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Counseling and River Cleanup Action to Reduce Water Pollution and Increase Environmental Awareness

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Abstract

This river cleanup and counseling initiative was specifically designed to address the critical issue of water pollution while enhancing environmental awareness within the local community. The counseling sessions, a crucial part of the initiative, were aimed at educating residents about the severe effects of water pollution on human health and the environment. These sessions emphasized the importance of maintaining river cleanliness and proper waste management practices by providing clear, practical information. Participants were encouraged to recognize their role in contributing to pollution and adopt more sustainable habits daily. Meanwhile, the cleanup effort involved active participation from community volunteers, local government agencies, and environmental organizations. Working together, they physically removed pollutants from the river, including plastic waste, industrial effluents, and other harmful materials. This hands-on experience resulted in a cleaner waterway and fostered a deeper connection between participants and their natural environment. The collaborative nature of the project is expected to lead to long-term behavioral changes in waste disposal and environmental stewardship as community members become more conscious of their ecological footprint. Furthermore, the involvement of local government officials signals a commitment to continuing these efforts, with the potential to develop policies that support sustainable waste management practices. This activity is foundational to fostering long-term collaboration between government entities, local communities, and environmental organizations. Such partnerships are essential for maintaining clean water, promoting ecological sustainability, and ensuring that future generations enjoy unpolluted rivers and healthy ecosystems. The success of this initiative highlights the effectiveness of community-driven environmental actions. It sets a precedent for similar projects that could be implemented in other regions facing water pollution challenges. Ultimately, the initiative aims to improve water quality and create a culture of environmental responsibility within the community.

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INTRODUCTION

River pollution has emerged as one of the most pressing environmental concerns, especially in urban areas. Once essential natural resources, rivers are now often treated as dumping grounds for household waste and industrial effluents, leading to the severe

deterioration of water quality and damage to aquatic ecosystems. Increased human activities, coupled with inadequate waste management systems at both domestic and industrial levels, significantly contribute to this pollution crisis (Li et al., 2023; Lai et al., 2022). For instance, heavy metals such as cadmium and chromium from industrial discharges have been shown to impact benthic communities and alter riverine ecosystems severely. Furthermore, untreated sewage and urban runoff during heavy rains exacerbate the pollution load, with nutrient levels peaking, causing eutrophication and further degrading river health. This pollution, particularly in densely populated regions, not only affects water quality but also poses a significant threat to the biodiversity within the river ecosystems, leading to the loss of sensitive species (Latinopoulos et al., 2023; Carvaho et al., 2022). Additionally, urbanization exacerbates the issue of microplastic contamination, especially during flood events, which can further degrade water quality and impact the food chain. The long-term impact of these issues could trigger a more severe water crisis, jeopardizing the livelihoods of communities dependent on river resources (Pérez-Calpe et al., 2022; Lasaiba, 2023).

In addition to domestic waste, industrial discharges significantly contribute to river pollution, especially in urban areas. Many factories discharge untreated effluents directly into rivers, which include hazardous chemicals like heavy metals, organic waste, and harmful nutrients that deteriorate water quality and severely harm aquatic ecosystems (Lemessa et al., 2023; Lasaiba, 2023b). These pollutants disrupt the balance of marine communities, causing significant shifts in species composition, including the decline of sensitive macroinvertebrate species and the proliferation of more tolerant organisms. The release of toxic substances like cadmium and chromium has been linked to severe eutrophication and the destruction of riverine ecosystems, as observed in heavily industrialized regions (Albini et al., 2023; Li et al., 2023). Despite environmental regulations, inadequate compliance and weak enforcement have allowed many rivers to become dumping grounds for industrial waste, leading to long-term ecological degradation. As a result, rivers that once provided clean water are now severely polluted, presenting significant risks to the environment and human health (Mat Saad et al., 2022; Mmonwuba et al., 2023).

A significant factor contributing to the worsening condition of rivers in Indonesia is the need for more public awareness regarding the importance of maintaining clean water bodies. Many individuals and communities living near rivers still treat them as convenient and low-cost household and industrial waste dumping sites. This behavior stems from a need for more knowledge about the harmful effects of water pollution on human health and ecosystems. Studies have shown that water pollution, especially from untreated sewage, leads to waterborne diseases such as diarrhea, cholera, and other infections that pose significant health risks to affected populations (Lin et al., 2022; Ali et al., 2023). Pollution concentrates hazardous materials in water bodies, worsening bacterial virulence and amplifying the risks of disease outbreaks, particularly in vulnerable communities.

