Nusantara Sociological Forum (NSF)
Jurnal Kajian Sosiologi, Ekologi, dan Ruang Hidup
Diterbitkan oleh: Sekolah Penelitian

The Role of Coastal Women in Supporting Food Security

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Abstract

Coastal food security is still threatened by limited access, environmental degradation, and reliance on outside food sources. No locally based intervention model integrates women's food utilisation roles. This study examines coastal women's role in natural resource-based food security in Buru Regency and the social, economic, and environmental factors that affect it, underscoring the need for sustainable natural resource management. This study was qualitative and phenomenological. This method allows for in-depth study of Buru people's worldview, traditions, and connections to value systems and the environment. The study was conducted in farming and fishing households in five villages in Buru Regency, Maluku: Waeura, Waeperang, Airbuaya, Sanleko, and Wamlana. Twenty-three informants were purposively selected for in-depth interviews and participant observation, then analysed thematically using MAXQDA 24.4.1. Women are key ecological actors and guardians of local wisdom, integrating traditional values with modern adaptation strategies. Key findings show that women's natural resource management boosts household food security and local alternative businesses. Women hold strong moral and intellectual authority in traditional institutions and pass on knowledge across generations, but formal institutional structures have significant structural inequalities. Women are underrepresented in strategic decision-making, indicating systemic barriers to leadership recognition. Thus, this study shows that inclusive and sustainable development requires strengthening women's bargaining power in formal policy structures to ensure community ecological and economic sovereignty.

Keywords: women, coast, food, village, Buru

Introduction

Food security is a strategic issue in sustainable development, particularly in island and coastal areas that are highly dependent on natural resources. Buru Regency, with predominantly coastal and marine geography, faces complex challenges in maintaining sustainable food availability (Jamaludin et al., 2026)Amidst the social, economic, and ecological dynamics of coastal areas, women play an indispensable role. They are not only domestic actors who regulate household consumption and nutrition, but also crucial agents in natural resource management, food distribution, and the transmission of local knowledge (Mari et al., 2026).

In the domestic sphere, coastal women ensure family food stability through managing reserves, diversifying menus, and utilising local produce.(Amanatin et al., 2025; Setiani & Laelia, 2024) In the ecological realm, they engage in marine product processing, small-scale fisheries cultivation, and the use of coastal forest products, guided by local wisdom oriented toward sustainability (Knott et al., 2025; Saadah & Sampoerno, 2025).

This role is strengthened by their capacity for food distribution, both through local market networks and through social solidarity that ensures food access for communities. Furthermore, coastal women also inherit traditional knowledge, maintaining and transmitting cultural values and conservation practices that underpin community food systems (Purnani & Yolanda, 2024). Thus, coastal women are not merely an accessory to the food system, but rather a key pillar integrating domestic, ecological, economic, and cultural dimensions to strengthen natural resource-based food security.

Various studies have confirmed that women play a fundamental role in supporting food security at both the household and community levels. Garai and Jemal emphasize that women's contribution lies in their ability to diversify local food sources, namely integrating various traditional food sources with modern consumption practices to maintain family nutritional sustainability. This diversification is not only a domestic strategy but also an adaptation to resource limitations and market fluctuations (Garai, 2024; Jemal et al., 2024). In line with this, Siga's analysis shows a growing trend in research on women's role in Indonesia's food system, indicating academic recognition of women as key actors in the food chain (Demetrius Siga et al., 2025). This trend shows that gender and food issues are receiving increasing attention in the scientific literature, while also creating space for more systematic role models for women.

In the coastal context, Salgueiro's study highlights fisherwomen's adaptive capacity in facing regulatory challenges and climate change (Salgueiro-Otero et al., 2022). Coastal women play a role not only in producing and processing marine products but also in developing adaptation strategies that sustain natural resources. This adaptive capacity

is evident in environmentally friendly traditional practices, social solidarity in food distribution, and their ability to manage climate-change risks. Thus, coastal women function as both ecological guardians and strengthen community food security. This multidimensional role demonstrates that women are not merely complementary to the food system, but rather a key pillar connecting ecological, economic, and cultural aspects in maintaining the sustainability of natural resource-based food.

Although research on women's roles in food security has been extensive in Indonesia, studies specifically on coastal women in Buru Regency remain very limited. Yet, women in this region make multidimensional contributions. They not only produce and process marine and agricultural products, but also serve as guardians of local knowledge passed down across generations. This knowledge encompasses traditional fish processing techniques, the utilisation of coastal forest products, and conservation practices based on local wisdom that ensure the sustainable use of natural resources. This role can be understood as a form of ecological capital, namely, ecological capital derived from local practices, values, and knowledge held by communities. Economically, the ecosystems maintained by coastal women strengthen community resilience against external pressures such as environmental degradation from resource exploitation, market fluctuations that affect food prices, and climate change impacts that threaten production stability.

Thus, coastal women in Buru Regency are not merely additional actors in the food system, but rather key actors who integrate economic, ecological, and cultural dimensions to support resilient communities and ensure the sustainability of natural resource-based food security. Therefore, this study aims to develop a role model for coastal women in supporting natural resource-based food security in Buru Regency. This model is expected to enrich the literature on gender and food security, while providing a practical framework for strengthening the capacity of coastal women as key actors in sustainable development.

Materials and Methods

This research uses a qualitative, phenomenological approach. This approach was chosen because it allows for in-depth exploration of the lived experiences of the Buru people, including how they make sense of the world, interpret traditions, and connect everyday experiences with their value systems and environment (Rashid & Mowla, 2025; Williams, 2021). Phenomenology seeks to understand reality from the informant's perspective, making the research results more authentic and contextual. Thus, this

research not only describes phenomena but also seeks to capture the meaning embedded in the Buru people's cultural and ecological practices.

The research was conducted in farming and fishing households in five villages (Waeura Village, Waeperang Village, Airbuaya Village, Sanleko Village, and Wamlana Village) in Buru Regency, Maluku, focusing on coastal community characteristics. The location selection was based on the villages' connection to Buru people's lives, where women's roles are highly relevant to food security efforts in subsistence, tradition, and social systems. The selection also considered accessibility, the presence of women, and the availability of relevant informants (Ahmad & Wilkins, 2025). With broad geographic coverage, this research is expected to uncover the role of coastal women in the Buru community.

