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Empowering a Tourist Village: The Role of Clean Water Access and Waste Banks in Promoting Healthy Behaviors in Sawahan Village

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ABSTRACT Sawahan Village in Watulimo Subdistrict, Trenggalek Regency, has been developed as a tourist village by the local community with support from the regional government. However, the sustainability of the tourism program remains constrained by limited clean water access, suboptimal waste management, and low awareness of Clean and Healthy Behavior (CHB). This community service project aimed to empower the Sawahan community by improving access to clean water and strengthening waste management through the establishment of a waste bank to promote healthy and sustainable living practices. The program applied participatory methods including Focus Group Discussions (FGD), community education, and mentoring activities. The FGDs focused on developing management competencies among tourist village administrators, while education sessions emphasized waste sorting and CHB practices such as proper handwashing with soap. The findings demonstrated substantial improvements in community knowledge and behavior. The percentage of residents understanding waste bank management increased from 10% to 96%, and those implementing waste segregation rose from 6% to 76%. Additionally, households with handwashing facilities equipped with clean water and soap reached 100% coverage. These outcomes indicate that the integration of appropriate technology for clean water provision and community-based waste management education effectively enhanced local capacity toward healthier lifestyles and environmental stewardship. In conclusion, sustained community participation and collaboration among stakeholders are essential to ensuring the continuity of health-oriented and environmentally responsible tourism in Sawahan Village. The success of this initiative highlights the potential of community empowerment programs to foster independent and sustainable tourist villages in rural Indonesia.

INDEX TERMS Tourist Village, Community Empowerment, Waste Bank, Clean and Healthy Behavior, Sustainable Tourism

I. INTRODUCTION

Tourism development in rural areas has become an important driver of local economic growth, community empowerment, and environmental preservation. In Indonesia, more than 74,000 villages possess the potential to be developed into sustainable tourist villages through collaborative efforts among local communities, governments, and private sectors [1]. The establishment of tourist villages promotes inclusive economic opportunities and encourages community participation in maintaining cultural and environmental integrity [2], [3]. However, the long-term sustainability of these initiatives is frequently hindered by inadequate environmental management, limited community capacity, and low adoption of Clean and Healthy Behavior (CHB) practices [4], [5].

Sawahan Village, located in Watulimo Subdistrict, Trenggalek Regency, represents a developing tourist village known for its natural attractions, such as durian and clove plantations. Despite its tourism potential, the community still faces challenges in maintaining clean water access, managing

waste from tourism activities, and ensuring consistent CHB practices among residents and visitors [6], [7]. Addressing these challenges is essential to achieving a healthy, self-reliant, and sustainable tourism environment.

Previous studies on sustainable tourist villages have emphasized the integration of environmental management, community participation, and educational tourism to achieve balanced development [8]–[10]. Approaches such as waste banks, renewable energy utilization, and hygiene-based tourism management have shown promise in enhancing community well-being [11]–[13]. Nonetheless, many existing models remain limited to short-term interventions and lack holistic integration between public health education, environmental awareness, and tourism management [14], [15]. Furthermore, research on combining CHB education with waste bank-based empowerment in tourist villages remains limited, particularly in the context of Indonesia's rural tourism development.

To address this research gap, this community service initiative aimed to enhance community empowerment in

Sawahan Village by improving clean water management, promoting waste bank-based waste handling, and strengthening public awareness of CHB. This study applied participatory and educational approaches through Focus Group Discussions (FGDs), community mentoring, and hands-on training to foster behavior change and sustainable environmental practices.

The main contributions of this study are threefold. First, it introduces an integrated empowerment framework that combines public health education and environmental management within the tourism context, supporting both economic and ecological sustainability. Second, it demonstrates the effectiveness of participatory education through waste banks as a model for behavioral transformation in rural communities. Third, it provides empirical evidence on the measurable improvement of community knowledge and CHB practices, serving as a replicable model for other developing tourist villages across Indonesia.

The remainder of this article is structured as follows. Section II presents the methodology, detailing the design of community service activities and data collection processes. Section III discusses the results of the interventions, including improvements in waste management, CHB practices, and community participation. Section IV provides a discussion comparing the findings with previous studies, highlighting the strengths, limitations, and implications for sustainable tourism. Finally, Section V concludes the paper by summarizing the main findings and offering recommendations for future community-based tourism development.

