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Willingness to Pay and Participate in Improved Water Quality by Lay People and Factory Workers: A Case Study of River Sosiani, Eldoret Municipality, Kenya

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Abstract: This paper examines the willingness to pay for and participate in volunteer activities for the restoration of the Sosiani River in Eldoret, Kenya. The willingness to pay is examined through two scenarios which differ in the organizations conducting the proposed project. The study focuses on factory workers situated in textile industries and lay people living in the area, who are divided into two groups: respondents living downstream, who are situated mostly in town centers and at the mid/lower parts of the river and the respondents living upstream, mainly found at the upper parts of the River Sosiani. The study employs the double-hurdle model to identify the factors that influence the willingness to pay (WTP) for improved water quality in the area. An ordinal regression model is used to analyze the willingness to participate and its influencing factors. The results of the study show that an average of 74.4% of the 279 respondents studied were willing to pay for river restoration in the area. The mean willingness to pay for the government proposed scenario was KSh 182.51 (1.66$) per household/month and KSh 169.28 (1.54$) per household/month for a non-governmental proposed project. Within the groups upstream and downstream, inhabitants had higher mean scores for a non-government project as compared to a government project, while the reverse was observed in the factory group. The empirical results of this study show that risk perception, trust and socio-demographic variables were significant factors on the stated amount and the decision to participate of the respondents. The characteristics of respondents with zero WTP, who comprised a significant amount of the respondents (25.6%), are also analyzed in depth shaping the recommendations of this study. The empirical results show that the number of years lived in the community is a major determinant on willingness to participate and pay for environmental restoration projects in the area. The results of this study could influence decision makers in general and have potential implications that can be applied in other sectors not necessarily related to water issues.

Keywords: water quality; water pollution; willingness to pay; willingness to participate; policies; risk perception

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1. Introduction

Pollution of river waters with harmful microbes, chemicals and toxic substances has been steadily increasing in recent years [1]. The entry of these pollutants into river water can occur from a either a non-point or point source. Non-point source pollution of rivers occurs from rainwater surface run-offs, storm sewer spillages or overflow, while point-source pollution comes from discharge of untreated or partially treated effluents from sewage plants or wastewater treatment plants [2,3]. In Kenya, river pollution has become more severe over the years, especially in urban areas with the rapid economic development and urbanization [4]. Kenya is a water stressed country with a per capita freshwater availability of approximately 440 m^3 and a forecast of 248 m^3 by 2025 [4]. The country

thus needs to mitigate river water pollution to ensure availability of already scarce water resources in the future [4]. Therefore, prudent management of the available freshwater resources is not only necessary but imperative.

Rivers like River Sosiani are marred by high pollution levels from agricultural and organic pollution sources and contain pollutants like heavy metals from industries, toxic dye components and hospital waste [5,6]. This has resulted in proliferation of water-related diseases, such as typhoid, declining water quality and water shortage in the area. In an effort to avert this crisis, over the years, the government of Kenya has resorted to action measures tailored to restore river networks and diminish the negative effects of water pollution across the country. For example, along River Sosiani, the government has initiated rehabilitation projects such as the Nandi Park Rehabilitation Project, which yielded temporarily results as the river continues to experience major water pollution issues. Such projects, among others in the country and in other developing nations, mostly lack longevity and only have temporary success, as the rivers continue to suffer from continued decline in water quality. For such activities and initiative to succeed long-term, there has to be a clear evaluation of the general public with regard to the community's views, attitudes and behavior towards environmental issues. With this understanding, solutions specific to the community can be arrived upon.

In most cases, the solutions proposed to deal with such environmental issues involve changes in policies or policy evaluations that must be imposed on the citizens. However, the level of social acceptability is majorly connected to citizens' individual behaviors and attitudes [7]. In order to reveal the citizens' attitudes towards environmental issues and policies, it is important to evaluate their behaviors and any factors influencing their understanding of environmental matters. This involves exploring explanatory factors such as social capital [7–9]. Social capital factors include compliance with social norms, e.g., paying taxes for the protection of common goods among members of a community; social trust, i.e., trust between individuals; institutional trust, referring to trust in institutions, such as the government and social networks, i.e., the membership of individuals in organized activities. According to Solow [10], where social norms, such as additional taxes for environmental remediation are necessary, destitute nations appear to have a choice between cooperating in the degradation of their own environment and acquiescing in their own poverty. Recently, however, the argument that environmental quality should not be sacrificed for economic growth has been on the forefront, with emphasis upon acting and protecting the environment before it is too late [11,12]. This has prompted developing nations to undertake environmental restoration projects.

To determine the welfare gains and benefits of these projects, there has to be some valuation of the ecosystem and its services. For water resources, this valuation is especially difficult because the benefits provided by improved water quality in an area do not have direct market value that can be immediately observed [13]. However, there is a need to quantify the value of these resources because better knowledge of the value of clean water will lead to informed decisions by private and public sectors [13], resulting in economic implications, such as appropriate wastewater treatment approaches that can be taken into account. Additionally, assessing the monetary value of these resources provides the necessary information, including water use and availability, to help decision makers obtain the costs and benefits for any planned projects [14]. This provides an opportunity to understand the public attitudes and preferences for environmental restoration, which are crucial in aiding the evaluation of alternative policies on environmental improvement. It may highlight the link between policy making and human behavior regarding the natural ecosystem [15]. Finally, this valuation reveals the people's attitudes towards the future of the environment and future generations.

A number of approaches have been used when valuing water resources, such as the travel cost method [16], the benefit and cost method [17] and the contingent valuation method (CVM), which is the most commonly used method [18,19]. The CVM explores an individual's willingness to pay for a change in public goods and reveals the benefits

that a society receives from the good/service [15,20–24]. The method consists of asking people directly what value they would attribute to a service or good, i.e., their willingness to pay [25]. According to Haneley et.al [26], the WTP extracted from this method is an individual's personal economic valuation of the goods/services in question, resulting from a clear explanation of the aspects that need to be evaluated. In social sciences and economic studies more specifically relating to water resources, the CVM has been widely applied to evaluate public preferences on ecosystem services, WTP for improvement in the quality of surface waters and river restoration projects. For example, Loomis et al. [27] applied the CVM to measure the economic value of restoring the ecosystem services of an impaired river basin in Platte River. Zhao et al. [28] reported on the integrated contingent valuation of the ecosystem services of Zhangjia Bang Creek in Shanghai. Cooper et al. [29] highlighted the non-market benefits of improving the status of rivers and the motivations behind it. Nallathiga and Paravasthu [30] estimated the economic value of conserving river water quality at the Yamuna river basin, India. Bateman et al. [18] estimated the benefits improving urban river water quality. Del Saz-Salazar et al. [19] considered the willingness to pay as willingness to accept the economic valuation of the non-market benefits derived from improving water quality for people living in Serpis basin in Spain.

Most of these studies employ convenient population samples mainly consisting of the lay people with minimal differentiation of the population under study. This is because the main focus is usually the valuation of the resource in question. Those that attempt to focus on different groups have focused on gender differences, groups that have children as opposed to those without and populations located close to the resource in question as opposed to those far from it. Other studies have sought to analyze whether time and the scenarios presented to the respondents influence their decisions. The findings in all these studies have shown that different characteristics or groups of people think differently or are impacted directly by different phenomena. For example, the view that the more one is concerned with the risks associated with a poor-quality environment the more one is willing to pay for any improvements has been supported by a large amount of literature. Besides risk perception, socio-demographic factors including income, education, age and use of the resource in question influence an individual's WTP. For WTP studies that do not pay attention to lay people and focus on skilled workers instead, the attention has mainly been on occupational health and safety [31], social opportunity cost [32] and health insurance premiums and wellbeing of the workers [31,33]. Few of these studies have attempted to contrast this population to lay people and solicit their willingness to pay jointly. This group of respondents possesses unique characteristics, especially when they work in situations where their own actions are likely to have consequences on the general public by exposing them to risks and contributing to increased environmental degradation. Furthermore, analyzing the viewpoints of this group and that of the lay people highlights the differences in attitudes, behavior and beliefs of each group. This information is important, as it helps identify the different characteristics of each group that determine how they make WTP decisions. Importantly, including this group can help alleviate problems in the community by encouraging them to comply to set laws and regulations that help minimize pollution or harmful effects to the community and correct an erroneous conception about their actions within the community. This can also bridge any existing gaps between the workers and lay people, where their actions are viewed as the cause of the problems in the community. Furthermore, for longevity and success of environmental efforts, there has to be an understanding of all stakeholders and parties involved so that all viewpoints can be analyzed and understood.

The interest of the paper is also linked to the fact that literature on this topic has mainly focused on WTP determinants but has not investigated the WTP differences when the proposed scenario is conducted by two different entities/institutions within different groups. The institution tasked with organizing environmental restoration projects matters. For example, in a case where people may not place higher levels of confidence or trust in an institution proposing a project, this might influence their WTP or willingness to

participate. Moreover, obtaining this information may provide insight into the longevity and success of the projects oriented towards a better environment, gauge the attitudes of the public towards different institutions in the society and highlight the public's valuation of the ecosystem and potential risks. It will also provide information to policy makers about the community's view of not only environmental goods and services but also the different actors and stakeholders in the community. This information would enable decision makers to use favored stakeholders or actors to conduct community outreach activities to encourage public participation and finally acceptance and longevity of any efforts to remedy the environment. This information can also be of value to public decision makers in areas characterized by difficult governance due to either the presence of many stakeholders or the lack of support, by helping them come up with tailored strategies and action plans that better suit each group in the community. Based on this idea, the current study sought to investigate the following research questions:

1. Does the WTP vary between lay people and factory workers?
2. Is there a difference in stated WTP between government projects and non-government projects?

