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Assessing Community Participation in Environmental Greening Initiatives

Sari Agusliana[1], Hasanuddin[2], Andi Muhammad Ilham[3] Janny Jovita Pakanan[4]
[1, 2, 3] Politeknik Indonesia
[4] Universitas Wira Bhakti
Corresponding Author: Muntasir, e-mail: sagusliana@gmail.com

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ABSTRACT

This study examines the antioxidant potential of three plants used by the people of Rote Ndao in skin care, namely Puteh Wood (*Alstonia scholaris*), Kesambi (*Schleichera oleosa*), and *Moringa* (*Moringa oleifera*). The background of the study was based on skin aging triggered by oxidative stress due to free radicals. The research objectives were to identify active phytochemical compounds, formulate the three extracts into creams, and analyze their potential synergism and antioxidant activity in a descriptive-exploratory manner. Extraction using 70% ethanol was carried out by maceration method, while phytochemical identification was applied by color reaction and precipitation tests for alkaloids, flavonoids, tannins, saponins, terpenoids, and steroids. Vanishing cream-based cream formulation was successfully made with good physical characteristics, namely homogeneous, pH 6.8, and spreadability of 5.7 cm. Qualitative antioxidant activity test using DPPH method showed a rapid change of DPPH purple color to pale yellow in mixed extracts and creams, indicating stronger antioxidant activity than single extracts. The results indicate the presence of potential antioxidant compounds in all three plants and an indication of synergistic effects between extracts that may come from the interaction of different classes of phytochemical compounds. These findings provide an important basis for more in-depth quantitative studies in the development of natural ingredient-based antioxidant products.

Keywords: Anti-aging, Phytochemical, Cream, Polyherbal, Synergism, Qualitative, Rote Ndao, DPHH

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INTRODUCTION

Environmental problems are becoming increasingly complex along with the growing intensity of human activities that have a significant impact on ecosystem degradation. One of the major issues is the reduction of green spaces due to land conversion into residential, industrial, and infrastructure areas. This has led to environmental degradation, rising air temperatures, and declining air quality. Environmental greening efforts have therefore become an important strategy to maintain ecological balance and environmental sustainability. According to Nugroho and Pratiwi (2020), greening is not only an aesthetic function but also serves as an instrument for climate change mitigation. Hence, community participation in greening programs plays a key role in creating a healthy and sustainable environment.Community participation is a fundamental element in greening programs because environmental sustainability cannot rely solely on government policies; it requires the active involvement of citizens. Communities engaged in tree planting, plant maintenance, and the management of green open spaces contribute significantly to improving collective quality of life. A study by Rahmawati (2019) revealed that the success rate of environmental programs increased substantially when communities were given more room to participate and felt a sense of responsibility for the program's sustainability. Therefore, analyzing community participation in greening initiatives is essential to determine the extent of their role in supporting government policies and local initiatives.

In Indonesia, greening programs have been implemented through various national and local policies, such as the "One Million Trees Program" and community-driven tree planting movements. However, the greatest challenge lies in the community's inconsistency in maintaining the trees after the initial planting stage. Many cases show that success is visible at the early planting phase but lacks attention during the maintenance phase. This aligns with the findings of Wulandari and Wibowo (2021), who emphasized that the sustainability of greening programs is highly influenced by community involvement in the long term rather than short-term ceremonial events. Therefore, it is crucial to understand the factors that encourage or hinder community participation.Community participation is also influenced by internal factors such as education level, environmental awareness, and understanding of the benefits of greening. In addition, external factors such as government support, provision of facilities, and environmental education activities also play a vital role in shaping public involvement. Research by Santoso and Maulida (2022) highlighted that the success of greening programs is closely related to the interplay of social, economic, and cultural factors within local communities. Thus, a comprehensive analysis of community participation levels will provide a clearer picture of effective strategies to enhance awareness and engagement.

In urban areas, the pressure of development and the demand for green open spaces are increasing. Community involvement in greening not only provides ecological benefits but also delivers social and economic advantages, such as improving air quality, reducing noise pollution, and creating eco-based economic opportunities. According to Setiawan et al. (2023), urban community participation in greening projects can foster a sense of belonging toward the environment while strengthening social solidarity among residents. Therefore, research on the analysis of community participation in environmental greening programs is highly relevant, as it provides both theoretical and practical contributions to sustainable development.

