the Weighted Sum Value column contains the Criteria Weight. The final step involves calculating the ratio of the Weighted Sum Value to the Criteria Weight. This ratio serves as a measure of consistency in the pairwise comparison matrix.

Consistency Index (CI) check and consistency ratio (CR)

The calculation of λ_{Max} involves finding the average of all the values obtained and dividing it by the number of compared elements. Following this, the Consistency Index (CI) is determined using the formula below:

$$\text{Consistency Index (C.I.)} = \frac{\lambda_{Max} - n}{n-1}$$

where: λ_{Max} is the maximum eigenvalue, n is the number of compared elements

$$\text{C.R.} = \frac{\text{C.I.}}{\text{R.I}}$$

Consistency		
Count		CR
λ_{Max}	11.69	Constant

Table 4

Scale of Pairwise Comparison

Importance scale	***Definition***
1	Equally Important
3	Moderately Important
5	Strongly Important
7	Very strongly Important
9	Extremely Important
2,4,6,8	For compromise among the mentioned above values

Note. Adapted from *Decision making for leaders: the analytic hierarchy process for decisions in a complex world*, by T.L. Saaty, 2001, RWS publications. Copyright 2001 by RWS publications.

Table 5

Normalized Pairwise Comparison Matrix

Normalized Pairwise Comparison Matrix															
	AI	***DW***	***SL***	***NM***	***HI***	***HF***	***HO***	***RS***	***TR***	***CA***	***CO***	***Sum***	***Criteria Weight***	***%***	***Rank***
AI	0.19	0.25	0.26	0.20	0.19	0.18	0.16	0.14	0.13	0.12	0.10	1.92	0.1748	17.48	1
DW	0.14	0.18	0.24	0.18	0.17	0.22	0.21	0.16	0.16	0.13	0.12	1.91	0.1738	17.38	2
SL	0.06	0.06	0.08	0.15	0.15	0.13	0.07	0.07	0.08	0.09	0.07	1.00	0.0905	9.05	5
NM	0.04	0.04	0.02	0.04	0.07	0.06	0.04	0.05	0.04	0.05	0.05	0.51	0.0461	4.61	8
HI	0.06	0.06	0.03	0.04	0.06	0.08	0.04	0.07	0.07	0.08	0.07	0.66	0.0596	5.96	6
HF	0.16	0.12	0.09	0.11	0.10	0.15	0.28	0.20	0.18	0.15	0.15	1.70	0.1547	15.47	3
HO	0.15	0.11	0.14	0.15	0.17	0.07	0.12	0.23	0.19	0.17	0.16	1.64	0.1488	14.88	4
RS	0.06	0.05	0.05	0.04	0.03	0.03	0.02	0.04	0.09	0.08	0.14	0.62	0.0565	5.65	7
TR	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.04	0.09	0.07	0.47	0.0425	4.25	9
CA	0.04	0.04	0.02	0.03	0.02	0.03	0.02	0.02	0.01	0.03	0.04	0.30	0.0269	2.69	10
CO	0.05	0.04	0.03	0.03	0.02	0.03	0.02	0.01	0.01	0.02	0.03	0.28	0.0258	2.58	11

Table 6

Category Pairwise Comparison Matrix

Category Pairwise Comparison Matrix															
	AI	***DW***	***SL***	***NM***	***HI***	***HF***	***HO***	***RS***	***TR***	***CA***	***CO***	***Weighted Sum Value***	***Criteria Weight***	***Sum/ Weight***	
AI	0.17	0.24	0.30	0.20	0.20	0.19	0.20	0.20	0.15	0.12	0.10	2.06	0.17	11.77	
DW	0.13	0.17	0.28	0.19	0.18	0.23	0.25	0.22	0.18	0.13	0.11	2.07	0.17	11.93	
SL	0.05	0.06	0.09	0.15	0.15	0.13	0.08	0.10	0.09	0.08	0.07	1.06	0.09	11.76	
NM	0.04	0.04	0.03	0.05	0.07	0.06	0.04	0.07	0.05	0.04	0.04	0.54	0.05	11.75	
HI	0.05	0.06	0.03	0.04	0.06	0.08	0.05	0.10	0.08	0.07	0.07	0.70	0.06	11.77	
HF	0.14	0.12	0.11	0.11	0.11	0.15	0.34	0.28	0.21	0.15	0.14	1.87	0.15	12.06	
HO	0.13	0.10	0.16	0.15	0.18	0.07	0.15	0.31	0.22	0.16	0.15	1.79	0.15	12.01	
RS	0.05	0.04	0.05	0.04	0.03	0.03	0.03	0.06	0.11	0.07	0.14	0.65	0.06	11.53	
TR	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.04	0.08	0.07	0.48	0.04	11.32	
CA	0.04	0.04	0.03	0.03	0.02	0.03	0.03	0.02	0.01	0.03	0.04	0.31	0.03	11.38	
CO	0.05	0.04	0.03	0.03	0.02	0.03	0.03	0.01	0.02	0.02	0.03	0.29	0.03	11.33	
														128.61	λ_{Max}

Table 7

Random Index Value (R.I.)

