



STRATEGY TO IMPROVE THE COMMUNITY BEHAVIOR TO CONTROL ENVIRONMENTAL DAMAGE THROUGH BREADFRUIT CONSERVATION IN A SMALL ISLAND, MAKASSAR CITY, INDONESIA

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ABSTRACT

The breadfruit tree is a multi-functional plant that can increase the value of the Environmental Performance Index (EPI) and support the SDG's agenda. However, the condition of this plant in the small island area of Makassar City is threatened with degradation. This study aims to formulate a strategy to improve community behaviour to control environmental damage through breadfruit conservation on the Small Island of Makassar City. This research is quantitative research with two stages of data collection. There were 50 respondents selected by purposive sampling method who were involved in filling out the questionnaire. Focus Group Discussion (FGD) was also conducted involving eight experts. People's behaviour in preparing breadfruit on small islands was found to be low, with a score of 54. This fact was influenced by limited knowledge, motivation, attitude, concern, commitment, locus of control, and application of policies to support breadfruit. The strategy formulated is the EDTS program, namely the delivery of education, dissemination, and joint movement for handling breadfruit (together) and imposing sanctions on breadfruit loggers.

Keywords: Conservation; breadfruit; environment control

1. INTRODUCTION

Environmental issues have become a global concern due to the impact of environmental damage on the sustainability of human life on Earth. The Environmental

Performance Index 2022 (EPI) assessment, which includes indicators of environmental health, climate, and ecosystem vitality, ranked Indonesia's environmental sustainability with a score of 28.20, placing it at 164 out of 180 countries, indicating poor performance. Factors influencing this include climate change, high deforestation rates, and land degradation. According to the Ministry of Environment and Forestry (2021), deforestation in Indonesia from 2018 to 2020 reached 584,600 hectares, making it one of the highest rates in the world. The data also shows that approximately 14,006,450 hectares of land are degraded, including those in small island areas (Central Statistics Agency, 2023). Coastal areas and small islands in Indonesia, including those in Makassar City, are at risk due to climate change and erosion. A survey conducted by the Makassar City Environment Agency (2012-2016) revealed that 12 small islands in Makassar City have experienced erosion.

Breadfruit trees are multi-functional plants that, if conserved, can improve the Environmental Performance Index (EPI) and support achieving the SDG's agenda, including poverty eradication, zero hunger, healthy and prosperous lives, climate action, and land ecosystem conservation. This plant plays a vital role in ecosystems as a producer of organic mulch, which adds organic matter to the soil. It also provides shade, protection, and a source of food for various animals such as bees, birds, and fruit bats. Additionally, it has ecological functions such as erosion control and minimizing abrasion due to its strong root system and broad canopy. From an economic, social, and health standpoint, the fruit of the breadfruit tree is a highly nutritious food source, and its leaves can be used medicinally due to their special compounds with antibacterial, antiviral, anti-inflammatory, anti-allergic, and anticancer properties. They can also prevent the formation of free radicals (antioxidants) and minimize wounds (Makmun and Pertiwi, 2022).

Breadfruit belongs to the tropical plant category and thrives in hot lowland areas, including both wet and dry regions (Sikarwar et al., 2014). It can even grow well on coral islands and coastal areas (Ramadhani, 2009). This plant can tolerate high soil salinity, such as in coastal areas (Risnandar, 2018). Breadfruit adapts to low and high rainfall levels, ranging from 80 to 100 inches annually. It flourishes in hot and humid locations with temperatures between 15-38°C (Ahra, 2019). Breadfruit trees are widely distributed in Indonesia, from Aceh to Papua (Rukmana, 2007), and they grow abundantly in the South Sulawesi region.

However, in the coastal areas and small islands of Makassar City, breadfruit trees are not being conserved. Many of these trees are cut down by the local communities as they are deemed less beneficial, leading to degradation. For example, several breadfruit trees are felled on Lae-Lae Island in Makassar City for building materials or other purposes. Reafforestation programs have been implemented on this island, including planting breadfruit trees, but they are not being conserved, resulting in the death of many plants

(Makmun and Pertiwi, 2021). On the other hand, breadfruit production in the past three years in Makassar city has significantly declined, from 103 tons in 2018 to 39 tons in 2019, and zero tons in 2020. This indicates that Makassar City and its coastal areas are experiencing the degradation of breadfruit trees. The factors causing this damage and the underlying issues are quite complex. However, the core of these problems ultimately lies with humans and their behavior, specifically the local communities.