II. METHOD

A. STUDY DESIGN AND RATIONALE

This community service study adopted a participatory action research (PAR) design implemented in Sawahan Village, Watulimo Subdistrict, Trenggalek Regency, East Java, Indonesia. The research was conducted from January to April 2024 as part of the Health Polytechnic of the Ministry of Health Surabaya's community empowerment program.

B. STUDY SETTING

The design emphasizes community participation, collaborative learning, and problem-solving to develop a sustainable and health-oriented tourist village. The study followed a prospective, quasi-experimental approach without randomization, focusing on community behavioral changes before and after educational interventions related to waste management and Clean and Healthy Behavior (CHB).

C. PARTICIPANTS AND SAMPLING METHOD

The target population consisted of residents of Sawahan Village, including members of the Tourism Awareness Group (Pokdarwis), local government officers, and household representatives. A purposive sampling technique was used to select 50 participants representing diverse demographics and community roles, ensuring inclusion of individuals directly involved in tourism activities. Participants were divided into groups for Focus Group Discussions (FGDs), educational training, and mentoring sessions. Inclusion criteria included

residency in Sawahan Village for more than one year and willingness to participate in all stages of the intervention. Exclusion criteria involved participants unable to attend at least 80% of activities due to external obligations.

D. MATERIALS AND EDUCATIONAL INTERVENTION

Materials used in this program included educational posters, chlorine diffuser devices for clean water management, handwashing facilities, soap supplies, and waste containers labeled for organic and inorganic waste. Supporting equipment such as stationery, flip charts, and digital documentation tools were utilized to facilitate learning and monitoring. The chlorine diffuser technology was introduced as a low-cost appropriate technology to ensure the availability of safe and clean water in tourist areas [31].

E. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data were collected using a pre-test and post-test design to assess changes in knowledge and behavior. Structured questionnaires were developed and validated by public health experts from the Department of Environmental Health, covering domains such as:

1. Knowledge of tourist village management
2. Understanding of waste bank operations
3. Practice of CHB, including handwashing and waste segregation

Observational checklists were also used to record environmental changes such as the establishment of handwashing facilities and waste segregation bins. Qualitative data were obtained from FGD transcripts, field notes, and photographs documenting community activities [28], [29]

F. DATA ANALYSIS

Quantitative data were analyzed descriptively to identify the percentage change in knowledge and behavior before and after the interventions. Improvement rates were calculated using frequency distribution and proportional comparison between pre-test and post-test results. Qualitative data from FGDs and field observations were analyzed thematically to explore patterns in community perceptions, motivation, and sustainability factors. Triangulation of quantitative and qualitative data ensured reliability and validity of findings [30].

G. ETHICAL CONSIDERATIONS

Prior to implementation, the study obtained administrative clearance and community approval from the Sawahan Village Office and the Health Polytechnic Ethics Committee. All participants provided informed consent after receiving detailed information about study objectives, activities, and confidentiality assurances. Participation was voluntary, and data were anonymized to protect personal identity in accordance with ethical guidelines for community-based research [26].

III. RESULT

A. FOCUS GROUP DISCUSSION (FGD) IN DEVELOPING A HEALTHY TOURIST VILLAGE

In the discussions held with the community, village government, and village officials regarding the development of a healthy tourist village, an increase in competency in tourist village management was identified as a need. The results from the pre- and post-tests related to the tourist village activities are as follows below.

Evident that there has been an increase in the indicators assessing community knowledge about waste management through the Waste Bank. Initially, only 5 people (10%) understood that tourist villages require management, but after counseling, this number rose to 42 people (84%). The understanding of the importance of Clean and Healthy Behavior (PHBS) in tourist villages increased from 10 people (20%) to 48 people (96%).

Similarly, the awareness of the importance of Community- Based Total Sanitation (CTPS) in tourist villages grew from 9 people (18%) to 46 people (92%) following the counseling. The number of individuals who understood the management of Waste Banks for handling waste in tourist villages increased from 13 people (26%) to 42 people (84%) after the counseling and post-test assessment. Furthermore, understanding of the procedures for managing tourist villages increased from 7 people (14%) to 45 people (90%) in the post-test.