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Random Index (R.I.)	0	0	0.6	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Note. Adapted from *Decision making for leaders: the analytic hierarchy process for decisions in a complex world*, by T.L. Saaty, 2001, RWS publications. Copyright 2001 by RWS publications.

From Table 7, the Consistency Ratio (C.R.) is calculated by dividing the value of the Consistency Index (C.I.) by the Random Index (R.I.). The AHP process specifies that factors with 3-15 indicators have a Random Index (R.I.) value that can be used to calculate the weights. However, factors with only 2 indicators cannot be used in the formula. Therefore, the researchers assigned the same weight to factors with 2 indicators.

The Random Index serves as the consistency index of a randomly generated pairwise matrix. If the resulting C.R. is less than 0.1, it is reasonable to assume that our metrics are consistent.

$$\text{C.I.} \quad \frac{\lambda_{Max} - n}{n-1} = \frac{11.69 - 11}{11-1} = 0.069$$

$$\text{C.R.} \quad \frac{0.0069}{1.51} = 0.0456$$

<=0.1 Consistent

After the experts have assessed the comparative importance of each pair of main categories, it is essential to evaluate the relative weights. This requires normalizing the matrix of category results for main categories (Table 5).

To normalize the pairwise matrix for Main Categories, each value in a column is divided by the sum of that column. Following this, Criteria Weights are calculated. These weights are determined by averaging all values in each row. The sum of values in the row is divided by the number of criteria, providing the criteria weight.

In the following step, the experts assess the sub-categories (criteria) using the same evaluation method as in Part 1 (Main Categories). They have the option to selectively respond to only those subcategories within their expertise, ensuring the collection of accurate information. The limitation in assessing the comparative importance of each pair of subcategories lies in the requirement for a minimum of three indicators and should not be greater than ten indicators (Hansasooksin, 2018), for each subcategory, so that the results are more consistent and accurate. For example, the drinking water subcategory has three indicators, housing has nine indicators, roads and pathways have six indicators, public buildings have five indicators, and public spaces have four indicators.

RESULTS

When the criteria weights for each sub-category are obtained, they need to be converted into percentages. Subsequently, these percentages are multiplied by the criteria weight of the corresponding main category to obtain the relative priority values. The sum of these relative priority values should be 100%. It is feasible to process and represent the information using a Sunburst Chart (see Figure 5) to be used as a guiding framework for the development of the ThaiWBAFC assessment tool.

Figure 5 shows the evaluation of the weights for the main and subcategories of ThaiWBAFC assessment tool. It reveals that physical

environmental factors affecting the independent living and well-being of older adults are ranked and discussed based on expert input as follows:

1. Air Quality (17.48%): It includes indicators like smoking control and air quality standard. Experts noted that requirements for reducing air pollution, as set by international standards like Well Community and Fitwel Community, may need to be revised. This is because government authorities find it difficult to monitor air quality data. The experts also suggested excluding indicators related to shared cars or bicycles, as these may not be suitable for older individuals in developing countries, particularly in rural areas. In such settings, older people are less likely to use mobile applications, making these indicators irrelevant to their behaviors. Additionally, metrics promoting the use of electric cars are considered inappropriate for people in rural areas of Thailand due to the lack of public EV charging stations and the high cost of installing private charging facilities at home. Hence, it is recommended not to consider these indicators as minimum standards for developing countries. In addition, the study found that air quality also affects the walking exercise of older people (Paydar et al., 2023).

2. Drinking Water Quality (17.38%): It includes criteria such as drinking water quality, drinking water quality inspection, and drinking water subsidies. Having safe drinking water, is a fundamental utility that developed countries overlook (Gleick, 1998). However, budgetary issues may make delivering this service inaccessible to some areas. The experts suggested that while providing free drinking water may not be possible, communities can still offer it at an affordable price. The experts also recommended conducting drinking water quality inspections at least twice a year and expanding monitoring indicators to include water distribution pipelines. Establishing a regular, transparent monitoring system is important, with inspection results made publicly available through accessible platforms.

3. Healthy Food Environment (15.47%): It includes criteria such as market access and nutrition education. The experts suggested establishing community vegetable and fruit gardens free from pesticides. They also emphasize the importance of protein in older people's diets and recommend providing access to protein sources like fish and poultry. Additionally, they proposed implementing food transportation systems within communities, such as mobile fresh markets or local food trucks, to ensure access to healthy food, especially for older people who have difficulty walking or who live in remote areas. Incorporating these indicators into the evaluation criteria can promote access to nutritious food, aligning with existing standards.