Moreover, rivers contaminated by coliform bacteria and other harmful pathogens are increasingly linked to outbreaks of diseases like cholera and skin infections, as seen in regions with high levels of water pollution (Mohan et al., 2022; Lasaiba, 2023b). These environmental health risks, worsened by improper waste management, underscore the need for more vital public education and regulatory measures to prevent further degradation of river ecosystems and protect public health (Zviaholska et al., 2023; Ntajal et al., 2022). Addressing this issue is vital, as river pollution degrades ecosystems and contributes significantly to the spread of life-threatening diseases, particularly in densely populated urban areas.

River pollution severely impacts the quality of life of communities that rely on rivers for daily activities such as bathing, washing, and drinking. Contaminated water sources lead to an increase in infectious diseases, including diarrhea, cholera, and skin conditions, particularly in rural and peri-urban areas with limited access to clean water. Polluted rivers also contribute to declining groundwater quality, worsening the situation for populations that depend on wells for water. Studies have shown that groundwater contamination from industrial and agricultural pollutants, including nitrates and fecal coliform bacteria, poses significant health risks (Ojimma & Joshua, 2022; Mendoza et al., 2023). The spread of waterborne diseases, such as diarrhea and cholera, is further exacerbated by groundwater contamination with pathogenic bacteria like E. coli, as seen in rural and urban areas. In addition, poor sanitation systems, often located near water sources, contribute to the pollution of both surface and groundwater, further increasing the risk of disease outbreaks (Bakari et al., 2023; Lasaiba, 2024). These findings emphasize the urgent need for effective policies and interventions to reduce water pollution and

improve water quality, particularly in regions with limited access to safe water (L. Lin et al., 2022).

Addressing river pollution through educational outreach and concrete actions is essential to raising public awareness and improving waste management practices. Counseling sessions are an effective way to inform the public about the long-term consequences of polluting rivers, and studies have shown that such educational efforts can significantly increase community knowledge and change harmful waste disposal behaviors. For example, community education programs focusing on the management of household waste have been shown to reduce the amount of waste improperly disposed of into rivers, highlighting the effectiveness of targeted counseling in changing waste disposal habits (Rachmanillah et al., 2022; Lasaiba, 2022). Additionally, educational programs emphasizing the health risks associated with improper waste disposal have been shown to improve waste management practices and reduce environmental pollution (Dokubo et al., 2022; Kumurur et al., 2022). Studies on waste management in settlements along rivers have demonstrated that educational outreach can enhance community willingness to participate in waste reduction initiatives. Moreover, integrating waste management education into school curriculums has raised awareness among younger generations, creating a more environmentally responsible society (Akintunde & Akintunde, 2023). These educational strategies are vital in fostering community support for government programs and policies to reduce water pollution and protect river ecosystems.

River cleanup activities are crucial in engaging communities in environmental preservation by removing waste from polluted rivers and promoting hands-on involvement. These efforts raise awareness about the importance of maintaining clean water bodies and improving local ecosystems' health. For example, the Adopt-an-Estero Water Body Program in the Philippines demonstrated that cleanup activities significantly increased environmental awareness and motivated participants to reduce waste, positively impacting the community and the environment (Hampac & Gavadan, 2022). Similarly, community involvement in cleanup initiatives leads to improved river health and a reduction in pollutants like plastics and harmful chemicals, as seen in efforts to clean the Sapangdaku River in the Philippines (Sanchez et al., 2022; H.-H. Lin et al., 2022). These activities also serve as platforms for introducing sustainable waste management practices and strengthening stakeholder cooperation, which can help foster long-term environmental stewardship. Moreover, autonomous cleaning technologies, such as GPS-based systems, are increasingly integrated into cleanup efforts, enhancing efficiency and effectiveness (Karthik et al., 2023; Lasaiba, 2024a).

Activity Objective

Increasing public understanding of the impact of water pollution and the importance of keeping rivers clean is critical for fostering a sustainable approach to environmental conservation. Public awareness programs can help people grasp the far-reaching consequences of water pollution, including its effects on human health, local ecosystems, and biodiversity. When communities are made aware of the dangers of pollutants entering water sources—from agricultural runoff to industrial waste—they are more likely to take preventative measures to avoid contamination. Emphasizing rivers' vital role in daily life, from providing drinking water to supporting agricultural and fishing activities, can motivate individuals to prioritize river cleanliness and understand that protecting these resources is a shared responsibility. Public education campaigns, workshops, and outreach through schools can serve as vital tools to cultivate a deeper appreciation for clean water and instill environmental stewardship among all community members.