Another critical element of our study is the analysis of respondents with zero WTP, especially protest zero responses, which are defined as responses that do not state the true WTP [34]. A larger number of protest responses in WTP studies could be an indicator of the existence of certain factors such as moral or political attitudes, which should be substantiated. This not only helps reveal the correct WTP of the respondents and promote correct policy decisions but also reveals the characteristics of the respondents in question. In the past, a few studies that have been conducted in Kenya to gauge the WTP of respondents with regard to water resources [35–37]. In this paper, we present the first results of the research on willingness to pay (WTP) for river restoration of River Sosiani in Eldoret Kenya and highlight the different determinants of WTP while exploring the impacts of different organizations or entities on the WTP. The present study also aims to contribute to the massive literature that exists on WTP and bridge the gap on the missing literature on factory workers and lay people as well as institutional scenarios pertaining to WTP. The major objectives of this paper are to: (1) Identify the different characteristics of the three groups and the influence of these characteristics on WTP and the willingness to participate. (2) Determine the WTP and willingness to participate in public activities for improvement in environmental quality for the residents in the region and their influencing factors. (3) Determine the level of influence that different organizations have on WTP of the public for improvement in environmental quality. (4) Identify the characteristics of respondents with zero WTP in the area. This study also hopes to provide further evidence for the validity of Contingent Valuation as approach to elicit WTP [38]. Moreover, the results obtained from this study will provide an opportunity for making recommendations with regard to conducting environmental restoration projects and activities in the future, by highlighting important and influential characteristics of the community's views on these projects and activities that determine their behavior in the area.

2. Literature Review

2.1. WTP Design

The willingness to pay certain amounts can be estimated using a number of different designs in the CVM. The most commonly used methods are open-ended (OE) and dichotomous choice (DC). Studies that use either of these methods point out different advantages of selecting their preferred design. For example, Mitchell and Carson [39] point out that some researchers advocate for the use of the discrete choice or close-ended elicitation format because they believe that this technique makes the task of answering a contingent valuation question easier and results in a lower item non-response rate. Critiques of these designs, however, argue that in these methods the WTP is usually inferred and the resulting estimates may be sensitive to the assumptions made about the specific utility function [40]. OE, on the other hand, has been praised and preferred due to the fact that the WTP is

directly elicited and inference is not required. DC methods have been known to result in much higher mean values for WTP than OE methods [41]. Loomis [40] evaluated the comparative reliability of dichotomous choice and OE contingent valuation methods and deduced that the test-retest correlations were not statistically different between the two methods [40]. Brown et al. [41] found that DC designs resulted in a greater hypothetical market error than an equivalent OE. Therefore, OE designs are preferred, as they offer conservative design of the survey [42]. When an open-ended question is used in the valuation scenario, this model distinguishes between factors affecting whether or not respondents are in the market for this public asset and considers the factors that affect the stated amount that they are willing to pay.

2.2. Econometric Analysis

The technique used for econometric analysis of WTP data is critical because an inappropriate choice can lead to erroneous inferences about the determinants of WTP and consequently about their validity [43]. According to Donaldson et al. [44], the type of model used is largely dependent on the type of question asked and the selected model should fit the WTP questions asked. When a payment scale, a bidding approach or open-ended questions are adopted, the outcome is continuous monetary WTP values [44] and the WTP is usually censored, so that the data contains a large proportion of zero values, for which there is a range of possible explanations, such as protest responses or real zeros consistent with economic decisions. On the other hand, the close-ended approach and a dichotomous choice with follow-up valuation only provides qualitative binary values. For such questions, binary logit and probit analysis is highly recommended. For payment scale, data-ordered logit/probit are the most appropriate methods. For open-ended questions, the resulting values are quantitative [44] and modelling methods, such as standard linear models by ordinary least squares (OLS), Tobit regression, double-hurdle models and truncated regression models, have been recommended [44–48]. The selection of these models, however, is largely dependent on the treatment of zero responses in any case.

The estimation in OLS is believed to be biased and inconsistent, because it fails to account for the qualitative difference between limit (zero) observations and non-limit (continuous) observations with potential erroneous results. The most frequently advocated method is the Tobit model, especially when dealing with censored data in contingent valuation [43]. However, there have been numerous debates on the treatment of zeros in this model, implying that the underlying assumption in the Tobit model does not differentiate between the continuous zeros and the zero-decision process. That is, the Tobit specification is relevant only if all zero realizations represent an economic decision, i.e., a real zero preference for the program or issue in question. Recent research suggests that the cause of zeros observed in survey data has important statistical consequences [49]. Common practice in the treatment of the zeros in the data involves identifying the two types of zeros and discarding them from the analysis. This introduces potential biases if other characteristics of the respondents in the protest group are different from the population sample. According to Donaldson et al. [44], positive WTP values and zero values could significantly differ in their determinants. Therefore, they should not be discarded, but rather differentiated [44].

The type II Tobit model [50] is a more flexible model and has been proposed to accommodate the different patterns that arise from the questions of how much and whether to pay for a proposed project. However, this model does not differentiate zeros generated by economic decisions (genuine zero values) from zeros generated by non-economic decisions (protest zeros), which makes interpretation difficult. Another popular approach that tries to differentiate the zeros is the double-hurdle model, originally proposed by Cragg [51].

This model assumes that two separate hurdles must be passed before a positive level of consumption can be observed. Each of these hurdles is determined by a different set of independent variables. The first hurdle involves the decision to participate or not to participate in the event, i.e., to protest or not, and the second hurdle then determines

the amount decision, i.e., the degree of participation through payment amount. The double-hurdle model is then characterized by the following relationship:

$$y_i = s_i h^*_i,$$

where y_i is the observed value of the dependent variable and

s_i = the selection variable
h^*_i = the continuous latent variable

The selection variable = 1 if the dependent variable is not bounded and 0 otherwise as shown in the selection model.

$$\begin{cases} \text{Selection model: } s_i = 1 \text{ if } z_i \gamma + \varepsilon_i > 0 \text{ (participation)} \\ 0 \text{ otherwise (protest)} \end{cases}$$

where z_i = vector of the explanatory variables

γ = coefficient vectors
ε_i = standard normal error term

The double-hurdle model can determine the socioeconomic and personal characteristics of protest respondents by relaxing the assumption that the participation decision is irrelevant, as observed in the Tobit models. This is observed in the probit model aspect of the participation decision in the double-hurdle model. The double-hurdle model accounts for the presence of zeros in the population by allowing for observable and unobservable factors that affect the participation equation and also allows for some factors to affect only the participation decision and not the amount decision and vice versa. Additionally, the double-hurdle model treats the participation decision and the amount decision separately in the case of WTP [49].

The double-hurdle model has been applied in many social science studies [49]. For example, Blundell et al. [52] used the model to examine the relationship between participating in the labor force and the number of hours worked. Abdel-Ghany and Sharpe [53] used the model to investigate consumer participation and expenditure on lotteries in Canada. This model has also been used to examine the determinants of participation and intensity of cigarette smoking [54,55], physical activity and exercise [56]. In the aforementioned studies, the double-hurdle model has yielded satisfactory results and accounted for the two decisions that a respondent faces in a CVM interview [57]. Further, apart from the estimation of the social benefits, applying this method allows researchers to deal with the issue of zero responses in their responses [51]. Similarly, we applied the double-hurdle model in our study to evaluate the determinants for agreeing to participate in the proposed program and influence the amount decision for residents living near River Sosiani.

2.3. Determinants of WTP

According to Bateman [58], it is vital to understand the determinants of WTP relating to unfamiliar goods where preferences for the investigated good may not be clear. Previous research has found the various significant determinants of WTP, such as sociodemographic factors, age and income [38]. Other studies have observed that younger people have higher WTP compared to older people [59,60]. Nationality and the amount of time an individual has lived in an area have also been proven to influence an individual's WTP for ecosystem restoration [61]. The size of the household, i.e., family size, is also an important factor [62]. Previous studies have also shown that an individual's perceptions towards risk influences their WTP. More specifically, individuals who perceive there to be a greater risk are generally more likely to have a higher WTP to reduce the risk. For example, Georgiou et al. [63] deduced that an individual's WTP for improvements in bathing water quality was influenced by their socioeconomic status and was highly correlated with their perception of the health risks from exposure to polluted coastal bathing waters. Similar observations were made about the perceived risk in Nebraska, USA, where an individual's

WTP for groundwater improvements increased in cases where the perceived risk was greater [64]. Trust factors have also been identified to influence WTP. Some studies have asserted that as a factor of social trust, some individuals will be willing to pay more to save water resources [8]. Those who believe that their fellow citizens will comply with a new environmental regulation concerning water resources will perceive less social costs from a proposed policy [65]. Institutional trust, on the other hand, has been associated with the effectiveness of the institution [66]. Thus, higher trust may imply positive perceptions concerning the effectiveness of the proposed project or policy [7,9,67,68]. This may result in lower or no willingness to pay (WTP) or participate in any projects if they do not trust the institution undertaking the project.

Based on the literature review and research questions, two hypotheses of interest to this paper are proposed:

(1) There is a statistical difference in WTP between the lay people and factory workers.
(2) There is a difference in WTP1 and WTP2 between the groups.

3. Methodology

3.1. Study Area

The survey was carried around River Sosiani, located in Eldoret town, which serves as the Uasin Gishu County's capital in the Rift Valley region of Kenya. River Sosiani is a sub-catchment of the River Nzoia, which is a sub-basin that drains into Lake Victoria [69]. Lake Victoria is largest freshwater lake in East Africa, shared among three countries, i.e., Tanzania, Uganda and Kenya. It supports a huge population of communities that live near the lake. Eldoret is of strategic importance in the country, as it is the junction connecting main highways heading to the three East African countries, namely Kenya, Uganda and Tanzania. The land in Eldoret rises from the Sosiani River Valley, with its basin covering approximately 647 km^2 of area [70]. The main activities within the River Sosiani catchment involve farming in the upper zone, comprising both small-scale mixed farming and a few large-scale farmers growing wheat, maize and flower farming [70]. The midstream zone consists of human settlements, industries and hospitals, and the downstream zone is an urban environment marred by large road networks, garages and car washes as well as other industries. Besides the rapid population growth, industrial activities in the region have also increased over the years, characterized by consumer goods, with the primary goods being machinery and transportation equipment, textiles, petroleum products, iron and steel [71]. The rapid population growth in the basin and subsequent growth of urban areas to accommodate the large population have contributed to uncontrolled land use practices, reclamation of wetlands and deforestation of the upper catchment areas of the town [70]. Rapid industrial development coupled with unsustainable environmental practices, such as industrial and agricultural discharge in the river, poor agricultural practices and poor waste management in the region, have led to decreased water quality in river Sosiani over the years. This has left the government of Kenya with the burden of restoring the river. The residents lack clean water and experience water shortages [72]. Another major challenge has been large outbreaks of diseases, such as cholera and typhoid, which are often associated with poor and unsanitary water practices in the area [73].

