

Stakeholders' Observed Impact of the *Adopt-an-Estero* Water Body Program in Segment 3 of Iloilo Batiano River, Philippines

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ABSTRACT

Cleaning a river needs the collaboration of all stakeholders. Thus, this study delved into the stakeholders' observed impacts of the Adopt-an-Estero Water Body Program (AEWBP) jointly implemented at Segment 3 of Batiano River by the JBLFMU-Arevalo, DENR 6, and other sectoral groups. The study employed a descriptive research design with ninety-two respondents identified through purposive sampling. The findings revealed that the majority participated once to five times in the cleanup. When not involved in cleanup activity, stakeholders

visited the area five or more times a year. The observed impacts of AEWBP on the community include environmental education, increased health and safety, and established community relationships. On stakeholders, the observed impacts were becoming more environment-aware, motivated to reduce and properly dispose of garbage, and disciplined. On the environment, respondents observed healthier aquatic status, reduced plastic, and increased environmental awareness. Current strategies used, like the length of cleanup, using gaff, and the type of people involved, was rated highly effective, where a significant difference was noted in the stakeholders' observed effectiveness. The stakeholders cited other effective ways of implementation like more often clean up, dredging the river, more funds, continuing education, and more organizations. This study concludes that the AEWBP is a good learning avenue for the environmental protection of the community.

Keywords — Social Science, stakeholders, Adopt-an-Estero Water Body Program, segment 3, Iloilo Batiano River, descriptive, Philippines

INTRODUCTION

Rivers are valued as the main water source for irrigation, domestic supply, power generation, industry, and other ecosystem services. Undeniably, rivers and streams are priceless resources, but reports of pollution from urban and agricultural areas threaten our water quality (Tickner et al., 2017). A case study conducted by Srinivas (2016) covering the Thames River, U.K., Mekong River, Southeast Asia, Yodogawa River, Japan, and Ganges River, India revealed that communities living along banks are major culprits for various problems affecting water quality and quantity. It further proved the overuse of water, dumping solid waste, draining sewage and gray water, and urban debris that pollutes rainwater run-off into rivers. Industries compound these problems by injecting untreated and unsafe wastewater, chemicals, and other contaminants into rivers. To resolve water pollution, rivers in some countries like Asia, North America, and Europe have been divided into segments for adoption by communities living along the river. They are assigned to monitor and manage the segments. Coordinating the local governments, schools, NGOs, universities, and businesses near a segment helps the communities in their tasks and overall coordination of the local governments.

In Singapore, institutional, structural, and legal reforms are necessary to restore a river's health. For the country's development, these reforms can help

reduce sources of pollution going into the rivers (Joshi et al., 2012). The authors further affirmed that substantial funding should be invested to attain the program goal.

A study in Malaysia by Ismail and Salim (2013) revealed that the most effective way to maintain a river basin's health is to make a river community responsible. However, cleaning-up operations are also often necessary to revive and maintain water quality for human consumption. Their awareness was the most critical determinant in the success of the cleanup activities.

For Packett (2018), cleaning the Tagabe River in the Republic of Vanuatu is significant because the communities around the river have been continually mobilized to improve the river's health and the coastal areas. Collaboration with stakeholders, especially the surrounding communities, is a potent approach to positive environmental change.

Rivers are the focal points of nature. With clean rivers comes a sustainable and lasting environment (Packett, 2018). This can be achieved by engaging communities in a river cleanup as any organization pursues. Thus, in Iloilo City, the same is expected at Segment 3 of Batiano River, where John B. Lacson Foundation Maritime University (Arevalo), Inc. joined as one of the major implementers in the cleanup project. This is the Adopt-an-Estero Water Body Program (AEWBP), launched by the Department of Environment and Natural Resources (DENR) in 2010 and implemented nationwide.

Over the past 11 years, John B. Lacson Foundation Maritime University (Arevalo), Inc. has been involved as one of the major partners in the project. The effort focuses on cleaning the waterways of Batiano and Iloilo Rivers in Iloilo City, which is undertaken quarterly. Multiple academic institutions and other government and non-government organizations are involved, each taking ownership of the efforts for a section of the river. The regular cleanup is a nationwide effort undertaken to clear the river of debris. All this debris comes from the neighboring municipalities and barangays from the upland down to the rivers and ocean. The activities provide an avenue for unifying development efforts and maximizing human and material resources.