In addition to raising awareness, engaging communities in concrete actions to clean and sustainably maintain river environments is essential. River cleanup activities can mobilize local citizens, students, environmental organizations, and volunteers to take immediate steps to remove waste and reduce pollution. Such hands-on participation fosters a sense of ownership and collective responsibility for the local environment. Beyond initial cleanup efforts, long-term sustainability is critical, and this can be achieved by encouraging ongoing community involvement in waste management initiatives, such as regular cleanups, the establishment of recycling programs, and advocating for proper waste disposal infrastructure. By promoting active participation in household and environmental waste management, communities can create lasting change that not only preserves the cleanliness of rivers but also improves overall environmental quality. These efforts can set the foundation for long-term ecological consciousness and community-driven conservation strategies management.

Target Activity

Communities living around the river, particularly those that interact directly with it, play a critical role in maintaining the health and cleanliness of the waterway. These communities are often the most affected by river pollution, as they rely on the river for various daily activities such as bathing, washing, fishing, and even as a source of drinking water. Therefore, engaging these groups in environmental initiatives is essential for sustainable river management. By involving residents in cleanup efforts, educational programs, and waste management practices, they can better understand the direct link between their actions and the river's health. Empowering these communities to take ownership of river conservation helps protect their immediate environment. It fosters a sense of responsibility that can lead to long-term improvements in water quality and ecosystem preservation.

In addition to riverside communities, it is essential to involve the broader public, including children, youth, adults, local governments, environmental organizations, and students interested in environmental issues. Engaging a wide demographic ensures that the message of ecological conservation reaches all sectors of society, amplifying its impact. Children and youth are vital to fostering a future generation of environmentally conscious citizens. At the same time, local governments and environmental organizations provide the necessary support, policy frameworks, and resources to sustain ecological efforts. Students interested in environmental issues bring fresh perspectives and can act as advocates for clean water initiatives within their schools and communities. By connecting these diverse groups, a more unified and comprehensive approach to river conservation can be developed, strengthening efforts to protect water resources for both present and future generations.

SERIES OF ACTIVITIES

Environmental Counseling

The central topic of the program focuses on the importance of keeping rivers clean and effectively managing household waste, a critical issue in communities that rely on rivers for daily activities and livelihoods. Educating the public about the detrimental effects of pollution—incredibly improperly disposed household waste—on water quality and ecosystems is crucial to fostering lasting environmental stewardship. The program aims to show how individual actions contribute to more significant pollution problems and why proper waste management is essential to protecting local rivers, human health, and biodiversity. By emphasizing the role that clean rivers play in sustaining agriculture, fishing, and overall public health, the initiative encourages communities to adopt better waste management practices. Understanding that each person can make a difference by reducing waste, recycling, and properly disposing trash is central to this educational approach.

The methods employed to convey this message include presentations, interactive discussions, and distribution of educational materials such as leaflets, posters, and videos. These varied formats ensure the information is accessible to a broad audience and caters to different learning preferences. The interactive discussions, in particular, encourage active participation from the community, allowing individuals to share their experiences and challenges with waste management. The involvement of three expert lecturers from the Geography Education Study Program at Pattimura University enhances the program's credibility, offering in-depth knowledge and practical solutions for managing waste and keeping rivers clean. By the end of the program, the target output is to increase the participant's knowledge and awareness of water pollution and its solutions. Empowering individuals with practical knowledge help them take concrete steps toward improving their local environment, making this program a foundation for long-term behavioral change and environmental sustainability.

River Cleanup Action

The cleanup initiative occurs in a predetermined river section that is identified as having significant pollution problems. This location is selected based on the severity of pollution, making it an ideal site for demonstrating collective action's impact on improving river health. The primary method to address the pollution involves mobilizing local communities, volunteer groups, and environmental organizations to participate in a coordinated river cleanup. These groups are essential in tackling the issue by physically removing waste from the river and implementing strategies to ensure long-term cleanliness. This multi-stakeholder approach engages those directly affected by river pollution and builds a broader network of environmental advocates committed to maintaining the local ecosystem's health.

The cleanup process follows a series of carefully planned steps, beginning with identifying and mapping the most polluted areas of the river. It allows the organizing team to target the regions that require

the most attention efficiently. Next, tasks are distributed among the participating groups, which handle waste transportation, segregation, and management. To facilitate the work, cleaning tools and equipment, including gloves, garbage bags, and transportation equipment, are provided to all volunteers. After collecting, waste is categorized into organic, inorganic, and hazardous for proper disposal and management. These efforts aim to reduce the volume of trash in the river, significantly improving river cleanliness. This pollution reduction is not just a short-term win; it also sets the foundation for sustainable waste management practices that will help protect the river from future contamination.

