

Interchangeable Sensorial Encounters With Nature in Older Adults' Domestic Space in Indonesia

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ABSTRACT

This study investigates how older individuals encounter nature through sensorial contact in their domestic settings. It argues that nature should be integrated into the older adults' domestic spaces to foster connections with nature that promote active living and improve their well-being. Such interactions with nature are captured by understanding the relationships between the degrees of connection with nature: viewing nature, being in nature, and doing in nature. This study was conducted through field observations and interviews with 24 older adults with varying physical capacities and levels of independence across 15 households in Jakarta and West Java. It further maps the nature-related elements within households and reveals the trajectories of sensorial engagements among older adults, nature, and the surrounding domestic space. This study redefines nature in six roles: as an image, object, surface, threshold, living being, and space. Such roles were defined based on the elements of nature found in the domestic space. Furthermore, this study reveals how sensorial contact with nature is understood through their actions towards nature, particularly in personalizing their domestic space, by replicating, ordering, and caring for nature. It is found that degrees of connection with nature, from viewing to being to doing, are embedded in how older adults interact with nature and must be considered in developing spatial design for older adults' domestic settings to promote active living by incorporating nature elements into domestic space design.

Keywords: sensorial contacts, older adults, degrees of interactions, nature elements, domestic space

INTRODUCTION

This study explores the potential of domestic space in fostering diverse engagements with nature for older adults, emphasizing the significance of the elder-nature relationship. Although existing research highlights the many ways nature supports older adults' physical, mental, and social well-being (Gao et al., 2020; Wen et al., 2018), the sensory dimensions of this relationship within domestic space remain an inviting and underexplored area. This study examines ways in which nature is integrated into the everyday domestic spaces of older adults.

Outdoor mobility interventions intended to facilitate movement outside the home offer potential benefits but also present risks, including falls and injuries (Ringsten et al., 2023), particularly for some older people. In fact, domestic space for older adults is often discussed as a medium for keeping them active to maintain their well-being and improve their quality of life. It is a site that establishes a sense of belonging through active management of the surrounding space (Sixsmith et al., 2014), thereby maintaining older adults' independence. It also acts as a preferred space for them to live and work (Sattayakorn et al., 2023). Thus, it becomes necessary to improve the quality of life for older adults (Stephens & Allen, 2022) and maintain their social well-being (Sixsmith et al., 2014) within the domestic environment.

Prior research on the domestic environment primarily explores nature in relation to the outdoor environment through gardens and courtyards. Gardens serve as destinations of interest for older adults (Ahrentzen & Tural, 2015) and promote a sense of continuity with nature (Newton et al., 2021), while courtyards, as outdoor spaces, deepen the relationship between inside and outside (García-Casabán, 2025). However, such a perspective considers nature as a setting (Barret et al., 2019) that surrounds the subject (Salingaros, 2020). On the other hand, nature offers various benefits in the domestic setting, as it provides easier visibility into the natural environment (Uwajeh et al., 2019). It promotes the subject's focus (Jakob & Collier, 2017; Kellert et al., 2008), enabling multisensory experiences during the interaction (Tilley, 2006).

Furthermore, human senses play a significant role in understanding and experiencing nature in domestic spaces. Sensory and natural elements are often associated with therapies that promote health through active stimulation. In this way, nature serves as "passive recreation" for older adults (Baillon et al., 2002; Engelen et al., 2022) as it provides relaxation (Baillon et al., 2002), relieves stress (Engelen et al., 2022), and promotes social interactions among older adults (Otten et al., 2023). Nature should not be perceived solely as a stimulus for well-being among older adults; it also offers therapeutic qualities (Finlay et al., 2015) and should be integrated into their lives. Exploring everyday contact with nature is, as such, important for understanding the elements that promote both passive and active engagement in their daily routines.

Additionally, some research on older adults' domestic settings has also examined architectural elements that may pose risks to them, particularly in Southeast Asian domestic contexts. Tuicomepee et al. (2025) discussed how some spaces present household hazards that increase fall risk among older adults. For example, bathrooms (due to the slippery floor) (Chindapol, 2025), pathways to or inside the house (due to uneven ground or raised floors), and living areas with inadequate lighting (Tuicomepee et al., 2025). Such home conditions make it challenging for older adults to perform their everyday activities. Understanding established design recommendations that ensure the safety and comfort of older adults in domestic spaces is therefore necessary in developing the spatial design. For example, spaces should provide an interior atmosphere appropriate to a home environment that is without visual distractions (Yanprapasiri & Jarutach, 2025), eliminate raised steps or uneven surfaces to improve access (Tuicomepee et al., 2025), or provide sufficient lighting for accessibility (WELL Certified, 2025).

In particular, this study is situated in the Indonesian domestic households. Current research has explored the importance of investigating and relocating older adults to home care facilities (Stephens & Allen, 2022), which are beneficial for their quality of life (Ahrentzen & Tural, 2015; Andersson, 2011), but domestic spaces for older Indonesians, particularly within

the home setting rather than in home care facilities, requires further exploration. It is necessary to identify the sensorial interactions between the older adults, natural elements, and the surrounding space in the Indonesian domestic setting to further investigate the role of nature-related elements in spaces. This study examines how and the extent to which these individuals engage in sensorial contact with nature in their domestic settings, thereby contributing to the spatial design that integrates nature inside the domestic space.

LITERATURE REVIEW

Degrees of Interaction With Nature in the Domestic Space

The relationship between older individuals, nature, and their needs is multifaceted, unfolding both outdoors and in domestic environments. This study employs a theoretical framework to provide a more comprehensive understanding of this relationship by evaluating the distinctive, sensorily mediated ways in which older people experience nature. It further categorizes their experiences in nature into three levels: viewing, being in, and doing in nature (Buse et al., 2023; Orr et al., 2016). Viewing requires minimal movement in perceiving nature. It involves access to nature wherein the visual senses play a significant role in experiencing nature's qualities (Orr et al., 2016). Viewing nature also provides "wonderment"—a feeling of wonder and delight (Allen-Collinson & Leledaki, 2019, p. 462)—and can be achieved through photographs, videos, paintings, and murals related to nature (Barret et al., 2019; Reynolds et al., 2018; Uwajeh et al., 2019). Such actions are attempts to mimic nature's qualities through viewing nature.

On the other hand, being in nature requires a moderate level of closeness. Older adults are surrounded by nature; however, their interactions with it do not involve active movements, though they do engage with it beyond their visual senses. That is, they are closer to nature but merely passive. For example, older adults' engagement with natural materials (Barret et al., 2019) involves touching the textures of natural

elements. Another example is listening to the non-human elements, such as hearing birds chirping and leaves rustling. Such engagements allow them to explore various ways of being in nature, thereby facilitating play and enjoyment (Buse et al., 2023). Meanwhile, doing in nature enables intimate and active engagement with nature. This interaction expands the role of nature as an integrated part of their everyday activities. For example, interacting with pets or living animals provides a stronger connection with nature. Allen-Collinson and Leledaki (2019) see such engagements as "ecophilia—a loving and caring attitude towards nature" (p. 483).