3.2. Sampling and Population Sample

Prior to the actual survey, a pretest of 50 respondents was chosen to assist in the modification of the questionnaire and to determine the effectiveness of the questionnaire in interpretation and understanding. The pretest survey results revealed a need to administer the questionnaire in the local language. Kalenjin (a southern Nilotic language spoken in Kenya, mostly by the Kalenjin tribe) or the national language (Kiswahili) were used in cases where there was difficulty reading and writing in English. A total of 300 questionnaires were administered randomly to the communities residing along the River Sosiani and the workers in factories along the river. The participants included in the study were divided into three groups, as shown in Figure 1. The first group comprised of respondents

located midstream and downstream around the town area where the factories were located; throughout the study, they are referred to as downstream inhabitants/respondents. The second group consisted of upstream inhabitants/respondents. Finally, the factory group comprised respondents working in the factories surveyed from the three factories that agreed to participate in the study. The factories were from both private and government sectors and chosen based on their close proximity to River Sosiani. Random distribution methods were used to fill in the questionnaire and used for upstream and downstream respondents. In the factory group, the questionnaires were collected after an agreed period of time from the trainers' offices, gates or human resource offices, with follow up collection where necessary.

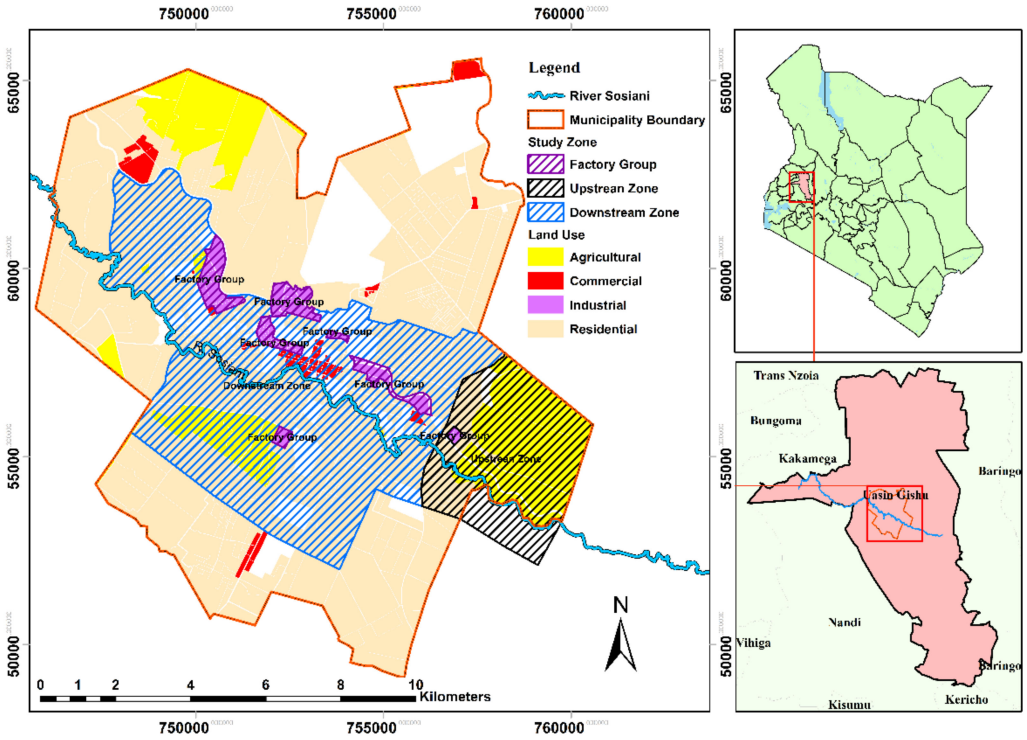

Figure 1. Study area and the selected regions in the area.

3.3. Survey Design and Data Collection

The questionnaire was designed to gather data on the respondents' understanding of water pollution in the area and their perceptions of water quality. To understand the socio-demographic characteristics of the respondents, information about their age, gender, number of family members, number of children under 18 years per family, income, occupation, education level and the number of years lived in the community was collected. Additional information about water consumption sources and use was collected. Knowledge about the existence and importance of the river was also assessed. To assess the trust factors used in the study, the respondents were asked to state their level of trust toward (1) the government, (2) local firms and (3) fellow local people's capacity in managing water quality in the region through various community efforts. These were measured using a 5-point Likert scale, ranging from 1 = Not at all to 5 = Very high. The respondent's level of risk perception was also solicited in order to assess the impact on WTP and willingness to participate of the respondents. Three questions, using the 5-point Likert scale, were selected to represent the respondents risk levels and perception. This were designed after the pilot survey had been conducted. These included (1) a direct question asking the respondents to state their level of perceived risk in their lives based on water quality in the area. (2) The extent to which they felt worried about their health as a result of water pollution in the

area due to increased industrial activities. (3) The scope of impact i.e., the degree of impact through contracting diseases as a result of the declining water quality.

Additional information about the degree of industrial risk and the underlying understanding of risk related judgement was also collected for use in our other study [74]. The willingness to participate and the contingent valuation question was presented in the final section of the questionnaire. A hypothetical scenario was provided, where the expected activities to be undertaken were listed out and the recurring benefits from these activities were clearly stated as follows:

"Suppose that the County government and central government is considering implementing a program to ensure river Sosiani clean up in order to improve the water quality of the river through a proposed list of activities. The activities proposed include: cleaning the rivers through solid waste removal, removal of structures from the river, planting of trees along the river bank. The program would lead to major ecological benefits in the area such as improved water quality and water clarity in the river leading to improved water quality within the required standard. The river water will also be improved for use and in a much better condition as a result of the activities."

Thereafter, the respondents were asked to state if they would participate in such a program, using a 5-point Likert scale ranging from 1 = Very likely to 5 = Unlikely. The respondents were asked, using a dichotomous choice question, to state if they were willing to pay an additional fee collectable every month to support the program in the area and, if yes, what amount they were willing to contribute, i.e., WTP1. A similar question was asked to determine the amount if another organization beside the government was responsible for the program, termed as WTP2. The respondents who answered yes were asked to state their reason for supporting the program. To understand the zero responses, the respondents who answered no were also asked to select reasons for their responses from a number of choices aimed at identifying protest voters. Respondents who made the following choices were considered as non-protest votes: "The program would not be worth anything to me", "I cannot afford to pay for the restoration of the river" and "I am planning to relocate". While respondents with the following choices were considered protest votes: "It is unfair to expect me to pay for this program", "I do not think this program would work", "It is the responsibility of the government" and "I object to this question". Respondents could also choose "Other" for specifying other reasons and write in their reasons.

3.4. Statistical Analysis

Multiple statistical analyses were performed in the study to achieve different objectives. Analysis of Variance (ANOVA) was applied to identify significant differences in WTP among the three groups. To compare and identify characteristics of each group of respondents, mean scores and standard deviations of the independent and dependent variables were analyzed. To measure the willingness to participate and its influencing factors, ordinal regression analysis was employed using IBM SPSS version 25. The willingness to participate was used as the dependent variable and selected variables (gender, age, income, education levels, the number of years lived in the community, the number of children, risk perception variables and trust factors) as the independent variables. To measure WTP and its influencing factors, the double-hurdle model was used and estimated using Stata version 16; StataCorp (College Station, TX, USA), which has an inbuilt command to run the analysis. WTP1 (amount when the government is running the project) and WTP2 (amount when other organizations, such as local NGOs or community groups that are not government-related are running the project) were used. In both the analyses, the dependent variable was the WTP amount and the independent variables were gender, age, income, education levels, the number of years lived in the community, the number of children, risk perception variables and trust factors. Zero responses were also analyzed to better understand the respondents and highlight their characteristics to provide better recommendations using the results.

3.5. Double-Hurdle Model Specification

In order to satisfy the normality assumption of the model, as in previous studies, the dependent variable (WTP) was transformed into a logarithmic function so as to avoid the conversion of the zeros into missing values after transformation [75,76]. The model requires explanatory variables to be included in the two hurdles. This selection is arbitrary and does not rest on any set theory [77]. Following previous research, the study selected the explanatory variables to be included in each hurdle in the model. Moreover, including the same set of explanatory variables in each hurdle makes it difficult to correctly identify the parameters of the model. Thus, exclusion restrictions must be imposed [77,78]. In previous studies, the first hurdle is usually assumed to be a function of noneconomic factors affecting the household's decision. Hence, economic variables, such as income, can be excluded from this hurdle. According to Pudney and Yen [79,80], this move is motivated by the discrete random preference theory, according to which sample selection is determined exclusively by noneconomic factors. This is in line with previous studies that have justified the inclusion or exclusion of certain factors, such as economic, demographic and sociological factors [77,79–82]. Based on the claims above and the gathered evidence, we excluded some variables in the first hurdle based on the fact that our independent variables were aimed to encompass the determinants influencing both the amount offered in the program, i.e., a higher or lower amount, and the decision to participate in the program [78]. Our criteria for exclusion included variables that were somewhat related and their influence on the decision to participate in the program were of critical importance to the study and impact when omitted. For example, the number of children and the years lived in the community are somewhat related to the family size and age of the respondents, respectively. Therefore, their omission in the first hurdle (i.e., decision to participate) would not necessarily impact their decision amount in the second hurdle (i.e., decision amount). Income was also not included in the first hurdle based on it being an economic factor. Perceived risk was only excluded in the first hurdle among the downstream respondents based on the prior conclusion that they had higher risk perception levels and this was a highly influential factor in participation decision. However, the amount decision was of more importance to the study. Furthermore, its inclusion in the model would be redundant. However, all the variables were accounted for in the second hurdle. To enable easier interpretation of the results of the first hurdle equation, marginal effects using Stata version 16 (Stata Corp, 2016) are reported and discussed. This is because the outcome variables from the double-hurdle model are latent and the maximum likelihood estimates cannot be interpreted in the same way as ordinary least square estimates.

