

Research Article

Sowur (House) Residential Space System, in the Eucalyptus Oil Industry in Wasur Village, Merauke, South Papua

Cindy Priscillia Sinay ^{1*}, Tarcicius Yoyok Wahyu Subroto ²

¹ Master of Architecture Study Program, Faculty of Engineering, Universitas Gajah Mada, Indonesia

² Master of Architecture Study Program, Faculty of Engineering, Universitas Gajah Mada, Indonesia

* Corresponding Author: cindypriscilliasinay24@gmail.com

Abstract: This study aims to analyze the factors that influence the residential spatial system of the Marori and Mengge ethnic groups in Wasur Village, Merauke, South Papua, in the context of their involvement in the eucalyptus oil industry as a leading tourism product of Wasur National Park. A rationalistic qualitative approach is used with the main theory of behavioral setting to examine the relationship between behavior, local culture, and spatial structure. The results of the study indicate that houses not only function as domestic spaces, but also as places for the production of eucalyptus oil, especially at the packaging stage. The overlapping use of space causes space invasion, changes in function, and the emergence of high spatial flexibility. The space of the house undergoes a temporal functional transformation, adjusting to the intensity of economic activities and cultural rituals of the community. Private, semi-public, and spiritual spaces experience shifting boundaries, which have an impact on social relationship patterns and living comfort. This study also found that social structure, customary values (Boan/marga), and division of customary areas play an important role in the formation of the spatial system. These findings are expected to be an important contribution to the development of residential architecture based on behavior and local wisdom, as well as community-based conservation area management. This study also highlights the urgency of preserving the culture and existence of indigenous tribes amidst the current of modernization and the threat of extinction.

Keywords: Behavioral Setting; Eucalyptus Oil; Local Wisdom; Marori Tribe; Mengge Tribe; Residential Space System; Spatial Flexibility; Spatial Invasion; Wasur National Park; Wasur Village,

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1. Introduction

South Papua has a variety of natural and cultural resources that have strategic value to be developed as a basis for sustainable tourism, one of which is through the eucalyptus oil industry in Wasur Village, Merauke. This local economic activity not only has an impact on improving community welfare, but also has a significant influence on the formation of a residential space system. Community adaptation to ecological conditions and the dynamics of production activities reflect the transformation of settlement patterns that are contextual and functional. This phenomenon shows a close relationship between domestic space, social practices, and the economic potential of the region, especially within the framework of developing eucalyptus oil as a superior tourism product that is in line with the principles of conservation in Wasur National Park. Therefore, research on the determining factors of the residential space system in Wasur Village is important as a conceptual and empirical basis in

compiling a thesis that discusses the integration between residential space, local culture, and the development of natural resource-based tourism.

The economic downturn in the interior of Papua has encouraged people to find ways to support their daily lives, the lives of people who rely on garden produce and hunting results cannot meet their daily needs. Merauke, South Papua, is precisely located in the Wasur National Park area and has an indigenous tribe that inhabits the Wasur National Park. The five sub-tribes are very backward in terms of economy. In the modern era that is very much covered by quite high needs for the daily needs of the community, the sub-tribes still experience many deficiencies which have resulted in increased health for the community. The distance to the city is also very difficult, people have to travel quite far if there are no vehicles that cross the area.

The existence of the 10 villages spread across Wasur National Park is occupied by sub-tribes that only exist in the Wasur National Park area, the emergence of the tribes that inhabit the Wasur National Park area is due to the mixing or marriage between the two ethnic races, namely the Malind-Anim tribe and the Papua New Guinea (PNG) tribe. This marriage resulted in the emergence of new sub-tribes in Wasur National Park, consisting of 5 new tribes, namely the Marori, Mengge, Kanum, Yei-nan and Namla tribes, the following sub-tribes are divided into several Ulayat areas (Customary areas) and also the 10 villages located within Wasur National Park. In addition to the new sub-tribes, the main tribe, namely the Malind - Anim tribe, is also spread across several areas in the Wasur National Park area. The 5 sub-tribes in the 10 villages, apart from hunting and gardening, the community also utilizes several plants as one of the economic supports, namely the Eucalyptus Tree Plant (*Melaleuca Cajuputi*).