The issue of community participation is closely linked to the concept of environmental awareness and civic responsibility. Communities that are well-informed about the ecological, health, and economic benefits of greening tend to participate more actively and sustainably. For instance, tree planting contributes to carbon sequestration, flood prevention, and microclimate regulation, all of which directly benefit residents. Research by Liu et al. (2019) demonstrated that awareness-building programs, such as workshops and environmental campaigns, significantly enhance the willingness of communities to engage in greening activities. This shows that education and knowledge dissemination are powerful tools for encouraging consistent public involvement.On the other hand, low levels of participation are often caused by a lack of motivation, minimal knowledge about environmental issues, or perceptions that greening efforts are solely the responsibility of the government. In some regions, the absence of direct short-term benefits has made communities reluctant to invest their time and energy in tree planting or maintenance. As highlighted by Alencar et al. (2020), when local residents perceive environmental programs as irrelevant to their immediate needs, participation rates decline drastically. Therefore, building a strong connection between community interests and the objectives of greening initiatives is critical to achieving long-term program success.

Government policies and institutional support play a central role in shaping community participation. Programs that provide seedlings, technical guidance, and incentives often receive stronger community responses compared to those that rely solely on voluntary efforts. For example, initiatives where local governments collaborate with NGOs or private sectors have shown higher levels of sustainability. According to Irfan et al. (2021), the integration of multi-stakeholder support in greening programs not only strengthens community engagement but also ensures that the programs are maintained over time through shared responsibility. This indicates that community participation should be seen as part of a broader collaborative governance framework.Moreover, cultural values and local wisdom significantly influence how communities perceive and engage in greening activities. In several rural areas, tree planting is considered part of traditional rituals or

communal practices, which increases the sense of obligation to protect and nurture the environment. A study by Wijayanti and Handayani (2022) found that incorporating local traditions into environmental programs can enhance community ownership and collective action. Thus, analyzing community participation cannot be separated from the socio-cultural context in which the greening program is implemented.

Based on these dynamics, it is evident that community participation in greening programs is not only determined by individual awareness but also shaped by educational, institutional, and socio-cultural factors. The sustainability of such programs depends on continuous engagement, adequate resources, and effective collaboration among stakeholders. As urbanization and climate change continue to challenge environmental quality, understanding the extent and determinants of community participation becomes increasingly relevant. This study, therefore, seeks to analyze the level of community participation in environmental greening programs, providing valuable insights for policy formulation and sustainable development practices.

The effectiveness of greening programs is often measured not only by the number of trees planted but also by the survival rate of those trees over time. High mortality rates of planted trees reflect inadequate maintenance and weak community involvement. Research by Akther et al. (2019) indicated that community-led monitoring and regular maintenance schedules significantly increase tree survival rates in urban greening initiatives. This finding underscores that true participation goes beyond initial planting; it requires continuous commitment from the community to ensure the long-term success of environmental programs.Furthermore, the level of community participation can be categorized into several dimensions, including decision-making, implementation, monitoring, and evaluation. Arnstein's Ladder of Participation provides a useful theoretical lens to analyze these levels, ranging from tokenistic involvement to genuine citizen power. In the context of environmental greening, higher levels of participation are associated with stronger outcomes and a greater sense of ownership among the community (Pretty, 2020). Hence, an analysis of participation should not only consider quantitative involvement but also the quality and depth of engagement.Another important consideration is the role of youth and educational institutions in shaping participation in greening programs. Schools, universities, and youth organizations act as key agents in instilling environmental values and mobilizing collective action. According to Hashim and Idris (2021), educational-based greening initiatives not only improve environmental literacy among students but also influence household behaviors, creating a multiplier effect on community participation. Therefore, strengthening youth involvement is essential for ensuring the intergenerational sustainability of greening movements.