4. Results and Discussion

4.1. Descriptive Statistics

The results of the socio-demographic characteristics of the respondents are presented in Table 1. The population surveyed included 146 (52.3%) males and 133 (47.7%) females with a low variation in gender ratio among the groups. The largest variation among the groups was in the education levels, with four and three respondents from the downstream and upstream respondents, respectively, having no education levels and zero respondents in the factory group. That is, all the respondents had some level of education. Another notable variation was in the level of primary school education, where the downstream group had the highest percentage (24.5%) compared to the other groups, as presented in Table 1. The factory group also had the highest number (N = 46) of respondents who had tertiary education compared to downstream respondents (N = 32) and upstream respondents (N = 29). A majority of the population sampled 149 (53.4%) had income levels of between 1–20,000 KSh (Kenyan shilling; 1 USD = 100.3 KSh). A small population of the sample 15 (5.4%) earned more than 60,000 KSh. As of 2015, Kenya's poverty rate (the percentage of the population living on less than $5.50 a day) was 86.50%; that is, a majority of the population still lives below the international poverty line [83]. As highlighted in the results obtained, a majority of the population in this area are low-income and middle-class

earners. Another distinct aspect was that only the factory group had a larger number of the respondents earning more than 40,000 KSh (USD 400) per month, compared to the two groups. However, given the fact that the respondents from this group were selected from a working environment, this result was expected.

Table 1. Descriptive statistics of the demographic characteristics.

	Factory Group		**Downstream Inhabitants**		**Upstream Inhabitants**	
	Frequency	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Male	48	48.0	48	51.1	37	43.5
Female	52	52.0	46	48.9	48	56.5
Age groups						
(20–29)	44	44.0	26	27.7	31	36.5
(30–39)	41	41.0	49	52.1	43	50.6
(40–49)	9	9.0	13	13.8	5	5.9
(50–59)	2	2.0	3	3.2	2	2.4
(60+)	4	4.0	3	3.2	4	4.7
Education						
No education	0	0.0	4	4.3	3	3.5
Primary school	6	6.0	23	24.5	8	9.4
Secondary school	48	48.0	35	37.2	45	52.9
Tertiary Level	46	46.0	32	34.0	29	34.1
Number of family members						
(1–3)	29	29.0	23	24.5	33	38.8
(4–6)	60	60.0	62	66.0	39	45.9
(7+)	11	11.0	9	9.6	13	15.3
Income in KSh [1]						
No income	2	2.0	23	24.5	19	22.4
1–20,000	61	61.0	42	44.7	46	54.1
20,001–40,000	22	22.0	18	19.1	15	17.6
40,001–60,000	9	9.0	5	5.3	2	2.4
60K+	6	6.0	6	6.4	3	3.5
Observation	100		94		85	

[1] KSh: Kenyan shilling, the currency used in Kenya.

4.2. Mean Score Differences of the Dependent Variable WTP and Independent Variables across the Groups

The overall percentage of respondents that were willing to pay for the program, both for WTP1 and WTP2, was 208 (74.6%) and 207 (74.2%) respectively. This indicates that residents in this region are concerned and willing to take measures to help alleviate the problems brought about by the decreasing water quality in the region. According to Choe et al. [17], there is a general conception among development economist and policymakers that, in developing countries, improved environmental quality is a luxury for the world's poor. The assumption being that people in these countries do not place much value on improvements in environmental quality, mainly because they cannot afford to pay for it [17]. However, our results indicate otherwise. In the area, the average mean score for a government-proposed projects (WTP1) is 182.51 KSh ($1.66), while that of the non-

governmental project (WTP2) is 169.28 KSh ($1.54). This result can be attributed to the fact that a majority of the respondents are low-class and middle-class income earners. The high average WTP for WTP1 is mainly a result of the high WTP1 scores for the factory group compared to those of the upstream and downstream respondents who had the highest mean scores for WTP2 (see Table 2). The mean differences of WTP1 and WTP2 were statistically proven by the results of the one-way ANOVA as shown in Table 2. First, the test of homogeneity of variances showed unequal variances across groups for WTP1 (sig = 0.008). Therefore, the results of Welch's *t*-test were used instead of the regular ANOVA test. The findings showed that WTP1 significantly differed among respondents living in the three groups (F (51,261.908) = 4.473, p = 0.000). A post-hoc analysis using Dunnett T3 was then performed to demonstrate multiple comparisons. For WTP2, the test of homogeneity of variances showed equal variances of the mean score across groups (sig = 0.172) with the no significance in difference within the groups (F (39,106.700) = 2.335, p = 0.099).

Table 2. Mean comparison of WTP1 and WTP2 across the groups.

				Mean Difference (Comparison within the Groups)		
Dependent Variable	**Group**	**N**	**Mean**	**Factory Group**	**Downstream Inhabitants**	**Upstream Inhabitants**
[*1] WTP1	Factory group	100	227.10	-	0.547	0.008 *
	Downstream inhabitants	94	185.00	0.547	-	0.145
	Upstream inhabitants	85	127.29	0.008 *	0.145	-
Total		279	182.51			
[*2] WTP2	Factory group	100	172.60	-	0.782	0.397
	Downstream inhabitants	94	197.66	0.782	-	0.101
	Upstream inhabitants	85	134.00	0.397	0.101	-
Total		279	169.28			

Notes: [*1] WTP1 = Government proposed project (Welch's *t*-test analysis) F = 5.035, p = 0.007; [*2] WTP2 = Non-government proposed project (Welch's *t*-test analysis) F = 2.370, p = 0.96; * The mean difference is significant at 0.05.

As shown in Tables 2 and 3, there were observable mean differences in the WTP1 and WTP2 amounts of the three groups. For downstream respondents, the mean scores increase slightly from M = 185.00 to M = 197.66. The increase in mean could be attributed to the fact that the number of zero responses decreases from N = 25 for WTP1 to N = 21 for WTP2, as discussed in Section 4.8 characteristics of zero respondents. That is, the mean WTP1 for positive respondents is lower than that of positive WTP2 respondents. A plausible explanation for this observation specific to this community is that given the history of governmental projects in the area that have not yielded sufficient results–for example, the Nandi rehabilitation project–the residents may feel less attached to the government's propositions to support the projects. Another possibility for the observed results would lie in the fact that the continuous experiences with water pollution and decreasing water quality in the area may result in the residents feeling let down by the government that is supposed to use the taxpayer's money to run similar projects as opposed to asking for more from them.

For upstream inhabitants, as shown in the table, there is an increase in the mean score for WTP2 (M = 127.29) from WTP1 (M = 134.00). However, the number of zero responses slightly increases from N = 27 to N = 28. The increase in mean score would mean that respondents with a positive WTP stated higher amounts for WTP2 than WTP1. A plausible explanation for this would be that they feel that a non-governmental organization would benefit more from their financial contribution than the government.

Table 3. Mean scores and standard deviations of the dependent variables and independent variables used in the study.

	Factory Group N = 100		Downstream Inhabitants N = 94		Upstream Inhabitants N = 85	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
WTP1	227.100	269.092	185.000	219.294	127.294	172.767
WTP2	172.600	189.052	197.660	221.692	134.000	178.767
Gender [1]	1.520	0.502	1.489	0.503	1.565	0.499
Age	32.460	9.894	34.468	9.384	33.471	10.471
Years lived in the community	12.450	14.641	11.691	12.833	9.518	11.612
Education [2]	3.400	0.603	3.011	0.874	3.176	0.743
Number of family members	4.470	1.817	4.415	1.602	4.376	1.711
Number of children	1.850	1.381	1.532	1.373	1.612	1.423
Income	24,000	23,000	22,000	31,000	15,000	18,000
Worry about possibility of impacts	3.770	1.004	4.230	0.926	3.894	1.165
Level of perceived risk	4.084	0.949	4.336	0.897	4.159	0.803
The scope of impact through contracting diseases	3.890	0.863	4.324	0.835	4.035	0.823
Trust in the government	4.370	1.253	4.138	0.837	4.024	1.263
Trust in the local firms	4.220	1.151	4.404	0.766	4.000	0.964
Trust in local people's capacity	4.000	1.393	3.894	1.121	3.694	1.528

[1] Gender is a dummy variable that takes the value of 1 when the subject is male and 0 otherwise. [2] Education is a dummy variable that takes the value of 1 when the subject has education levels of secondary school or above and 0 when otherwise.

For the factory group, there was a significant decrease in the stated amount, indicating an increased potential contribution for governmental-run projects as opposed to non-governmental ones. This change in mean score can be explained by the number of increases in zero responses from N = 19 to N = 23 and lower stated amount for WTP2 compared to that of WTP1. This indicates that respondents of this group highly favor governmental projects. These observations show that there is a difference in stated WTP between the lay people and factory workers. This highlights differences in perspective and views between the two groups, providing an insight into their attitudes and behaviors. This understanding is important when coming up with solutions and policies for this particular community, because it is clear that one solution might not be effective for them.

Table 3 provides the mean scores and standard deviation analysis of the independent variables, giving useful insights that define the characteristics of the three groups. From the data in Table 3, the following conclusions can be made. Downstream respondents have the highest risk perception in the area given the higher mean scores for the three risk perception variables (levels of perceived risk (M = 4.336, SD = 0.897), the scope of impact (M = 4.230, SD = 0.926) and increased worry as a result of industrial activities in the region (M = 4.324, SD = 0.835)), which are the highest among all the groups. This result is not surprising because the respondents are located in the mid-stream and downstream sections of the river, where the river is most polluted, as it collects waste upstream. Their location also has a large number of industries in the town center among other developmental aspects of town centers, such as road networks, hospitals etc. Upstream respondents have slightly higher levels of perceived risk (M = 4.159, SD = 0.803) in the region, which indicates that while industries are at fault for major water pollution in the area, the river is also polluted upstream, causing concern for the residents. This is an opportunity for urgent action to be taken in the area, as the community is being greatly affected by the decreasing water quality of River Sosiani. For factory respondents, the high mean scores for trust in the government and firms indicate

that, for this group, they also to some extent feel the responsibility of managing risks in the area. The implication of this finding is useful as it may help bridge the gap between them and the public by encouraging them to practice safer environmental practices such, as proper wastewater disposal that will minimize water pollution in river Sosiani.