IMPLEMENTATION MECHANISM

River Cleanup Program Preparation: Building Synergies with Local Governments and Environmental Organizations

The first step in preparing for the river cleanup program involves establishing strong coordination with relevant stakeholders, particularly local governments and environmental organizations. As the critical policymaker at the regional level, the government plays a crucial role in supporting the program's implementation. Effective coordination ensures that all legal and administrative processes comply with applicable regulations, such as obtaining permits for using public land near the river, arranging traffic flow if necessary, and securing technical and material support from relevant agencies. Additionally, environmental organizations play a vital role, given their field experience and extensive community networks. Their involvement aids in fundraising, promoting the program, and providing technical guidance on environmentally friendly cleanup methods.

Developing a data-driven and strategic plan is essential during this coordination phase. For instance, program administrators must map out the rivers requiring cleanup, considering local environmental and social conditions. Data from government agencies, such as the Regional Environmental Agency (BLHD), can offer valuable insights into water quality and pollution levels. Moreover, local communities can provide critical information about river conditions and pollution trends. Thus, coordination efforts should be participatory, involving governments, environmental organizations, and local communities in a synergistic and unified approach. This collective commitment ensures the program's effectiveness and long-term impact on river sustainability.

River Site Mapping: Identifying Critical Points for Action

After establishing coordination, the next step is to map the specific river areas for cleanup. This crucial phase involves environmental experts, local communities, and volunteers participating in the cleanup action. The mapping aims to identify critical points along the river where waste accumulates or where pollution is most severe. These areas are often near densely populated residential zones, markets, or water transportation routes. Proper mapping allows the implementation team to allocate resources efficiently, focusing on areas requiring the most attention.

Various technologies, such as Geographic Information Systems (GIS) or simple field surveys, can be used to assess the river's physical condition accurately. Drones can also be employed for aerial mapping, especially in hard-to-access areas. Once mapped, the team categorizes each river segment based on pollution levels. For instance, segments dominated by plastic waste prioritize plastic collection and recycling, while segments with organic waste might require different approaches, such as composting or bioremediation.

Logistics Preparation: Ensuring Availability of Tools and Materials

Logistics are a crucial aspect of executing a river cleanup program. Without adequate logistical preparation, the cleanup efforts could be inefficient or disrupted. Program administrators must ensure that all necessary tools and materials are available in sufficient quantities and on time. Essential tools include shovels, garden forks, waste collection nets, and transportation equipment. Volunteers will also need personal protective gear, such as gloves, masks, and boots, to ensure safety. In cases where waste is excessive or burdensome to remove manually, heavy machinery like excavators may be required.

In addition to physical tools, logistics also involves preparing educational materials. Posters, banners, or flyers containing information on river cleanliness, the health impacts of water pollution, and proper waste management practices must be distributed to the surrounding communities before and after the cleanup. Often, river cleanups only temporarily affect the community if it is not engaged through educational outreach. Therefore, effective logistics can catalyze changing community behaviors regarding waste disposal and environmental care.

Post-Event Waste Management: Sustainable Solutions for River Cleanliness

Once the cleanup is completed, the next challenge is managing the waste collected from the river. It is essential to sort and process the waste appropriately to prevent it from polluting the environment again. Program managers must coordinate with local sanitation departments to ensure proper waste transportation and management. For instance, plastic waste should be processed or recycled, while organic waste can be composted. Hazardous waste, if found, must be handled immediately by the relevant authorities to avoid further environmental damage.

Long-term waste management solutions around the river are critical to preventing a return to previous waste disposal habits. Integrated waste management facilities, such as temporary landfills or recycling centers, should be established in the area, providing the community with suitable disposal options. A sustainable river cleanup program involves more than immediate actions; it requires building an efficient waste management system and educating the community about environmental care. This program can become a lasting solution to river pollution through careful preparation and collaboration among various stakeholders.

IMPLEMENTATION

Training and Community Education on Waste Management and Environmental Protection

Training and educating the public is vital to any program addressing environmental challenges, notably water pollution. Without a comprehensive understanding of the importance of maintaining a clean environment and proper waste management practices, efforts to clean rivers or reduce pollution may only have temporary effects. This training program was designed to equip the community with foundational knowledge and practical skills, such as sorting organic and inorganic waste and treating household waste. In addition to waste management techniques, the training emphasizes water pollution's health and ecosystem impacts, allowing participants to relate their behavior to environmental quality directly.