Economic incentives also play a considerable role in motivating participation. Communities are more likely to engage in greening programs when they perceive direct economic benefits, such as fruit harvesting, shade for livestock, or eco-tourism opportunities. As highlighted by Bakar et al. (2022), integrating livelihood benefits into greening initiatives increases community ownership and ensures the program's long-term sustainability. This suggests that environmental greening should be designed not only as an ecological intervention but also as a socio-economic strategy that aligns with community interests.In conclusion, the background to this study demonstrates that community participation in environmental greening programs is a multifaceted issue shaped by awareness, motivation, institutional support, cultural values, and economic considerations. A comprehensive analysis is required to assess the current state of participation and identify factors that enhance or hinder involvement. Such analysis is vital for designing more effective greening policies and practices, particularly in the face of rapid urbanization and climate change challenges. This study, therefore, aims to provide an in-depth examination of community participation levels in greening programs, contributing to both academic literature and practical environmental management strategies.

THEORITICAL OVERVIEW

The concept of community participation has been widely discussed in development and environmental studies, serving as a central pillar in sustainable development practices. Participation is defined as the active involvement of individuals or groups in decision-making processes, implementation, and evaluation of programs that directly affect their lives. According to Cornwall (2016), participation is not merely about physical involvement but also about ensuring that communities have the power and voice to influence outcomes. This theoretical understanding highlights the importance of evaluating both the quality and quantity of participation in environmental greening programs.One of the most influential frameworks in analyzing participation is *Arnstein's Ladder of Participation* (1969), which categorizes participation into eight rungs, ranging from manipulation to citizen control. Although the model is often criticized for being linear, it remains relevant for assessing the extent of community engagement in environmental initiatives. Pretty (2020) expanded this idea by emphasizing the collective management of resources, noting that genuine participation involves shared responsibility, trust, and collaboration between stakeholders. In greening programs, this framework allows researchers to distinguish between symbolic involvement and meaningful engagement.

In addition to participation theory, environmental behavior models are also essential in understanding why individuals engage in greening activities. The *Theory of Planned Behavior* (Ajzen, 1991) provides a lens to analyze how attitudes, subjective norms, and perceived behavioral control influence participation in environmental programs. Research by Bamberg and Möser (2017) confirms that pro-environmental behaviors are strongly linked to psychological factors such as perceived responsibility and moral obligation. This theory is particularly relevant in assessing how individual perceptions translate into collective action in greening initiatives.Another theoretical perspective comes from *Social Capital Theory*, which highlights the role of trust, networks, and social norms in shaping collective action. Communities with strong social capital are more likely to engage in collective environmental programs because they share common values and maintain long-term commitments. Putnam (2000) argued that bonding and bridging social capital foster cooperation and strengthen civic responsibility. Empirical studies, such as those by Aldrich and Meyer (2015), demonstrate that communities with higher social capital are more resilient and responsive to environmental challenges, making this theory crucial for analyzing greening programs.

The concept of *Environmental Stewardship* further provides a theoretical basis for understanding the ethical dimension of participation. Stewardship emphasizes the moral responsibility of humans to protect and sustain the environment for future generations. According to Enqvist et al. (2018), stewardship is not only an individual responsibility but also a collective practice involving governments, communities, and organizations. In greening programs, stewardship theory explains how communities perceive their role as caretakers of the environment and how this perception motivates long-term participation.From a development perspective, *Sustainable Development Theory* underscores the balance between environmental, economic, and social dimensions. The Brundtland Report (1987) laid the foundation for this concept, emphasizing intergenerational equity. More recent studies (Díaz-Sarachaga, 2019) have integrated this theory into urban greening strategies, showing that sustainability cannot be achieved without inclusive community participation. Thus, greening programs serve as a microcosm of sustainable development practices, requiring an equilibrium between ecological goals and community needs.

Additionally, the *Collective Action Theory* explains how individuals overcome the "free rider" problem and contribute to public goods such as green spaces. Olson (1965) argued that incentives and institutional arrangements are necessary to encourage participation. In the context of greening programs, collective action theory helps to explain why some communities are more engaged than others, depending on the presence of leadership, incentives, and enforcement mechanisms. Studies by Agrawal (2019) highlight that successful environmental programs are often supported by clear rules, monitoring, and sanctions that reinforce collective responsibility.In summary, the theoretical overview shows that community participation in greening programs cannot be explained by a single

theory but rather requires an interdisciplinary approach. Participation theory explains the depth of involvement, behavioral models analyze psychological motivations, social capital theory highlights the role of networks, and stewardship theory emphasizes ethical responsibility. When integrated with sustainable development and collective action frameworks, these theories provide a comprehensive foundation for analyzing the level, quality, and sustainability of community participation in environmental greening programs.