4.3. Determinants of Willingness to Pay for the Government Proposed Project

Tables 4 and 5 presents the results for the double-hurdle model estimation for both the WTP1 (government-proposed project) and WTP2 (non-government proposed project) with the associated robust standard errors reported in parentheses. The results under the participation equation represent the results of the first hurdle, while those under the amount equation represent the results of the second hurdle, as discussed in the methodology section. The dependent variable is the log WTP. Both the log likelihood and pseudo-R^2 measures have been identified and presented in the tables. Significant variables in the first hurdle equation (participation equation) influence the decision of whether or not to participate and can be interpreted as increasing or decreasing the likelihood of saying yes to participate in the program. For this equation, the term 'likelihood' refers to the influence of a change in the level of an exogenous variable on the likelihood of participation. The estimated marginal effects for the variables, along with their delta-method standard errors, were reported as they are easier to interpret. A positive significant variable implies that the variable influences the probability of saying yes to participating in the program, while a negative value would imply the converse. In the second hurdle equation, termed the "amount equation", a significant variable indicates the influence the variables exert on the amount of money pledged for the program, and the effect of the variable can be interpreted as increasing or decreasing this amount. The discussion focuses specifically on the significant variables and their interpretation.

In the payment amount equation in all the groups, i.e., second hurdle equation, the sign and significance of the estimated coefficients are generally consistent with our expectations. Most of the socio-demographic characteristics were significant predictors of WTP, as shown in Table 4. The positive and significant estimated coefficient on income in all the groups reveals that the river restoration is viewed as a normal economic good and that an increase in income levels leads to an increase in the pledged WTP amounts. Furthermore, the analysis on the characteristics of zero respondents show that most of the respondents with zero WTP had the lowest income levels and a majority had no income levels, explaining the significant outcome of this variable in predicting pledged WTP amounts. This result is also consistent with the previous findings of Richard et al. [84] and Xiong et al. [85], who also found that increased income leads to higher WTP amounts and vice versa [86].

Similar to findings from earlier studies [85], the estimated coefficient of the education variable was significant in both downstream and upstream respondents, with a positive coefficient. That is, higher education levels lead to increased WTP amounts. This result is consistent with economic theory, in that education helps respondents understand the challenges (benefits) of restoring an environmental asset. A plausible explanation specific to respondents located upstream would lie in their consistent use of river water for agriculture. The process involves use of chemicals, which requires some level of scientific understanding/education.

Table 4. Double-hurdle model results for willingness to pay for a government-proposed projects.

	Factory Group				**Downstream Respondents**				**Upstream Respondents**			
	Amount Equation		**Participation Equation**		**Amount Equation**		**Participation Equation**		**Amount Equation**		**Participation Equation**	
WTP1	**Coef.**	***p*** **> |z|**	**dy/dx**	***p*** **> |z|**	**Coef.**	***p*** **> |z|**	**dy/dx**	***p*** **> |z|**	**Coef.**	***p*** **> |z|**	**dy/dx**	***p*** **> |z|**
Gender [1]	−0.011	0.930	−0.313	0.930	−0.127	0.078	−0.193	0.405	−0.291	0.034	−0.124	0.608
	(0.127)		(0.223)		(0.088)		(0.232)		(0.127)		(0.242)	
Years in the community	0.016	0.010			0.012	0.008			0.048	0.535		
	(0.006)				(0.004)				(0.007)			
Education [2]	−0.034	0.395	0.332	0.567	0.032	0.051	0.685	0.001	1.384	0.000	1.185	0.002
	(0.117)		(0.141)		(0.074)		(0.214)		(0.313)		(0.375)	
Age	−0.018	0.009	0.014	0.268	−0.018	0.010	−0.004	0.749	−0.005	0.493	0.009	0.572
	(0.008)		(0.015)		(0.005)		(0.013)		(0.007)		(0.016)	
Family size	−0.058	0.340	0.258	0.103	−0.075	0.140	0.264	0.016	−0.181	0.008	0.924	0.516
	(0.061)		(0.114)		(0.041)		(0.109)		(0.065)		(0.142)	
Number of children	0.163	0.047			0.108	0.978			0.299	0.001		
	(0.08)				(0.057)				(0.083)			
Income	0.001	0.001			0.001	0.001			0.001	0.001		
	(0.000)				(0.000)				(4.511)			
Worry about possibility of impacts	0.073	0.390	0.317	0.141	0.183	0.132	0.343	0.017	0.115	0.153	0.047	0.641
	(0.085)		(0.123)		(0.099)		(0.143)		(0.061)		(0.100)	
Level of perceived risk	0.309	0.001	0.265	0.007	0.688	0.001			0.502	0.001	0.551	0.001
	(0.085)		(0.069)		(0.114)				(0.116)		(0.159)	
The scope of impact through contracting diseases	0.165	0.029	0.213	0.037	0.148	0.025	0.214	0.116	0.586	0.003	1.309	0.001
	(0.075)		(0.124)		(0.06)		(0.136)		(0.145)		(0.184)	
Trust in the government	−0.108	0.037	−0.165	0.071	0.036	0.775	0.228	0.134	−0.026	0.673	−0.017	0.855
	(0.052)		(0.093)		(0.054)		(0.152)		(0.051)		(0.094)	
Trust in firms	−0.036	0.523	0.064	0.428	0.045	0.527	0.181	0.221	−0.087	0.406	−0.053	0.668
	(0.057)		(0.089)		(0.059)		(0.148)		(0.086)		(0.123)	
Trust in local people	0.036	0.518	0.121	0.082	−0.037	0.132	0.092	0.354	0.031	0.393	0.0084	0.283
	(0.056)		(0.069)		(0.04)		(0.099)		(0.047)		(0.079)	
Insigma	2.81	0.001			−1.083	0.000			−0.779	0.000		
	(0.726)				(3.542)				0.0928			
Log likelihood			−71.670101				−41.204407				−55.555383	
R^2			0.57				0.72				0.60	

Notes: Robust standard error reported in parenthesis. dy/dx = Marginal effects reported for the participation equation. [1] Gender takes the value of 1 when the subject is male and 0 otherwise. [2] Education takes the value of 1 when the subject has education levels of secondary school or above and 0 when otherwise.

Table 5. Double-hurdle model results for willingness to pay for a non-government proposed projects.

	Factory Group				Downstream Respondents				Upstream Respondents			
	Amount Equation		Participation Equation		Amount Equation		Participation Equation		Amount Equation		Participation Equation	
WTP2	**Coef.**	***p*** **> |z|**	**dy/dx**	***p*** **> |z|**	**Coef.**	***p*** **> |z|**	**dy/dx**	***p*** **> |z|**	**Coef.**	***p*** **> |z|**	**dy/dx**	***p*** **> |z|**
Gender [1]	−0.249	0.074	0.053	0.074	−0.155	0.082	0.178	0.415	0.191	0.095	0.306	0.308
	(0.142)		(−0.242)		(0.089)		(0.218)		(−0.114)		(−0.286)	
Years in the community	0.008	0.254			0.008	0.084			0.002	0.700		
	(0.007)				(0.004)				(0.006)			
Education [2]	0.419	0.372	0.537	0.074	0.135	0.056	0.523	0.084	0.744	0.037	1.125	0.014
	(0.47)		(−0.235)		(0.071)		(0.136)		(0.006)		(0.459)	
Age	−0.007	0.398	−0.006	0.067	−0.008	0.098	−0.004	0.001	−0.008	0.148	0.018	0.314
	(−0.009)		(−0.016)		(0.005)		(0.013)		(0.007)		(−0.018)	
Family size	−0.126	0.064	0.119	0.372	−0.039	0.320	0.159	0.761	−0.014	0.857	0.373	0.032
	(0.068)		(−0.094)		(0.040)		(0.097)		(0.058)		(0.169)	
Children	0.267	0.003			0.149	0.001	0.113		0.083	0.102		
	(0.892)				(0.058)		(0.044)		−0.072			
Income	0.006	0.001			0.001	0.001	0.001		0.001	0.001		
	(4.166)				(0.000)		(0.000)		(4.244)			
Worry about possibility of impacts	0.171	0.054	0.382	0.206	0.065	0.496	0.315	0.010	0.021	0.988	−0.111	0.492
	(0.888)		(−0.122)		(0.096)		(0.141)		(0.052)		(−0.125)	
Level of perceived risk	0.306	0.002	0.25	0.003	0.94	0.001			0.445	0.001	0.45	0.029
	(0.096)		(−0.079)		(0.106)				(0.108)		(0.201)	
The scope of impact through contracting diseases	0.114	0.175	0.127	0.448	0.189	0.001	0.008	0.001	0.293	0.019	1.075	0.001
	(0.084)		(−0.161)		(0.059)		(0.142)		(0.128)		−0.236	
Trust in the government	−0.089	0.148	−0.065	0.366	0.093	0.079	0.365	0.953	−0.011	0.856	−0.042	0.714
	(−0.058)		−0.109		(0.053)		(0.163)		(0.046)		−0.1119	
Trust in firms	−0.089	0.164	−0.013	0.723	0.04	0.504	0.200	0.025	0.057	0.358	0.035	0.842
	(−0.064)		(−0.113)		(0.059)		(0.141)		(0.077)		−0.157	
Trust in local people	0.101	0.104	(0.052)	0.003	−0.027	0.512	0.095	0.154	0.089	0.026	0.163	0.092
	(0.062)		(−0.085)		(0.040)		(0.141)		(0.042)		−0.096	
Insigma	2.161	0.004			−1.287	0.102			0.093	0.001		
	(−0.757)				(0.788)				(−0.114)			
Log likelihood		−93.306				−43.41				−52.724		
R^2		0.44				0.71				0.59		

Notes: Notes: Robust standard error reported in parenthesis. dy/dx = Marginal effects reported for the participation equation. [1] Gender takes the value of 1 when the subject is male and 0 otherwise. [2] Education takes the value of 1 when the subject has education levels of secondary school or above and 0 when otherwise.

In contrast to previous studies, such as that of Adhikari et.al [87], who did not find any impact in gender in their WTP studies, gender was a significant variable only in upstream respondents. This indicates that females in the region were most likely have a higher WTP compared to the male respondents. Age, on the other hand, was a significant variable in the downstream and factory respondents, with a negative coefficient an indication that the older population were willing to pay less compared to the younger respondents in these two groups. Taking into account the social characteristics of the specific community, it would be expected that the younger population in the region feel enthusiastic about the future possibility of changes in the region. On the other hand, the older population may have seen similar projects implemented in the area over the years and might feel some level of pessimism, especially those located in the downstream region that experiences severe pollution.