The indigenous sub-tribes in the Wasur National Park area are now decreasing and almost extinct. Of the 5 sub-tribes, according to Mr. Yosep Maria Mahuze as the head of the cultural division and also the deputy head of the traditional community, Mr. Eusebius Basik-basik, several tribes that are almost extinct are the Trucks And Mengge. Ethnic group Trucks And Mengge occupies one of the 10 villages in Wasur National Park, namely Wasur village with a total of 150 families consisting of 303 men and 319 women according to data from the Village Community Empowerment Service of Merauke Regency 2024. Wasur village is one of the villages that is still active in managing eucalyptus oil traditionally, which is managed in the homes of the Wasur village community.

In Wasur Village, the management of Cajuput Oil is carried out by the tribal community. Trucks And Mengge not only as an economic support and also the utilization of the Ulayat area (Customary area) but also as a superior product in Wasur National Park tourism. Wasur National Park is not only a nature reserve but also a tourist destination in Merauke Regency, besides that Wasur National Park also has its own destinations that are packaged in such a way in the form of ecotourism destinations totaling 14 tourist destinations. The management of eucalyptus oil was initially managed by a group of indigenous people consisting of 5 sub-tribes in Wasur National Park, until over time the community began to be independent and decided to manage it themselves according to the Ulayat area (Customary area) per tribe, Boan (clan) village. In Wasur Village there are 2 main groups that manage eucalyptus oil, namely Mengge Group 1 and Marori Group 2. Each group has a small sub-group consisting of several heads of families with different Boan (clans). In sacred beliefs Boan

(clan) is a symbol of Dema (ancestors). Each Boan (clan) has its own meaning which greatly influences the lifestyle of the local tribal community in socializing and forming groups.

Traditional Architecture (Gemef Sowur) ethnic group Trucks And Menggegenerally in contact with the Malind-Anim tribe because they still have the same ancestors and customs, namely the shape of the building is in the form of the letter "L", with a dirt floor with a sturdy house facade made of sago wood, Bus tree wood or coconut trees, and a roof of Nipa (palm leaves / sago) and alang-alang (wild grass). As time goes by, the Merauke Regency government has begun to renovate several villages in Wasur National Park considering the importance of the health of the local community, one of which is Wasur Village, where now the community's houses are more modern and suitable for habitation by the tribal community MArori and Mengge. The existence of habitable houses provided by the government does not immediately erase the pillars of tribal culture.Trucks And Mre, Tribal society Trucks And MenggeUntil now, they still carry out the same habits even though their houses or building architecture have changed.

The use of a quarter living house Trucks And Menggein managing products especially in the packaging of eucalyptus oil, in managing the wood oil the packaging process is carried out in people's homes this creates a sense of dilemma that occurs which requires people to use almost 90% of the space in people's homes in the packaging process. Some people complain about the limited space and also the function of the space in people's homes which is now changing. The invasion of space has resulted in the space that was originally used by people in household and spiritual activities becoming increasingly narrow and limited this encourages several rules in the culture set by the tribal communityTrucks And Mengge. The community has the opportunity to manage eucalyptus oil products that can support economic income, however, limitations in packaging space and use of residential homes as well as disruption of community spiritual activities are some of the problems faced by the tribal community.Trucks And Mengge.

Not only that, the threat of extinction of the tribeTrucks And Mengge,delivered directly by Mr. Eusebius Basik-basik as the deputy chairman of the traditional communityTrucks And Mengge, of the 5 tribes in Wasur National Park, the tribeTrucks And Menggewhich is now starting to decrease in number due to intermarriage (marriage of different tribes), the number in Wasur Village is considered the least compared to 10 other villages and other tribes. The modernization that occurred in Merauke Regency has an impact on several tribal identities in Wasur National Park and its surroundings. The words that are attached to the Papuan people are "Papuan Will Be Finished" in other words how to maintain the ancestral culture until now.

Therefore, this research is very necessary because it is the pillar of tribal culture. Trucks And Menggeand also maintain the integrity and encourage the sustainability of indigenous people's lives in the economy as well as in promoting local community production, namely Eucalyptus Oil, as a superior community product. Ethnic group Marori dan Menggefor tourism in Wasur National Park. And also the importance of knowing the changes that occur due to new activities that occur in the tribal homes.Trucks And Mengge.