Various degrees of connection with nature reveal strategies to develop a closer dialogue between nature and older adults. Nature provides playful and enjoyable experiences, often in gardening spaces, where older adults use tools and plants they have grown (Buse et al., 2023; Gibson, 2007). Fisher et al. (2018) and Otten et al. (2023) note how planting flowers or trees evokes reminiscence of past experiences, which can stimulate conversations among them. Another strategy for building closer engagement with nature is to provide boundaries (Moore, 2007) such as pergolas or low-enclosing fences to enable visual access to other parts of nature or the landscape and build social relations with others or neighbors.

Engagement between older people and nature requires attention towards their mobility, which affects how they connect with nature. With limited physical fitness due to increasing age, nature should be seen not as a physical barrier (Zhang et al., 2017), but a motivator for older people to be physically that enables them to remain "engaged and/or connected to the outside world" (Franke et al., 2019, p. 1651). It also celebrates independence and self-control, which encourage them to walk and move with nature (Musselwhite & Haddad, 2010). Within these diverse modes of interaction with nature, this study seeks to deepen understanding of how older adults experience and engage with nature in domestic environments, employing sensory and spatial analysis to examine their everyday interactions.

METHODOLOGY

An exploratory study of older adults' experiences and engagement with nature was conducted through a qualitative method as an inductive process of inquiry (Groat & Wang, 2013) into the domestic environment experiences of older adults. The study targeted older adults aged 60 years and above and the domestic environments where they reside. The data were collected from 15 households with 24 older adults in Jakarta and Depok, West Java, Indonesia, selected using purposive sampling. Given Indonesia's rapidly aging population, particularly in Jakarta and West Java (Badan Pusat Statistik, 2024) and the importance of aging in place, there is a critical need to investigate how residential conditions shape older people's well-being. As this study aims to provide an in-depth analysis through observational approaches and interviews, the sample size is appropriate because smaller groups allow for rich, context-specific insights that would not emerge in larger samples, thereby enabling a more nuanced understanding of participants' experiences while maintaining methodological rigor (Stokes & Bergin, 2006). The age at which someone is considered an older adult may vary; for example, in Australia and China, this classification often begins at age 65 (Australian Institute of Health and Welfare, 2024; Wang & Chen, 2022). As this study is situated in the Indonesian context, "older adults" refers to individuals aged 60 years and above.

The age of older adults participating in this study ranged from 62 to 86 years old. There were 9 males and 15 females, with variation in functional capacity. Three of the participants are partially dependent, with caregivers to support some of their activities, while the others are independent older adults and do all their everyday activities without assistance. One of the partially dependent participants primarily moves with a wheelchair, although she can walk without assistance at a slower pace. As the study primarily examined natural elements in domestic settings and the sensory dimensions of viewing, being in, and doing in nature, mobility played a crucial role in enabling or constraining these forms of engagement. Accordingly, the evaluation incorporated a measure of physical condition based on walking ability (independent, assisted, or aided by a wheelchair or stick) and

walking pace (Shi et al., 2018). Considering physical condition as a variable enabled the study to identify which domestic natural components and sensory modes were key across capacities and which were capacity-sensitive.

The study employed field observations and semi-structured interviews, enabling a comprehensive examination of environmental interactions and participant experiences. During the field observation, the natural elements in each house were recorded and mapped to illustrate the presence of nature in the domestic environment. Interviews were employed to provide an in-depth understanding of older adults' preferences for nature and the reasoning behind them by asking participants to define nature and explain their interest in it. The study also collected data on their daily activities and hobbies, and where these activities take place inside the house, including position and orientation during the activities, as well as the reasons for choosing that space or object. The data were analyzed by classifying observational notes and conducting thematic coding of interviews, which were then represented through spatial mapping. The analysis is followed by initial classifications of the natural elements present in domestic spaces and the types of interactions with these elements. Based on the classifications, the data are further categorized by degree of connection with nature—viewing, being in, and doing in. The integration of these methods provides a deeper understanding of the interactions and trajectories that characterize older people's experiences with nature.

FINDINGS AND DISCUSSION

Findings: Nature Encounters in the Older Adults' Domestic Spaces

Drawing on both observational field notes and interviews, the findings bring together the outcomes of these methods and are presented in two interconnected sections. First, the analysis explores how participants identified, interpreted, and located nature-related elements in their

homes. The second section maps the trajectories of their daily activities, highlighting the ways they encountered and sensorially engaged with these elements.

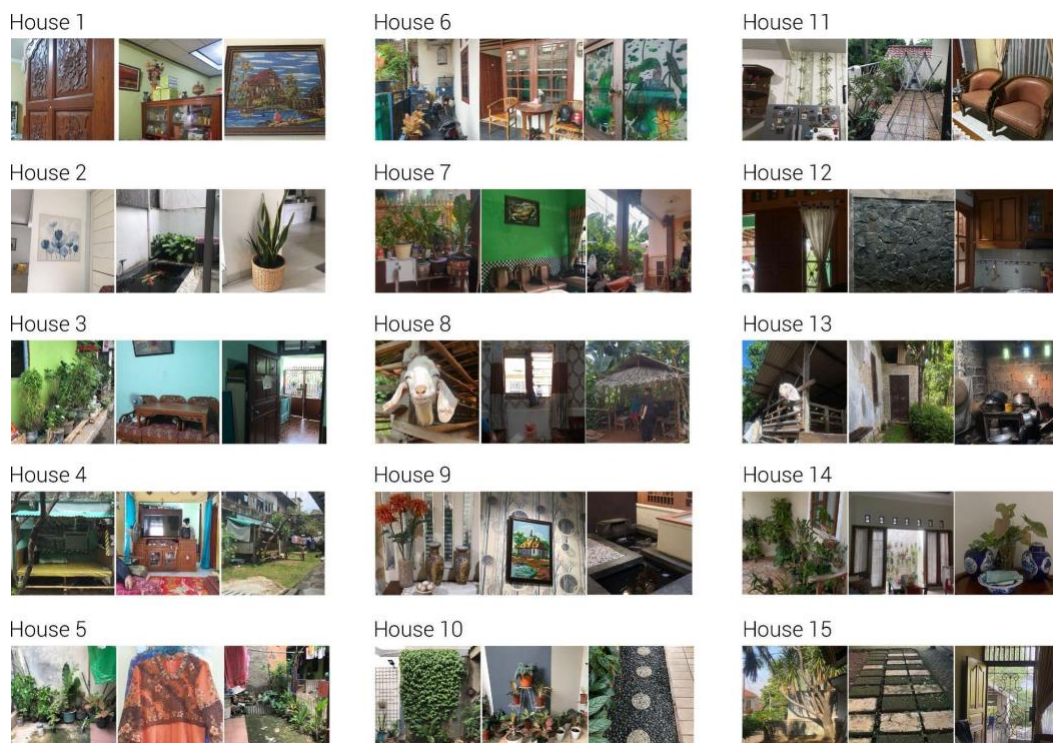
The following section presents various nature-related elements in participants' homes and elaborates on how older adults define nature. Figure 1 demonstrates various nature-related elements in each household. All houses had natural plants or planting-related elements, including potted plants, artificial plants, decorative plants, vines, grass, or trees. Some houses had various representations of nature through colors and patterns, such as green walls and nature wallpaper, as seen in Houses 1, 3, 5, 6, and 7. In contrast, some had built elements using natural materials, such as stone pathways or stone walls. Some older adults kept animals as pets or livestock, as seen in Houses 8, 13, and 15. In short, the homes had a rich array of nature-based elements that existed alongside or supported a variety of activities. For example, Grandma W in House 13 attempts to maintain a village atmosphere by interacting with animals and cooking with traditional tools near the pens. Other cases involved interactions with nature through cleaning are embedded in older adults' everyday routines, as seen in Houses 2, 9, 10,