The researchers selected informants through purposive sampling, a deliberate selection based on specific criteria. The main criterion was having experience and a deep understanding of women's roles in supporting food security. Key informants included: 1) village heads, 2) housewives, 3) female fish traders, 4) female farm labourers, 5) female farmer and fisher groups. The number of informants was determined based on the criteria, which set a total of 23 people. Data were collected through in-depth interviews using a semi-structured guide, allowing informants to speak freely while staying focused on the research (García-Jurado et al., 2021; Johansson et al., 2024). Questions focused on women's lived experiences, food security practices, and the meanings they attach to their activities. Researchers engaged in participant observation, observing women's economic activities such as processing catches, profit-sharing systems for trade, and subsistence activities. These observations provided direct insight into coastal women's roles. Prior to the interviews, researchers explained the research objectives and obtained informed consent from the informants. The researchers built rapport to create a comfortable atmosphere for informants to speak openly. Researchers also used local languages or translators when necessary to ensure effective communication.

This research upholds ethical principles, including informed consent: each interview was recorded with permission. Data confidentiality: researchers maintained informant identities to avoid negative impacts. Cultural respect: researchers adhered to local customary norms, including rituals and social interactions. Non-intervention: researchers avoided disrupting customary activities and instead observed and documented them. By applying these ethical principles, the research is expected not only to produce valid data but also to build trust with the Buru community.

The analysis followed four stages of naturalistic analysis: category collection; identifying main themes from interviews and observations, such as community network

structure; utilisation of natural resources; individual and community awareness; and actions to fulfil needs. Direct interpretation: understanding the meaning of informants' statements without excessive reduction; pattern formation: finding relationships between categories, for example, the relationship between network structure and actions to fulfil needs. Naturalistic generalisation: drawing conclusions that are relevant to the context of coastal women, while also being comparable to women's communities in different regions. For data processing and analysis, the author used MAXQDA 24.4.1 software developed by VERBI GmbH, which allows researchers to code text, identify themes, analyse relationships between categories, and produce comprehensive data visualisations (Guetterman & James, 2023).

Results

This study generated data on the role of coastal women in supporting food security, using interview results systematically compiled in tabular format. Interview data were processed using MAXQDA 24.4.1 software developed by VERBI GmbH, which allows researchers to code text, identify themes, analyse relationships between categories, and generate data visualisations, as illustrated in the following figure.

Name	Frequency	Percentage	Percentage (valid)
Economy and Livelihood	53	2.0%	2.0%
Economy and Livelihood > Alternative business	48	1.8%	1.8%
Economy and Livelihood > Women's contribution to food security	31	1.1%	1.1%
Economy and Livelihood > Women's livelihoods	231	8.5%	8.5%
Institutional	30	1.1%	1.1%
Institutional > The role of women in traditional institutions	47	1.7%	1.7%
Institutional > Women's involvement in decision making	2	0.1%	0.1%
Local Knowledge and Adaptation	92	3.4%	3.4%
Local Knowledge and Adaptation > Inheritance of knowledge	113	4.2%	4.2%
Local Knowledge and Adaptation > Integration with modern science	91	3.4%	3.4%
Local Knowledge and Adaptation > Local wisdom of women	304	11.2%	11.2%
Socio-cultural	365	13.5%	13.5%
Socio-cultural > Customary values	183	6.8%	6.8%
Socio-cultural > Involvement of the younger generation	47	1.7%	1.7%
Socio-cultural > The role of women in tradition	341	12.6%	12.6%
The Ecological Role of Women	231	8.5%	8.5%
The Ecological Role of Women > Adaptation to climate change	23	0.8%	0.8%
The Ecological Role of Women > Natural resource management	448	16.5%	16.5%
The Ecological Role of Women > Traditional practices	29	1.1%	1.1%
TOTAL (valid)	2709	100.0%	100.0%
Missing	0	0.0%	-
TOTAL	2709	100.0%	-

Figure 1. Overview of Codes
Source: Field Data Processing with MAXQDA 24 Software

This study collected 2,709 data segments across five main categories. The Ecological Role of Women is the dominant category, with the sub-code "Natural resource management" recording the highest frequency: 448 segments (16.5%). Socio-cultural: Has

a total of 365 segments (13.5%), with the main focus on "The role of women in tradition", with as many as 341 segments (12.6%). Local Knowledge and Adaptation: Includes the sub-code "Local wisdom of women" with 304 segments (11.2%). Economy and Livelihood: Focuses on "Women's livelihoods" with 231 segments (8.5%). Institutional: This category has the lowest frequency, with "Women's involvement in decision-making" recorded in only 2 segments (0.1%).

The matrix shows the varied contributions of 23 informants: Key Informant: Inf_4 contributed the most segments overall (363 segments), followed by Inf_3 (240 segments) and Inf_19 (208 segments). The informant with the Lowest Data: Inf_2 only contributed 8 segments throughout the interview. The thematic details based on the visual model include Local Knowledge and Adaptation. This model explores the transmission and adaptation of knowledge: local wisdom is dominated by narratives from Inf_21 and Inf_22. Knowledge Inheritance: Involves informants such as Inf_23, Inf_22, and Inf_21. Modern Integration: Shows the intersection between local wisdom and modern science, as voiced by Inf_19, Inf_21, and Inf_22.

In the Economy and Livelihoods segment, Inf_21 is the primary source of information on how women make ends meet, while in Food Security, contributions come from a broader group of informants, including Inf_2, Inf_22, Inf_3, Inf_23, and Inf_1. In the activities section, socio-cultural information reflects traditions and customs: customary values and women's traditional roles are heavily centred in the information provided by Inf_21. Furthermore, in the Youth section, data from Inf_22 and Inf_21 support efforts to engage the younger generation in cultural aspects.

The fourth section, Ecological Roles, highlights Natural Resource Management as the main focus of women's roles in nature, supported by Inf_18, Inf_19, and Inf_5, and Climate Change Adaptation, discussed through statements by Inf_22, Inf_12, and Inf_15. In the final section, namely institutional, the marginalisation of decisions against women is evident: the visualisation emphasises women's limited role in local politics, where involvement in decision-making comes from only one informant.