An assessment of the water quality of Batiano River, specifically at Segment 3 from 2014 to 2016 by the EMB-DENR 6, proved that there was an increased amount of dissolved oxygen (DO) and the biological oxygen demand (BOD) in the water. These data exceeded the DENR's standards in 2015, which implies that the quality of water got poorer. However, from 2016 to 2017, there was a drop in DO and BOD to show that water quality has improved. On the total suspended solids (TSS), the assessment from the downstream showed a slight

excess from the standards. However, the sample from the upstream was still within the standards (Environmental Management Bureau Region 6-The Department of Environment and Natural Resources, 2017). The results mean the water at Segment 3, Batiano River, has started to improve its quality. Continued cleanup of the river and proper environmental practices of the nearby people will result in enhanced water quality.

John B. Lacson Foundation Maritime University (Arevalo), Inc. (JBLFMU-A), as one of the key players in the AEWBP cleanup drive, has also recognized the importance of a clean river for the benefit of all living organisms, including humans. As a result, the institution has adopted Segment 3 of Batiano River along with other stakeholders reflecting its commitment to the program. From another perspective, this is also the institution's support for the Philippine Clean Water Act of 2004 (Republic Act No. 9275).

Since the AEWBP's launching in 2010, the DENR 6 has regularly assessed the water quality. Likewise, the JBLFMU-Arevalo has conducted two institutional researches on water pollutants and quality. No study was ever conducted that could detail the effective strategy employed in the AEWBP implementation. There has yet to be a study suggesting other ways to strengthen the current practices and can show the impacts of the program on the stakeholders, the community, and the environment. Because of this dearth of information, the researchers have decided to assess the stakeholders' observed impact of the "Adopt-an-Estero Water Body Program" (AEWBP) implemented by the institution in Segment 3 of Batiano River in January 2020. In addition, the researchers are the direct implementers of the cleanup program representing the institution with which they are affiliated. This study can strengthen the program, with an expected increase in long-term impact and effectiveness.

FRAMEWORK

The study is anchored on the Theory of Change, which according to Rogers (2014), is a good way of interpreting the outcomes or impacts of a certain program, project, or intervention. It is used to understand activities conducted and how they contribute to the intended impacts of any development effort. This encompasses processes like individual change to raise awareness about an issue, healthy relationships, and connections for networking with inter-group dialogue and understanding the root cause of long-term structural and social change. Further, it uses institutional development for new governance arrangements and entities and the mobilization of grassroots by involving communities as advocacy

groups in a non-violent direct action campaign. All these processes were observed as part of various activities or strategies in implementing the *Adopt-an-Estero Water Body Program* (AEWBP).

OBJECTIVES OF THE STUDY

The study assessed the impact of the cleanup activities under the AEWBP based on the stakeholders' observations. Specifically, the study sought to (1) determine the number of times the stakeholders joined the clean-up in the past, (2) identify the number of stakeholders' visits in the area when not involved in a cleanup program, (3) determine the impact of the program on the community, on the stakeholders, and on the environment, (4) determine the current strategies used they find highly effective in the AEWBP, (5) determine the significant difference among the current strategies used when classified according to the level of effectiveness, and (6) examine other ways that could be done to improve the AEWBP implementation.

METHODOLOGY

Research Design

This descriptive research aims to “describe or give a verbal portrayal or picture of a person, thing, event, group, situation, and others (Baraceros, 2016).” This type of research may be repeated after a certain number of years because its scope is limited only to a short period of time. This design systematically and accurately describes a case being investigated and can answer questions like what, when, where, and how. Here, the researcher simply records what has been observed but never can he manipulates the variables (McCombes, 2022). In this study, the impact of the program was described according to the stakeholders' observations; thus, a descriptive research design was employed.

Research Site

The site of the study is focused in Section 3 of Batiano River, lying between barangays Sto. Nino Sur and Sta. Cruz of Arevalo District, Iloilo City, Philippines.