The training employs an interactive, community-based approach. Through hands-on demonstrations, participants learn to compost from organic waste, recycle plastics using simple technologies, and creatively repurpose household waste. Furthermore, the program underscores the importance of water hygiene as a vital resource for life. As a result, participants gain practical waste management skills and develop a deeper understanding of the harmful effects of water pollution and how their efforts contribute to preserving the environment.

Interactive Discussion on the Community's Role in Water Pollution Reduction

Interactive discussions are among the most effective ways to foster community awareness and environmental responsibility. These sessions provide a platform for participants to share experiences, discuss challenges in waste management, and collaboratively develop solutions. Through this dialogue, the community can reflect on its role in reducing water pollution and protecting the environment, fostering a sense of ownership over the solutions identified. This sense of ownership encourages proactive participation in everyday environmental actions.

Facilitators introduce concepts such as the circular economy, where waste is viewed as a resource that can be recycled or repurposed rather than discarded. It encourages participants to think creatively about reducing waste, such as producing recycled products from plastics or using organic waste for agricultural purposes. Discussions also explore the community's role in maintaining river cleanliness, including forming river patrol groups or organizing regular environmental cleanup events. The more ideas generated through community engagement, the greater the likelihood of long-term sustainability for the program.

Distribution of Environmental Campaign Materials: Reinforcing Messages through Visual Media

The distribution of environmental campaign materials, such as posters, stickers, and brochures, plays a crucial role in reinforcing the messages delivered during training and discussions. These materials help extend the program's reach, spreading information beyond the immediate circle of participants. Eye-catching visuals and simple, accessible information are critical to the success of these campaigns. Posters, for instance, are displayed in strategic public spaces like village halls, schools, and crowded marketplaces, ensuring that messages about environmental protection and waste management reach a wider audience.

Stickers and brochures are distributed directly to participants and placed in public areas such as shops, markets, or places of worship. These materials serve as reminders and invite individuals to participate in

environmental activities. For example, stickers displayed in homes can inspire neighbors to engage in river cleanup initiatives or reduce single-use plastics. Consequently, the distribution of campaign materials disseminates information and helps build momentum for broader public participation in environmental protection.

Strengthening Public Awareness through Sustainable Campaigns

Sustained environmental campaign efforts are essential to ensure that the messages delivered through training, discussions, and campaign materials have a lasting impact. These campaigns should not be one-time events but rather part of a long-term strategy supported by local governments, environmental organizations, and the community. Involving community leaders or local influencers as role models can significantly strengthen these campaigns, as their endorsement can motivate greater community participation in environmental protection activities.

Additionally, modern technology can be leveraged to amplify the Campaign's reach. Social media and environmental applications can be used to engage the community. For instance, a river cleanliness reporting app allows individuals to report pollution hotspots requiring attention. Social media platforms are also utilized to encourage sharing stories about environmental actions, such as participating in cleanups or recycling household waste. By integrating traditional and digital media, these campaigns remain active within the community, significantly contributing to improved waste management and reduced water pollution.

Involvement of Communities, Volunteers, and Related Parties in Cleanup Activities

The active participation of communities and volunteers in environmental cleanup activities, particularly those focused on rivers and watersheds, is critical to the program's success. Engaging the community enhances the cleanup's effectiveness and cleanup collective responsibility for environmental preservation. Communities are not just the beneficiaries but also the primary drivers of these activities, contributing directly to the cleanliness of their surroundings. Moreover, it is essential to involve various stakeholders, including non-governmental organizations (NGOs), government agencies, and educational institutions, as volunteers from diverse backgrounds can provide significant support in executing the program.

Training and socializing volunteers and communities on safe and effective cleanup methods is a crucial early step in implementation. During the activity, participants are taught waste sorting techniques, personal protective equipment (PPE) use, and waste management practices. This participatory approach strengthens the connection between volunteers and the community, building environmental solidarity and ensuring the sustainability of the river cleanup program. Vcleanups also play a pivotal role in educating communities not directly involved in the activities, helping spread awareness about the importance of maintaining clean rivers and environments.

Data Collection of Waste Types for Follow-up Reports

Collecting data on the types of waste gathered during the cleanup process is an overlooked but essential aspect of such initiatives. Systematic data collection provides insight into the most prevalent forms of pollution in rivers and other water sources. This information is valuable for creating follow-up reports that local governments or authorities can use as a basis for future waste management policies. For example, if the data reveals that plastic waste is dominant, it can inform policies focused on reducing plastic usage or expanding recycling programs.

Waste collected is categorized into several types: organic matter, plastic, metal, glass, paper, and hazardous waste. Each category is weighted to estimate the volume of garbage collected. It provides a more accurate basis for reports and tangible evidence of the cleanup's impact on the community and stakeholders. The data can also help monitor future pollution trends, enabling preventive measures before pollution levels rise again.