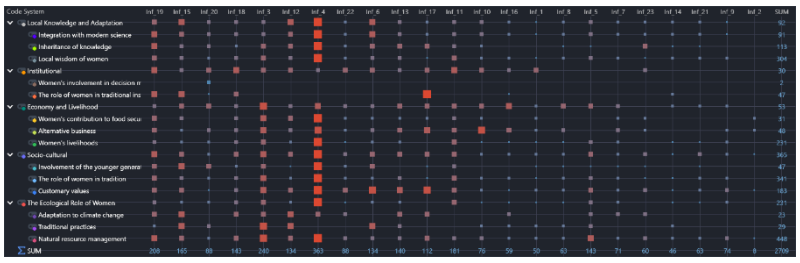


Figure 2. Code Matrix
Source: Field Data Processing with MAXQDA 24 Software

This data shows the relationship between informants (Inf_1 to Inf_23) and various research code categories (themes). The total number of coded segments was 2,709. The most influential informant, Inf_4, contributed the most segments (363), followed by Inf_3 (240) and Inf_19 (208). The least influential informant, Inf_2, only contributed 8 segments. By total segments per category, the most discussed themes are: Natural Resource Management (448 segments), the largest single subtheme across the data. Socio-cultural (365 segments): Shows the social and cultural aspects that carry significant weight in this study. Local wisdom of women (304 segments): Highlights women's specific role in local knowledge. The Ecological Role of Women (231 segments): Equivalent to the theme of livelihoods (Women's livelihoods), showing a strong focus on ecology.

Specific findings per category in Figure 2 are local knowledge and adaptation: Women's local knowledge is the most dominant element in this category. Inf_4 makes a very significant contribution (large red box) to this subtheme. Institutional: This category has the lowest frequency (only 30 segments in total). Women's involvement in decision-making is very minimal, appearing in only 2 segments from all informants. Economy and Livelihood: The main focus here is on women's livelihoods (Women's livelihoods - 231 segments). This shows that the economic dimension of the research subjects depends heavily on their daily activities. Socio-cultural: The role of women in tradition is a key point, with 341 segments. Customary values are also quite strong (183 segments). The Ecological Role of Women: Beyond dominant natural resource management, traditional practices are also an important part of their ecological role. The data in Figure 2 show that women play a central role in natural resource management and the preservation of traditions and culture. However, their role at the institutional or decision-making level remains very weak.

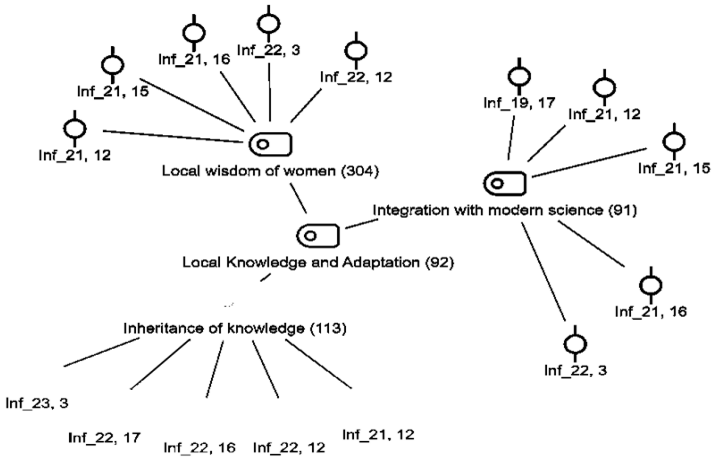


Figure 3. Local Knowledge and Adaptation - Code-Subcodes-Segments Model
Source: Field Data Processing with MAXQDA 24 Software

The model visualisation in Figure 3 shows how the sub-codes under Local Knowledge and Adaptation connect to specific segments from certain informants: Local wisdom of women (304) is strongly connected to informants such as Inf_21 and Inf_22. Inheritance of knowledge (113): Indicates the existence of a process of inheriting information documented by informants Inf_21, Inf_22, and Inf_23. Integration with modern science (91): Indicates that local knowledge does not stand alone; rather, efforts to integrate it with modern science emerge largely from the statements of Inf_19, Inf_21, and Inf_22.

The data show a very strong role for women in practical and cultural aspects, but very weak in political/formal aspects (involvement in decision-making). This data is rich in narratives about local wisdom passed down through generations and how it has adapted to modern science.

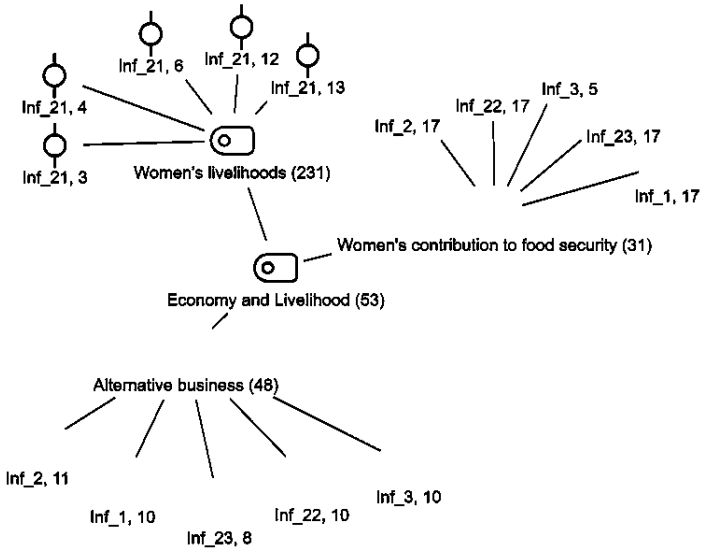


Figure 4. Economy and Livelihood - Code-Subcodes-Segments Model
Source: Field Data Processing with MAXQDA 24 Software

Figure 4 details the Economy and Livelihood categories (53 segments): Women's Livelihoods (231 segments): This is the primary economic focus, with Inf_21 contributing very in-depth information through several interview segments. Alternative Business (48 segments): This indicates efforts at economic diversification, supported by data from Inf_1, Inf_2, Inf_3, Inf_22, and Inf_23. Women's Contribution to Food Security (31 segments): Although lower in frequency, this aspect of food security emerged consistently from statements by Inf_1, Inf_2, Inf_3, Inf_22, and Inf_23.

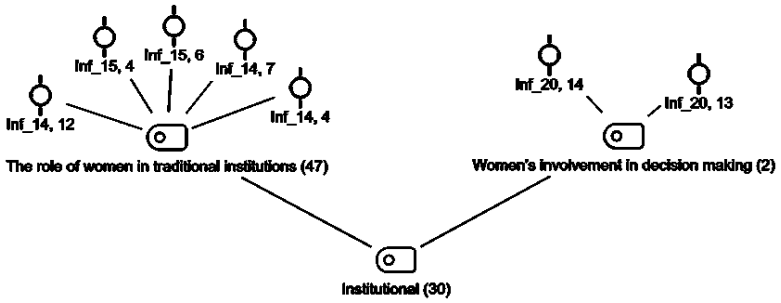


Figure 5. Institutional - Code-Subcodes-Segments Model
Source: Field Data Processing with MAXQDA 24 Software

Figure 5 shows categories that explore how women manage traditional knowledge: Local Wisdom: The sub-code Local wisdom of women has a high frequency (304 segments). This data is strongly supported by statements from Inf_21 and Inf_22. Knowledge Inheritance: 113 segments discuss the Inheritance of knowledge, involving informants across generations such as Inf_21, Inf_22, and Inf_23. Modern Adaptation: This knowledge is not static; 91 segments address integration with modern science, largely emerging from the narratives of Inf_19, Inf_21, and Inf_22.