The number of years lived in the community was significant for downstream inhabitants and the factory group, with positive estimated coefficients. This indicates that families that had lived in the area for many years were willing to pay more for the program compared to those that had stayed in the region for a shorter period of time. This result is complemented by the analysis of zero respondents in the area which show that respondents with a zero WTP had spent fewer years in the community compared to those with a stated positive WTP. The significance of this variable could be attributed to the fact that those who had stayed in the community longer had more experiences with water pollution in the region, compared to their counterparts who had either just moved in the region or lived in the region for a shorter period of time. Another significant explanation for this could be that those who had lived in the region longer had more attachment to the natural resources in the area and were thus willing to spend more to conserve it.

Family size was significant and inversely related to WTP for upstream respondents. The assumption would be that larger households would be willing to pay less as opposed to smaller ones due to budgetary constraints, similar to previous findings [86]. The number of children in a family was also a determinant to the amount of money pledged for the factory group and upstream inhabitants; i.e., families that agreed to participate in the program and had a higher number of children were more likely to have higher amounts. A plausible explanation for this is that families that have children who are more susceptible to diseases would be willing to pay more to protect them from the adverse effects of water pollution in the region.

Among the trust variables, trust in the government was the only significant factor in one group, the factory group, with a negative coefficient sign. This finding of a negative influence of institutional trust is consistent with previous findings [88]. There was an indication that increased trust levels in the government led to a decrease in the amount pledged. This finding contradicts that of Halkos et al. [89], who found that citizens with lower trust levels in the institutions of their community were more positive in stating a specific amount, because they linked this with perceived levels of effectiveness. An explanation for this inverse observation is based on the observations of mean and SD of this variable, where the protest respondents seem to have higher mean scores and low SD (M = 4.909, SD = 0.302), the high SD value for positive WTP respondents (M = 4.395, SD = 1.221) is an indication that their trust in the government is lower, which explains the negative coefficient observed in the double-hurdle model results. Also, the high SD for trust in the government of respondents with real zero observation (M = 3.375, SD = 1.847) (see Section 4.8) is an indication that that this does not influence the negative correlation and thus the negative coefficient of the significant variable of trust in the government.

Meanwhile, the risk variables level of perceived risk and scope of impact through contracting diseases are significant, with a positive coefficient in all the three groups. That is, generally increased risk perception levels lead to an increase in the amount pledged, as observed in similar studies [90,91]. Further, the analysis of zero respondents compliments this result in that most respondents who had lower risk perception scores had zero WTP.

Regarding factors explaining the decision to participate in the program, education in socio-demographic factors was a significant determining factor on the individual's decision to participate in the program. That is, individuals with higher levels of education were more likely to say yes to the program. Among risk perception variables, the level of perceived risk and the scope of impact through increased diseases in the area were significant factors across all groups and influenced the respondent's decision to participate in the program. The positive coefficient sign indicates that those with higher risk perception levels were more like to say yes to the program than those with lower risk perception in the area. The possibility of impact, i.e., worried residents as a result of increased industrial growth in the region, was a determinant in the downstream respondents, with a positive coefficient. This indicates that for respondents in this group, the more worried they were, the more likely they were to participate in the program. A plausible explanation for this would be that, given the location of these respondents, i.e., the city area, full of industrial activities, they probably feel the effects of water pollution the most and are worried about the increase of industrial growth and industrial water pollution in the region. Unexpectedly, none of the trust factors were significant indicators on the decision to participate for respondents in any of the groups.

4.4. Determinants of Willingness to Pay for a Non-Government Proposed Project

The double-hurdle model results for WTP for a non-governmental project are presented in Table 5. The significant explanatory variables in the participation equation and amount equation for WTP2 did not vary from those of WTP1. However, the following notable changes were observed. For upstream respondents, trust in the local people's capacity was a significant variable in the amount equation, with a positive coefficient–meaning that increased trust led to higher WTP amounts. The trust variable can also be a causative factor for the significance of this variable. For this group, the mean and standard deviation for the variable trust in the local people for respondents with a positive WTP is the lowest; (M = 3.845, SD = 1.484) and (M = 3.877, SD = 1.477) for WTP1 and WTP2, respectively. This indicates that the responses were highly varied. Thus, respondents in this group with higher trust in the local people's capacity stated higher amounts for WTP2 than for WTP1. Another possibility lies in the relatively high mean scores for willingness to participate observed. This reveals that respondents in this group somewhat feel a sense of responsibility towards environmental issues in the area. This could be because the respondents in this group view their personal contributions as a possible resolution for environmental issues. They could also be hopeful that their own contributions and efforts can help improve the poor environmental conditions. Another noteworthy fact in the significant predictors of WTP2 was that the number of children was no longer a significant determining factor in the amount equation in this group. For the participation equation, the family size was a determinant for the decision to participate or not in the program, with a positive sign. This means that people with larger family sizes were more likely to say yes to the program.

For downstream respondents, the years lived in the community and age were no longer significant variables. However, the number of children was an influencing factor in the amount pledged for the program, with household that had higher number of children more likely to pledge a higher amount than those with few children in their household. Family size was not a significant variable for WTP2. The other notable change was the significance of the variable scope of impact through contracting diseases in influencing the decision of the household in participating in the programme. Individuals who were worried about contracting diseases in the area were more likely to participate in the programme. In the factory group, changes included trust in the local people, which was a significant determinant in the participation equation. In the amount equation, worry about increased industrial activity was a new significant predictor for this group, with a positive coefficient, meaning that respondents who perceived higher risks as a result of industrial

growth in the region pledged more money. Trust in the government and the years lived in the community were no longer significant for WTP2.

4.5. Willingness to Participate

The mean score and standard deviations of the willingness to participate are also presented in Table 6. As shown in the table, downstream respondents had the highest mean scores for willingness to participate compared to the other two groups. The factory group had the lowest mean sores. This means that upstream and downstream respondents are more willing to participate in volunteer activities in the area compared to those in the factory group. A number of factors could be attributed to this observation. The factory population could view the activities as being too engaging, given that they have day jobs and hence have less time to volunteer for the program. On the other hand, they also might not be as enthusiastic as the other respondents in the two groups. Meanwhile, upstream and downstream respondents might view this as an opportunity to be engaged in local activities to better their community, having witnessed the extreme eventualities of water pollution in the area. This observation presents an important characteristic of these three groups. Downstream respondents, who face extreme water pollution in the area, are still hopeful and willing to be engaged in volunteer activities to help improve the conditions in the area. Upstream respondents, who also face water quality problems and rely on the river mostly for agricultural activities, also seem enthusiastic about cleanup activities. This indicates that although the severity of the pollution might not be as high for them as downstream respondents, they are concerned about the welfare of the other citizens in the area. The factory group, who are part of the institution accused of water pollution in the area, appear to be less enthusiastic about volunteering their time but more eager to volunteer financially, as shown in the WTP results.

Table 6. Mean scores of willingness to participate for the three groups.

	N	Mean	SD	Std. Error
Factory group	100	3.75	1.058	0.106
Downstream respondents	94	4.28	0.809	0.083
Upstream respondents	85	4.09	0.881	0.096
Total	279	4.03	0.95	0.057

Notes: Std.Error = Standard error.

4.6. Determinants of Willingness to Participate

The determinants of the willingness to participate among the three groups in the proposed scenario were obtained using an ordinal scale response, as described in the methodology section. Therefore, ordinal regression models were designed using the logit function to identify the determinants of the willingness to participate; the results presented in Table 6. The goodness-of-fit and pseudo R^2 were used to ascertain the validity of the results. The Pearson chi-square test and the deviance test respectively of downstream respondents [$\chi^2(173) = 147.921$, $p = 0.917$], [$\chi^2(173) = 109.488$, $p = 1.000$], upstream respondents [$\chi^2(155) = 107.206$, $p = 0.314$], [$\chi^2(383) = 66.904$, $p = 1.000$] and the factory group [$\chi^2(383) = 395.867$, $p = 0.314$], [$\chi^2(383) = 243.929$, $p = 1.000$] were all non-significant, suggesting that the model is a good fit. The pseudo R^2 -Cox and Snell are shown in Table 7 and treated as rough analogues of the r-square value in the OLS regression [92–95]. Based on this, significant predictors in the upstream inhabitants explained 73.8% of the variation in willingness to participate. While the significant predictors of downstream respondents and the factory group explained 59.7% and 28.4% of the variation in willingness to pay, respectively.

Table 7. Ordinal regression results for the willingness to participate.

	Factory Group				**Downstream Inhabitants**				**Upstream Inhabitants**			
	Estimate	**Log Odds**	**Wald**	**Sig.**	**Estimate**	**Log Odds**	**Wald**	**Sig**	**Estimate**	**Log Odds**	**Wald**	**Sig**
[WTPA = 1]	−6.998	0.001	10.776	0.001	-		-	-	-		-	-
[WTPA = 2]	−4.775	0.008	5.486	0.012	-		-	-	-		-	-
[WTPA = 3]	−3.485	0.031	2.979	0.068	3.913	50.053	1.760	0.185	2.660	14.298	0.325	0.569
[WTPA = 4]	−1.355	0.258	0.464	0.517	6.877	969.934	4.989	0.026	6.109	450.003	1.669	0.196
Gender [1]	−0.037	0.964	0.008	0.928	−0.833	0.435	2.147	0.143	−2.027	0.132	6.049	0.014
Age	0.044	1.045	2.980	0.043	−0.112	0.894	10.253	0.001	−0.056	0.945	1.951	0.163
Years lived in the community	0.005	1.005	0.053	0.817	0.019	1.020	0.309	0.579	0.039	1.040	0.721	0.396
Education [2]	−0.239	0.788	0.411	0.521	0.443	1.558	1.235	0.266	−0.797	0.451	1.251	0.263
Number of family members	−0.108	0.898	0.311	0.577	−0.374	0.688	2.127	0.145	−0.436	0.646	1.560	0.212
Number of children	−0.393	0.675	2.325	0.127	0.675	1.965	3.050	0.081	1.337	3.808	9.368	0.002
Income	1.546	1.000	1.559	0.212	1.990	1.000	1.008	0.315	0.000	1.000	9.858	0.002
Trust in the government	0.008	1.008	0.002	0.962	0.363	1.437	1.216	0.270	−0.225	0.799	0.570	0.450
Trust in the local firms	0.260	1.296	2.125	0.145	0.308	1.361	0.741	0.389	−0.810	0.445	2.670	0.102
Trust in local peoples capacity	0.010	1.011	0.005	0.941	0.224	1.251	0.835	0.361	−0.064	0.938	0.069	0.792
Worry about possibility of impacts	−0.127	0.881	0.284	0.907	0.597	1.817	2.711	0.100	0.534	1.705	2.993	0.084
Level of perceived risk	−0.772	0.462	6.971	0.004	1.204	3.333	6.202	0.013	0.061	1.063	0.013	0.908
The scope of impact	0.012	1.013	0.003	0.835	−0.248	0.780	0.518	0.472	2.802	16.473	9.166	0.002
R^2 (Cox and Snell)		0.284			0.597				0.738			

Notes: WTPA- Willingness to participate, [1] Gender is a dummy variable that takes the value of 1 when the subject is male and 0 otherwise. [2] Education is a dummy variable that takes the value of 1 when the subject has education levels of secondary school or above and 0 when otherwise.