and 14. Meanwhile, House 4 had the fewest nature-related elements. It mainly featured natural elements, such as patterns, openings, and objects, given the participants' limited activity within the house.

Given the variety of nature-related elements in the house, for most participants, nature was associated with images and/or objects, particularly plants and flowers (Houses 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, and 15). Most participants owned potted plants or artificial plants or had nature paintings hung in their homes. For them, nature was also often defined by its color (green) (Houses 1, 6, 11, and 14), which is represented in their interior space, where they had painted their walls green. Nature was also seen in some participants' association of nature with animals (Houses 1, 8, and 13). Some perceived nature as a village, where "feeding chickens" was part of the experience (House 1). Another highlighted its connection to agriculture (House 8), while another described it as a space away from crowds (House 7). The spatial meaning was further emphasized in some responses, including aspects such as historic value (House 11) and memorable experiences (House 14).

Figure 1

Some Collections of Nature Elements Inside the Older Adults' Domestic Spaces



Redefining the Role of Nature in the Older Adults' Domestic Settings

Based on analysis of nature-related elements in the observed houses, we can identify various roles of nature as sensorial stimulation for older adults, ranging from a limited role as a visual image to an expanded role as a space, as demonstrated in Figure 7. Nature serves as an image when represented in two-dimensional views. In such cases, older adults mainly rely on their visual senses as they view nature patterns and paintings or see green colors representing nature. One can also experience nature as images through sewing nature patterns or painting walls green. Alternatively, nature may be an object, such as decorative potted plants, placed within the domestic space. Here, interaction takes place through a) viewing nature by seeing artificial plants or decorative objects made from natural materials; b) being in nature by touching artificial plants or cleaning objects made from natural materials; and c) doing in nature by arranging potted plants inside the house. Perceiving nature as objects is commonly experienced by older adults in their domestic spaces, providing stimulation and fascination (Moore, 2007).

Nature serves as a surface when older adults utilize natural materials as, for example, tables and chairs made of wood and woven rattan for sitting and relaxing. Such use can promote interaction by viewing (seeing the furniture made of natural materials) and being in (sitting on the furniture). As a surface, nature enables them to be in closer contact with it by occupying the surface, rather than simply seeing and touching nature-related elements. Nature can also be seen as a threshold that provides access to the inside and/or outside of the domestic space. It can promote interaction through viewing (providing visual access to the outdoor environment or hearing the outside environment) and being in (passing through the threshold to enter the outdoor environment). In this role as a

threshold, nature can provide boundaries and, at the same time, offer access to the outdoor environment for older adults, promoting their mobility within the house.

Nature is also presented as living beings in contexts related to farming and agricultural events, wherein there is interaction among the older adults and livestock. Such interactions consist of viewing nature by seeing or hearing the animals, being in nature by touching the animals, and doing in nature by feeding the animals regularly. A broader perspective on nature can be achieved by considering it a space that enables older adults to engage in various activities. Through viewing nature, they can see the garden, hear nature, and share documentation of nature. Being in nature as a space can involve activities such as walking on a textured path, being surrounded by plants, and sunbathing; meanwhile, interacting with nature can include planting flowers.

Encounters With Nature-Related Elements in Everyday Routine

Next, mapping the trajectories of the older adults' daily activities within the domestic setting reveals various forms of sensorial engagement with nature. Based on the observations and interviews, interaction with nature is a part of their daily routines. House 8 demonstrated a domestic setting where older adults can engage in active living and interact with nature, both inside and outside the house. In the morning, Grandpa M does light work on the terrace to enjoy the fresh air and hear the sounds of nature, such as birds chirping and leaves rustling. He spends most of his mornings outdoors at the livestock pens at the back of his house, feeding the goats and cutting the grass for animal feed. He spends his afternoons resting, then again feeds the animals in the evenings and stays outdoors for hours, until dawn (Figures 3 and 4).

Figure 2
Degrees of Connection With Nature

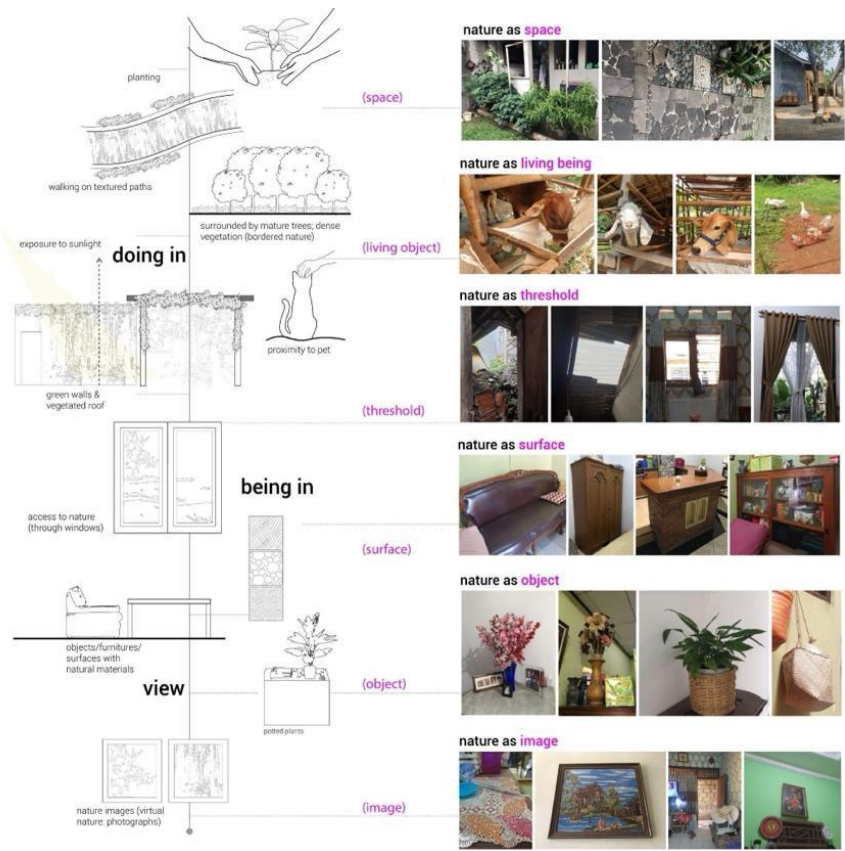


Table 1
Identifying the Nature-Related Elements Inside Older People's Domestic Spaces