4. Housing (14.88%): It includes criteria such as residential environment, aging in place, universal design, maintenance, home renovation service and support, residential alternatives, design for older people, community engagement, and social housing. The experts suggested that all involved parties should have knowledge and understanding of how to improve houses to meet the needs of older people. They also recommended that the government should devise financial mechanisms to support home improvement for those with low incomes.

5. Street Lighting (9.05%): It includes criteria such as pedestrian lighting and glare control. The experts recommended extra lighting at road crossings and ensuring sufficient luminosity for older people to see clearly.

6. Heat Island Mitigation (5.96%): It includes criteria such as heat island mitigation and heat alarm system. The goal is to create a comfortable environment, reduce temperatures, and minimize the heat island effect, particularly in developing countries with tropical climates. The experts suggested a passive design approach, such as orienting buildings north-south for better air ventilation, avoiding direct sunlight, designing roof overhangs for shading, and using light-colored roofing materials to reduce heat retention. They also recommended planting trees around buildings and along sidewalks to decrease heat and increase humidity. According to research, the minimum standard for the number of trees on urban sidewalks should be classified as "Moderate," with 50-100 trees per 600 meters of street length (Surinta, 2023).

7. Roads and Sidewalks (5.65%): It includes criteria such as sidewalks, crosswalks,

maintenance, public restrooms, separate traffic lanes, and bicycle facilities. The experts agreed that variations in community context should be considered. In rural communities with low vehicle density, there may not be a necessity to separate roads and sidewalks, or it can be achieved simply by drawing lines.

8. Noise Mitigation (4.61%): The criteria include having a community policy to reduce noise pollution or limit noise levels in affected areas. This involves identifying sensitive areas and existing sources of noise within the community. Research shows that exposure to noise, with a mean of 56.2 dBA, may increase the risk of Alzheimer's disease (Weuve et al., 2021) and raise blood pressure levels (D'Souza et al., 2021).

9. Public Transportation (4.25%): It covers criteria including vehicle management, public transportation stations, bus stops, special community transportation, and fare system. While private automobiles are the primary mode of transportation in rural areas (Tontisirin et al., 2024), for urban and inter-city public transportation, qualified experts recommend providing clear signage on buses suitable for older adults, along with bus schedules specifically designed to accommodate their needs.

10. Community Assets (2.69%): It contains standards for restrooms, universal design, healthcare facilities, mixed-use development, and wayfinding. The WELL Community Standard prioritizes access to mental health facilities. However, with an aging population, the demand for primary healthcare facilities is also rising rapidly (Liu et al., 2024). Therefore, it is recommended to adapt the environment of primary healthcare facilities to be more friendly to older people. Experts suggested that emphasis should be placed on access to all aspects of basic healthcare facilities. Mental health education should be delivered to both healthcare staff members and older people through seminars and posters at community centers or other accessible means.

11. Community Open Space (2.58%): It includes criteria such as public restrooms, garden development, exercise space, and management. In addition to providing a quantitative suitable environment for older people, experts recommended qualitative evaluation indicators such as smooth sidewalk surfaces, non-slip floors, and contrasting colored edges for better visibility by older people. There should also be a plan for maintaining sidewalk surfaces. For exercise spaces, outdoor equipment should promote all three types of exercise according to WHO concepts (World Health Organization, 2020). Signs and posters providing knowledge about appropriate exercises for older people based on their physical abilities or specific health conditions should be available, along with guidelines for accidents or emergencies. This category should be considered a minimum standard indicator.

Based on the evaluations from experts in Figure 5, the ranking of importance for the 11 main categories and 43 subcategories can be summarized with the top 3 priority indicators as follows:

1. Market Access (11.59%)
2. Drinking Water Quality (10.73%) (Tied for second position.)
3. Air Quality Standard (8.62%) (Tied for third position.)

From the research process used to evaluate the weightings of the main and subcategories, the findings can be summarized into scores for each item, as shown in Table 9 below. The scores are based on a total of 100 points, providing a framework for stakeholders involved in environmental planning in Thai communities to use for assessment purposes. The importance is determined by the weighted scores assigned by 15 qualified experts. As shown in Table 9, there are 11 main categories and 43 sub-categories with indicators arranged according to their importance values consistent with Figure 5.The total score for all items is calculated as 100 points.