2. Method

This research uses an approach qualitative rationalistic which aims to deeply understand the phenomenon of changes and invasion of space in the homes of the Marori and Mengge tribes due to the activity of packaging eucalyptus oil. This approach was chosen because it is able to reveal the complex relationship between the behavior of residents, local culture, and spatial dynamics in the context of changes in the function of housing. This method also allows exploration of spatial patterns that are not rigid and contextual in accordance with the character of the local community.

The research stages include: formulation of issues, determination of objectives, selection of appropriate theories, and deductive descriptive analysis. The main objective is to formulate factors that influence changes in spatial function, analyze shifts in spatial patterns, and describe space invasions in residential homes. The theoretical approaches used include behavioral setting (Barker), space flexibility (Schneider, Pena & Parshall), as well as the spatial relationship theory of F.D.K. Ching and Tschumi. This framework is used to explain the dynamics of domestic space which also functions as a production space.

The research location is in Wasur Village, Wasur National Park, Merauke, South Papua. This village was chosen because it is the center of activity of the Marori and Mengge tribes in the traditional management of eucalyptus oil. With a total of 54 houses, the research samples were taken from houses that experienced significant changes in spatial function due to production activities. In practice, the house not only functions as a place to live but also as a product packaging area, which triggers an invasion of private and spiritual space.

Data collection was conducted through direct observation, in-depth interviews with residents, and physical documentation of the house. Three mapping techniques were used: Person Centered Map, Place Centered Map, And Physical Traces Map. In addition, the technique used Time Budget to understand the allocation of daily activity time that shows the flexibility of space use. This technique helps to reveal the time dimension in the relationship between behavior, space, and new functions in the household.

The data analysis method is descriptive with a deductive approach, which connects phenomena in the field with relevant theories. Analysis is carried out on changes in space function, space invasion, spatial relationships between spaces, and space flexibility based on domestic and production activities. With this approach, the study is able to holistically map how the residential space system is formed, modified, and interpreted by local communities in responding to economic pressures and cultural needs.

3. RESULTS AND DISCUSSION

Results

This study examines the residential spatial system of houses in Wasur Village, Merauke, South Papua, which is used dually as a residence and a location for the production of eucalyptus oil by the Marori and Mengge tribes. This home industry activity has given rise to complex spatial dynamics, including flexibility of spatial functions, changes in layout, and invasion of private space for production activities. Using a rationalistic qualitative approach and behavioral setting theory, this study identifies that there is a shift in the function of space from merely domestic to productive functions without permanent physical changes. The process of packaging eucalyptus oil carried out inside the house requires temporary spatial

adaptations that reflect the strong relationship between local culture, economic activities, and spatial conditions.

The results of the analysis show that the community adjusts spatial patterns based on seasonal needs, social structures, and community networks, which are shown through non-linear or conventional spatial relationship patterns. The phenomenon of spatial invasion occurs when production activities disrupt household functions, especially spiritual and private spaces. These findings show that the spatial system in Wasur Village is very contextual, adaptive, and rooted in local wisdom.

The implications of this research are important for the development of residential architecture based on local behavior and culture, especially in the context of preserving endangered indigenous tribes and the integration of conservative tourism in the Wasur National Park area.

Discussion

The following are the results of the analysis of the spatial properties obtained from each S1, S2, S3, S4, S5, S6, S7 and S8. The samples obtained make one zone in each sample according to the initial spatial function until the entry of the eucalyptus oil industry.

Changes that occur at home/sowur ethnic group Trucks And Mengge regularly fixed and Semi-Fixed S1, S2, S3, S5, S6, S7 and S8 have significant tendencies related to changes and the location of the rooms added to the house/sowur or rooms that should not be in the house/sowur. Changes in space occur due to the needs of the homeowner and also the traditions adhered to by the homeowner/sowur namely the tribe Trucks and Tribe Mengge, the changes that occurred resulted in several rooms becoming contradictory to their proper function, which created a conflict between ritual rooms in terms of culture/traditions of the community that are directly related to the production process of eucalyptus oil.