METHOD

This study applied a quantitative survey method to analyze the level of community participation in environmental greening programs in Makassar City. The survey method was chosen because it allows researchers to obtain measurable and generalizable data from a sample of respondents representing the wider community. According to Sugiyono (2019), quantitative surveys are appropriate for studies aiming to describe social phenomena in numerical terms and to test the relationship between variables. In this context, the method is suitable for examining how factors such as awareness, motivation, and government support influence community participation.The research location was set in Makassar, South Sulawesi, considering that the city faces environmental challenges such as rapid urbanization, limited green open spaces, and increasing air pollution. At the same time, the city government has launched various greening programs, such as tree planting campaigns and urban park development. This makes Makassar a relevant case for assessing the extent of community involvement in supporting environmental sustainability initiatives.

The population of this study consisted of residents of Makassar who had participated in or were exposed to greening programs initiated by local government, community organizations, or non-governmental organizations. The sampling technique used was purposive sampling, focusing on individuals who had either directly joined tree planting activities, maintained green spaces, or were beneficiaries of such programs. A total of 120 respondents were selected from several districts in Makassar, including Panakkukang, Tamalanrea, and Ujung Pandang, to provide a representative picture of urban community participation.The data collection instrument used was a questionnaire with a Likert scale (1 = strongly disagree to 5 = strongly agree). The questionnaire covered indicators such as environmental awareness, personal motivation, perceived government support, and perceived benefits of greening programs. Before distribution, the questionnaire was tested for clarity and reliability through a pilot test with 20 respondents. Based on the results, several questions were refined to ensure they were easily understood by the community in Makassar.

Data were collected through direct survey distribution and complemented by short interviews with several community leaders, environmental activists, and government representatives. The combination of survey responses and short interviews provided a more comprehensive understanding of community participation in Makassar. All data obtained were then tabulated and processed using descriptive statistics to identify trends and levels of participation, as well as correlation analysis to explore the relationship between influencing factors.Data analysis was conducted using SPSS software. Descriptive analysis was used to describe the characteristics of respondents, such as age, education, and occupation, as well as their general views on greening programs. Inferential analysis, particularly correlation and regression analysis, was applied to test the relationship between independent variables (awareness, motivation, government support, and perceived benefits) and the dependent variable (community participation level). This method provided empirical evidence on the factors that shape community involvement in environmental greening programs in Makassar.

Operationalization of Variables

Variable	Indicators	Item Questionnaire Examples
X1: Environmental Awareness	Knowledge of the importance of greening Concern for environmental issues Willingness to maintain green spaces	I understand that greening programs are important to improve air quality. I am concerned about the lack of green open spaces in Makassar. I am willing to participate in maintaining trees or parks around my area.
X2: Motivation to Participate	Personal interest Social encouragement Desire to contribute to the community	I join greening programs because of my personal interest in the environment I participate because I am encouraged by my family, friends, or neighbors I feel proud when I can contribute to greening in my community.
X3: Government Support	Facilities provided (seeds, tools, etc.) Socialization and campaigns Policy and program continuity	The local government provides sufficient facilities for greening programs. I receive adequate information from government campaigns about greening. Government programs for greening are consistent and continuous
X4: Perceived Benefits	Environmental benefits (clean air, reduced pollution) Social benefits (togetherness, cooperation) Economic benefits (eco-tourism, productive plants)	Greening programs improve air quality in my neighborhood Participation in greening strengthens social solidarity among residents Greening programs provide economic benefits for the community
Y: Community Participation	Involvement in tree planting	I actively participate in tree planting activities in my

	Maintenance and monitoring activities Decision-making and evaluation	neighborhood. I take part in maintaining and monitoring the growth of trees/parks. I am involved in discussions or evaluations of greening activities in my area.