Figure 5

Weights of Each Main Category and Each Subcategory

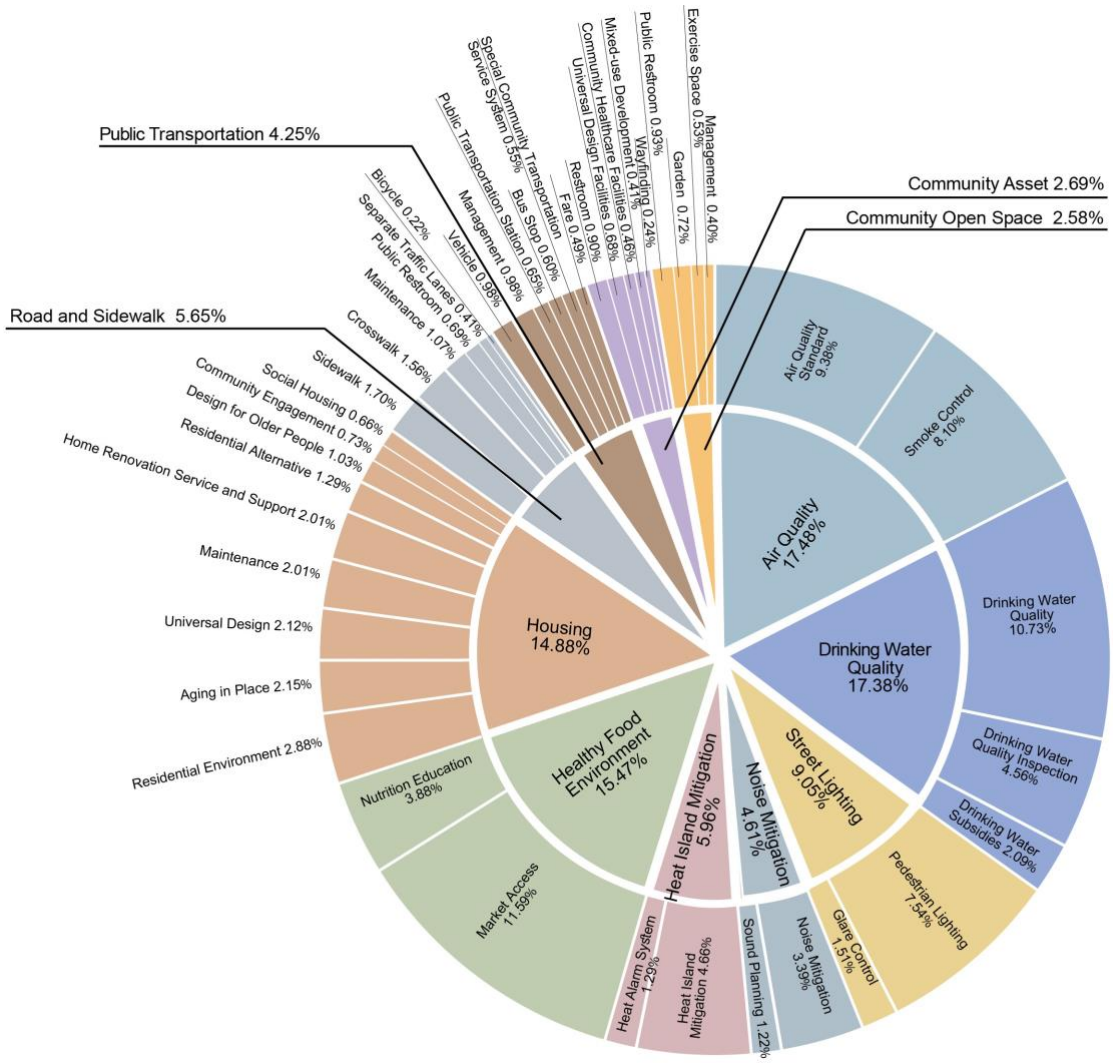


Table 9

Scoring of the ThaiWBAFC Assessment Tool

	Main-Categories Sub-Categories	Score	Indicators
1	**Air (AI) 17.48 points**		
AI1	Air Quality Standard	9.38	1.1 PM2.5 and PM10 not exceeding the annual average relevant standard.
AI2	Smoking Control	8.10	1.2 Outdoor spaces and public areas are non-smoking areas and no-smoking signage must be seen clearly. 1.3 Smoking is permitted in designated areas only.