Furthermore, the economic aspect focuses on women's active role in supporting family life: Livelihood: Women's livelihoods are the strongest economic element, with 231 segments, and Inf_21 contributes very in-depth information. Food Security & Business: Informant groups such as Inf_1, Inf_2, Inf_3, Inf_22, and Inf_23 document diversification efforts through alternative businesses (48 segments) and contributions to food security (31 segments). Institutional Participation and Challenges (Critical Findings)

Despite their significant social and economic roles, the data show a large gap at the formal level: Lack of Decision Making: The sub-code Women's involvement in decision making has the lowest frequency, at 2 segments. Both of them come from only one informant, namely Inf_20. Traditional Institutions: The role of women in traditional institutions recorded 47 segments, with the main contributors from Inf_14 and Inf_15.

This data shows women holding significant authority in local knowledge and natural resource management and serving as the backbone of their families' economies. However, systemic marginalisation persists, and this knowledge and economic power have not yet translated into political power or involvement in formal decision-making.

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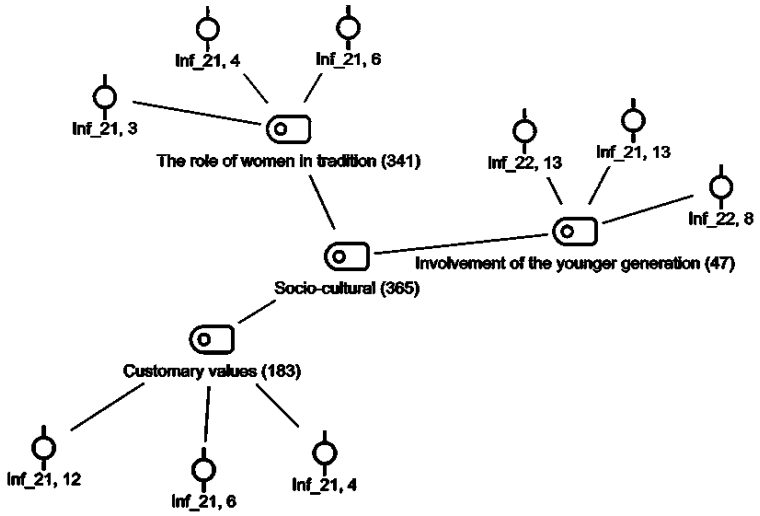


Figure 6. Socio-cultural - Code-Subcodes-Segments Model
Source: Field Data Processing with MAXQDA 24 Software

This model describes the large Socio-cultural category which has a total of 365 data segments. This category is divided into three main sub-codes with the following distribution: The role of women in tradition (341 segments): This is the most dominant element in the socio-cultural aspect. This sub-code is strongly linked to informant Inf_21, who contributed several interview segments (such as segments 3, 4, and 6). Customary values (183 segments): This sub-code shows the customary values that apply in the community. Informant Inf_21 again contributes most to this theme, as seen in several segment connections, such as segments 12, 6, and 4. Involvement of the younger generation (47 segments): This sub-code discusses the younger generation's involvement in socio-cultural aspects. The data in this section is supported by informants Inf_21 (segment 13) and Inf_22 (segments 13 and 8).

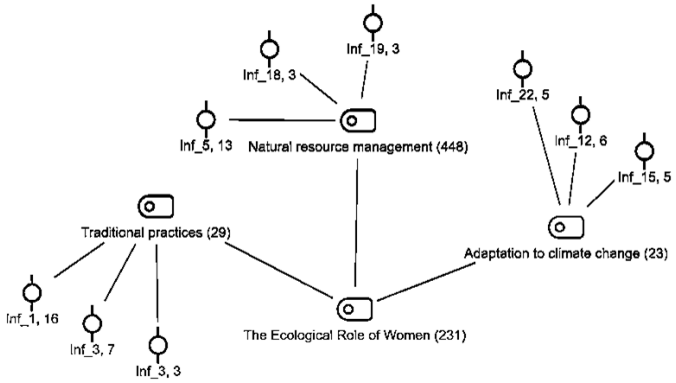


Figure 7. The Ecological Role of Women - Code-Subcodes-Segments Model
Source: Field Data Processing with MAXQDA 24 Software

Figure 7 details the broad category The Ecological Role of Women, which includes 231 data segments. This category is divided into three main sub-codes that describe how women interact with the environment: Natural Resource Management (448 segments): This is the most dominant theme, even surpassing the number of segments of its parent category due to its broad scope. This subcode indicates women's active involvement in managing natural resources. Key informants supporting this theme are Inf_18 (segment 3), Inf_19 (segment 3), and Inf_5 (segment 13). Traditional Practices (29 segments): This subcode refers to traditional practices women carry out to maintain the ecosystem. This data was contributed by several informants, including Inf_1 (segment 16) and Inf_3, who appeared in two different segments (segment 7 and segment 3). Adaptation to Climate Change (23 segments): This theme discusses how women adapt to climate change. The informants who provided statements regarding this matter were Inf_22 (segment 5), Inf_12 (segment 6), and Inf_15 (segment 5).

The visualisation in Figure 7 confirms that women's ecological roles are most often manifested in direct natural resource management. Although traditional practices and adaptation to climate change appear in the data, they occur far less often than daily resource management.