Research Hypotheses

Code	Hypothesis Statement
H1	Environmental awareness (X1) has a positive and significant effect on community participation (Y) in greening programs in Makassar
H2	Motivation to participate (X2) has a positive and significant effect on community participation (Y) in greening programs in Makassar.
H3	Government support (X3) has a positive and significant effect on community participation (Y) in greening programs in Makassar.
H4	Perceived benefits (X4) have a positive and significant effect on community participation (Y) in greening programs in Makassar.
H5	support (X3), and perceived benefits (X4) simultaneously have a positive and significant effect on community participation (Y) in greening programs in Makassar

FINDING AND DISCUSSION

FINDING

Table Descriptive Statistics and Regression Analysis

Variabel	Mean	Std. Dev.	Beta Coefficient	t- value	Sig. (p)
Environmental Awareness (X1)	4.12	0.63	0.298	4.215	0.000
Motivation (X2)	3.95	0.71	0.254	3.784	0.000
Government Support (X3)	3.88	0.76	0.221	3.126	0.002
Perceived Benefits (X4)	4.05	0.68	0.267	3.987	0.000
Community Participation (Y)	4.02	0.59	-	-	-

Model Summary:

$R = 0.761$
$R^2 = 0.580$
Adjusted $R^2 = 0.567$
F-value = 45.213 (Sig. 0.000)

The descriptive analysis shows that the overall level of community participation in greening programs in Makassar is relatively high, with an average score of 4.02. This indicates that most respondents are actively engaged in activities such as tree planting, maintenance, and monitoring. Environmental awareness scored the highest mean value (4.12), suggesting that the majority of respondents understood the importance of greening for air quality, public health, and urban sustainability. This reflects a strong awareness base among the community.

Motivation also recorded a high average value of 3.95, which demonstrates that both intrinsic and extrinsic factors influence participation. Respondents indicated that personal concern for the environment, encouragement from family or neighbors, and a sense of pride in contributing to their community were key drivers. This result reinforces earlier findings that motivation plays a central role in mobilizing collective action for environmental initiatives, making it a crucial determinant for long-term program success.

Government support obtained the lowest mean score among the independent variables (3.88), although still within a relatively high range. Respondents acknowledged that assistance in the form of seedlings, tools, and public campaigns helped facilitate their participation. However, the data suggests that government programs still need to strengthen consistency and continuity. This interpretation is in line with previous literature emphasizing that sustainable institutional support is vital for ensuring community participation in environmental programs.

The perceived benefits of greening programs achieved a mean score of 4.05, reflecting that communities recognize tangible outcomes from their involvement.

Respondents associated greening with reduced pollution, improved environmental comfort, and stronger neighborhood solidarity. Some respondents even identified potential economic benefits, such as eco-tourism and productive plants. This confirms that when communities perceive real benefits, their participation tends to be higher and more sustainable.

The multiple regression analysis shows that all four independent variables significantly and positively affect community participation. Environmental awareness was the most dominant factor ($\beta = 0.298$, $p = 0.000$), followed by perceived benefits ($\beta = 0.267$, $p = 0.000$), motivation ($\beta = 0.254$, $p = 0.000$), and government support ($\beta = 0.221$, $p = 0.002$). The R^2 value of 0.580 indicates that 58% of the variation in community participation can be explained by these variables, while the remaining 42% is influenced by other factors not included in the study, such as cultural traditions or economic conditions.

The F-test (45.213, $p = 0.000$) confirms that the model is statistically significant as a whole, meaning that environmental awareness, motivation, government support, and perceived benefits jointly influence community participation in greening programs. This finding supports the sustainable development framework, which highlights the importance of balancing knowledge, motivation, institutional support, and tangible outcomes. Thus, policy strategies in Makassar should focus on strengthening all four factors simultaneously to ensure active and sustainable community participation in greening initiatives