Table 9 (Continued)

	Main-Categories Sub-Categories	Score	Indicators
2	**Drinking Water (DW) 17.38 points**		
DW1	Drinking Water Quality	10.73	2.1 Drinking water quality in public areas must not contain any contaminants or chemicals that exceed the standard.
DW2	Drinking Water Quality Inspection	4.56	2.2 Drinking water in public areas is to be inspected for quality water at least 2 times* a year. 2.3 Drinking water is provided in public areas free of charge.
DW3	Drinking Water Subsidies	2.09	2.4 The cost of drinking water is partially subsidized.
3	**Healthy Food Environment (HF) 15.47 points**		
HF1	Market Access	11.59	3.1 Grocery stores, markets, convenience stores are within walking distance for older people. 3.2* Communities should have access to protein sources such as fish and poultry for food purposes. 3.3* Food transportation systems should be available for older people who live in a remote area and are unable to walk easily.
HF2	Nutrition Education	3.88	3.4 PR board, bulletin board, or other media that older people in the community can access.
4	**Housing (HO) 14.88 points**		
HO1	Residential Environment	2.88	4.1 Housing is not overcrowded. 4.2 Housing is not located in areas prone to natural disasters. 4.3 Financial aid is provided for housing security measures.
HO2	Aging in place	2.15	4.4 Affordable services are provided to enable older people to remain at home for “aging in place”. 4.5 Older people are well-informed of the service available to help them age in place.
HO3	Universal Design	2.12	4.6 The new residential project must allocate at least 10 percent of its total for units with facilities to support older people.

Table 9 (Continued)

	Main-Categories Sub-Categories	Score	Indicators
HO4	Maintenance	2.01	4.7 There are reliable maintenance service providers. 4.8 Public housing and public areas are well-maintained.
HO5	Home Renovation service and support	2.01	4.9 Essential services are provided at affordable prices for older people. 4.10* Financial aid is provided for older people with low income for home modifications. 4.11 A system to support community contractors to provide services at a lower cost. 4.12* All relevant parties have a deep understanding of home renovation to meet the needs of older individuals.
HO6	Residential Alternatives	1.29	4.13 Older people are well-informed of the available housing options.
HO7	Design for Older People	1.03	4.14 Sufficient space for older people to move around freely. Step-free design. 4.15 The house is well-structured.
HO8	Community Engagement	0.73	4.16 Senior housing is an integration of the community.
HO9	Social Housing	0.66	4.17 Residential projects must allocate units for older people whose income is lower than average.
5	**Street Lighting (SL) 9.05 points**		
SL1	Pedestrian Lighting	7.54	5.1 There are lamp posts along main streets. There should be an emphasis on lighting in the area of a crosswalk with luminosity that older people can clearly see.
SL2	Glare Control	1.51	5.2 Anti-glare control lamps
6	**Heat Island Mitigation (HI) 5.96 points**		
HI1	Heat Island Mitigation	4.66	6.1 Shading of trees along the sidewalks or plaza. 6.2 Roofs, roads, and parking lots are of light colors or have low heat accumulation value.

Table 9 (Continued)

	Main-Categories Sub-Categories	Score	Indicators
HI2	Heat Alarm System	1.29	6.3 An alert system provided to alert older people of extreme heat and discourage them from working outside in case of heat stroke.
7	**Roads and Sidewalks (RS) 5.65 points**		
RS1	Sidewalk	1.70	7.1 The sidewalk surface is flat, in good condition, and not slippery. 7.2* There are no obstructions along the sidewalk and wide enough for wheelchair users. 7.3* Newly built sidewalks must comply with regulations for all physical abilities' users. A ramp width of at least 90 cm. slope is not more than 5 degrees (Ministry of Interior, 2005).
RS2	Crosswalk	1.56	7.4 Crosswalks are available at intersections and connection points. 7.5 A crossing signal available with sound and lighting that is clearly visible and audible. Timing is enough for older people to cross the road safely. 7.6 The distance between pedestrian crossings is not too far.
RS3	Maintenance	1.07	7.7 Road, sidewalk, and street furniture is always well-maintained.
RS4	Public restroom	0.69	7.8 Public restrooms accessible for every physical condition, always clean, and well maintained.
RS5	Separate Traffic Lens	0.41	7.9 Sidewalks, bicycle paths, and roads are clearly separated.
RS6	Bicycles	0.22	7.10 Bicycle parking is located near a public area or a public transport service, and is considered safe.
8	**Noise Mitigation (NM) 4.61 points**		
NM1	Noise Mitigation	3.39	8.1 A community's policy to reduce noise pollution or limit the level of noise.

Table 9 (Continued)

	Main-Categories Sub-Categories	Score	Indicators
NM2	Sound planning	1.22	8.2 Strategies to prevent noise in the affected area. 8.3 Identify sensitive areas in the community and define zoning affected by various noise levels.
9	**Transportation (TR) 4.25 points**		
TR1	Vehicle	0.98	9.1 Vehicles are accessible for older people and people with disabilities. 9.2 Vehicles display clear signage indicating the vehicle number and destination. 9.3 Sufficient transport services dedicated to older people. 9.4 Public transportation is safe from crime. 9.5 Public transportation is clean and in good condition.
TR2	Management	0.98	9.6 Public transportation is available and able to take older people to important places. 9.7 Public bus parks close to the curb to help older people getting off safely. 9.8 All areas are well-serviced with adequate, well-connected transport routes within and across the city.
TR3	Public Transportation Station	0.65	9.9 Timetables are legible, in large print, and easy to access. Information text and graphics are easy to understand and are provided to older people on how to use public transport and the options available. 9.10* Public buildings provide facilities according to the regulations. 9.11* Priority parking bays for older people are provided close to buildings, strictly reserved for the target group only.
TR4	Bus stop	0.60	9.12 There is enough lighting, seats, and a canopy over the bus stop. 9.13 There is a sufficient number of well-maintained seats at bus stops that are safe to use.