House Number	Definitions of Nature	Nature Elements Inside the House	Role of Nature	Number of Nature Elements
1	Landscape, serene, fresh, playing with animals, green color	nature patterns (printed), nature paintings	Nature as image	36
		artificial flowers, decorative objects from natural material, potted plants	Nature as object	
		wooden furniture	Nature as surface	
		openings (doors & windows)	Nature as threshold	
		trees	Nature as living being	
		aquariums, bird nests, chicken nests, skylights, wooden bridges	Nature as space	
2	Plantings, colorful flowers, fresh	nature painting, nature patterns (printed)	Nature as image	47
		decorative plants, artificial plants, plants, decorative objects from natural material,	Nature as object	
		wooden furniture	Nature as surface	

Table 1 (Continued)

House Number	Definitions of Nature	Nature Elements Inside the House	Role of Nature	Number of Nature Elements
		openings (doors & windows), skylight/void	Nature as threshold	
		vines	Nature as living being	
		terrace, fishpond	Nature as space	
3	Outdoor activity, sports, outdoor environment, large plants	nature painting, green painted wall,	Nature as image	47
		potted plants	Nature as object	
		wooden furniture	Nature as surface	
		openings (doors & windows), void/skylight	Nature as threshold	
4	Garden	nature patterns (printed)	Nature as image	11
		wooden furniture	Nature as surface	
		openings (doors & windows), skylight	Nature as threshold	
		garden	Nature as space	
5	Decorative plants (for aesthetic purposes)	nature patterns	Nature as image	15
		potted plants, Christmas tree, objects from natural materials	Nature as object	
		wooden furniture	Nature as surface	
		openings (door & window), skylight/void	Nature as threshold	
6	Green color, cool	nature patterns	Nature as image	32
		potted plants, artificial plants, decorative objects from natural material	Nature as object	
		wooden furniture	Nature as surface	
		skylight/void, openings	Nature as threshold	
		vines	Nature as living being	
		bird nests	Nature as space	
7	Landscape, far from the crowd	nature painting, nature patterns, green painted wall	Nature as image	17
		potted plants, artificial plants	Nature as object	
		wooden furniture	Nature as surface	
		openings (door & window)	Nature as threshold	
		garden, bird nest	Nature as space	

Table 1 (Continued)

House Number	Definitions of Nature	Nature Elements Inside the House	Role of Nature	Number of Nature Elements
8	Plants, animals, garden, farming	green painted wall, nature pattern	Nature as image	33
		artificial plants, decorative objects from natural material	Nature as object	
		openings (door & window)	Nature as threshold	
		cows, goats, goose, ducks, trees, chicken	Nature as living being	
		fish aquarium, animal pens, roof made of leaves, wooden & bamboo bridges,	Nature as space	
9	Decorative plants, fresh	nature painting, nature patterns, wallpaper with nature images, green painted walls	Nature as image	39
		decorative objects from natural material, artificial plants	Nature as object	
		wooden furniture	Nature as surface	
		openings (door & window)	Nature as threshold	
		bird	Nature as living being	
		garden, terrace	Nature as space	
10	Plants, decorative plants, fresh	nature patterns (printed & engraved),	Nature as image	42
		artificial plants, objects from natural material, preserved birds of paradise, decorative plants	Nature as object	
		wooden furniture	Nature as surface	
		vines, plants	Nature as living being	
		gardens, natural stones, stone pathways	Nature as space	
11	Plants, decorative plants, fresh, green color, has historical value	wallpaper with nature images, ceramic walls with nature images, engraving in furniture, tiles, carpets and curtains with nature patterns, tablecloth, bedsheet	Nature as image	49
		potted plants, decorative objects, artificial plants, preserved bird of paradise	Nature as object	
		furniture	Nature as surface	
		openings (door & window)	Nature as threshold	
		garden, wooden stairs	Nature as space	
12	Plants, natural patterns, Arabic calligraphy	nature paintings, engraving in furniture, nature patterns in cushions, table mats, tablecloth,	Nature as image	45

Table 1 (Continued)

House Number	Definitions of Nature	Nature Elements Inside the House	Role of Nature	Number of Nature Elements
		decorative objects (angklung), lighting fixtures, artificial plants,	Nature as object	
		openings (door, window, partition)	Nature as threshold	
		decorative roofs, gardens, terraces, green walls, natural stone walls	Nature as space	
13	Plants, green color, animals, stones	potted plants, tablecloth, table mat, bedsheets, prayer mat, nature paintings, curtain	Nature as image	67
		decorative objects, bamboo clothes hanger	Nature as object	
		furniture	Nature as surface	
		openings (door & window), walls	Nature as threshold	
		trees, grass, river, sand	Nature as living being	
		livestock pens, wooden roof, green walls, fireplace	Nature as space	
14	Colorful plants, decorative plants, natural patterns in the object, memorable, fresh, green color	Arabic engraving calligraphy, table mat, engraving in furniture, nature patterns in bed sheet	Nature as image	59
		potted plants, decorative objects, artificial grass,	Nature as object	
		furniture	Nature as surface	
		vines	Nature as living being	
		openings (door & window),	Nature as threshold	
		stone tiles, terrace, cat cage,	Nature as space	
15	Fresh, fruits, trees and plants, open space, freedom, natural materials, garden	curtain, Arabic engraving calligraphy, carpets	Nature as image	62
		furniture	Nature as surface	
		openings (door & window),	Nature as threshold	
		trees, plants, moss, piles of leaves,	Nature as living being	
		green walls, hallway, stone walls, woven bamboo, textured pathway, stone pathway	Nature as space	

Interaction with nature-related elements is also incorporated into the domestic space. For example, in House 2, various attempts were made to incorporate nature-related elements into the house by bringing nature inside (Figure 4). Based on the interviews, Grandma T mainly engages with nature while she does house chores, including cleaning the house in the morning and afternoon and drying the clothes in

the afternoon (Figure 5). She can directly see and touch nature-related elements, as she is surrounded by nature and able to arrange and view decorative or potted plants that dot the domestic space, creating a visual connection. In contrast, she has limited engagement with nature during leisure activities such as watching TV in the living room or relaxing in the in-between space.