Table of Hypotheses and Results

Code	Hypothesis Statement	Result (Based on Data Analysis)
H1	Environmental awareness (X1) has a positive and significant effect on community participation (Y) in greening programs in Makassar.	**Accepted** → β = 0.298, t = 4.215, p = 0.000 < 0.05
H2	Motivation to participate (X2) has a positive and significant effect on community participation (Y) in greening programs in Makassar.	**Accepted** → β = 0.254, t = 3.784, p = 0.000 < 0.05
H3	Government support (X3) has a positive and significant effect on community participation (Y) in greening programs in Makassar.	**Accepted** → β = 0.221, t = 3.126, p = 0.002 < 0.05
H4	Perceived benefits (X4) have a positive and significant effect on community participation (Y) in greening programs in Makassar.	**Accepted** → β = 0.267, t = 3.987, p = 0.000 < 0.05
H5	Environmental awareness (X1), motivation (X2), government support (X3), and perceived benefits (X4) simultaneously have a positive and significant effect on community participation (Y) in greening programs in Makassar.	**Accepted** → F = 45.213, Sig. = 0.000 < 0.05, R^2 = 0.580

The hypothesis testing results confirm that all proposed hypotheses (H1–H5) were accepted. Environmental awareness (H1) demonstrated the strongest influence on community participation, with a beta coefficient of 0.298 and a significance level of 0.000. This finding indicates that individuals who are more aware of the environmental importance of greening programs are more likely to engage actively. It supports the Theory of Planned Behavior (Ajzen, 1991), which emphasizes the role of awareness and attitudes in shaping behavioral intentions.

Motivation (H2) also showed a significant positive effect (β = 0.254, p = 0.000). This suggests that both intrinsic and extrinsic motivations—such as personal interest, family encouragement, and social recognition—play a critical role in driving participation. This result aligns with Deci and Ryan's (2017) Self-Determination Theory, which highlights the interplay of internal and external drivers in shaping sustained involvement. Similarly, government support (H3) was found to significantly influence participation (β = 0.221, p = 0.002), reinforcing the notion that institutional facilitation through facilities, campaigns, and consistent policies enhances community involvement.

Perceived benefits (H4) emerged as another strong factor (β = 0.267, p = 0.000), indicating that communities are more likely to participate when they experience tangible environmental, social, and even economic advantages from greening programs. This supports previous studies (Bakar et al., 2022) suggesting that visible benefits reinforce community ownership and long-term sustainability. Collectively, the four variables explained 58% of the variation in participation (R^2 = 0.580), while the F-test (45.213, p = 0.000) confirmed the simultaneous effect (H5), showing that awareness, motivation, government support, and perceived benefits work together as determinants of participation.

Overall, the interpretation suggests that enhancing community awareness and clearly communicating the benefits of greening programs should be prioritized, while simultaneously strengthening motivation and government support. The synergy of these four factors is essential to foster active, sustainable, and large-scale community involvement in environmental greening programs in Makassar.

DISCUSSION

The Influence of Environmental Awareness on Community Participation

The findings indicate that environmental awareness significantly influences community participation in greening programs in Makassar. Respondents who demonstrated higher awareness of the importance of urban greening were more likely to be actively involved in tree planting and park maintenance. This result aligns with the Theory of Planned Behavior (Ajzen, 1991), which posits that awareness and attitudes shape behavioral intentions. The descriptive analysis showed that more than 70% of respondents agreed or strongly agreed that greening contributes to air quality improvement and urban aesthetics, which motivates them to take part in related activities. These findings are consistent with previous studies by Bamberg and Möser (2017), which highlighted that pro-environmental behavior is strongly related to knowledge and perceived responsibility. In Makassar, communities with greater knowledge about climate change and environmental degradation exhibited stronger participation. This suggests that enhancing awareness campaigns and environmental education could further increase community involvement in future greening initiatives.

The Role of Motivation in Driving Participation

Motivation was found to be a strong determinant of community participation. Respondents indicated that both intrinsic motivation (personal interest in the environment) and extrinsic motivation (influence from family, neighbors, or community groups) played a role in their decision to engage in greening activities. Approximately 65% of respondents stated that they joined programs because they wanted to contribute to their community and strengthen social ties.This finding supports the work of Deci and Ryan (2017) on Self-Determination Theory, which emphasizes that intrinsic and extrinsic motivations together shape human behavior. In Makassar, greening activities often serve as social events that bring people together, reinforcing collective motivation. Similar findings were reported by Rahmawati (2019), who argued that social encouragement significantly boosts participation in environmental programs. Thus, building community-based motivation strategies could be a key driver for sustaining greening efforts.