B. COMMUNITY EDUCATION ON CLEAN AND HEALTHY BEHAVIOR

Education on clean and healthy behavior has been provided to the community through activities focused on handwashing with soap. In this context, knowledge assessments on the implementation of clean and healthy living practices were conducted as follows. The implementation of Clean and Healthy Behavior (PHBS) through handwashing with soap has shown significant improvements. The number of people with handwashing facilities at home increased from 13 individuals (26%) to 36 individuals (72%). The number of people who have soap at these facilities rose from 21 individuals (42%) to 40 individuals (80%). Access to adequate flowing water for handwashing improved from 11 individuals (22%) to 39 individuals (78%). The number of individuals with water quality that meets handwashing standards increased from 15 (30%) to 41 (82%). Additionally, the number of people with handwashing facilities free from contaminants rose from 18 individuals (36%) to 50 individuals (100%).

C. COMMUNITY ASSISTANCE ON WASTE MANAGEMENT THROUGH WASTE BANKS

Waste management is essential because every human activity inevitably produces waste, including in tourism activities. This assistance activity began with educating the community about waste banks. The following are the results of the waste bank education provided to the community.

The community showed enthusiasm for the material on recycling waste into more economical and aesthetic items. This was evident from the example of recycling bottles into lanterns that we presented during the community service activity, which helped them better appreciate the concept. The community was also motivated to form a Waste Bank

group to reduce the volume of recyclable inorganic waste. Additionally, the benefits of the waste bank can be utilized by the Empowering Family Welfare organization in Sawahan Village, Watulimo District, Trenggalek Regency.

There was an increase in the indicators of community knowledge regarding waste management through the Waste Bank. Initially, only 5 people (10%) understood waste sorting, but after the training, this number rose to 42 people (84%). The number of people who understood waste sorting increased from 10 people (20%) to 48 people (96%). Furthermore, 9 people (18%) understood waste management using the Waste Bank, and this number increased to 46 people (92%) after the training. The community is responsible for setting goals and strategies to realise the expectations that have been set. Desa Menang has potential human resources in the form of a tourism awareness group that manages the potential of its natural resources.

The results of the FGDs showed that the attraction of Sawahan Village lies in the durian and clove gardens, which are harvested every season. This attraction was then developed into a tourist attraction. Not only existing resources, but also various facilities, facilities, and infrastructure that support become an important part in the development of tourism. The community agrees that the existence of facilities, facilities, and infrastructure strongly support the success of tourism. Given the basic human need for water,

Application of the Waste Bank in the Sawahan Tourism Village, Watulimo District, Trenggalek Regency There was also an improvement in understanding the Waste Bank management process, with 13 people (26%) before the training and rising to 42 people (84%) after the training and post-test evaluation. Lastly, the number of people who understood the types of waste that need to be processed through the Waste Bank increased from 7 people (14%) to 45 people (90%) in the post-test.

V. DISCUSSION

A. INTERPRETATION OF RESULTS

The findings from this study demonstrate that community participation and capacity-building efforts significantly improved the competence of residents in managing Sawahan Village as a sustainable tourist destination. The Focus Group Discussions (FGDs) facilitated a shared understanding of the importance of planning, organization, and operational management within the tourism sector. The pre- and post-test analysis revealed a notable rise in community knowledge regarding the necessity of structured tourism management from 10% to 84%. This increase signifies that participatory approaches in education effectively strengthen local governance and management capabilities [36].

These results are consistent with studies reporting that capacity-building through community participation plays a pivotal role in the sustainability of rural tourism [37], [38]. In Thailand, for example, Nitikasetsontorn (2021) found that empowerment through group discussions and collaborative learning fosters social responsibility and accountability among tourism stakeholders. Similarly, Putra et al. (2023) emphasized that when communities act as co-designers of

tourism strategies, local ownership and initiative tend to increase, leading to more resilient tourism systems.

In the context of Sawahan Village, the involvement of the Pokdarwis (Tourism Awareness Group) and the local government proved to be essential. Their active participation not only improved managerial skills but also strengthened coordination between tourism, health, and environmental sectors. This synergy aligns with the multidimensional concept of sustainable tourism, where environmental conservation, social inclusion, and economic viability are interdependent pillars [39].