Table 9 (Continued)

	Main-Categories Sub-Categories	Score	Indicators
TR5	Special Community transportation service system	0.55	9.14 A community's special transportation service is available to take older people to their desired destination. 9.15 Taxis are comfortable and accessible, with room for a wheelchair and/or walker.
TR6	Fare	0.49	9.16 The public transport service charge is easily visible.
10	**Community Asset (CA) 2.69 points**		
CA1	Restroom	0.90	10.1 Restrooms are in good condition and convenient for older people. 10.2 Clear signage.
CA2	Universal Design Facilities	0.68	10.3 Facilities and equipment are provided as follows: - Floor with a non-slip surface - Ramp or elevator - Stair steps that are not too high. - Handrail - Comfortable chair or bench - Wheelchair user parking - Wayfinding signage
CA3	Mixed-use Development	0.41	10.4 The community must provide necessary facilities, located in the community or outside the community within the older people's waking distance.
CA4	Community Healthcare Facilities	0.46	10.5 Primary healthcare facilities are easy to access and are located in the community or outside the community at a distance not exceeding older people's waking distance. 10.6 The community has a mental healthcare support service unit, or mental health through seminars, or other media.
CA5	Wayfinding	0.24	10.7 Signage indicating the destination before reaching the entrance.

Table 9 (Continued)

	Main-Categories Sub-Categories	Score	Indicators
11	**Community Open Space (CO) 2.58 points**		
CO1	Public Restrooms	0.93	11.1 Public restrooms must comply with the accessible regulations. 11.2 Open for service free of charge.
CO2	Gardens	0.72	11.3 Shady 11.4 Enough benches 11.5 Accessible for all physical conditions 11.6 Most of the garden's area must be planted including evergreen large trees to provide shade.
CO3	Exercise space	0.53	11.7 The elements are presented as follows: - A garden or green area. - Multipurpose area.
CO4	Management	0.40	11.8 Garbage collection and time. 11.9 Eliminate breeding grounds for germs. 11.10 Public areas cleaning. 11.11 Street cleaning.
	Total	**100**	

Note. Indicates the additional indicators by the experts' recommendations.

DISCUSSION

The main categories of the ThaiWBAFC are ranked as follows: (1) Air Quality (17.48%) (2) Drinking Water Quality (17.38%) (3) Healthy Food Environment (15.47%) (4) Housing (14.88%) (5) Street Lighting (9.05%) (6) Heat Island Mitigation (5.96%) (7) Roads and Sidewalks (5.65%) (8) Noise Mitigation (4.61%) (9) Public Transportation (4.25%) (10) Community Assets (2.69%) (11) Community Open Space (2.58%) (see Figure 6). The top four categories—Air Quality, Drinking Water Quality, Healthy Food Environment, and Housing—are weighted between 14% and 17.5%, reflecting fundamental human needs. Following these are categories like Street Lighting, designed to accommodate older adults with appropriate brightness and glare control. The next set of categories, weighted between 4.5% and 6%, includes Heat Island Mitigation, Road and Sidewalk Quality, Noise Mitigation, and Public Transportation. These criteria emphasize environmental sustainability and transportation—both pedestrian and mass transit. Noise Mitigation, however, is given less weight compared to other categories. The lowest-ranked categories are Community Assets and Community Open Space, both weighted around 2.5%. This suggests that community facilities, such as restrooms with universal design and outdoor ecological spaces, are seen as less critical by the elderly population.

The ThaiWBAFC criteria differ from international standards like the WELL Community Standard, Fitwel Community Standard, and Age-Friendly