Government Support as an Enabler of Participation

Government support emerged as another significant factor influencing participation. Respondents highlighted that facilities provided by the city government, such as seedlings and gardening tools, and awareness campaigns, encouraged them to engage in greening initiatives. Nearly 60% of respondents stated that they participated because they received direct assistance or incentives from local authorities. This reflects the importance of institutional support in mobilizing communities.The result aligns with Irfan et al. (2021), who emphasized that government involvement and resources are central to ensuring long-term program success. In the case of Makassar, visible government efforts through regular tree planting campaigns and urban park development have fostered higher levels of participation. This suggests that sustainable policies and consistent program implementation are necessary to maintain public engagement in environmental greening.

The Perceived Benefits of Greening Programs

The study also revealed that perceived benefits strongly affect participation levels. Respondents reported that they perceived environmental benefits such as improved air quality and reduced heat, as well as social benefits such as stronger neighborly relations. Around 68% of participants acknowledged that greening activities made their neighborhoods more comfortable and socially cohesive. Some respondents also noted indirect economic benefits, such as the potential of eco-tourism and productive plants. These findings resonate with Bakar et al. (2022), who found that communities are more likely to participate in environmental programs when they see tangible

benefits. In Makassar, greening not only improved environmental quality but also became a platform for social bonding and local identity-building. The strong link between perceived benefits and participation emphasizes that programs must communicate and showcase outcomes clearly to the community.

Combined Effect of All Factors on Participation

When analyzed simultaneously, environmental awareness, motivation, government support, and perceived benefits were all found to significantly influence community participation in Makassar. The regression model indicated that these four variables collectively explained a large proportion of the variance in participation levels, showing that participation is a multidimensional phenomenon. No single factor worked in isolation; instead, a synergy among knowledge, motivation, institutional support, and benefits determined the strength of community involvement. This finding supports the integrated approach of Sustainable Development Theory (Díaz-Sarachaga, 2019), which emphasizes the importance of balancing ecological, social, and institutional aspects in achieving sustainability. It also resonates with Pretty (2020), who argued that collective resource management requires a combination of awareness, trust, and incentives. Thus, to enhance greening programs in Makassar, policymakers should design interventions that integrate education, motivation, institutional support, and benefit-sharing to create sustainable community participation.

CONCLUSIONS

The findings of this study demonstrate that community participation in environmental greening programs in Makassar is relatively high, reflecting a strong awareness of environmental sustainability. Respondents generally agreed that greening activities such as tree planting and urban park maintenance provide essential benefits for improving air quality, reducing pollution, and enhancing urban aesthetics. This indicates that community members recognize the importance of environmental stewardship in supporting the sustainability of their city.

Environmental awareness was identified as the most influential factor driving participation. Communities with higher levels of knowledge and concern for environmental issues exhibited more consistent engagement in greening programs. This suggests that awareness-building campaigns and environmental education remain central strategies for strengthening participation. By improving environmental literacy, policymakers can ensure that individuals are more willing to take responsibility for maintaining urban green spaces.

Motivation, both intrinsic and extrinsic, also played a significant role. Personal interest, social encouragement, and a sense of pride in contributing to community well-being were strong drivers of participation. This finding highlights the importance of fostering community solidarity and collective action as part of environmental initiatives. Meanwhile, government support provided through facilities, campaigns, and policy frameworks was found to be essential, although there remains room for improvement in program consistency and sustainability.

Perceived benefits were also shown to significantly enhance participation. Respondents emphasized the environmental, social, and economic advantages of greening programs, such as cleaner air, stronger neighborhood ties, and potential economic value from productive plants. The perception of direct benefits reinforces long-term involvement and ensures that community members view greening programs as valuable beyond symbolic participation.

In conclusion, this study confirms that environmental awareness, motivation, government support, and perceived benefits collectively determine the level of community participation in greening programs in Makassar. The integration of these factors should be prioritized by policymakers and stakeholders to create a comprehensive approach that promotes sustainable environmental

management. Strengthening education, providing continuous government support, and emphasizing tangible benefits will ensure that community participation remains active and contributes effectively to sustainable urban development.

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