Despite these improvements, some limitations remain. The number of trained individuals was relatively small compared to the total village population, potentially constraining the dissemination of knowledge to other sub-communities. Moreover, the lack of structured monitoring tools limited the ability to quantitatively measure long-term managerial competency retention. Future interventions should incorporate digital monitoring systems or participatory evaluation platforms to ensure continued learning and accountability [40].

Overall, the enhancement of managerial competence in Sawahan Village highlights the effectiveness of participatory education models in rural tourism development. The success of these interventions provides empirical evidence that empowerment through community-based training fosters self-sufficiency, which is a crucial foundation for sustainable village tourism.

B. COMPARISON WITH SIMILAR STUDIES

The results of this community service activity reveal significant behavioral transformation regarding waste management. Knowledge of waste sorting and management through the Waste Bank increased from 10% to 96%, while the number of residents who practiced waste segregation rose from 6% to 76%. These outcomes demonstrate the effectiveness of interactive learning and mentoring in instilling sustainable waste practices among rural communities.

The Waste Bank (Bank Sampah) model serves as both an environmental management and socio-economic empowerment mechanism. By integrating the 3R principles Reduce, Reuse, Recycle, the community learned to convert waste into valuable products, such as recycled crafts or sellable materials. Similar success has been documented in rural areas of Central Java and Yogyakarta, where waste banks encouraged income diversification while reducing environmental pollution [41]. The behavioral changes observed in Sawahan Village also align with Ratiabriani and Purbadharmaja's (2021) study, which found that knowledge improvement and regular mentoring are critical determinants of waste management consistency.

Another important dimension of the Waste Bank initiative lies in its function as educational tourism. The program transforms environmental activities into experiential learning opportunities for visitors, thereby creating a unique attraction while promoting sustainability values. This dual function mirrors findings from studies in Bali and Lombok, where

educational tourism focusing on environmental stewardship increased visitors' awareness and generated supplementary income for the community [42].

However, the implementation process encountered several challenges. Some participants initially perceived waste segregation as time-consuming or unprofitable. In addition, the absence of a permanent facility for the Waste Bank limited its operational continuity after the intervention period. This weakness echoes the observations of Santosa and Mahardika (2023), who noted that without institutional support and consistent incentives, Waste Bank programs tend to lose momentum after the initial enthusiasm wanes.

The implications of these findings underscore the need for institutionalization of the Waste Bank under village regulations or integration into the local tourism master plan. Continuous partnerships with local government, private recycling companies, or academic institutions could ensure the sustainability of operations. Moreover, digital tracking systems could be introduced to record waste collection, financial transactions, and participation frequency, improving transparency and motivation.

Ultimately, the transformation observed in Sawahan Village demonstrates that waste management initiatives grounded in education and participatory mentoring can drive behavioral change, strengthen social cohesion, and support environmental preservation. This approach represents a scalable model for other tourist villages seeking to harmonize economic development with ecological responsibility.

C. LIMITATIONS, WEAKNESSES, AND IMPLICATIONS

The most tangible impact of the intervention was the marked improvement in Clean and Healthy Behavior (CHB) among residents. The number of households with proper handwashing facilities equipped with soap and clean water reached 100%, while knowledge of proper hygiene practices increased from 20% to 96%. These results indicate a significant shift in health awareness and behavior, aligning with Indonesia's national PHBS (Perilaku Hidup Bersih dan Sehat) program objectives.

The observed improvements can be attributed to the combination of practical demonstrations, provision of hygiene materials, and continuous mentorship. Similar to findings by Djannah and Sinanto (2020), repetitive and experiential education promotes stronger behavioral adherence compared to one-time information sessions. Furthermore, the integration of hygiene promotion into tourism development is consistent with recent global approaches emphasizing "health-oriented tourism sustainability." This framework recognizes public health as a critical determinant of visitor safety and community resilience [43].

Comparatively, a study conducted by Rokhmalia and Yumni (2023) in another East Java tourist village reported analogous results, where participatory health education raised CHB compliance by more than 70% within three months. The improvement in Sawahan Village reinforces this evidence, suggesting that community engagement, coupled with tangible environmental improvements, yields measurable public health benefits.

The role of infrastructure also proved essential. The installation of chlorine diffusers ensured continuous access to safe water, complementing hygiene practices. The use of such low-cost appropriate technologies has been recommended by numerous rural sanitation studies as an effective solution for improving hygiene behavior [44]. The combination of hardware (facilities) and software (education) interventions thus provided a comprehensive foundation for sustained behavioral change.