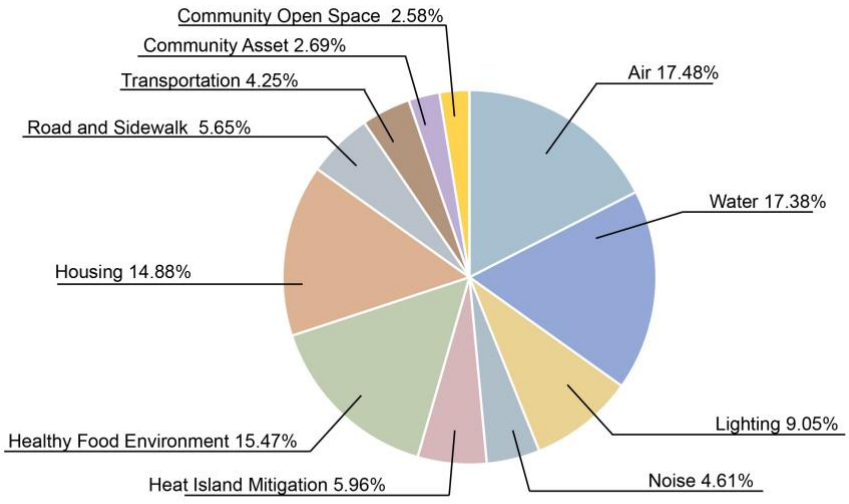
Community (AFC) guidelines (see Figure 6). ThaiWBAFC places greater emphasis on outdoor environmental factors like air and water quality, as well as housing and healthy food—fundamental human needs. In contrast, the WELL Community Standard distributes weights more evenly across categories like Air, Water, Lighting, Heat Island Mitigation, Healthy Food, and Community Assets. However, the top two categories in WELL are Community Open Space (18.42%) and Roads and Sidewalks (11.40%), which differ significantly from the ThaiWBAFC.

Similarly, Fitwel emphasizes built environment factors, with Community Open Space and Roads and Sidewalks receiving higher weights (25.97% and 16.78%, respectively). In contrast, the Age-Friendly Community (AFC) guidelines focus more on community management and supportive policies. Unlike the WELL and Fitwel standards, AFC assigns the least weight to Community Open Space (1.52%), even less than ThaiWBAFC. AFC's top three categories—1) Transportation (22.73%), 2) Housing (13.64%), and 3) Roads and Sidewalks (9.09%)—indicate a stronger focus on outdoor transportation and essential living facilities, differing from the other standards.

It was found that indicators for older individuals should differ from those for other age groups due to factors such as age, declining physical health, income levels, literacy, and societal changes, which result in distinct environmental needs. The experts recommended adding more relevant indicators and removing those that rely on complex technologies, such as smart home monitoring systems or mobile phone applications with elderly-unfriendly user experience design. Local government agencies can use these criteria to conduct self-assessments and enhance the community environment to better meet the needs of older individuals.

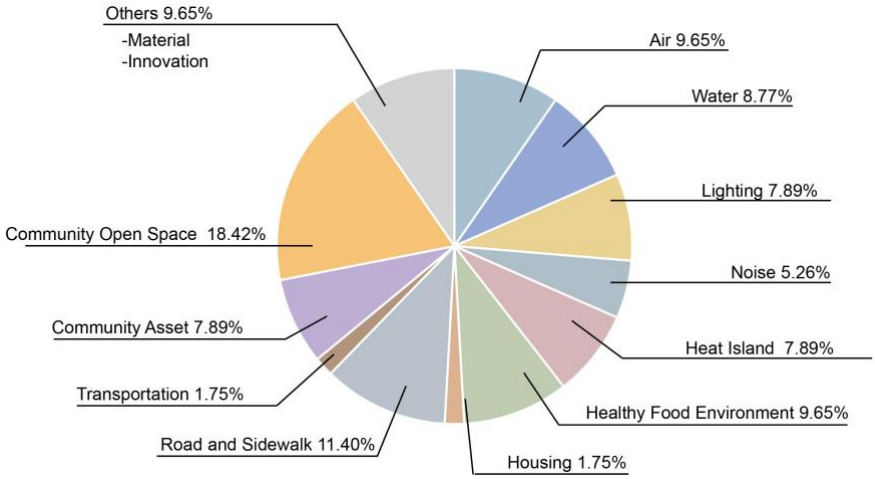
Figure 6

Comparison of Main Categories and Weights Across the ThaiWBAFC Assessment Criteria and International Standards