There was not much variation in the predictors of willingness to participate for the factory group and downstream respondents. While age and the levels of perceived risk were significant for these two groups, they had different coefficient signs. In the factory group, the coefficient sign was positive, meaning that for every one unit increase in age, there was a predicted increase of 0.044 in the log odds of a respondents participating in the program. That is, participants who were older were more likely to participate in the program compared to the younger counterparts.

The coefficient sign for perceived levels of risk were negative, indicating that for every increase in one unit of perceived risk, there is a predicted decrease of 0.772 in the log odds of participating in the program. That is, those with higher risk perception levels were less likely to participate in the program. While this result was unusual, as the reverse would be expected, the WTP levels were higher in this group, meaning that they were more inclined to participate in the environmental issues financially rather than by volunteering. A plausible explanation for this observation would lie in the results presented in Table 8, which show that respondents with zero WTP generally had higher willingness to participate and those with zero responses (Tables 9 and 10) generally had higher risk perceptions.

For downstream respondents, the age variable was significant with a positive coefficient sign and so was the perceived risk variable. That is, for every one unit increase in age and level of perceived risk in this group, there is a predicted increase of 0.112 and 1.204 in the log odds of the respondents participating in the program. This means that younger respondents who had higher risk perception levels were more likely to volunteer in the program. It is no surprise that those with high levels of perceived risk were more likely to volunteer in the program. As mentioned earlier, this group seems eager for change in the area and more hopeful about finding solutions. They believe that they can help bring change in the region through both financial contribution and volunteer activities.

For upstream respondents, a number of factors were significant in predicting the probability of participating in the program. Apart from gender, the number of children, income and one variable for risk perception (the possibility of impacts of water pollution through contracting diseases) were significant determinants of the likelihood for respondents participating in the program, all with a positive coefficient sign. This indicates that the more the number of children, increased income and increased risk perception levels, the higher the predicted probability of participating in the program. A plausible explanation for this observation is that, like downstream respondents, they are also eager for change in the environmental conditions in the area and are ready to put in the effort and work to realize that goal. This presents an opportunity for policy makers and actors to include enthusiastic community members in future decision-making and implementation processes of any proposed initiatives, since they appear receptive and ready to engage in activities for improving their community. Furthermore, this provides an opportunity for public participation.

Table 8. Mean scores of the willingness to participate for both positive and zero responses.

	Factory Group			**Downstream Inhabitants**			**Upstream Inhabitants**		
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**
Positive WTP1	81	3.506	0.976	69	4.551	0.718	58	4.603	0.560
Zero WTP1	19	4.767	0.681	25	3.55	0.495	27	3.000	0.000
Positive WTP2	77	3.442	0.953	73	4.479	0.766	57	4.596	0.563
Zero WTP2	23	4.762	0.682	21	3.611	0.637	28	3.100	0.316

Table 9. Characteristics of real zeros and protest zeros respondents for WTP1.

		Factory Group						**Downstream Respondents**						**Upstream Respondents**					
WTP1		**Real Zeros**			**Protest Zeros**			**Real Zeros**			**Protest Zeros**			**Real Zeros**			**Protest Zeros**		
		N	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**
Gender	Female	6	4.50	1.22	6	4.83	0.41	4	3.75	0.50	3	3.33	0.58	11	3.00	0.00	5	3.00	0.00
	Male	2	5.00	0.00	5	5.00	0.00	6	3.67	0.52	12	3.42	0.51	7	3.00	0.00	4	3.00	0.00
Age	20–29	3	4.00	1.73	8	5.00	0.00	0			9	3.56	0.53	6	3.00	0.00	3	3.00	0.00
	30–39	4	5.00	0.00	3	4.67	0.58	6	3.67	0.52	6	3.17	0.41	10	3.00	0.00	6	3.00	0.00
	40–49	1	5.00		0			3	4.00	0.00	0			0	3.00		0		
	50–59	0			0			1	3.00		0			1	3.00		0		
Education	No education							3	4.00	0.00	1	4.00		3	3.00	0.00			
	Primary school	2	5.00	0.00	2	5.00	0.00	4	3.50	0.58	12	3.42	0.51	4	3.00	0.00	1	3.00	
	Secondary school	6	4.50	1.22	9	4.89	0.33	3	3.67	0.58	2	3.00	0.00	9	3.00	0.00	6	3.00	0.00
	Tertiary Level	0			0			0			0			2	3.00	0.00	2	3.00	0.00
Family Members	1–3	8	4.63	1.06	10	4.90	0.32	8	3.75	0.46	8	3.63	0.52	14	3.00	0.00	6	3.00	0.00
	4–6	0			1	5.00		2	3.50	0.71	7	3.14	0.38	4	3.00	0.00	3	3.00	0.00
Number of children	1–3	8	4.63	1.06	11	4.91	0.30	10	3.70	0.48	15	3.40	0.51	17	3.00	0.00	9	3.00	0.00
	4–6	0			0			0			0			1	3.00		0		
Income in KSh	No income	2	5.00	0.00	0			9	3.67	0.50	14	3.36	0.50	12	3.00	0.00	5	3.00	0.00
	1–20,000	6	4.50	1.22	11	4.91	0.30	1	4.00		1	4.00		6	3.00	0.00	4	3.00	0.00
Years lived in Community	1–5	8	4.63	1.06	11	4.91	0.30	10	3.70	0.48	15	3.40	0.51	14	3.00	0.00	9	3.00	0.00
	6–10	0			0			0			0			4	3.00	0.00	0		
Willingness to participate		8	4.63	1.06	11	4.91	0.30	10	3.70	0.48	15	3.40	0.51	18	3.00	0.00	9	3.00	0.00
Risk perception	Worry about possibility of impacts	8	2.63	1.19	11	2.45	0.69	10	3.23	0.74	15	3.11	0.95	18	3.39	0.78	9	3.22	0.83
	Level of perceived risk	8	3.34	0.48	11	2.82	0.43	10	3.20	0.79	15	3.07	0.46	18	3.56	0.73	9	3.58	0.83
	The scope of impact through contracting diseases	8	3.25	0.71	11	3.45	0.52	10	3.40	0.84	15	4.13	0.75	18	3.22	0.65	9	3.11	0.33
Trust factors	Government	8	3.38	1.85	11	4.91	0.30	10	3.80	0.63	15	3.67	0.90	18	4.00	1.41	9	4.11	1.27
	Firms	8	3.63	1.41	11	3.91	0.94	10	4.30	0.82	15	4.13	0.83	18	3.78	1.06	9	3.78	1.09
	People	8	2.00	0.93	11	2.64	1.29	10	3.80	1.62	15	3.73	0.88	18	3.44	1.69	9	3.22	1.48

Table 10. Characteristics of real zeros and protest zeros respondents for WTP2.

		Factory Group						**Downstream Respondents**						**Upstream Respondents**					
WTP2		**Real Zeros**			**Protest Zeros**			**Real Zeros**			**Protest Zeros**			**Real Zeros**			**Protest Zeros**		
		N	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**
Gender	Female	7	4.57	1.13	6	4.83	0.41	3	3.67	0.58	2	3.00	0.00	11	3.00	0.00	5	3.00	0.00
	Male	2	5.00	0.00	8	4.88	0.35	6	3.67	0.52	10	3.40	0.52	7	3.00	0.00	5	3.40	0.89
Age	20–29	3	4.00	1.73	10	4.90	0.32	0			7	3.43	0.53	6	3.00	0.00	4	3.50	1.00
	30–39	5	5.00	0.00	3	4.67	0.58	5	3.60	0.55	5	3.20	0.45	10	3.00	0.00	6	3.00	0.00
	40–49	1	5.00		0			3	4.00	0.00	0			0			0		
	50–59	0			1	5.00		1	3.00		0			1	3.00		0		
	60+	0			0			0			0			1	3.00		0		
Education	No education	0	0.00	0.00	0	0.00	0.00	2	4.00	0.00	1	4.00		3	3.00	0.00	0		
	Primary school	2	5.00	0.00	2	5.00	0.00	4	3.50	0.58	10	3.30	0.48	4	3.00	0.00	2	3.00	0.00
	Secondary school	6	4.50	1.22	12	4.83	0.39	3	3.67	0.58	1	3.00		9	3.00	0.00	6	3.33	0.82
	Tertiary level	1	5.00		0			0			0			2	3.00	0.00	2	3.00	0.00
Family Members	1–3	8	4.63	1.06	11	4.82	0.40	7	3.71	0.49	7	3.57	0.53	14	3.00	0.00	7	3.29	0.76
	4–6	1	5.00		3	5.00	0.00	2	3.50	0.71	5	3.00	0.00	4	3.00	0.00	3	3.00	0.00
Number of children	1–3	8	4.63	1.06	11	4.91	0.30	9	3.67	0.50	12	3.33	0.49	17	3.00	0.00	8	3.00	0.00
	4–6	1	5.00		3	4.67	0.58	0			0			1	3.00		2	4.00	1.41
Income in KSh	No income	2	5.00	0.00	0			9	3.67	0.50	11	3.27	0.47	12	3.00	0.00	7	3.29	0.76
	1–20,000	7	4.57	1.13	14	4.86	0.36	0			1	4.00		6	3.00	0.00	3	3.00	0.00
Years lived in Community	1–5	9	4.67	1.00	13	4.92	0.28	9	3.67	0.50	12	3.33	0.49	14	3.00	0.00	9	3.00	0.00
	6–10	0			1	4.00		0			0			4	3.00	0.00	1	5.00	
Willingness to participate		9	4.67	1.00	14	4.86	0.36	9	3.67	0.50	12	3.33	0.49	18	3.00	0.00	10	3.20	0.63
Risk perception	Worry about possibility of impacts	9	2.78	1.20	14	2.71	0.83	9	3.26	0.78	12	3.14	1.07	18	3.39	0.78	10	3.70	0.95
	Level of perceived risk	9	3.31	0.46	14	3.00	0.57	9	3.33	0.71	12	3.00	0.43	18	3.56	0.73	10	3.83	0.93
	The scope of impact through contracting diseases	9	3.44	0.88	14	3.43	0.65	9	3.56	0.73	12	3.99	0.74	18	3.22	0.65	10	3.40	0.70
Trust factors	Government	9	3.56	1.81	14	4.86	0.53	9	3.89	0.60	12	3.50	0.80	18	4.00	1.41	10	4.20	1.23
	Firms	9	3.78	1.39	14	4.00	0.96	9	4.44	0.73	12	4.25	0.87	18	3.78	1.06	10	4.00	1.15
	People	9	2.33	1.32	14	2.71	1.38	9	3.67	1.66	12	3.67	0.89	18	3.44	1.69	10	3.10	1.45