The lack of awareness and understanding among the community regarding coastal policies, low levels of education, societal characteristics, and the cost of living pressures contribute to the frequent environmental destruction carried out by coastal communities (Primyastanto et al., 2010), including the loss of biodiversity. Hiariey et al. (2013) state that education level, perception, and income influence the interests of coastal area utilization. The influence of community knowledge about the environment is a crucial aspect that drives tangible behavioral changes for communities to create environmental improvements (Heddy, 1994). Human interaction and nature also lead to ecosystem degradation (Vatria, 2010).

The level of public knowledge about the potential of breadfruit trees is still low, which hinders their optimal utilization and, consequently, affects their habitat and conservation. The lack of knowledge in the cognitive domain has resulted in the community on Lae-Lae Island in Makassar City not utilizing breadfruit trees as medicinal plants (Makmun and Pertiwi, 2021). The community's perception of breadfruit trees is not favorable, with 58.41% of respondents having basic knowledge about breadfruit trees but not knowing their functions and benefits (Manurung et al., 2014).

The belief that breadfruit trees can grow independently can impact the low motivation to maintain them and the negative attitude towards their conservation. The community tends to have a short-term mindset, leading to a lack of concern for their environment. Considering the unique characteristics of the coastal areas and small islands in Makassar city and the value of breadfruit trees, in-depth research is needed on strategies to enhance the community's behavior in preserving breadfruit trees on small islands in Makassar city. This research can provide inputs for formulating strategies and policy directions for environmental preservation and conserving breadfruit trees in coastal areas and small islands.

2. METHODS

The research method used in this study is Quantitative Research, which aims to describe the behavior of the community on small islands in Makassar City in preserving breadfruit trees. The respondents were 50 individuals selected through purposive sampling on Lae-Lae Island in Makassar City. The data were analyzed using descriptive

statistical analysis based on the percentage for each question item and the average score of respondents' answers indicating positive behavior in preserving breadfruit trees. Furthermore, a frequency distribution of score categories was prepared using a four-point scale. According to Suharsimi Arikunto (1993: 196), the score categories are as follows: (1) Very low category, if the score is < 40%. (2) Low category, if the score is 40% - 55%. (3) Moderate category, if the score is 56% - 75%. (4) High category, if the score is 76% - 100%. A Focus Group Discussion was also conducted involving 8 experts who were considered knowledgeable about the issues and solutions related to the community's behavior in preserving breadfruit trees on small islands.

Table 1. Participants of FGD

No	Expert's Name	Occupation/Field of Expertise
1	Ervan Agustiar, ST	Deputy Coordinator of Natural Resources Conservation, Environmental Agency
2	Irnawati Hamid, ST, M.Si	Environmental Impact Controller
3	Andi Tenri Ulfa, SP, M.Si	Analysis of Agricultural Product Marketing, South Sulawesi Province
4	Abdul Gaffar M.	Agricultural Extension Officer, Makassar City
5	Sri Wulandari, S.Kel, M.Si	Expert in Coastal and Marine Area Management
6	Dr. Ahmad Syaiku	Expert in Empowerment
7	Irwan, M.Pd	Sociology Lecturer, Unsa Makassar
8	Apt Nur Yusroni Kaenong, S.Si	Expert in Medicinal Plants, Health Department of Makassar City

The research was conducted over three months (February - Mei 2023) and involved several stages of activities, including preparing the research plan, collecting secondary data such as literature and demographic data, developing research instruments, conducting on-site surveys, data collection, data processing, data analysis, and preparing the research report.

3. RESULTS AND DISCUSSION

Based on the analysis of data obtained from the questionnaire on community behavior to control environmental damage through the conservation of breadfruit trees on small islands in Makassar, with a total of 50 respondents, it was found that the highest score was 100 and the lowest score was 0, with a mean of 54 and a standard deviation (SD) of 26. Respondents who scored 100 accounted for 8%, indicating a very positive behavior in preserving breadfruit trees on small islands. The high behavior of these respondents can be influenced by internal factors such as their experience and intelligence, as well as external factors such as education and information. To determine the categories of community behavior scores, a frequency distribution of score categories was compiled, divided into four intervals, as shown in Table 2.