Participants

The respondents were the stakeholders who participated in the regular river cleanup conducted from 2017 to 2019 at Segment 3, Batiano River.

Table 1. Distribution of Respondents

Variables	f	%	Rank
A. Age			
Younger (15-35 yr. old)	52	57	1
Older (36-60 & above yr. old.)	40	43	2
Total	92	100	
B. Sex			
Male	60	65	1
Female	32	35	2
Total	92	100	
C. Educational Level			
Some College	60	65	1
College Graduate	12	13	2
High School Graduate	8	9	3
Elementary	6	7	4
Some High School	4	4	5
Secondary	2	2	6
Total	92	100	

They comprised students and employees of JBLFMU-Arevalo, employees of Meat Cares Products, and barangay officials of Sto. Nino Sur and Sta. Cruz and some selected personnel of the EMB-DENR 6 who regularly took part in the said activity.

This investigation used purposive sampling to identify only those who participated in the river cleanup from 2017 to 2019 in Segment 3 of Batiano River. They were then asked about their observed impacts of the AEWWBP. The respondents were primarily young (f=52, 57%), which implies that a greater number of the stakeholders were students. As to sex, most were males (f=60, 65%), and the dominant figures show that most stakeholders were in college (f=60, 65%). Table 1 shows the data.

Instrumentation

The instrument is a researcher-made questionnaire submitted to experts for face and content validation. After validation, this was tested for reliability, which showed an alpha coefficient of 0.80.

The questionnaire is divided into three parts. Part I includes items to ascertain the respondents’ demographics and extent of participation in the cleanups. Part II contains questions meant to describe the respondents’ observation of

the impact of the AEWBP on the community, stakeholders, and environment. Part III contains questions on the current strategies used and other ways that may be considered for a more effective AEWBP implementation.

The assessment was jointly done with the JBLFMU-Arevalo Community Extension Services (CES) Office.

Since the instrument was written in English, stakeholders from the two barangays, including those from Meat CARES Products, were convened by the researchers in a small group. Those from the local government and the EMB-DENR were also gathered in their respective offices for an interview. Before interviewing them, the researchers explained to the respondents the purpose of the study. The former assured the respondents of the confidentiality and the utilization limit of the data generated from the latter. For clarity, the researchers translated and explained the questions in the local dialect before the respondents checked their choice of response.

To comply with the research ethics protocol, the researchers secured clearance from the university Ethics Review Board before deploying the questionnaire. Likewise, the researchers sent a letter to the two local chief executives of barangays Sto. Nino Sur and Sta. Cruz for permission and approval to conduct a survey. After permission and approval were sought, the survey questionnaires were then circulated to different sets of stakeholders who were involved in various river cleanup operations in the past.

Statistical Techniques

The study employed statistical tools like frequency, percent, standard deviation, and rank to analyze descriptive data, while the Friedman Test was used for the inferential data. This study used the frequency and percent to determine the number of stakeholders' participation in the river cleanup operations and their frequency of visits in the area. In addition, the same tools were also employed to determine stakeholders' suggestions on other ways to make the AEWBP implementation more effective.

The rank in this assessment was used to identify order among the prevailing current program strategies rated according to the level of effectiveness and the indicated observed impacts of AEWBP on the community, the stakeholders, and the environment.

The Friedman Test was used to determine the significant difference among the current strategies used in the AEWBP implementation when classified according to the level of effectiveness based on the 0.05 alpha level of significance.

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software.

RESULTS AND DISCUSSION

Number of Participation in the “Adopt-an-Estero Water Body Program”

The highest number of stakeholders ($f=48, 52\%$, Rank=1) have participated in the AEWBP clean-up for one to five times in three consecutive years. There is a lesser number ($f=24, 26\%$, Rank= 2), however, which shows they joined the clean-up 11 or more times, followed by another group of respondents ($f=20, 22\%$, Rank=3) who claimed at least 6-10 participations in three years.