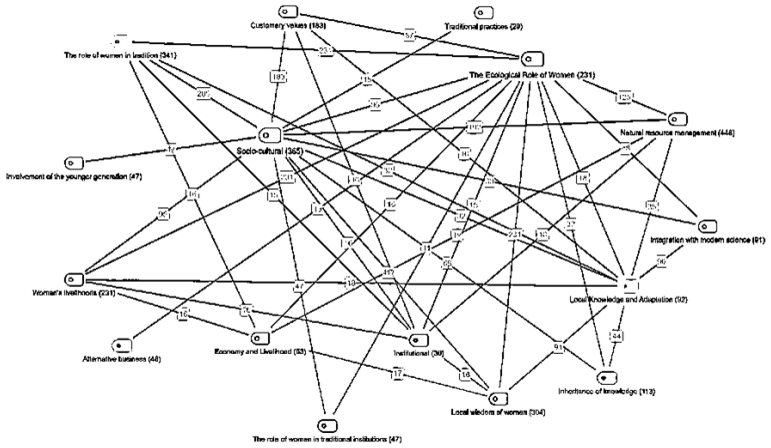


Figure 7. Code Co-occurrence Model (Code Intersection)
Source: Field Data Processing with MAXQDA 24 Software

Figure 7 shows how the research themes intersect: The strongest intersection is between The Ecological Role of Women and Natural Resource Management (231 intersections). In addition, Socio-cultural has a very strong relationship with The role of women in tradition (231 intersections) and Customary values (183 intersections). Synergy of Knowledge and Tradition: Women's local wisdom is clearly linked to Socio-cultural (117

intersections), indicating that it is deeply rooted in the local community's socio-cultural values. Economic Linkage: Women's livelihoods are linked to Natural resource management (125 intersections), confirming that their livelihoods depend heavily on natural resource management.

Next, we describe the findings by category, namely Socio-cultural (365 segments): Women's roles dominate the sub-codes The role of women in tradition (341 segments) and Customary values (183 segments). Inf_21 is a key informant who contributed substantial data to this category. The Ecological Role of Women (231 Segments): The main focus is natural resource management (448 segments), supported by Inf_18, Inf_19, and Inf_5. Adaptation to climate change also appears, though less frequently (23 segments). Local Knowledge and Adaptation (92 segments): This category highlights women's local wisdom (304 segments) and the inheritance of knowledge (113 segments). Efforts to integrate with modern science (91 segments) are widely voiced by Inf_19, Inf_21, and Inf_22, as well as Economy and Livelihood (53 segments): Women's livelihoods (231 segments) are the main source of income. Other strategies include Alternative Business (48 segments), Contribution to Food Security (31 segments), and Institutional (30 segments); these areas have the lowest female participation. Their role is more visible in Traditional Institutions (47 segments) compared to Decision Making (only 2 segments), which is represented only by Inf_20.

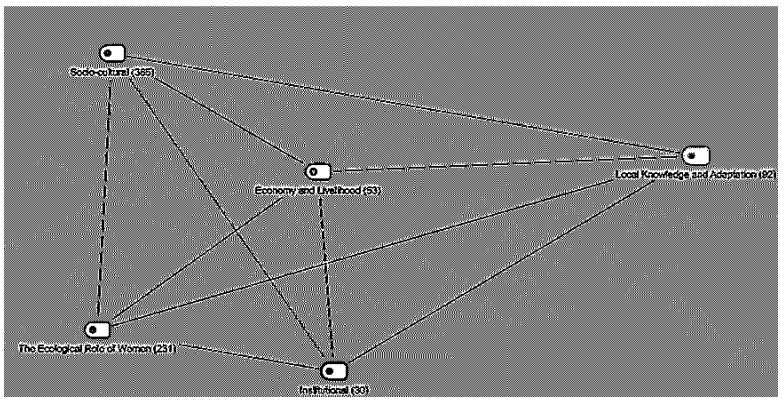


Figure 8. Code Co-occurrence Model (Code Occurrence)
Source: Field Data Processing with MAXQDA 24 Software

Figure 8 shows the interconnectedness of the themes; the visualisation reveals how various aspects of the subjects' lives intersect deeply: Ecology and Economy: There are 125 intersections between Natural resource management and Women's livelihoods. This shows women's strong economic dependence on direct natural resource management. Culture and Local Wisdom: The relationship between Socio-cultural and

Local wisdom of women is recorded at 117 intersections. This shows that women's local knowledge is deeply rooted in community traditions. Internal Cultural Correlation: The strongest intersections appear between the parent category Socio-cultural and its subcodes, namely The role of women in tradition (231 intersections) and Customary values (183 intersections).

Next, we describe the findings by main category, starting with the Ecological Role segment (231 segments). Natural Resource Management (448 segments) is the most dominant activity in all research (16.5% of the total data). Key informants for this theme are Inf_18, Inf_19, and Inf_5. Climate Change Adaptation (23 segments): Emerging as a growing issue, with contributions from Inf_22, Inf_12, and Inf_15. Next, Socio-Cultural (Total 365 Segments). Role in Tradition: Being a main pillar of culture with 341 segments (12.6%). This data focuses heavily on information from Inf_21. Young Generation (47 segments): Discusses efforts to pass on culture to young people, which is supported by statements from Inf_21 and Inf_22.

The third segment, Local Knowledge (92 segments), presents data on Local Wisdom (304 segments), a prominent subject identity strongly supported by Inf_21 and Inf_22. Inheritance of Knowledge (113 segments): This inheritance process is documented through informants Inf_23, Inf_22, and Inf_21. Integration of Modern Science (91 segments): Shows how local knowledge adapts to modern science, voiced by Inf_19, Inf_21, and Inf_22. The fourth segment, Economy and Livelihood (53 segments), includes Livelihood (231 segments), a major source of women's daily income. Inf_21 provides the most detail in this section as well as Food Security (31 segments): involving a group of informants such as Inf_1, Inf_2, Inf_3, Inf_22, and Inf_23. The final section includes Institutional (30 segments), consisting of Inequality of Participation (the category with the lowest frequency) and Decision Making: only 2 segments were recorded (0.1%), both from Inf_20. This indicates a significant barrier for women in formal power structures.

Discussion

This discussion explores women's multidimensional role as intellectual actors and key practitioners in maintaining ecosystem balance and socio-cultural sustainability. Through a qualitative lens, women's activities can no longer be viewed solely as domestic work, but as a strategic integration of natural resource management, the preservation of ancestral traditions, and the strengthening of family economic resilience. Women act as a bridge between past wisdom and future challenges, with every ecological action rooted in customary values passed down through generations. By positioning women at the centre of the narrative of food sovereignty and knowledge transmission, this discussion

will examine how their real contributions at the grassroots level often clash with limited access to formal decision-making structures, creating a dynamic struggle for more inclusive and equitable recognition of their roles.

The Ecological Role of Women

The socio-cultural dimension is the second fundamental pillar in strengthening food security in Buru Regency, as reflected in Figures 1 and 6. The data show that the Socio-Cultural category has a significant accumulation of segments, with the Role in Tradition sub-code recording 341 segments (12.6%). Theoretically, this indicates that coastal women's economic activities do not occur in a vacuum, but are strongly tied to what Karl Polanyi called economic embeddedness in social institutions (Guillet, 2024). In Buru Regency, women act as cultural agents, integrating communal values into food provision practices so that food security is defined not only as calorie availability but also as maintaining collective identity. The strong emphasis of data from informant Inf_21 confirms that the social structure of coastal communities provides ample informal space for women to lead the rhythms of cultural life.