Table 2. Frequency distribution of community behavior scores

No	Description	Score	Frequency	%
1	Very Low	< 40	9	18
2	Low	40 – 56	16	32
3	Fairly High	56 – 75	8	16
4	High	76 - 100	17	34

The average value of the respondents was 54, indicating a low category. Around 50% of the respondents scored below the average value, falling into the low and very low categories. This implies that the average population of Lae-lae Island has a low tendency to control environmental damage through breadfruit conservation in the small city island of Makassar. However, there is a positive behavior with a fairly high category in terms of planting breadfruit trees for food purposes. On the other hand, negative behavior with low and very low categories is observed when it comes to planting other crops due to the perception that breadfruit is not suitable for cultivation in the island region. The large size of the tree requires ample planting space, which is limited on the island. Additionally, the fallen fruits can cause damage to the residents' houses.

The factors contributing to the negative behavior of the community include a lack of knowledge about the benefits of breadfruit in terms of its medicinal properties, water conservation, erosion prevention, and high economic value. These benefits are crucial, especially for those residing in small island areas with limited access to healthcare, scarce food resources, and the threat of climate change. Currently, the only part of the plant utilized is its fruit. The island community lacks information about the various benefits of breadfruit beyond its use as a vegetable (Syaiku, 2023). They are unaware that it can be used medicinally for treating hepatitis (Kaenong, 2023), hypertension, and diabetes. The traditional method involves washing and drying the old/yellow leaves, followed by boiling them in a stainless-steel pot and consuming the resulting liquid before bedtime (Gaffar, 2023). Furthermore, breadfruit trees are beneficial for environmental conservation in small island regions as their root system can store water, and their broad leaves minimize erosion caused by coastal winds (Hamid, 2023).

According to Sri Wulandari (2023), the negative behavior of the island community towards breadfruit conservation is primarily influenced by economic factors. Most islanders work as fishermen, and planting breadfruit does not provide immediately visible benefits for them. Therefore, they need to be educated about the benefits of breadfruit and accompanied until they experience its advantages.

Another factor was suggested by Irwan (2023). In implementing conservation policies or breadfruit-related initiatives on the island, the government, as a social structure, does not adequately involve the island community as agents. In terms of social

inclusion, community participation is essential in decision-making processes or when imposing sanctions on violators. Ulfa (2023) states that active stimulation is needed to engage the community in breadfruit conservation on the island, such as initiating a community movement to plant breadfruit trees and intensifying awareness campaigns about the benefits of breadfruit. Agustiar (2023) suggests that ecologically, breadfruit trees play a vital role on the island, and loggers should be penalized, such as implementing a policy of planting ten trees for each one that is felled. Failure to comply would result in the denial of administrative services for population management at the local level.

Based on the results of focus group discussions with experts, it was identified that the community's behavior towards breadfruit conservation is influenced by their knowledge about conservation, breadfruit cultivation, the value of breadfruit benefits, and the environment. These factors subsequently influence their attitudes, motivation, concern, and commitment to preserving breadfruit on the small island.

Strategies formulated to enhance the community's behavior in preserving breadfruit include the implementation of the EDTS (Education, Dissemination, Together, Sanctions) program:

- 1) Education on the importance of preserving the island's environment, the benefits of conservation activities, including breadfruit cultivation, and training on breadfruit cultivation. The community should be educated about the direct benefits of breadfruit, such as its use as a medicinal plant for preventing and alleviating diseases like heart ailments, cholesterol, diabetes, hepatitis, and kidney problems. This education is crucial due to the limited access to healthcare facilities in small island areas. The community should not only be provided with information but also be accompanied until they experience the benefits of breadfruit.
- 2) Dissemination of information about the benefits of breadfruit through campaigns using posters or leaflets distributed in the island region, especially in areas with limited information access. Establishing demonstration gardens where breadfruit trees are planted and maintained, involves local institutions and community organizations.
- 3) Implementing a community movement (Together) to plant breadfruit trees, utilizing corporate social responsibility (CSR) initiatives and seedling assistance from the government. Enforcing penalties for those involved in the illegal felling of breadfruit trees.

CONCLUSION

- 1) The factors influencing community behavior in controlling environmental damage through the conservation of breadfruit on small islands are as follows: their knowledge about the environment, conservation, breadfruit cultivation, the value and benefits of breadfruit, and the implementation of policies to preserve breadfruit. These factors subsequently influence their attitudes, motivation, concern, locus of control, and commitment to maintaining breadfruit on small islands.
- 2) The strategy to enhance community behavior in controlling environmental damage through the conservation of breadfruit on Small Island, Makassar City, is through the EDTS program, which includes: conducting education, dissemination, and joint movement for handling breadfruit (together) and imposing sanctions on breadfruit loggers.

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