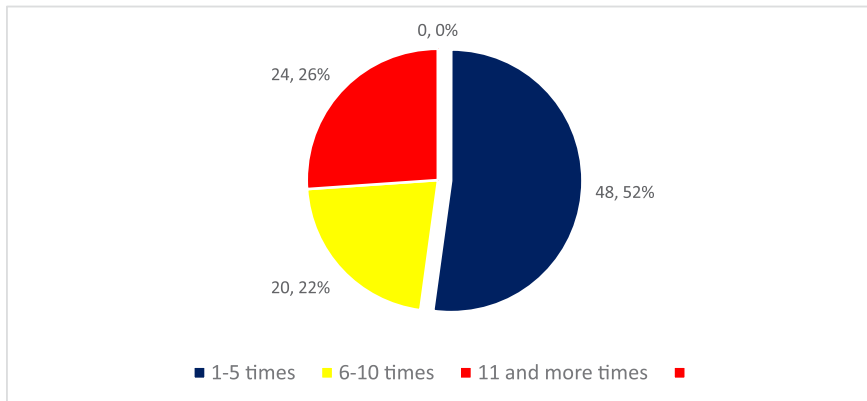


Figure 1. Number of Participation in the “Adopt-an-Estero Water Body Program” from 2017-2019

The data reveal a significant number of the stakeholders with a limited number of participations in the river cleanup are not permanent residents of the community. Hence, they lose the opportunity to participate in some cleanup operations, especially when it is set on weekends. Those with more participation imply that they are just living near the site under investigation so that they can join right away any cleanup activity set for the said quarter. In Figure 2, these are community residents of the two barangays who claimed they were permanent residents. Figure 1 shows the data.

Frequency of Visit When Not Involved in the “Adopt-an-Estero Water Body Program”

When not involved in the river cleanup, the biggest number of stakeholders indicated a visit to the area more than five times a year ($f=42$, 46%, Rank=1). There are those who also frequent the area three to five times ($f=22$, 24% Rank=2), while others indicated one to two visits in a year ($f=16$, 17%, Rank=3). However, it is worth knowing that a few have claimed they are permanent residents in the area ($f=12$, 13%, Rank=4). These permanent residents may include barangay officials and employees from nearby meat product factories who regularly join the quarterly cleanup. Visiting the area by the stakeholders aside from joining the clean-up activity shows a good sign of the enhanced environmental status. Figure 2 shows the data

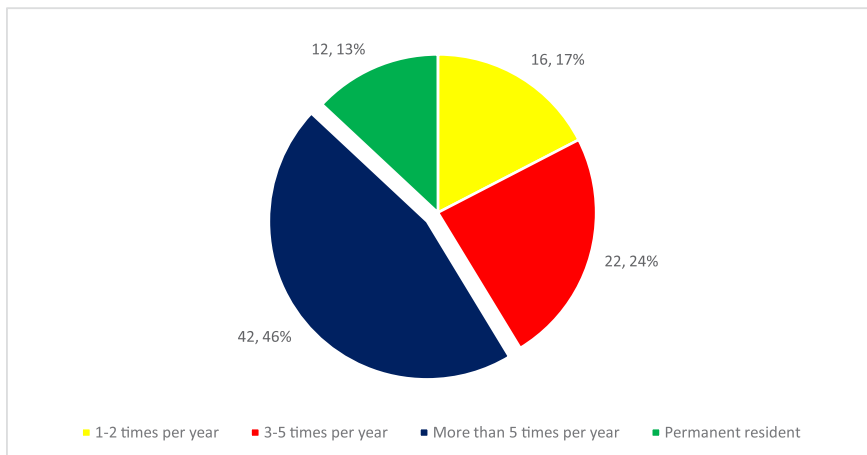


Figure 2. Frequency of Visit When Not Involved in the “Adopt-an-Estero Water Body Program”

Observed Impact of the “Adopt-an-Estero Water Body Program” on the Community

The majority of the respondents have considered the top three impacts of the AEWBP on the community, like educating them about environmental protection (Rank=1), increasing health and safety for those using the area (Rank=2), and building community relationships (Rank=3).

Educating the community on environmental protection is one of the significant impacts on the community that supports the study of Ismail and Salim (2013). It says here that educating the surrounding community will help sustain the program.