Figure 3

Mapping of Nature Elements in House 8

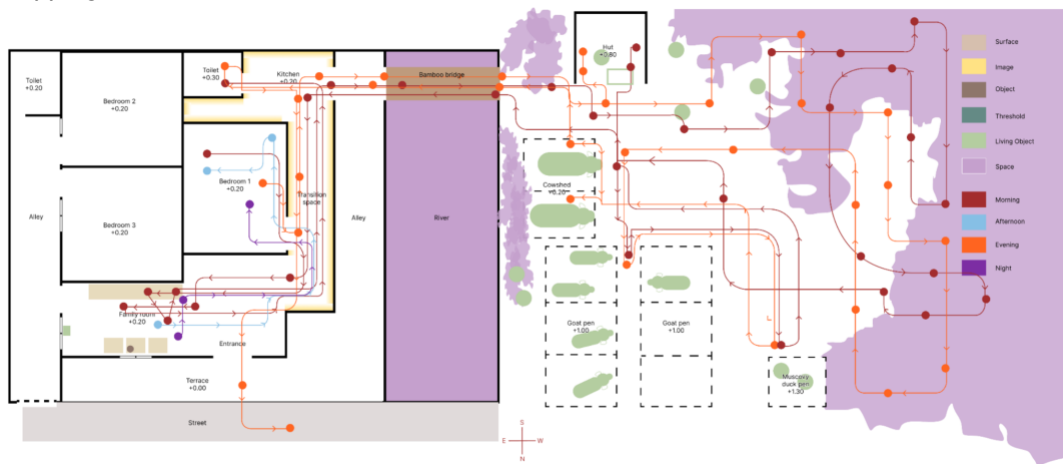


Figure 4

Trajectories of Sensorial Experience with Nature in House 8 (Grandpa M)

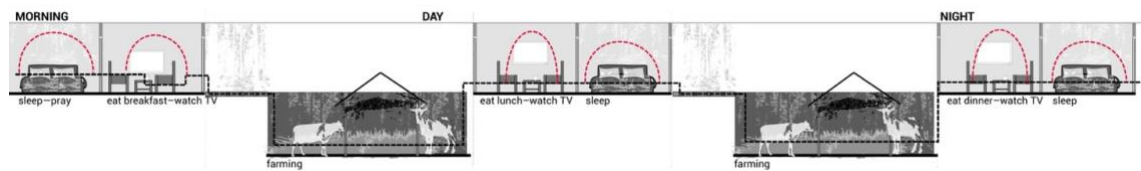


Figure 5

Mapping of Nature Elements in House 2



For interactions with nature involving elements brought into the domestic space, the interviews with participants in several houses also indicated that not all such elements are recognized, even though their activities may bring them close to them. In House 1, the elements were unrecognizable due to their size and placement. They forgot to mention the decorative plants, likely since they are placed on top of the cupboard. They also did not recognize the decorative objects made of natural materials because the color blended into the surrounding object (Figure 6, top). Thus, visual access to

nature-related elements becomes necessary for recognizing nature within the domestic space. Grandma NT did not notice the natural patterns on a chair backrest, nor the natural paintings which were placed far above, making them difficult to see. In House 3, Grandma S did not notice the table mat with nature patterns because it was covered by surrounding objects (Figure 7, middle). On the other hand, in House 6, the nature patterns in the flooring and on the bedroom curtain were difficult to recognize due to limited visual acuity (Figure 7, bottom).

Figure 6

Trajectories of Sensorial Experience With Nature in House 2 (Grandma T)

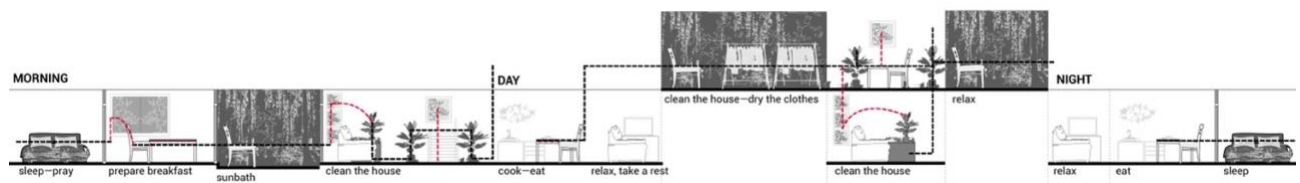
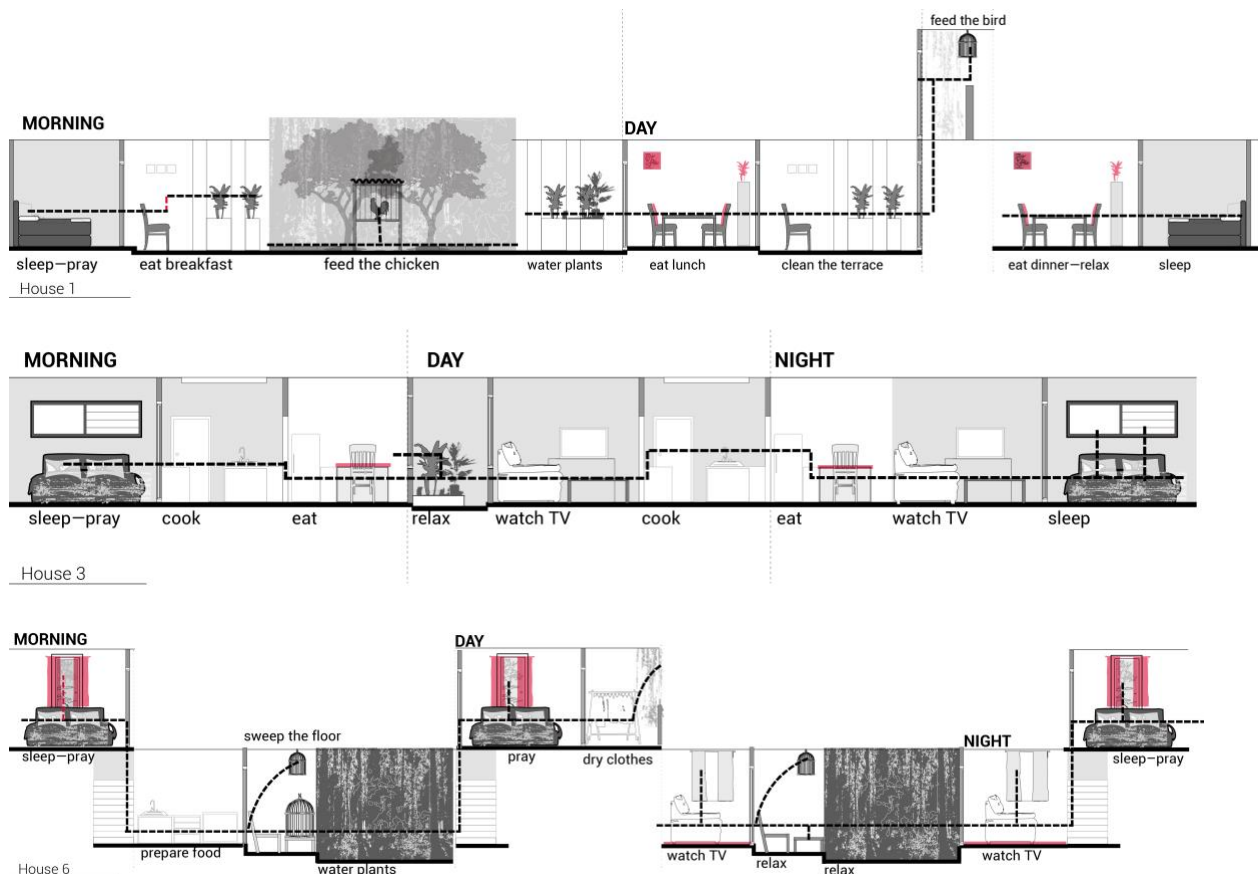