The entry of eucalyptus oil management also makes the nature of the main room shift or increase or decrease. The following is a table of analysis results related to the nature of the room from each sample house purchased:

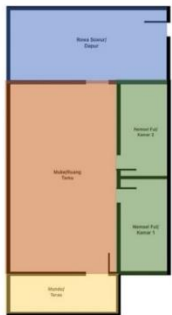
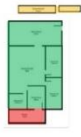
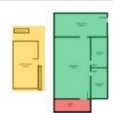
Table 1. Properties of House Space/Sowur Ethnic group Trucks And Mengge

No	Case Sowur/ Eucalyptus Oil Production House	Properties of Space		Information
		Fixed	Semi-Fixed	
1	K. SOWUR 1 (Mengge)	●	●	➤ Change Fixed: additional rooms, namely, Bachelor's Room/<i>Anep sowur</i>, Kitchen /<i>Rowa Sowur</i>, Breakfast, and Bathroom ➤ Semi-Change Fixed: There is an addition furniture in the living room/<i>We are</i>, bedroom/ <i>Nemsel I went</i>, back room/<i>Pune</i> and others.
2	K. SOWUR 2 (Trucks)	●	●	➤ Change Fixed: additional space, namely, living room/<i>Muk</i>, Kitchen /<i>Rowa Sowur</i>, <i>Befak</i>/<i>Bifak</i>. ➤ Semi-Change Fixed: There is additional furniture in the living room/<i>We are</i>, and others.
3	K. SOWUR 3 (Trucks)	●	●	➤ Change Fixed: additional rooms, namely, bedrooms/<i>Nemsel I went</i>, Kitchen /<i>Rowa Sowur</i>, Breakfast,

4	K. SOWUR 4 (Menge)		●	➤ Semi-ChangeFixed: There is additional furniture in the living room/ <i>We are</i>, bedroom/ <i>Nemsel I went</i>, and kitchen / <i>Rowa Sowur</i> and others. ➤ No changeFixed At home/ <i>sowur</i> This ➤ Semi-ChangeFixed: Moving objects such as mattresses/ <i>same fukyer</i> and table in the living room/ <i>We are</i>
5	K. SOWUR 5 (Menge)	●	●	➤ Change Fixed: additional rooms, namely, kitchen / <i>Outer Rowa Sowu</i> and also room dividers. ➤ Semi-ChangeFixed: There is additional furniture in the living room/ <i>We are</i>, bedroom/ <i>Nemsel I went</i>, and kitchen / <i>Rowa Sowur</i> and others.
6	K. SOWUR 6 (Trucks)	●	●	➤ Change Fixed: additional rooms, namely, kitchen / <i>Outer Rowa Sowu</i> ➤ Semi-ChangeFixed: There is additional furniture in the living room/ <i>We are</i>, bedroom/ <i>Nemsel I went</i>, and kitchen / <i>Rowa Sowur</i> and others.
7	K. SOWUR 7 (Trucks)	●	●	➤ Change Fixed: additional rooms, namely, kitchen / <i>Outer Rowa Sowu</i> and also room dividers. ➤ Semi-ChangeFixed: There is additional furniture in the living room/ <i>We are</i>, bedroom/ <i>Nemsel I went</i>, and kitchen / <i>Rowa Sowur</i> and others.
8	K. SOWUR 8 (Wom)		●	➤ Semi-ChangeFixed: There are changes to the furniture layout in the living room/ <i>We are</i>, bedroom/ <i>Nemsel I went</i>, and kitchen / <i>Rowa Sowur</i> and others.

Source: Researcher, 2025.

The nature of the space is then described in the form of a plan, in order to know the pattern of each zoning space that previously had no new activity and then a new activity, namely the management of eucalyptus oil. The phenomenon that occurs due to industrial activities mixed with domestic activities and the culture of the homeowner. This can be seen in the table below:

Floor Plan Before Sowur S1-S8	Floor Plan After Sowur S1-S8	Fixed	Semi-Fixed	Space Zoning Before	Nature of Space	Information
	S1	●	●		PRIVATE	Owner: Bapak Charles Gebze & Ibu Paulina Sambo Mahaze Menge Tribe
	S2	●	●			Owner: Ibu Paulina Mahaze (Ibri Ketua Adat) Maruri Tribe
	S3	●	●		SEMI-PRIVATE	Owner: Ibu Noberita Masimbu Mahaze Maruri Tribe



Source: Researcher, 2025.