The data also proves that through this program, the community is gradually educated on environmental protection, as proven by the stakeholders’ greater awareness of the environment (see Figure 4), and the safety and health of those using the area are secured. The AEWBP is a timely response for developing community relations among residents affirmed by the program’s impact on the respondents, like building more personal relationships (see Figure 4).

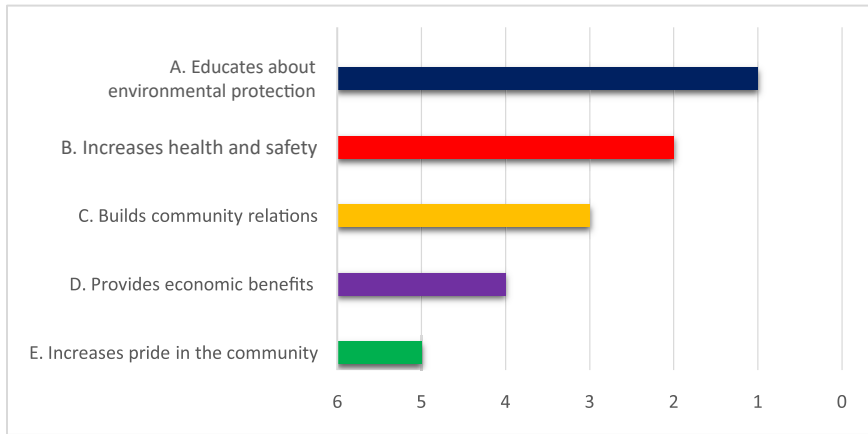


Figure 3. Observed Impact of the “Adopt-an-Estero Water Body Program” on the Community

Observed Impact of the “Adopt-an- Estero Water Body Program” on the Stakeholders

The top four observed impacts of the *Adopt-an-Estero Water Body Program* on the stakeholders include becoming more aware and concerned about the environment (Rank=1), motivation to reduce the amount of garbage produced (Rank=2), and finally, motivation to dispose of their garbage properly and building discipline (Rank=3). These data imply that the program has taught the respondents to observe sound environmental practices emphasizing waste reduction and management. The results are also in consonance with the reports of Joshi et al. (2012) that by cleaning the river, there is a reduction of sources of pollution going into the river, which can be attained through proper waste disposal.

The stakeholders’ awareness of environmental protection and their motivation to reduce the production of garbage could have been the consequences of the education, which impacted the community through the program (see Figure

3). Because of its good impact on the community, the stakeholders are likewise influenced to observe proper waste management. Figure 4 shows the data.

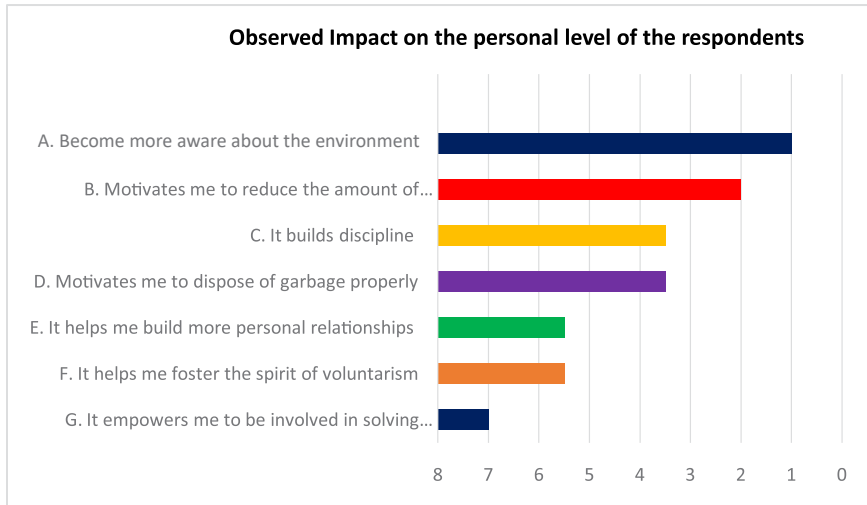


Figure 4. Observed Impact of the
“Adopt-an- Estero Water Body Program” on the Stakeholders

Observed Impact of the “Adopt-an-Estero Water Body Program” on the Environment

For most of the stakeholders, the top four observed impacts of the *Adopt-an-Estero Water Body Program* on the environment are as follows: leading to a healthier aquatic environment and reduction of plastic entering the aquatic environment (Rank=1.5); and leading to healthier aquatic plant life and increased environmental awareness (Rank=3.5).