Waste Management After Transportation: Recycling and Safe Disposal

Once the waste is collected and transported from the cleanup site, it is cleaned. Not all waste should be sent to landfills; many types of waste can be recycled or managed sustainably to reduce environmental impact. For instance, organic waste can be processed into compost, benefiting local agriculture, while plastic waste can be reprocessed into new products through recycling. Proper waste management reduces the amount of waste sent to landfills and helps mitigate overall environmental pollution.

Hazardous waste, such as batteries, chemicals, or e-waste, must be handled with special care and not mixed with regular waste. These materials are sent to

specialized facilities capable of processing them safely, minimizing risks to human health and preventing environmental contamination. Effective post-cleanup waste management requires strong coordination between the local sanitation department and recycling companies to ensure that each type of waste is treated according to its specific characteristics. This approach minimizes the environmental footprint and enhances the sustainability of cleanup activities.

Documenting Activitiecleanupporting and Future Campaigns

Documenting river cleanup activities serves not only as a cleanup but also as a powerful campaign tool. Photographs, videos, and written reports from such activities provide compelling evidence of the importance of maintaining clean rivers and neighborhoods. These records can also attract support from other stakeholders, including donor agencies, private companies, and government bodies interested in supporting similar initiatives.

Beyond being a campaign tool, documentation is essential for creating detailed activity reports. These reports include data on the number of participants, the volume of waste collected, the types of waste found, and the cleanup's direct impact on the environment. A well-organized report can serve as a reference for planning future activities and identifying areas for improvement in implementation methods. Moreover, high-quality documentation can be shared on social media or other platforms, spreading the message about the importance of environmental stewardship and reaching a broader audience to build greater public awareness.

Indicators of Success

Improved Public Understanding of Water Pollution and Its Impacts

One of the primary indicators of the success of water pollution outreach is an increased understanding of the importance of maintaining clean water and the impact of pollution on human health and the environment. This understanding is typically measured through post-program surveys, which include questions designed to assess how well participants grasped the concepts presented during the outreach. For instance, the survey can evaluate how many participants can identify the sources of water pollution in their community, explain the consequences of pollution on human health and ecosystems, and describe the steps they are taking to mitigate pollution. These surveys are crucial as they provide a concrete picture of the program's effectiveness while also helping to identify areas where public understanding may need further improvement.

Additionally, surveys offer valuable insights into shifts in attitudes and behaviors following the outreach. For example, if participants begin reducing their use of single-use plastics or adopt waste sorting practices at home, this can be considered a significant indicator of success. Behavioral change is the ultimate goal of any educational program, and post-outreach surveys provide data to measure the extent to which such change has occurred. As a result, these surveys assess theoretical understanding and practical application of knowledge in everyday life.

Number of Participants in Extension Activities

The number of participants attending and actively engaging in extension activities is another crucial indicator of success. A larger turnout suggests a broader dissemination of information, particularly critical in areas with high water pollution levels or low environmental awareness. High attendance reflects strong community interest in the issues presented and the organizers' success in mobilizing public participation. The outreach strategy and communication about the activities must be carefully planned to maximize participation, utilizing local communication channels such as community radio, social media, and community leaders.

However, participation numbers alone are not the only measure of success. The quality of engagement is equally important. It is essential to assess whether participants were actively involved during the counseling sessions—did they ask questions, provide feedback, or share personal experiences? The more engaged the participants, the more likely the outreach will leave a lasting impression, motivating them to implement changes in their daily lives. Thus, effective outreach hinges on the number of participants and the quality of engagement that leads to real, tangible impacts on the environment.

Sustainability of Actions After Counseling

Another critical indicator of success is the community's ability to sustain the actions initiated by the outreach after the program concludes. Success is measured by the number of participants, their theoretical understanding, and the practical actions they take afterward. For example, do participants begin to use water more efficiently, reduce household waste

that could pollute water sources, or become involved in advanced environmental activities, such as regular river cleanups?

Organizations conduct follow-up surveys several weeks or months after the outreach to gauge this indicator and determine whether significant behavioral or habit changes have occurred. Additionally, ongoing monitoring of local water quality can reveal reductions in pollution levels. If the community remains actively involved in maintaining a clean environment and applying the techniques learned during the outreach, the program can be considered successful in the long term. Ultimately, the sustainability of action is the ultimate goal of any environmental education program.