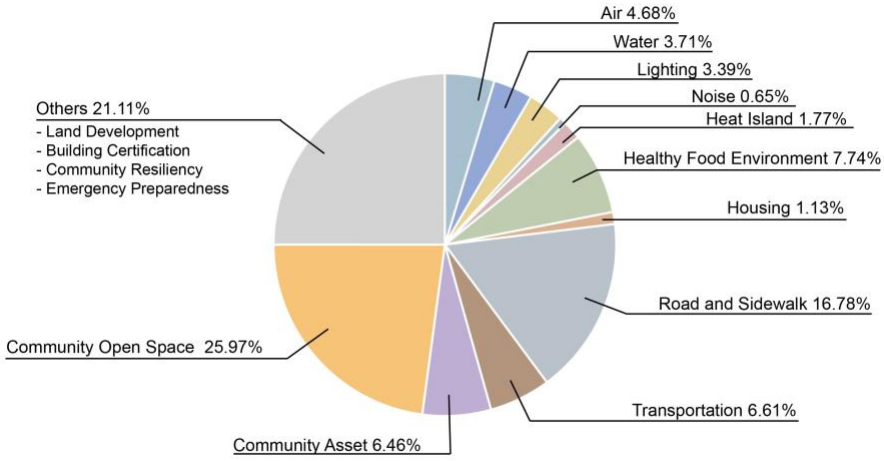


(a) ThaiWBAFC

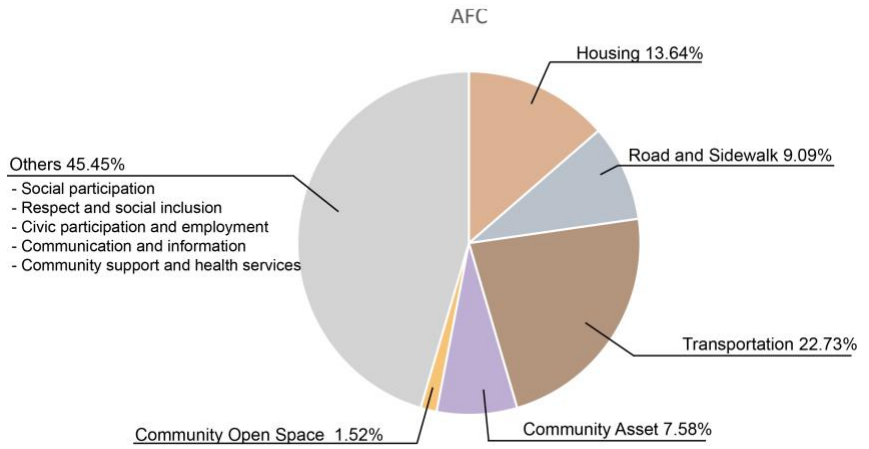
Figure 6 (Continued)



(b) WELL Community Standard



(c) Fitwel Community Standard



(d) Age-Friendly Community (AFC)

Note. Figure (a) the main categories of ThaiWBAFC, (b) the main categories of the WELL Community Standard, (c) the main categories of the Fitwel Community Standard, (d) the main categories of Age-Friendly Community (AFC)

CONCLUSION

The development of the Thai Well-Being and Age-Friendly Community (ThaiWBAFC) framework addresses the needs of an aging population in the context of a developing country. Utilizing the Analytic Hierarchy Process (AHP), this study offers a comprehensive and systematic approach to prioritizing indicators that support both well-being and age-friendly communities. The research identifies the weight values of 11 main categories and 43 criteria. The weighted rankings of the main categories in ThaiWBAFC are: (1) Air Quality, (2) Drinking Water Quality, (3) Healthy Food Environment, (4) Housing, (5) Street Lighting, (6) Heat Island Mitigation, (7) Roads and Sidewalks, (8) Noise Mitigation, (9) Public Transportation, (10) Community Assets and, (11) Community Open Space. The top four categories are weighted between 14% and 17.5%, reflecting fundamental human needs. The lowest-ranked categories, Community Assets and Community Open Space, are weighted around 2.5%, indicating that community facilities such as restrooms with universal design and outdoor ecological spaces are considered less critical by the qualified experts selected for this study.

The research reveals that the weight values of these categories and criteria differ from international standards such as the WELL Community Standard, Fitwel Community Standard, and Age-Friendly Community (AFC). ThaiWBAFC strikes a balance between well-being and age-friendly indicators, highlighting the unique characteristics of Thailand's context. This emphasizes the importance of tailoring well-being indicators for older individuals in tropical developing countries like Thailand, considering factors such as age, physical decline, income, literacy, and societal changes—all of which shape specific environmental needs. Consequently, the qualified experts recommended adding new indicators and removing inappropriate ones, particularly those that rely on complex technologies or are unsuitable for Thailand's tropical climate. This criteria development can serve as a valuable tool for local government organizations to self-assess and improve the environments of aging communities in developing countries.

One limitation of the research is the relatively small sample size of experts, with only 15 participants, and each field represented by just 1-3 individuals. This may affect the diversity of perspectives. However, despite the small sample size, all experts have significant experience and expertise in their respective fields. The study employed qualitative analysis techniques to gather in-depth insights from each expert. Additionally, the interviews revealed that the definition of "community" varied among the experts, which may influence the accuracy of the results.

For future studies, stakeholder engagement between local government organizations and community leaders is essential to ensure that the categories and indicators remain responsive to evolving community needs. To better reflect the practices of Thailand's older population, the assessment tool should include culturally appropriate indicators that account for cultural sensitivities and local contexts. Alternatively, the indicators should be adaptable to the varying local contexts, needs, and resources of urban and rural areas.

ACKNOWLEDGEMENTS

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