The results strengthen the idea of Packett (2018) that with clean water comes a sustainable and lasting environment, as reflected in a healthier aquatic environment/life in this study.

These data also support the water quality assessment conducted by the EMB-DENR Region 6 in 2017, which revealed an improved water quality in Batiano River in Segment 3 from 2016 to 2017. It means the efforts invested in the program have benefited the environment.

The observed reduction of plastic entering the aquatic environment and a healthier aquatic environment show a strong connection between the observed reduction of garbage produced and the established awareness about

environmental protection impacting the respondents (see Figure 4). It could be concluded that the reduction of garbage generated and an established awareness of the stakeholders result in reduced plastic entering the site and a healthier aquatic environment or life.

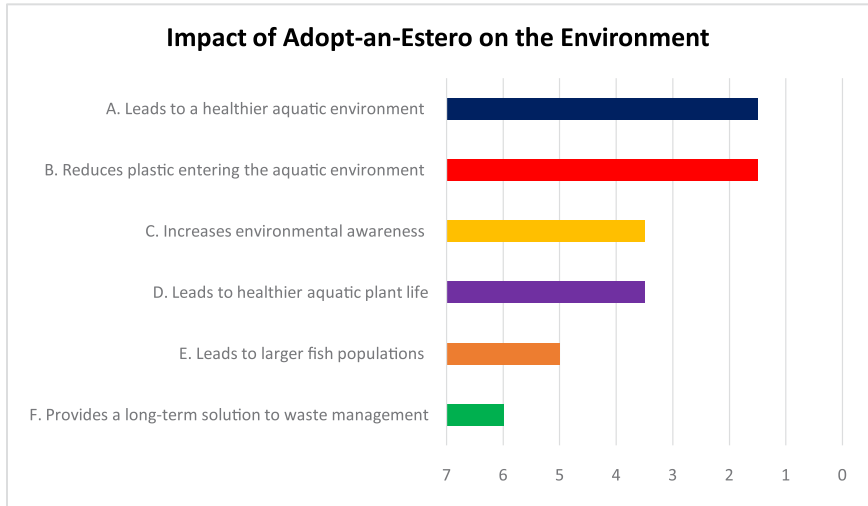


Figure 5. Observed Impact of the “Adopt-an-Estero Water Body Program” on the Environment

Current Strategies considered highly effective in the AEWBP

Among the many strategies currently used during the *Adopt-an-Estero Water Body Program* activity, the stakeholders have observed the top four considered “highly effective in promoting program objectives.” These were the length of each cleanup (M=4.57, Rank=1), the use of gaff or bamboo sticks with a hook to collect debris (M=4.46, Rank=2), the type of people involved (M=4.40; Rank=3), and the frequency of cleanups (M=4.24, Rank=4). Those described only as “effective in promoting program objectives” include using flatboats (M=4.03, Rank=5), using bamboo rafts to collect debris (M=3.93, Rank=6), and marketing/awareness strategy (M=3.91, Rank=7).

Generally, the process and the length of cleanup, including the people involved, matter most in implementing the AEWBP. This means the people involved are the critical components of the success and sustainability of the program. These findings affirm the statements of Packett (2018) that improving

the health status of the Tagabe River was due to the regular involvement of the communities around the river.

The length of clean-up now relates to a more specific response which is a longer activity as suggested by the stakeholders (see “Figure 6”) when they were asked for other ways to effectively implement the program and, most of all, to attain its sustainability. Likewise, the “type of people involved,” as mentioned by the stakeholders, is given a clearer picture now, like recruiting more community members and organizations who have stakes in the program (see Figure 6).