Figure 7

Unrecognized Nature-related Elements in the Trajectories of Experience in Houses 1, 3, and 6



Actions Toward Nature: Personalizing Domestic Space to Connect With Nature

Further analysis was conducted to understand the sensorial engagement of older adults in the domestic setting, identifying the various actions they perform toward nature. This study views these actions as a way to personalize the domestic space and maintain connections with nature. Such actions are found in three forms: replicating nature, ordering nature, and caring for nature.

Replicating Nature

Actions of replicating nature involve interactions from seeing to touching through creative production and focus on the creative and aesthetic production of nature-related elements. Some acts of replicating nature included creative production of artwork, crafts, or objects inspired by nature, to be later displayed and enjoyed. In House 1, Grandma NT made three woven paintings with a natural theme that were displayed on the wall. She had a mental image of nature as a landscape, as illustrated in her first and third paintings, which featured a blue sky, ocean, and trees. She was also inspired by animals and their habitats, leading her to paint sunsets, rivers, and flamingos in her second painting. Since she made the paintings, she often sees them in the living room while relaxing in the afternoon and evening. In House 5, similarly, Grandma R produces embroidery of nature motifs in the form of flowers for dresses, batik blouses, or *kebaya* (traditional Indonesian women's clothing), which were hung in the living room. She prefers to sit and display the embroidery by the windows to make the patterns stand out, particularly in the morning and afternoon.

Another act of replicating nature is painting house walls green to represent the colors of nature. Such actions were found in most houses, particularly in areas designated for relaxation, including the living room (Houses 7, 8, and 15), bedroom (House 3), and terrace (Houses 12 and 13). Participants painted the walls green to create a cool atmosphere in the space where they frequently relax, as the area had limited

plantings. In this way, the participants actively engage with nature by painting with natural colors or sewing natural patterns to enjoy and view when they relax.

Ordering Nature

The act of ordering nature involves attempting to intervene in it through acts of seeing, touching, and arranging. Some of the acts found in this study involved arranging natural elements to make them visible, touchable, and enjoyable in everyday life. In House 2, Grandma M collects and arranges potted plants (*Sansevieria*), which were placed in every corner of the house, particularly in the living room and near the stairs, as these are places she frequently passes. Others order nature as part of a hobby of collecting objects. In House 9, Grandma HM arranges the decorative plants with the other objects. She likes to arrange the artificial plants with matching tablemats or furniture. The plants are placed in front of her bedroom, where she usually arranges them in the morning and afternoon. Through these actions, the participants interact with nature by arranging and positioning various natural elements, combining them with other domestic objects for decorative purposes.

Ordering nature can also involve arranging it by size and color, as demonstrated in House 10 by Grandma SY. She arranges the potted plants and the stone pathway to accommodate her foot therapy and for sunbathing in the morning and evening. Such arrangements will later be shared or posted on social media, particularly on TikTok. These actions demonstrate how seeing nature (e.g., plants, stone, decorative plants), being in nature (e.g., hearing the sounds of nature such as wind or being surrounded by natural elements such as plants), and actively taking care of nature enhance a sense of pride and independence in managing the domestic space (Sixsmith et al., 2014). Such arrangements of nature are flexible, allowing them to rearrange the elements multiple times based on their mood and preferences. They personalize and intervene in nature to build a sense of ownership of the surrounding space. As home maintenance becomes difficult for them (Fausset et al., 2011), they prefer the general cleaning tasks, one of which is ordering nature.

Caring for Nature

The act of caring for nature involves interacting with plants and animals, recognizing nature as both objects and living beings. Such experiences usually involve seeing plants and animals, hearing their sounds, being surrounded by them, and touching and caring for them. These actions result from a deep engagement with the plants and animals they own, to which they are strongly attached. From the interviews, Grandpa G owns three turtle doves, one spotted dove, and one lovebird (House 7). Grandpa M (House 8) and Grandma W (House 13) own livestock animals, including goats. Additionally, Grandma N owns an orchid and vegetable farm (House 14). They feed the animals (Houses 6, 7, 8, and 13) and interact or play with them (Houses 7 and 8) to actively engage with nature.

Such attachment is evident in their behavior. For example, Grandma W eats facing the goats and cooks in the kitchen near the pens (House 13). For Grandma W, such behaviors toward nature resemble how she used to live in the village. The participants' strong attachment to nature is also evident in their activities, such as watering plants (Houses 7, 10, and 14) and planting flowers or vegetables (House 14). These actions indicate that they are attached to nature as living beings, enabling them to integrate nature into their daily lives. Engaging with living beings, such as being surrounded by plants and animals or touching them, can foster a stronger attachment to nature through active interaction, which keeps them active during the day and night.

The Interchangeable Sensorial Interactions With Nature

This study expands the role of nature for older adults beyond merely discussing it as an outdoor environment through gardens or green spaces; instead, nature can be defined in six roles within the domestic space: nature as image, object, surface, living being, threshold, and space. As an image, nature is perceived through colors or natural patterns, as seen in paintings and in patterns found in domestic spaces. As an object, nature has decorative or artificial qualities, while nature as a surface accommodates the functional and daily activities of older adults, such as sitting.

As a living being, nature can be seen through animals such as pets or livestock. Nature as a threshold provides access to the outside environment, and nature as a space enables older adults to engage with various activities that can promote active living.

Limited engagement with nature through viewing, seeing, and hearing, can be found in most of the roles of nature. Such experiences involve minimal movement, with nature as the main subject. On the other hand, more active engagement—being in nature—is found in the role of nature as object, surface, and space. Participants could touch and arrange potted plants, where nature is seen as an object, occupy nature-based surfaces to relax, or experience a sense of being surrounded by nature. Such experiences indicate that older adults seek nature-related experiences that enable passive recreation (Engelen et al., 2022). Meanwhile, doing in nature could be seen among images, objects, living beings, surfaces, and spaces, where the boundaries between nature and participants were blurred. In such engagement, they attempted to “control” nature, promoting active and healthy aging in place. Thus, redefining the roles of nature reveals how older adults encounter and interact with it in their domestic spaces, based on their everyday routines.