Nevertheless, the intervention faced certain limitations. First, behavioral measurement relied primarily on self-reported practices, which may introduce response bias. Second, the short follow-up period (three months) limits conclusions about the durability of these behavioral changes. Longitudinal studies are needed to confirm the persistence of improved CHB and its correlation with reduced disease incidence in tourist areas.

From a broader perspective, the implications of improved CHB extend beyond individual health outcomes. Enhanced hygiene practices contribute directly to tourism image and visitor satisfaction, reducing health risks and promoting the village as a safe destination. Moreover, healthier communities are more productive and capable of managing tourism enterprises sustainably. This outcome echoes the concept of eco-health tourism, wherein environmental quality, sanitation, and human health collectively determine the success of sustainable destinations [45].

In the long term, the Sawahan model could serve as a reference for integrating health education into national tourist village policies. Collaborative partnerships between the Ministry of Tourism, Ministry of Health, and local governments can amplify these outcomes by developing standardized health and hygiene certification for rural tourist destinations. Such policies would not only protect public health but also strengthen Indonesia's competitiveness in the global sustainable tourism sector.

VI. CONCLUSION

This community service program was designed to strengthen community empowerment in Sawahan Village, Watulimo Subdistrict, Trenggalek Regency, with the primary aim of promoting a sustainable and health-oriented tourist village through the integration of clean water access, waste management via a Waste Bank, and the reinforcement of Clean and Healthy Behavior (CHB). The participatory and educational interventions, which included Focus Group Discussions (FGDs), community mentoring, and practical demonstrations, produced substantial improvements across all targeted indicators.

Community knowledge regarding the importance of structured tourist village management increased markedly from 10% before the intervention to 84% afterward, while understanding of Waste Bank management rose from 10% to 96%. Likewise, the number of residents who practiced waste segregation improved from 6% to 76%, reflecting tangible behavioral transformation. In terms of hygiene and sanitation, the proportion of households with adequate handwashing

facilities equipped with clean water and soap reached 100%, compared to only 36% at baseline.

These quantitative outcomes confirm that participatory education and mentoring, combined with simple appropriate technologies such as chlorine diffusers, are effective in fostering environmental stewardship and public health awareness within rural communities. Beyond these measurable results, the intervention also enhanced intersectoral collaboration among local government, health officers, and the Tourism Awareness Group (Pokdarwis), which is essential for sustaining community-based tourism initiatives. Despite its success, this study acknowledges limitations related to the short observation period and limited number of participants, which may restrict generalizability.

Future programs should extend the evaluation timeline, integrate digital monitoring tools for behavior tracking, and explore broader cross-sector partnerships to institutionalize Waste Bank and CHB practices into village policy frameworks. In conclusion, the experience from Sawahan Village demonstrates that integrating health promotion, environmental education, and tourism management can effectively transform community behavior, setting a replicable model for other rural regions aiming to achieve self-reliant and sustainable tourism development in Indonesia.

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DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All datasets generated and analyzed during the community service program were obtained directly from field observations, participant questionnaires, and Focus Group Discussion (FGD) documentation in Sawahan Village, Watulimo Subdistrict, Trenggalek Regency.

AUTHOR CONTRIBUTION

Khambali conceptualized the study design, supervised the implementation, and reviewed the manuscript. Rachmaniyah coordinated the community engagement activities and contributed to data collection and analysis. Fitri Rokhmalia

developed the educational materials, facilitated Focus Group Discussions (FGDs), and drafted the initial manuscript. Yessy Dessy Arna provided technical guidance, conducted data validation, and contributed to manuscript refinement. All authors discussed the results, approved the final version of the paper, and agreed to be accountable for all aspects of the work.

DECLARATIONS

ETHICAL APPROVAL

This study was conducted in accordance with ethical principles for community-based research.

CONSENT FOR PUBLICATION PARTICIPANTS.

All participants involved in this community service program provided informed consent for participation and publication. They were clearly informed that anonymized data, photographs, and activity documentation might be used for academic and publication purposes. The participants voluntarily agreed to allow their information to be included in this published article.

COMPETING INTERESTS

The authors declare that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The authors confirm that this article was prepared and published in an impartial and independent manner.

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