Table 2. Effectiveness of the Current Strategies Considered in the “Adopt-an-Estero Water Body Program”

Effective Strategies in the “ <i>Adopt-an- Estero Water Body Program</i> ”	n	Mean	Std. Deviation	Interpretation
A. Length of each clean-up	92	4.57	0.52002	Highly effective
B. Use of gaff/bamboo stick with a hook to collect debris	92	4.46	0.50084	Highly effective
C. Type of people involved	92	4.40	0.59411	Highly effective
D. Frequency of cleanups	92	4.24	0.61786	Effective
E. Use of a flatboat to collect debris	92	4.03	0.81808	Effective
F. Use of the bamboo raft to collect debris	92	3.93	0.65974	Effective
G. Marketing/awareness strategy	92	3.91	0.68983	Effective
H. Distribution of information, education, and communication (IEC) on environmental materials to residents	92	3.48	0.52369	Effective
I. Installation of signage around the community	92	3.38	0.53127	Slightly effective
J. Building partnerships with non-government organizations (NGOs), people’s organizations (PO’s) aside from JBLFMU-A	92	3.36	0.54635	Slightly effective
K. Number of people involved	92	3.09	0.46058	Slightly effective

Note. 4.21-5.00 = highly effective at promoting program objectives, 3.41-4.20 = effective at promoting program objectives, 2.61-3.40 = slightly effective in promoting program objectives, 1.81-2.60 = no effect on program objectives, and 1.00-1.80 = detrimental to program objectives

INFERENCEAL RESULTS

Significant Difference among the Current Strategies Used in the “Adopt-an-Estero Water Body Program” When Classified According to the Level of Effectiveness

Using the Friedman Test, the results show a significant difference between the means of the respondents when classified according to the level of effectiveness of the strategies used in the AEWBP. The data presented a p-value (of 0.000) lower than the significance level of 0.05. Therefore, the hypothesis is accepted, which states, “There is a significant difference among the current strategies used in the AEWBP implementation when classified according to the level of effectiveness. The researcher, therefore, concludes that one or more of the strategies have different levels of effectiveness. Specifically, the use of a flatboat (M=6.60), the use of a bamboo raft (M=6.12), and the marketing/awareness strategy (M=5.95) are close to the overall mean, which is 6.00. However, the length of each clean-up (M=8.56), gaff/sticks (M=7.99), and the type of people involved are substantially higher than those other strategies. As revealed, items A to C indicate a “highly effective” current strategy (see Table 2) used in the AEWBP implementation as per observation by the stakeholders.

Table 3. Significant Difference among the Current Strategies Used in the “Adopt-an-Estero Water Body Program” When Classified According to the Level of Effectiveness

Categories	Mean Rank	n	Df	Chi-Square	P-value	Remarks
A. Length of each clean-up	8.56					
B. Use of gaff/bamboo stick with a hook to collect debris	7.99					
C. Type of people involved	7.93					
D. Frequency of clean-ups	7.21					
E. Use of a flatboat to collect debris	6.60					
F. Use of the bamboo raft to collect debris	6.12					
G. Marketing/awareness strategy	5.95	92	10	385.146	0.000	Significant
H. Distribution of information, education, and communication (IEC) on environmental materials to residents	4.56					
I. Installation of signage around the community	4.01					
J. Building partnerships with non-government organizations (NGOs), people’s organizations (PO’s) aside from JBLFMU-A	4.14					
K. Number of People involved	2.94					
Over-all Mean	6.00					

Note: P-value $\leq \alpha$: The differences between some of the means are statistically significant @ 0.05 level of significance

Other Strategies That Could Be Done to Strengthen the Program

The top five other strategies that could be applied to strengthen the program, as indicated by the respondents, were the following: cleanup to occur more often (Rank=1), dredging the river, and more funds should be raised to promote the program (Rank=2.5), educational component, more organizations are recruited, and longer clean up (Rank=5).

Raising more funds to promote the AEWB program objectives strengthens the insights of Joshi et al. (2012) in their article “Cleanup of the Singapore River: Before and after,” that substantial funding is invested to attain the program goal.

In like manner, the recruitment of more organizations was also noted in the study of Srinivas (2016). In this study, he confirmed that through the coordination of the local governments, various stakeholders like schools, NGOs, universities, and businesses near a segment of a river were involved to warrant success in cleaning the river.