The depth of this social role is further evident through the prominent local wisdom category as a subject identity with 304 data segments, strongly supported by statements from Inf_21 and Inf_22. Local wisdom here functions as a social navigation system that regulates how communities interact with coastal resources. This finding aligns with Robert Putnam's theory of social capital, where the trust, norms, and networks women foster lubricate community cooperation in addressing the food crisis.(Putnam, 1994)Previous research by Tahir and Purba showed that in rural Indonesian communities, the strength of social networks managed by women acts as a safety valve during famine, through profit-sharing and barter systems based on traditional values rather than pure market logic (Purba et al., 2025; Tahir et al., 2025).

A crucial aspect this study identifies is knowledge continuity through the Inheritance of Knowledge, recorded in 113 segments through the contributions of informants Inf_23, Inf_22, and Inf_21. This transmission process is vital because it ensures that technical and philosophical skills in food management are not lost over time. From an educational sociology perspective, this represents a form of cultural pedagogy in which domestic and coastal spaces become informal schools (Sri Ilham Nasution et al., 2026). As primary educators at the household level, women ensure that the younger generation (47 segments) has an adequate understanding of their ecosystem. This reinforces Rahman's findings that local knowledge becomes a resilience asset only when

transmitted intergenerationally (Rahman et al., 2026), a process women in Buru Regency carry out militantly.

Furthermore, women's socio-cultural role in Buru shows a dynamic character through the integration of modern science, as recorded in 91 data segments, echoed by Inf_19, Inf_21, and Inf_22. Figure 3 visualises this phenomenon, showing that women are not resistant to technological advances or external knowledge. Instead, they hybridise traditional methods with modern techniques to improve food-processing efficiency. Theoretically, this refers to transformative resilience, where a community can absorb innovation without losing its cultural roots. This adaptive capacity is crucial in modern food security, which demands both production efficiency and the preservation of local values (Trippl et al., 2024).

The interconnectedness of cultural aspects and local knowledge also forms what is known as knowledge-based food sovereignty. Data from the local knowledge category (92 segments in total) show that women have cognitive authority in determining which crops or seafood are suitable for consumption and marketing. This knowledge serves as a bulwark against external food interventions that may be incompatible with local ecological conditions. This finding supports Pimbert's research, which argues that food sovereignty is possible only if local communities, especially women, control their own knowledge systems (Pimbert, 2023). In Buru, women ensure that the family "dining table" remains connected to their ancestral "land and sea" through well-maintained cultural practices.

Socio-cultural power remains confined to the domestic sphere and limited communities. Although women are recognised as "keepers of tradition" and "repositories of knowledge," this position does not automatically grant them legitimacy within formal village or district structures. A gap remains between the authority of women's local knowledge and its formal recognition in village development policies. Yet, integrating women-managed local knowledge into development planning could be key to a more inclusive and sustainable food security model in Buru Regency. This presents a sociological and institutional challenge for stakeholders to begin viewing women's socio-cultural role as a strategic development asset, rather than simply a complement to customary ceremonies.

The Role of Women in Tradition

Women's role in the traditional dimension in Buru Regency is a social foundation that ties food security practices to local cultural identity. Based on the data in Figures 1 and 6, the sub-code "Role in Tradition" is highly significant, with 341 segments (12.6%).

This high number indicates that women's activities are not only technical-economic but also strongly tied to symbolic values. Theoretically, this reflects Schou's findings on social embeddedness, where coastal communities' economic actions are "embedded" in traditional social relations and institutions (Schou et al., 2022). Women here are not merely food providers but also maintainers of social order, ensuring that resource distribution follows the principles of justice established by custom.

A closer look at Figure 6 shows that the narrative on this tradition relies heavily on information from Inf_21. The dominance of data from this informant suggests that female or central figures in the Buru coastal community hold authority over knowledge of customary rhythms. This knowledge encompasses procedures for managing resources in harmony with ancestral values, which development studies refers to as social capital. As Putnam states, social capital, in the form of norms and networks maintained by women, serves as a lubricant for community cooperation (Putnam, 1994)In Buru, tradition is not a barrier, but rather a driving force, enabling women to mobilise collective resources to maintain household food security amid seasonal uncertainty.

The connection between tradition and sustainability is also evident in how women position themselves within traditional institutional structures. Although men dominate formal leadership positions, data in Figure 5 and socio-cultural narratives indicate that women play a strategic role in traditional institutions (47 segments). Previous research by Soegijono showed that in rural communities in Indonesia, women's informal roles in traditional ceremonies and in managing the distribution of agricultural products matter more for community food security than formal policies (Soegijono et al., 2026)In Buru Regency, this involvement ensures that marine harvesting practices adhere to traditional boundaries, indirectly serving as an environmental conservation mechanism.

Another crucial aspect is women's role as intergenerational bridges in preserving values. Data on the "Young Generation" (47 segments), supported by Inf_21 and Inf_22, highlight systematic efforts to pass on traditional values. Women act as primary socialisation agents, teaching culturally based ecological knowledge to young people. This aligns with Cultural Pedagogy, where teaching and learning occur through active participation in daily rituals and activities (Villaver, 2024)Without women's role in transmitting these traditional values, the sociocultural identity of the Buru coastal community will be threatened, which in turn will weaken the locally based food security system they have long relied on.

Furthermore, traditions in Buru Regency have been shown to be dynamic and open to changes over time. Findings on integrating traditional knowledge with modern methods (91 segments) show that women can negotiate culture. They use traditional

values as a filter to absorb modern science without losing their identity. Previous research by Dong argued that coastal communities' resilience depends heavily on their ability to hybridise knowledge (Dong et al., 2026). In Buru, women show that maintaining tradition means maintaining sovereignty over how they produce and consume food, a protective measure against the commodification of food that marginalises local values.

The strong role of women in tradition, as recorded in these 341 data segments, confirms that food security in Buru Regency is a cultural endeavour. Tradition provides a moral framework for women to act as responsible resource managers. However, the challenge ahead is how to formally recognise women's traditional authority in regional development policies. Ignoring women's traditional roles means neglecting the greatest social asset within coastal communities. Therefore, strengthening food security must begin by giving women more space to articulate traditional values in higher decision-making forums, so policies align with the pulse of local communities.