Building Collective Awareness Through Extension

Environmental outreach, especially regarding water pollution, is about providing technical information and fostering collective awareness. Water pollution problems often arise due to a need for more understanding of how individual actions collectively affect the environment. By delivering inclusive outreach programs that engage various segments of society, organizers can create a space for dialogue where individuals can better understand their role in maintaining clean water.

Collective awareness is vital for sustainable environmental change, as it is only achieved when all community members feel involved and responsible. Successful outreach cultivates a shared sense of responsibility for water cleanliness, encouraging communities to protect their environment proactively. This awareness often manifests through the formation of environmental groups at the local level, which serve as the driving force behind keeping rivers clean, conducting ongoing education, and ensuring that pollution prevention measures are consistently implemented. In this way, environmental outreach becomes an educational tool and a catalyst for broader social and ecological change.

Reduction of Waste Volume in Cleared Rivers: Measuring Success Through Waste Tonnage

A vital indicator of the success of river cleanup activities is the reduced volume of cleanup collected from the river. One standard method for measuring this success is calculating the tonnage of waste removed during the cleanup. Depending on the volume and type of garbage, waste can be weighed manually or with a heavy cleanup device, such as excavators. Each section or area cleaned can be recorded separately to generate more accurate data on the types and amounts of waste found at different points along the river.

The total tonnage of waste collected is a direct measure of the effectiveness of the cleanup efforts. A large amount of waste indicates pollution, while a decrease in waste volume after successive cleanups signals long-term program success. Besides cleaning the total tonnage, waste can be categorized by type—such as plastic, organic, metal, or hazardous waste—to understand better the pollution sources and how they should be managed in the future. This data allows local governments and environmental organizations to design more specific and effective pollution prevention strategies.

Additionally, long-term monitoring of waste volume trends is essential. If cleanup activities are conducted periodically, the tonnage of waste collected over time can reveal whether pollution decreases or remains stable. A significant reduction in waste tonnage from one cleanup to the next indicates the program's success in mitigating pollution through improved waste management practices within the community or a decrease in careless dumping into the river. Conversely, if the cargo remains high, further investigation into the factors contributing to persistent pollution is necessary, including socio-economic conditions, environmental awareness levels, and infrastructure issues.

Sustainable Impact Measurement: Community Involvement in River Cleanliness

After the cleanup activities, one of the most significant challenges is cleaning up the river's cleanliness over time. While difficult to measure, ongoing community involvement in preserving the river is critical to the program's long-term success. One way to assess this is through direct field observation. Local authorities or the organizations that initiated the cleanup can conduct regular inspections to determine whether the community continues to keep the river clean or reverts to littering. Environmental officers, volunteers, or even the community itself—through small, designated monitoring groups—can be tasked with observing and reporting on river cleanliness.

In addition to direct observations, follow-up surveys can be conducted with residents. These surveys can assess whether individuals believe the cleanup had a positive impact, whether they took cleanup steps to maintain river cleanliness, and whether they adopted new waste management practices. High levels of community engagement are often reflected in local

initiatives, such as establishing river cleanup groups, installing trash bins and cleanup rivers, or grassroots-driven follow-up campaigns. When these developments occur, the cleanup efforts are not only short-term successes; cleanup creates lasting, sustainable impacts.

The Importance of Community Involvement in River Cleanliness

Community involvement is crucial to the success of any environmental program, including efforts to keep rivers clean. Without the active support and participation of the people living near the river, cleanup initiatives will yield only temporary red cleanup. The primary objectives of cleanup activities are to raise the community's awareness of the importance of maintaining their water environment as a social responsibility and for the tangible benefits they will experience, such as improved water quality and a healthier living environment. When communities are actively engaged, they become more conscious of the negative consequences of behaviors like littering.

Community involvement can take many forms, from simple actions such as not dumping garbage into the river to more complex initiatives like establishing a waste recycling program at the community level. This participation reflects fundamental changes in attitudes and behaviors following the outreach and cleanup activities. The frequency of involvement in cleanup activities, such as cleanup campaigns or periodic river cleanups, can measure indicators of community engagement. Ongoing incidents demonstrate that the community from the cleanup feels a collective responsibility to maintain the river's cleanliness.

Figure 1. Implementation of Water Pollution and Its Impact on Counseling Activities

FOLLOW-UP

Periodic Monitoring and Evaluation of River Conditions After Cleanup Activities

The most crucial follow-up to river cleCleanuptivities is regularly monitoring and evaluating cleanuper's condition. The long-term success of cleanup efforts depends on continuous evaluation to ensure that they remain clean and that the community does not revert to littering habits. Periodic monitoring can be undertaken by a small team comprised of local government representatives, volunteers, or members of environmental organizations. This team would regularly inspect the river for accumulated waste, measure water quality, and assess any significant ecological changes post-cleanup.