Picture 1. Characteristics of House/Sowur Space, Tribe Marori & Mengge.

Behavioral Setting (Behavior Settings)

From the results of the analysis obtained, namely the behavior of each activity carried out by the homeowner starting from daily life, rituals to the industrial activities of managing eucalyptus oil, zoning was formed on the house plan. New activities that enter the homes of the tribal community Trucks And Menggeresulting in shifting, moving and increasing functions and space in the house. By using the method of theory Behavioral Setting by using four specific aspects, namely by mapping/mapping consisting of Place Center Map, Person Center Map, Physical Traces Map and Time Budget.

Usage mapping the following results in different spatial zoning from the floor plan before the entry of the wood oil industry activity and the floor plan after the entry of the eucalyptus oil management activity. The phenomenon of changes in function and space in the house/sowur society that initially had certain spaces that were very private and also limited is now increasingly flexible. This phenomenon is then described in a table that is filled in for each sample house/sowur from community groups who participated in the management of eucalyptus oil consisting of eight sample houses/sowur which is symbolized as S1, S2, S3, S4, S5, S6, S7, and S8, each sample house represents a tribe in the Wasur village, which has four tribal houses. Trucks consisting of S2, S3, S6, and S7 and for the house/sowur which represents the tribe Mengge which consists of S1, S4, S5 and S8.

Below is a description of the house plan/sowur from the results of observations which are then analyzed in the form of a spatial zoning picture:





Source: Researcher, 2025

Picture 2. Behavioral Setting Conclusions.

Space Flexibility

From the following table, we can see the results of the analysis and description of cases S1, S2, S3, S4, S5, S6, S7 and S8 in Wasur Village, presented in the form of a table containing the floor plan before the changes occurred up to the changes that occurred due to activities in the house/sowurthe case. The table above is summarized into one conclusion which is divided into several categories which are indicators of each case of a house/sowur.

No	Case	<i>Expansibility</i>	<i>Convertability</i>	<i>Versatility</i>
1	Sample Sowur 01	●	●	●
2	Sample Sowur 02	●	●	●
3	Sample Sowur 03	●	●	●
4	Sample Sowur 04	▢	▢	●
5	Sample Sowur 05	●	▢	●
6	Sample Sowur 06	▢	▢	●
7	Sample Sowur 07	▢	●	●
8	Sample Sowur 08	●	▢	●
Total		40%	60%	100%

Source: Researcher, 2025

Picture 3. Indicators of Types of Changes in House/Sowur Cases

Based on the table above, the results of the analysis revealed a phenomenon that occurred, namely changes that occurred in several houses/sowur which according to the theory applied, namely Schneider T, 2005, spatial flexibility is not just a good and correct spatial layout, but rather aims to provide a space that is able to accommodate changes in use in everyday life and the activities that take place in it. And according to Geoff (2007), flexibility can be divided into five types, namely adaptable, universal, movable, transformable, And responsive. The changes that occur are driven by the categories of a theory that is applied with the following indicators, Expansibility, convertible And Versatility. From the case of the four houses, it is indicated that they have the same category or not. The tendency that occurs in the case of the eight houses is Versatility namely, buildings can provide space that can be used in various activities with a variety of functions and times that change or certain times.

The changes that occur are one of the strategies of the community, especially home owners/sowur and as the main role in managing eucalyptus oil in utilizing the space in the house /sowurthem. Although there are changes in function and form, this occurs due to economic pressure factors that occur in Wasur village.

Table 2. Analysis of Spatial Relationship Indicators

Case	Space Relationship Status Indicator		
	<i>Indifference</i>	<i>Conflict</i>	<i>Reciprocity</i>
S. <i>Sowur</i> 1	50%,	30%	30%
S. <i>Sowur</i> 2	40%	30%	30%
S. <i>Sowur</i> 3	20%	80%	-
S. <i>Sowur</i> 4	30%	10%	10%
S. <i>Sowur</i> 5	60%	20%	20%
S. <i>Sowur</i> 6	20%	-	80%
S. <i>Sowur</i> 7	20%	10%	70%
S. <i>Sowur</i> 8	20%	10%	70%
Rate-rate	48,90%	23,90%,	30,89%.