Women's Contribution to Food Security

Women's contribution to food security in Buru Regency clearly reflects household economic resilience rooted in coastal resources. Referring to the data in Figure 1, the sub-code "Women's contribution to food security" recorded a frequency of 31 segments. Although this frequency appears smaller than that of ecological roles, narratives from informants such as Inf_1, Inf_2, Inf_3, Inf_22, and Inf_23 indicate that this contribution is qualitative and strategic. Women in this region act as food managers, regulating the availability, accessibility, and stability of family consumption. Theoretically, this aligns with the FAO's concept of food security, which emphasises four main pillars (KIYOHARA, 2024). Women in Buru play a key role, especially in food accessibility and utilisation through processing diverse seafood.

A close analysis of Figure 8 reveals a very strong correlation between food contributions and women's livelihoods. Women's involvement in "Alternative Business" (48 segments) shows that they do not rely solely on a single source of food or income. Business diversification, such as processing salted fish, making fish jerky, or local snacks, is an adaptive strategy to ensure food availability during the lean season. Previous researcher Quisumbing stated that increased income in the hands of women is directly correlated with improved child nutrition and household food security, compared to when men hold the income (Quisumbing et al., 1996). In Buru Regency, women's economic diversification is the primary "safety net" for stable family consumption.

Women's contributions also show up in the efficient use of local resources through the application of local wisdom. Supported by data from the local knowledge and

adaptation category (92 segments), women use their knowledge to minimise food loss or waste. For example, through traditional preservation techniques learned through the Inheritance of Knowledge process (113 segments), women can store excess catches during the harvest season for future needs. This aligns with the Livelihood Strategies theory, where vulnerable communities manipulate limited resources to maintain resilience (Huynh, 2022). Women in Buru can transform seasonal natural resources into annual food stocks, making a real contribution to local food stability.

Beyond availability, women contribute significantly to food quality and safety by integrating modern science. The data show 91 segments addressing integration with modern science, echoed by informants such as Inf_19 and Inf_21. This suggests that coastal women in Buru are beginning to adopt more modern hygiene standards and packaging techniques in seafood processing. These efforts not only increase product value but also help ensure that food consumed by families and surrounding communities meets higher safety standards. This finding supports Smit and Skinner's research on food sector adaptation, where technology adoption by women's groups is a key driver in the modernisation of traditional food systems in rural areas (Smit & Skinner, 2002).

However, limited access to capital and formal markets hampers this contribution. Figure 4 shows that although women make significant economic contributions (231 livelihood segments), they still face obstacles in expanding their businesses. This reflects what gender sociology calls the Double Burden, where women must manage household food security while also earning additional income, without adequate policy infrastructure support (Adeomi, 2026). Without institutional interventions that support women's access to more advanced food processing technologies, their contributions will remain at a subsistence level and remain vulnerable to global economic fluctuations.

Women's contributions to food security in Buru Regency are the backbone of protecting communities from hunger and poverty. Data from 31 food security segments and 231 livelihood segments show that every rupiah and every grain of food women produce has high socioeconomic value. Therefore, regional food security policies should no longer position women merely as objects of aid, but rather as strategic subjects. Strengthening women's capacity in food management and providing access to broader supply chains is an absolute prerequisite for achieving sustainable food sovereignty in Buru Regency, as emphasised in the inclusive development vision that prioritises household well-being as a key indicator of success.

Women's Involvement in Decision Making

Women's involvement in decision-making is the most contradictory finding in this study. Based on the visualisation in Figure 5 and the data tabulation in Figure 1, the sub-code "Women's involvement in decision-making" only recorded a frequency of 2 segments (0.1%). This very low figure creates a sharp sociological anomaly when compared to their ecological role, which reached 448 segments. Theoretically, this phenomenon reflects the concept of Gendered Power Relations, where women's dominance in the domestic sphere and natural resource management does not automatically transform into political authority in the public sphere (Prior & Peled, 2022). In Buru Regency, women are the primary managers of food security on the ground, but they remain peripheral figures at formal negotiating tables at the village and district levels.

This participation gap is further underscored by data from the institutional category, which covers only 30 segments in total. Although women are involved in traditional institutions in 47 segments, this involvement is ceremonial or limited to technical cultural matters, rather than in strategic decision-making regarding resource allocation or coastal development policies. This aligns with Bina Agarwal's findings on "participatory exclusion," where women may be physically present in community forums, but their voices carry little weight in determining the final policy outcomes (Agarwal, 2021). In the coastal region of Buru, excluding women's voices from formal decision-making risks producing food security policies that are insensitive to the real needs of field managers.

This anomaly becomes even more apparent when we examine the data intersection in Figure 7. Although women possess knowledge on climate change adaptation (23 segments) and the integration of modern science (91 segments), this cognitive authority lacks formal channels to channel it into institutional policy. Informants such as Inf_19, Inf_21, and Inf_22 demonstrate strong intellectual prowess in ecosystem management, but because decision-making structures are patriarchal, this knowledge remains an asset for individuals or small groups rather than for regional policy. Previous researcher Cornwall has argued that participation without decision-making power is merely a form of "fake consultation" that will not change the structure of gender inequality in development (Cornwall, 2003).

Factors inhibiting women's involvement in decision-making in Buru Regency can also be analysed through the lens of social capital. Although women have strong bonding social capital (relationships between women/families), they lack linking social capital (relationships with political authorities). Data show that knowledge transfer in 113

segments occurs more in informal family spaces than through formal institutional mechanisms. This means women's leadership capacity is not systematically institutionalised. As a result, during village meetings or discussions on food aid programs, women are represented only quantitatively, without substantive involvement in formulating program priorities.

Compared with Susilowati's research on coastal communities in Indonesia, these structural barriers are exacerbated by the double burden.(Susilowati, 2019)Women who already spend significant time on natural resource management (448 segments) and livelihoods (231 segments) have limited time to engage in inflexible decision-making bureaucracies. However, this document demonstrates that leadership potential exists, particularly among key informants like Inf_21, who provided the most detail on economic and social aspects. This potential represents human capital that is wasted if not given formal space within the village institutional structure in Buru Regency.

The low participation rate in decision-making (only two segments) is the biggest challenge to food sovereignty in Buru Regency. Sustainable food security is impossible to achieve if the key actors who maintain ecosystems and manage food production are not involved in policy design. Institutional transformation is needed that provides quotas and space for women to articulate their ecological and social knowledge into formal regulations. Making women subjects in decision-making is not only a matter of gender equity, but also a pragmatic strategy to ensure regional food security policies are grounded in data and field realities traditionally controlled by women.