The inclusion of the item “cleanup to occur more often” gives a clearer and more specific meaning to the “frequency of cleanup” mentioned in the preceding table (see Tables 2 & 3). Furthermore, the “educational component of the program” suggested by the stakeholders shows their recognition of the “IEC materials” as an effective means for educating the community (see Tables 2 & 3).

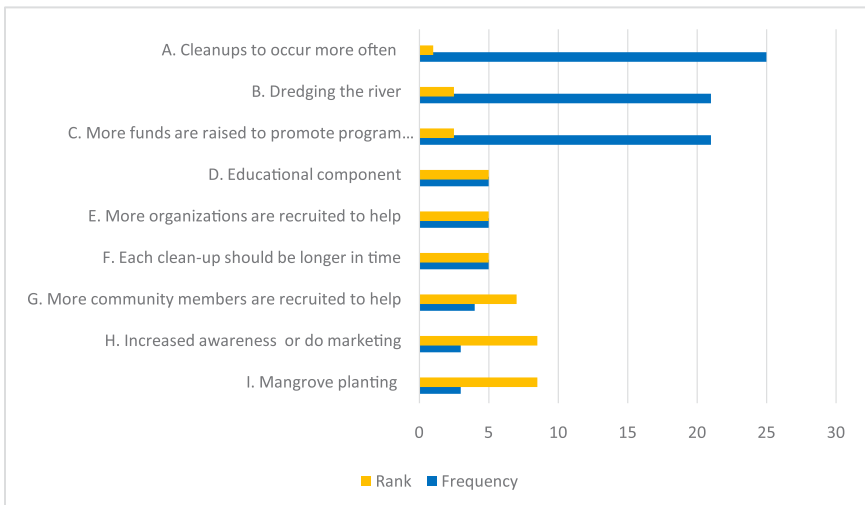


Figure 6. Other Strategies That Could Be Done to Strengthen the Program

CONCLUSIONS

From the foregoing results, the following conclusions are advanced: (1) the biggest number of stakeholders in the AEWBP cleaning operation has only a limited total number of participations for three consecutive years. This implies that most stakeholders are not permanent residents of the area; thus, they did not have the opportunity to join the quarterly clean-up operation as often as their fellow stakeholders did because the activity is regularly set during weekends. (2) A considerable number of the stakeholders hold activities and visit the site despite the absence of clean-up activity which means the area has improved, especially in terms of environmental status. (3) The AEWBP is a good learning avenue for the community to learn more about environmental protection, safety, and health, which leads to better community relations and a healthier aquatic environment. (4) The program has also taught the stakeholders to be more concerned about their environment, emphasizing waste reduction and management. (5) Because of the AEWBP, the site has improved its aquatic environment, reduced the entry of plastics, and made people more aware of the environment. For the respondents, the length of cleanup, and the use of gaff and sticks with hooks, including the people involved, are among the highly effective strategies currently used; therefore, they matter most in effectively implementing the AEWBP. Frequent clean-ups, dredging of the river, and raising more funds are other suggested ways for the successful delivery of the program. This means more room for improvement in the AEWBP implementation. Further, there are still challenges to surmount, which the stakeholders need to address for a lasting impact of the AEWBP.

RECOMMENDATIONS

Based on the foregoing results, the following are the relevant recommendations: (1) there is a need for a more frequent cleanup, which means more stakeholders should be involved, particularly those coming from the river communities. (2) Continue the advocacy by distributing IEC materials to educate more people. (3) Coordinate with the EMB-DENR 6 and the local government unit of the City of Iloilo to verify the need to dredge some sections of the river. (4) More funds should be raised, or more organizations like schools, barangay LGU, and business establishments in the area must be involved, particularly in generating funds to sustain the maintenance of the flatboat and bamboo sticks needed during the cleanup. (5) A copy of this study shall be given to the local government units and

the EMB-DENR 6 for their consideration in policy-making or issuance of local ordinances related to the cleaning up of the river.

TRANSLATIONAL RESEARCH

The findings of the study will form a basis for policy-making or strengthening on the part of the EMB-DENR6, which will focus on the greater involvement of the residents as informal settlers living along the river banks. The results will also be a good guide for the barangay or city local government unit to promulgate a local ordinance that will reduce sources of pollution thrown into the river for a lasting program impact.

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