Source: Researcher, 2025

Picture 4. Analysis of Spatial Relationship Indicators

Spatial Relationships

The following is the status of the room relationship of each house/sowur case in Wasur village, Merauke, South Papua, grouped into three indicators, namely Indifference, Reciprocity And Conflict. Each of the spatial relationship statuses of each house/house casesowur has an average of spatial relationship status, the type of spatial relationship that has the largest average number of presets is Conflict which is 23.90%, this is because a room that is used does not have a definite purpose or is not the same which is contradictory. And in other relationship status indicators, namely Indifference 48.90% and Reciprocity amounted to 30.89%. The status of the stated spatial relationship Conflict If the percentage is greater, there is a possibility of an invasion in the room, in other words, the homeowner feels that the process of managing wood oil, culture and habits can affect the main function of the room

Sample	Wide <i>Sowur</i>	Invasion Area	Invasion Percentage	Indicator
<i>Sowur 01</i>	40 m'	22 m'	65%	Mayor
<i>Sowur 02</i>	40 m'	10 m'	30%	Minor
<i>Sowur 03</i>	40 m'	24 m'	80%	Minor
<i>Sowur 04</i>	40 m'	10 m'	30%	Mayor
<i>Sowur 05</i>	40 m'	26 m'	85%	Moderate
<i>Sowur 06</i>	40 m'	20 m'	20%	Mayor
<i>Sowur 07</i>	40 m'	26 m'	85%	Moderate
<i>Sowur 08</i>	40 m'	20 m'	20%	Minor

The following is a depiction of the floor plan which previously had no changes and then changed due to industrial activity:

Table 3. Analysis of Spatial Relationship Indicators.



Source: Researcher, 2025.

Picture 5. Spatial Relationships and Changes in House/Sowur Space in Wasur Village

Space Invasion

In Alline (2011), the invasion occurred when the perpetrator felt that his space for movement was disturbed, resulting in an anxious attitude and discomfort in the activities being carried out. The following conditions occur in cases of houses/sowur In Wasur Village, the invasion of space that occurred is depicted in the form of zoning of the house plan/casesowur

the zoning is indicated into three, namely minor, moderate and major. In the major indicator, the invasion occurs because certain areas are influenced by the status of certain



Source: Researcher, 2025.

Picture 6. Analysis of House Space/Sowur, Wasur Village.

4. Conclusion

The use of space from the analysis results tends to utilize existing space and convert it into a new function, in other words, a space that is in each house/sowur. Of the two tribes, it tends to be more flexible, this is because the analysis results use the method Behavioral Setting knowing the flow of activities and patterns of activity tendencies, both daily, ritual and when managing eucalyptus oil, which are often repeated in the same place. In addition, indicators of the nature of space are obtained from cases of houses/sowur which is more dominant in research Versatility namely that there is use of space in various activities with a variety of functions and changing times. Use of space in tribal houses Trucks And Mengge can be seen from the presentation Time Budget, the duration of management activities as well as daily activities can influence how space is used in a tribal home. Trucks And Mengge based on the status of the spatial relationship that the use of house/tribe space Trucks and tribe Mengge dominant Indifference And Conflict, the conflict that occurred because there was a space invasion.

Space system of the house/sowur ethnic group Trucks and Mengge namely in the analysis using the method Behavioral Setting by carrying out mapping, namely Place Center Map, Person Center Map, Physical Traces Map with the aim of how the house space/sowur ethnic group Trucks and Mengge meet the need for space. The residential space system of the community is more directed towards habits or behaviors that are in accordance with the traditions of the two tribes. The presence of new activities that enter the house, namely the management of eucalyptus oil, changes and shifts the function of the house and certain spaces.

The spatial system was formed due to the entry of eucalyptus oil management activities which were originally houses with tribes. Trucks more private, now the spaces are starting to shift and move spaces. The activity of managing eucalyptus oil not only changes the space system but also changes the function of the space in the house. The changing space system in the house People tend to be more flexible based on the time of the eucalyptus oil process. Some houses have a house partition system that functions as a room divider in the same room, which functions as a boundary between different activity spaces, namely the management of eucalyptus oil.

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contribution to the development of a sustainable residential space system that supports local wisdom.

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