This study also recognizes relationships among the six roles of nature and actions toward nature (replicating nature, ordering nature, and caring for nature) that result in the fluidity of the older adults' degrees of interactions with nature (viewing, being in, and doing in nature). Table 2 summarizes the relationships among different roles of nature, the degrees of interactions, and the actions toward nature found in this study. It illustrates the opportunities presented by natural elements in the domestic spaces of participants that provide them with a variety of experiences and engagement with nature.

Sensorial encounters with nature as image and object enable older adults to replicate nature. Such representations (e.g., colors, patterns) in the mind trigger creative engagement. For example, by viewing nature as images, older adults' tactile experiences are enhanced through hands-on activities that attempt to replicate it, such as painting walls green, sewing nature-inspired patterns, or creating nature paintings. As

Robertson and McCall (2018) note, creative work by older adults is not seen as an output but rather as a form of engagement to boost their confidence and self-expression. Replicating nature expands the degrees of connection with nature, allowing them to be seen flexibly. The degrees are fluid. For example, viewing colors and elements of nature transforms the degrees of connection from perceiving nature as images to directly perceiving nature as an object (painting) and/or space (Figure 8). Thus, by replicating nature, encounters with nature can be experienced in creative ways, ranging from passive observation to hands-on engagement to inhabiting and seeing the space of nature.

Similarly, the role of nature as object also enables the participants to order nature. Such is the case in their everyday routines which frequently involve ordering nature, in the form of decorative plants, potted plants, or stones, as they perform household chores. Such acts, of course, begin with viewing nature as objects and lead into engage with it as a space where they can later hear its sounds, be surrounded by it, and touch its elements. Going from seeing nature as objects to experiencing nature as a space results in more active engagement with it by arranging nature-related elements that

Table 2
Relationships Among the Roles of Nature, Degrees of Interaction, and Actions Toward Nature

Role of Nature	Degree of Interaction	Actions toward Nature
Nature as image	Viewing nature	Replicating nature
Nature as object	Viewing nature Being in nature Doing in nature	Ordering nature Caring for nature
Nature as surface	Being in nature	Ordering nature
Nature as threshold	Viewing nature	-
Nature as living being	Viewing nature Being in nature Doing in nature	Caring for nature
Nature as space	Viewing nature Being in nature Doing in nature	Ordering nature Caring for nature

Figure 8
Replicating Nature: Being Creative With Nature



accommodate their health and well-being. The domestic space of older adults is not only a place to live and work (Sattayakorn et al., 2023), but also one that supports individual agency in actively adapting to their environment and changing needs, thereby contributing to their independence and well-being (Stephens & Allen, 2022). In doing so, the degrees of connection with nature become blurred as they can engage with and experience nature according to their preferences, promoting a sense of ownership over the objects and space (Figure 9).

Caring for nature necessarily involves seeing nature as objects and living beings to engaging with nature as a space. In other words, viewing nature serves as a starting point for creating connections with nature by seeing it as a living entity. Older adults can, further, experience being in nature by hearing and touching animals and plants, which in turn leads them to interact

directly with nature by watering the plants, cutting the grass for animal feed, feeding the animals, and planting. Caring for nature, in turn, keeps older adults active in their domestic spaces, where they not only interact with nature as objects and living beings but also engage with the space itself, be it a livestock pen or garden. The material environment becomes an important site for human-animal relations, as evidenced by the spatial configuration and material flows within the multispecies interior (Paramita et al., 2024). The degrees of interaction with nature in the domestic space are expanded, where viewing, being in, and doing in nature are experienced outside of a sequential order, and caring for nature in the domestic space opens further engagements with the space for the living beings. Older adults can view and experience nature while also nurturing the nature-related elements integrated into their everyday routines.