This ongoing evaluation also helps identify new challenges that may arise after the initial cleanup. For example, are there new sources of pollution, such as individual cleanup or household waste, that were not addressed during the original effort? Officials can gather relevant data on water quality, waste quantities, and types of pollutants, which can then inform follow-up action plans. Monitoring also allows for adjustments and improvements to the cleanup strategy, ensuring that future efforts are efficient and clean. Additionally, maintaining community motivation is crucial—showing that their efforts yield results and that their river is monitored for the collective benefit.

Formation of River Care Community Groups for Sustainability

An essential next step in ensuring long-term success is forming a river care community group responsible for maintaining the river's cleanliness and sustainability. This group would consist of residents who live near the river and are directly impacted by its condition. Their involvement is critical, as they can act as custodians of the river, ensuring that the improvements achieved during the cleanup are sustained. These community members can serve as

agents of cleanup, encouraging neighbors to avoid littering and actively monitoring activities that could pollute the river.

River care groups can also organize regular cleanup efforts on a smaller scale, such as weekly or monthly cleanup-communal work) to remove accumulating trash. Additionally, they can advocate for local policies supporting improved river environment management, such as expanding waste management facilities or promoting household waste reduction campaigns. The group can also collaborate with local governments and environmental organizations to secure the technical and material support needed to continue their activities. Sustainable river cleanliness is unattainable without the active involvement of concerned local communities.

Continuous Campaign Through social media and Collaboration with Schools

An ongoing social media campaign is one of the most effective ways to maintain awareness about the importance of keeping rivers and water sources clean. After the cleanup, organizers can create and share visual and narrative reports and clean up the process and outcomes of the cleanup through platforms like Facebook, Instagram, or YouTube. Incorpcleanup photos, videos, and participant testimonials can extend the Campaign's reach, attracting an audience beyond the immediate local community. Moreover, these campaigns can provide practical information on how communities can continue contributing to water cleanliness through direct action and daily behavioral changes.

Collaboration with schools and local organizations is essential for expanding the Campaign's impact. Schools are particularly strategic in fostering environmental awareness among the younger generation. Initiatives such as recycling programs, student-led river cleanups, or scientific projects focused on water quality can be integrated into the curriculum or extracurricular activities. By engaging schools, the message of environmental stewardship continues to reach children and youth, who will grow up to be agents of change. Schools can also work with river care community groups on environmental projects, strengthening the relationship between educational institutions and local communities in their shared mission to protect the environment.

Ensuring Sustainability Through Long-Term Support

To maintain the effectiveness of follow-up efforts, long-term support from various stakeholders is essential. Local governments, the private sector, and non-governmental organizations (NGOs) are vital in providing technical and material assistance to river care groups and ongoing campaigns. For example, the government can allocate budgets for regular monitoring and cleaning activities and support the development of adequate waste management facilities near the river. The private sector can contribute through corporate social responsibility (CSR) initiatives, offering financial support, technology, or equipment needed to maintain the river's health.

In addition to material support, effective communication among all parties involved is critical. Local governments, community groups, and environmental organizations need a common platform for sharing information, monitoring results, and developing strategies for improving the program. Periodic meetings or local environmental forums can help ensure that efforts to keep the river clean remain coordinated and targeted. With sustained support, cleaned rivers can remain pollution-free while public awareness of the importance of preserving clean water resources continues to grow.

CONCLUSIONS

Counseling and river cleanup activities are essential first steps to fostering positive changes in community behavior regarding environmental conservation, particularly in maintaining water cleanliness. Through counseling sessions to raise public awareness about the impact of water pollution and the importance of proper waste management, communities are expected to become more informed and motivated to take meaningful action. These educational efforts seek to shift the community's perception of rivers from mere watercourses to vital sources of life that must be kept clean. By equipping individuals with the necessary knowledge and skills, the goal is to significantly reduce the habit of littering, replacing it with responsible waste management practices.

Moreover, the active participation of various stakeholders—including the government, environmental organizations, volunteers, and local communities—is critical to ensuring the long-term success of these initiatives. By involving all relevant parties, the message of maintaining river cleanliness becomes more than just a topic discussed in counseling sessions; it is translated into real-world, collective action. This collaboration fosters a shared ownership of the river pollution problem and emerging solutions. Suppose this initial effort catalyzes a broader and more

sustainable movement. In that case, Indonesia's rivers have the potential to become clean, healthy ecosystems that support both biodiversity and human communities. Ultimately, this success will enhance the quality of life, improve public health, and ensure the preservation of water resources for future generations.

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