Inheritance of Knowledge

Knowledge transmission is a crucial mechanism that ensures the sustainability of the food security system in Buru Regency. Based on data in the MAXQDA-processed document, this category recorded 113 segments (4.2%). This data is documented through statements from informants Inf_23, Inf_22, and Inf_21, which indicate that knowledge transmission in this region does not occur by chance but through a structured socialisation process within domestic and communal spaces. Theoretically, this phenomenon can be explained through the concept of Traditional Ecological Knowledge, where knowledge is not simply a collection of information, but rather a dynamic accumulation of experiences passed down across generations to adapt to the local environment (Hartel et al., 2023).

This inheritance encompasses vital aspects that support women's ecological roles (448 segments) and natural resource management. Through daily interactions, senior women pass on cognitive skills about current patterns, planting seasons, and seafood

processing techniques to the younger generation (47 segments). As visualised in Figure 3, this inheritance bridges local wisdom and future challenges. Previous research by Lessy confirms that coastal communities' resilience depends heavily on effectively transmitting this knowledge; if the chain of inheritance is broken, the community loses its adaptive capacity to ecosystem changes, ultimately undermining local food sovereignty (Lessy et al., 2026).

One interesting finding in this data is the hybridisation of knowledge, where the inheritance process is not rigid or closed. The document shows 91 data segments related to Integration with modern science, voiced by Inf_19, Inf_21, and Inf_22. This indicates that women in Buru Regency practise what is known as Cognitive Resilience, namely the ability to maintain basic traditional values while adopting modern scientific knowledge (Shariq et al., 2026) Knowledge transmission in Buru is thus dialectical: it preserves ancestral identity while allowing innovation to ensure seafood retains economic value and meets high food safety standards.

Sociologically, women's role as primary agents in this inheritance strengthens their position within the informal social structure. Although their formal institutional role is minimal (only two segments in decision-making), their authority in the realm of knowledge is very dominant. Informants Inf_21 and Inf_22 consistently emerged as key figures in the local wisdom category (304 segments). This indicates that women are "living libraries" for the Buru coastal community. In Primary Socialisation theory, mothers and senior women play a crucial role in passing on practical knowledge about food, shaping future generations' orientation toward their environment. Without women's active involvement in this informal education process, knowledge about marine biodiversity and environmentally friendly subsistence methods will be lost (Schick et al., 2023).

Furthermore, Figure 6 shows that the transmission of this knowledge is also closely linked to women's role in tradition (341 segments). Tradition serves as a medium or platform through which this knowledge is practised and taught. For example, through participation in traditional ceremonies or collective work on the coast, younger generations learn about environmental ethics and customary boundaries in exploiting nature. This finding aligns with Saraswati's research, which states that in Indonesia, gender-based knowledge transmission is the most effective way to preserve marine ecosystems because it instils emotional bonds and moral responsibility from an early age (Saraswati et al., 2025).

The large volume of data on knowledge transmission (113 segments) strongly suggests that food security in Buru Regency has a solid intellectual foundation, but is vulnerable due to its lack of institutionalisation. Policies should support reliance on oral

transmission and daily practices by formally recognising women's local knowledge. Strengthening women's roles in knowledge transmission is not merely about preserving the past, but also about securing the future of regional food security. By creating space for women to integrate their local wisdom with development policies, Buru Regency can build a food security model that is not only economically sovereign but also intellectually and culturally sustainable.

Conclusion

This study concludes that women are the primary anchor in the food security system through the integration of ecological, economic, and sociocultural functions. The dominance of the "Ecological Role of Women" category, with 448 data segments, empirically proves that women are not merely resource users but proactive coastal ecosystem managers. This extensive involvement indicates that food stability in the region depends heavily on women's success in managing natural capital.

This research also confirms that food security in Buru Regency is based on a dynamic knowledge base. Through knowledge transmission (113 segments), women sustain local wisdom while hybridising it with modern science (91 segments). This phenomenon creates a cognitive resilience model that enables communities to maintain food sovereignty amidst the threat of climate change. Women's role as primary socialisation agents helps maintain environmental ethics and traditional technical skills as strategic assets for coastal communities.

However, this study reveals a stark participation paradox. Although women dominate the ecological (448 segments) and socio-cultural (341 segments) domains, their involvement in formal decision-making is recorded in only two segments (0.1%). This disparity indicates structural barriers hindering the transformation of women's real capacity into policy power. Without institutional recognition of women's knowledge authority and managerial roles, Buru Regency's food security system will remain at a vulnerable subsistence level.

As a recommendation, women's roles should be repositioned from mere "guardians of tradition" to "subjects of policy." Local governments and stakeholders need to integrate community-based decision-making mechanisms that give women substantive space to articulate their ecological and social knowledge. Strengthening food security in Buru Regency will not achieve true sovereignty without synchronising women's significant contributions in the field with their access to strategic authority at the institutional level.

Research Limitations

This study used a qualitative phenomenological approach and focused on five coastal villages in Buru Regency (Waeura, Waeperang, Airbuaya, Sanleko, and Wamlana). Therefore, findings on women's ecological, economic, and sociocultural roles are closely tied to the region's local context and may not generalise to coastal communities in other regions. This study draws entirely on the subjective experiences of 23 grassroots informants, including housewives, female fish traders, female farm labourers, and fishermen's groups. This study has not yet explored in depth the perspectives of formal policymakers at the government bureaucratic level regarding the reasons for the emergence of structural barriers to women's participation.

Research Recommendations

In response to the disparities in women's participation in the formal sphere identified in this study, institutional transformation of local governments is recommended to provide quotas and substantive space for women to articulate their ecological and social knowledge into village-level regulations and policies. Regional food security policies need to reposition coastal women from mere "guardians of tradition" or objects of aid to strategic "subjects of policy." This can be achieved by strengthening food management capacity and expanding women's access to broader economic supply chains. Further research is recommended on designing gender-inclusive policy formulation mechanisms, particularly to bridge the social capital gap at the linking level (relationships with political authorities), so women's leadership capacity in the food system can be institutionalised.

Acknowledgements

The authors thank the Faculty of Teacher Training and Education, Iqra Buru University, for their support during the research conducted in 2026.

Author's Contribution

AW: wrote the main text of the manuscript, prepared figures, and reviewed the manuscript. MHL: Data curation, resources, writing – review & editing. ESN: Writing – review & editing.

Conflict of Interest

The authors declare no conflict of interest

Data Availability Statement

Data will be made available on request.

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