Figure 9

Ordering Nature: The Act of Intervening in Nature

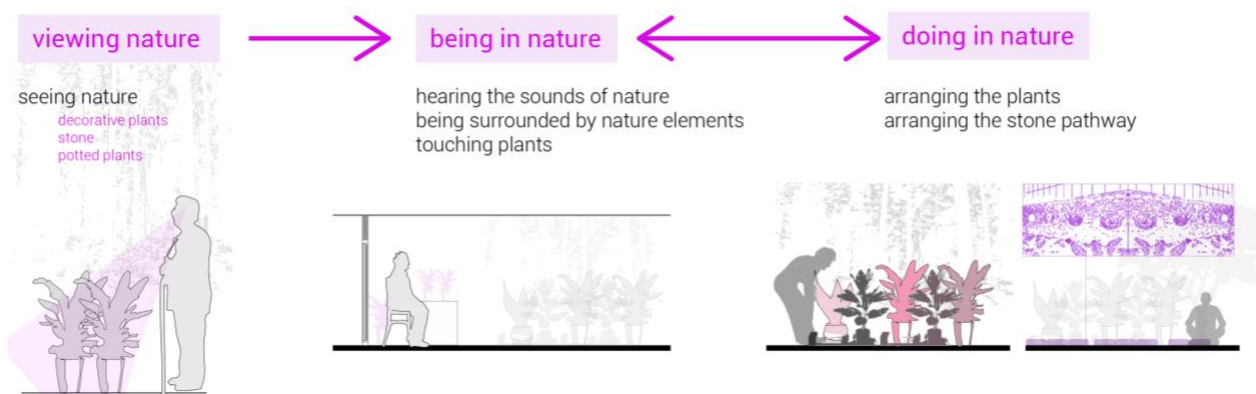


Figure 10

Caring for Nature, Keeping Older Adults Active

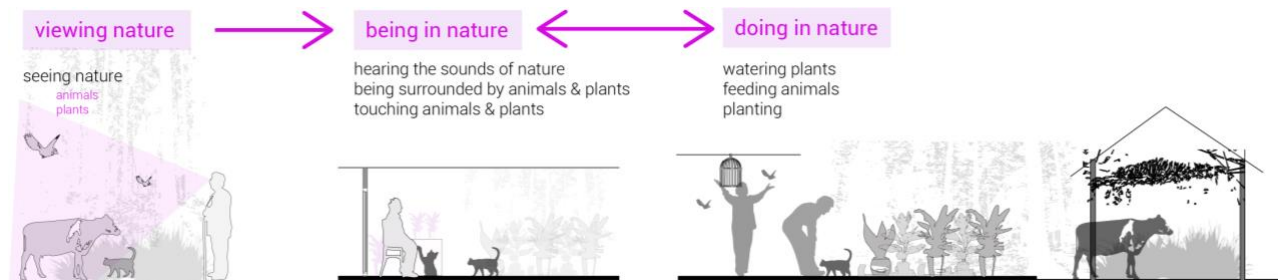
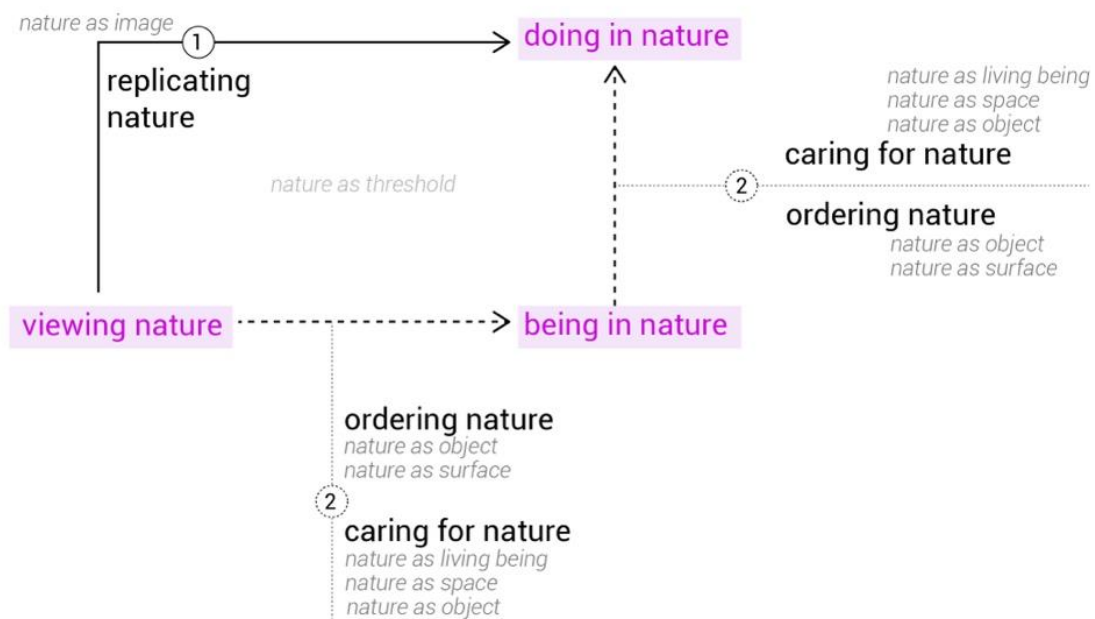


Figure 11

Relationships Between the Roles of Nature, Actions Toward Nature, and Degrees of Connection With Nature



Understanding the fluidity of sensorial encounters with nature, therefore, establishes spatial design requirements that provide safety for older adults, while also enabling them to personalize their spaces. Spatial design should, as such, consider elements that support their health and mobility by providing enough area to integrate nature into the domestic setting, thereby enabling the act of ordering nature. As different types and colors of natural elements—including indoor plants—have varying psychological and health impacts (Chatakul & Janpathompong, 2022), determining which types of plants can be re-ordered and arranged in older adults' domestic spaces is also necessary.

To promote creative engagement between older adults and nature by replicating nature, the spatial design should include sufficient areas or spaces for them to display their creative works. Such spaces or areas must be accessible and visible, particularly in spaces mostly occupied for relaxation, such as the living room, to provide refreshment and passive creation while viewing them. On the other hand, to support caring for nature, nature as living beings should be integrated into older adults' domestic spaces, utilizing indoor or outdoor spaces for the animals

to grow, as seen in some dwellings, where they often have spaces under the house (Tuicomepee et al., 2025) or in the backyard. Such integrations allow older adults to actively engage with and supervise the animals while carrying out their regular activities inside the house. Since encounters with nature as living beings mostly occur during feeding and watering (Paramita et al., 2024), ensuring the ground is clear of food or material spillage is necessary to avoid risk to older adults.

This study is situated in Indonesian domestic spaces, where active living while achieving serenity as one ages (Kusumaningrum et al., 2025) is promoted. Encountering nature in its various roles in this context enables older adults to sensorially engage with it. For example, their tactile experiences are enhanced by hands-on creative engagements, such as replicating nature or performing mundane activities like cleaning in the home. In most of their activities, their visual experiences are also heightened by the presence of nature. Meanwhile, the sensory experiences of smelling and hearing can be achieved by being surrounded by nature while performing everyday activities, promoting a sense of calm and relaxation.

CONCLUSION

This study identifies the sensory interactions between older adults and nature-related elements in domestic spaces. Adapted from Orr et al. (2016) on describing older adults' experiences with nature, this study views the experiences of viewing, being in, and doing in nature as degrees of connection with nature. Based on observations of 15 households and interviews with 24 older adults, this study investigates various interactions and the trajectories of their engagement with nature. It observes their daily activities and preferences for natural elements, identifying and mapping the natural elements within the house and how they interact with them. During their engagements with nature, participants did not recognize certain natural elements, even though these engagements may bring them closer to nature. The neglect of nature-related elements, or forgetting their existence, leads to a complete disregard for nature's presence.

The degrees of connection with nature serve as a basis for redefining the role of nature from the perspectives of older adults. Nature is defined in six roles: as an image, an object, a surface, a threshold, a living being, and a space. Such roles demonstrate how various forms of nature are incorporated into each element of the house, ranging from the patterns/colors/images of nature to objects and furniture made from natural materials to a larger form of nature as a space related to farming and agricultural activities. This study also categorizes actions toward nature into replicating, ordering, and caring for nature. Such actions help older adults personalize nature within the domestic space. As an image and an object, engagement with nature occurs through the replication of nature, enabling them to mimic nature creatively and offering them the opportunity to personalize natural elements, such as objects and surfaces, for integration into the domestic space. Likewise, nature as an object allows older adults to order nature, giving them ownership of nature elements and the surrounding space. A sense of ownership allows older adults to maintain independence and have self-control over objects and the space around them (Fausset et al., 2011). Other roles of nature, such as nature as living beings and as space, encourage older adults to care for nature,

which requires active, direct engagement with natural elements, inviting them to personalize the space by exposing them to the outdoor environment and activities.

This study also found degrees of connection (viewing, being in, and doing in) with nature while engaging in actions towards nature (replicating, ordering, and sharing nature). The degrees and actions toward nature can facilitate the development of spatial design for older adults to maintain continuous interactions with nature by personalizing their spaces. This may include arranging nature as objects or applying nature's colors within the domestic space to stimulate independence and well-being. The placement of nature elements for older adults should also ensure they are not camouflaged or forgotten due to limited visual capability. Integrating such natural elements into the domestic space enables nature to be embedded in their everyday routines, which can be achieved through viewing nature's colors or patterns, being surrounded by nature, or moving and actively caring for nature.

Degrees of interaction with nature can occur fluidly but being with viewing. Seeing nature triggers further active engagement, allowing degrees of connection with nature to be flexible rather than experienced sequentially. Further research may explore the potential of media and technology in supporting connections between older adults and nature in domestic spaces. The acts of viewing and doing in nature should not be limited to directly seeing the nature-related elements. Instead, older adults may engage with nature through social media and other digital technologies, thereby enriching their interactions with nature in the domestic space and contributing to the development of spatial design for older adults.

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