4.7. Willingness to Participate for Respondents with Positive and Zero WTP1 and WTP2

The study further analyzed the willingness to participate mean scores of both positive and zero WTP1 and WTP2. The results are presented in Table 8. In the factory group, zero WTP respondents had a higher willingness to participate in the program, while those with a positive WTP had lower mean scores, meaning that they were less likely to participate in the program. For WTP2 observations in this group, the mean scores for both upstream and downstream respondents with a positive WTP were high, meaning that they were more willing to give both financial and volunteer support to the program than those with zero WTP. However, in WTP2, there is a slight increase in the mean scores of willingness to participate, meaning that when a different organization runs the project, respondents with an initial zero WTP are more motivated to volunteer their time and contribute to activities aimed at environmental remediation. This could possibly indicate that they favor non-governmental agencies projects as opposed to government-run ones.

4.8. Characteristics of Real Zeros and Protest Respondents

The study further analyzed the characteristics of respondents who had zero WTP for both WTP1 and WTP2 with regard to their willingness to participate, as reported in Tables 9 and 10 respectively. This is because these descriptive statistics compliment the econometric results of the survey, as discussed earlier, and also help reveal characteristics of protest respondents. In the factory group, the respondents had lower income levels (less than 20,000 KSh), smaller family sizes and low levels of education. The major difference was the trust towards the government, where the protest voters had significantly lower mean scores while real zeros had relatively higher mean scores for this variable.

For downstream respondents, 80% of protest voters were male. This is similar to previous findings; for example, García-Llorente et al. [96] found that males had a higher probability of being protest voters. A majority of protest voters were also younger (20–29 years old), which is similar to the findings of Frey et al. [97]. Most zero respondents had no income and lower levels of education. Notable differences between the two WTP amounts were that, for stated WTP1, the respondents had lower mean scores for risk factors (worry about their health and levels of perceived risk) and trust towards the government. The risk measure of scope of impact through contracting diseases was much higher for protest voters than real zeros. For WTP2, the means scores for trust towards the government was much higher for the real zeros as compared to protest zeros.

For upstream respondents, zeros respondents had the following characteristics: A majority of them were female, in contrast to the results of downstream respondents, and had low education levels of mostly up to secondary school level. All of them had lived in the community for relatively shorter periods and had no income. These respondents also had fewer number of children recorded. Other interesting characteristics were their mean scores for trust in the government, which were slightly higher. There were no notable differences between WTP1 and WTP2 for this group.

From these characteristics, it is evident that for respondents with zero WTP and mostly protesting voters, a number of factors influence their decisions, attitudes and behaviors. For example, low levels of education observed in the results are similar to previous studies that found that being less educated is generally associated with protesting behaviors [98]. This could possibly mean a lack of understanding of the seriousness of the matter and the detrimental effects of polluted water. Another plausible explanation would be the lack of environmental awareness through knowledge acquired from school. The influence of the number of years lived in the community cannot be ignored, as it seems to be a factor in the decision to pay for the program or not. Plausible explanations for this behavior would be that these respondents might view the area as a temporary location and thus feel no attachment or care about the existing condition. They might also have less experience with water pollution in the area and thus their risk perception levels would be low. The lack of income is also a striking characteristic of these respondents. This is similar to findings from previous studies [97–101] that concluded that low-income levels were a significant

characteristic of protest voters. This may be attributed to the fact that making financial contributions would be a burden to their already strained financial situations. Owing to the lack of trust in the government, it is no surprise that they would choose to not contribute to government projects financially.

The following insights and implications from the study can be deduced. From an in-depth analysis of the study and the descriptive statistics, key opportunities for potential environmental actors and the government of Kenya were identified. It is evident that factory workers are more inclined to contribute to the welfare of the region through monetary support as opposed to volunteer actions in outreach programs. Moreover, respondents in this group seem to support the government's initiatives and have more trust in the government as compared to the other two groups. For this group, the opportunity lies in reaching out to them at their locations and emphasizing the importance of their compliance to set regulations in the region. This is because they still possess some level of responsibility, as revealed by their high WTP. Encouraging this group to volunteer in community activities is another opportunity to help bridge the gap between them and the community members, especially in cases where they are viewed negatively because of their activities that lead to water pollution (discharge of wastewater). The high levels of trust in the government exhibited by this group provides an opportunity for the government to reinforce sustainable practices in the area and promote better wastewater treatment technologies in the factories, which will reduce water pollution in the region.

Downstream respondents, on the other hand, exhibit characteristics that make them appear to be the most distraught and affected by pollution levels in the region. Despite this, the results show that they are the most enthusiastic group for volunteering and also have relatively higher mean scores for WTP amounts. Another characteristic revealed about this group is that they are more financially supportive of non-governmental projects. Upstream respondents are also equally concerned about the decreasing water quality in the region. This is an indication of the poor state of the river, because not only are the effects of the declining water quality felt mid-stream and downstream but also upstream. Like their downstream counterparts, they are eager for the conditions to improve and are willing to support programs in the area through monetary support and being involved in activities. This group also favors non-governmental projects based on the higher mean scores for WTP2. For these two groups, opportunities lie in the following areas: (i) incorporation of elements, such as volunteer activities, in the projects conducted in the area and inclusion of them in the decision-making processes. This will enable them to contribute and participate in the projects, thus promoting ownership and leading to longevity of the projects. (ii) Promotion and support for local environmental groups by the government in this region. (iii) Promotion of sustainable water practices, such as sustainable agriculture (especially for upstream respondents) and proper domestic wastewater management to help minimize the non-point sources of water pollution in the area.

An analysis of respondents with zero WTP across all groups revealed that a majority of zero respondents had lived a fewer number of years in the community. It is possible that they were unaware about the reality of the situation or did not care because they would eventually move to other regions. Thus, further follow-up studies are recommended to determine any possible changes in their attitudes and behavior over time. For such respondents, it would be interesting to understand whether any changes in behavior and attitudes took place over time while staying in the area. This understanding would make clear the impact of this variable on WTP and willingness to participate.

An interesting observation from the study was that despite the high poverty levels in the region, the respondents were willing to contribute financially to remedy the water problems in the region. This is encouraging for any environmental organizations and especially the government, as it highlights the need to engage all stakeholders in the region despite the poverty levels. Moreover, it is an indication that people value the water resources in the region. This could be a starting point for future policy makers and advisors creating programs that require behavioral changes or participation in developing countries.

Ultimately, a limitation of this study as in other WTP studies is that there is no way of assessing what the actual WTP would be in our case since the scenario is hypothetical. More so, the stated amount and the willingness to participate are self-reported and some respondents may have been reticent to express their true feelings. Another limitation of the study lies in the fact that the results obtained from this study are specific to the region and the textile industries surveyed thus caution should be taken when extending the results to other regions and other factory set ups that vary broadly.

5. Conclusions

The study presents the findings of three different analyses: (1) the willingness to pay, osbserved under two scenarios that differ in the organization conducting the project; (2) the willingness to participate and (3) the unique analysis of zero respondents among two groups, i.e., the lay people located in different sections of River Sosiani and factory workers. Further, the determinants willingness to pay and willingness to participate were also identified and discussed. The findings show that different factors, such as trust, risk perception and socio-demographic characteristics, influence the willingness to pay and participate among lay people and factory workers. The empirical results also indicate a difference in stated WTP for different organizations. Factory workers have higher stated WTP for governmental based projects, while the lay people have higher stated WTP amounts for non-government based projects. This provides an opportunity for decision makers as highlighted in the discussion when selecting target audiences and leaders for future projects they plan to undertake in the area. The results also reveal deeper insights into the characteristics of each group through the analysis of respondents with zero WTP. Respondents with zero WTP have characteristics such as low income, shorter periods lived in the area and lower education levels. This revelation is important as it presents information that calls for clear, precise communication and possible tailored approaches when approaching these respondents in future. The study thus not only makes unique contributions to the CVM studies conducted in developing nations but also explores many methodological issues, such as the in-depth analysis of respondents with a zero WTP and the effects of this characteristics not only on the willingness to pay but also the willingness to participate. The study also attempts to provide solutions to residents of Eldoret, Kenya, and the government, based on the declining water quality in the region aggravated by the lack of longevity of the projects and efforts that have been put in place over the years to avert this crisis. From the results, it is clear that the factors related to WTP are highly linked to an individual's characteristics, risk perception and trust factors. This implies the need for public participation and effective risk communication processes for longevity of future environmental restoration projects.

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