R2RW

Enhancing Awareness for Sustainable Watershed Management

Report of the "Knowledge, Attitudes and Practices" Survey

ARD

Ridge to Reef Watershed Project

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ENHANCING AWARENESS FOR SUSTAINABLE WATERSHED MANAGEMENT

Report of the "Knowledge, Attitudes and Practices" Survey

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Prepared for the:

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PREFACE

The Ridge to Reef Watershed (R2RW) project is a five-year initiative of the Government of Jamaica's (GOJ) National Environment and Planning Agency (NEPA) and the Government of the United States through its Agency for International Development (USAID) that seeks to promote the sustainable management of natural resources in the Great River and Rio Grande watersheds.

Public awareness is critical for effective watershed management. Yet there are often many assumptions associated with what people know and do not know about environmental issues and solutions. Communication programmes and public awareness campaigns are sometimes launched based on these assumptions rather than on informed evidence.

In its public awareness activities, R2RW is guided by a set of principles that include an emphasis on participatory communication methodologies, inter-disciplinary approaches to technology transfer, strong partnerships in implementation, respect for cultural and gender realities, and consideration of the full range of media channels and technologies. More importantly though, R2RW recognizes that no communication efforts will be effective or sustainable unless a full understanding of watershed audiences is first obtained.

The present ***"Enhancing Awareness for Sustainable Watershed Management - Knowledge, Attitudes and Practices"*** survey constitutes a detailed review of audiences in four major watershed areas of Jamaica. The findings, some of which challenge popular assumptions, will help in the development of targeted and specific communication programmes and will also allow for the establishment of measurable indicators for assessing changes in knowledge, attitudes and behaviour.

R2RW therefore expects that the report will be useful not only for its own activities, but will also assist the efforts of many other organizations and agencies that share the goal of enhancing awareness for sustainable watershed management.

ACRONYMS

ARD	Associates in Rural Development
ASC	Administrative and Support Center
CASE	Collage of Agriculture, Science and Education
CBO	Community Based Organization
CETF	Compliance and Enforcement Task Force
COP	Chief of Party
CWIP	Coastal Water Improvement Project
ED	Enumeration District
EE&C	Environmental Education & Communication
EFJ	Environmental Foundation of Jamaica
EJASP	Eastern Jamaica Agricultural Support Project
EWS	Environmental Wardens Services
FD	Forestry Department
GNRS	Governance and Natural Resources Specialist
GRW	Great River Watershed
GRWMC	Great River Watershed Management Committee
JAS	Jamaica Agricultural Society
JCDT	Jamaica Conservation and Development Trust
MBMP	Montego Bay Marine Park
MLGYCD	Ministry of Local Government, Youth and Community Development
N/A	Not Applicable
NEEC	National Environmental Education Committee
NEPA	National Environment and Planning Agency
NGO	Non-Governmental Organization
NIC	National Irrigation Commission
NIWMC	National Integrated Watershed Management Council
NRCA	Natural Resources Conservation Agency
NSWMA	National Solid Waste Management Authority
NWC	National Water Commission
ODPEM	Office of Disaster Preparedness and Emergency Management
PAPAS	Participation and Public Awareness Specialist
PATF	Public Awareness Task Force
PDC	Parish Development Committee
PEPA	Portland Environmental Protection Agency
PET	Polyethylene Terephthalate (plastic bottles)
PRO	Public Relations Officer
R2RW	Ridge to Reef Watershed Project
RADA	Rural Agricultural Development Authority
SDC	Social Development Commission
SEP	Schools Environment Programme
SO2	Strategic Objective number 2
SPSS	Statistical Package for the Social Sciences
SSU	Sanitation Support Unit
SWB	Sustainable Watersheds Branch
TAP	Targeted Appropriate Practices
TPDCO	Tourism Product Development Company
TV	Television
USAID	United States Agency for International Development
WMC	Watershed Management Committee
WMS	Watershed Management Specialist
WRA	Water Resources Authority
NEEAP	National Environmental Education Action Plan
SD	Sustainable Development

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EXECUTIVE SUMMARY

The current study was conducted to determine general levels of environmental awareness, as well as communities' understanding of specific watershed-level management. It was conducted for the Ridge to Reef Watershed Project (R2RW) in collaboration with the National Environment and Planning Agency (NEPA). Study objectives were:

1. To assess foundation attitudes, beliefs, perspectives, considerations, concerns, decision-making and evaluative methods applied by communities within the targeted watershed area to environmental & watershed issues, while reviewing their respective sources and communication channels.

2. To determine the levels of awareness, knowledge, attitudes and practices related to watershed management among key user-groups of, and communication audiences related to, watersheds -- with specific reference to *inter alia*,

    a. Issues of socio-cultural origin and relevance e.g. traditional and current indigenous perceptions, beliefs, attitudes and practices;

    b. Basic understanding and perceptions of "sustainable environment practices", and the "watershed" concept, including related definitions and (mis) management consequences;

    c. Economic and social reference points, and their relative importance;

    d. Concepts of stewardship, and assignment of roles;

    e. Issues of sustainability, responsibility, the onus for compliance, and contextual framework for enforcement;

    f. Existing and ideal communication ethos and channels, and methodological approaches for future interventions;

    g. Demographic and lifestyle backgrounds.

3. To determine key descriptive awareness variables, those that would be most prescriptive for use in future post-intervention programme evaluations, and the best approach to audience segmentation.

4. To make recommendations to the client regarding current population attitudes and practices, their origins and strengths, and the best methods to be pursued for conducting sustainable environmental/watershed management programmes with user-groups and audiences in watershed areas.

Communities within four (4) watersheds were studied, i.e. ***Great River*** (Hanover, St. Elizabeth, St. James, and Westmoreland), ***Rio Cobre*** (St. Catherine), ***Rio Grande*** (Portland), and the ***Wag Water*** (St. Andrew). Two methodologies were used to determine community awareness and response:

(a) Participatory qualitative techniques comprising e.g. *content analyses, focus groups, in-depth interviews, key informant panel discussions, observations, mapping, ranking, photography; trend and transect analyses;*which was conducted from February 12 to April 13, 2002, and

(b) Household survey – conducted among 831 households residing in the four (4) watersheds. Enumeration Districts (ED's) were used for sampling households, and one (1) qualified person was selected for interview in each sample household. Among other criteria, respondents had to be between 15 and 84 years of age.

The final survey questionnaire was developed from study objectives, findings from the qualitative phase, and results from the pre-test. The instrument included sections on:

- Identification: community, watershed- and parish- locators
- Introduction: an overview of the study and request for cooperation
- The Environment: concepts, attitudes, and practices
- Sustainability, Compliance & Communication:
- Farming: with some inclusion of backyard gardening
- Background Information: demographic and related data

Interviewers were selected and specially trained for the assignment, sessions including:

- Background to the study
- Introduction to environmental issues and awareness
- General interviewing/administrative procedures & responsibilities
- Sampling and respondent identification
- Stage-wise review of the questionnaire and component questions;
- Asking the questions & recording answers; and
- Questionnaire management.

All quantitative survey fieldwork was conducted between 4th May and 4th June 2002. Data collection was followed by data management activities e.g. coding, data entry, and data analyses. The final study report was preceded by draft reports on (a) qualitative phase; and (b) survey phase. The current report combines findings from these previous phases, but presents them in sections as follows: -

- Background to study
- Methodology
- Qualitative Findings
- Survey Results
- Conclusions & Recommendations

Qualitative Findings

Findings indicated a general lack of awareness among watershed residents of details related to environmental management. Discussions, and observations of poor practices substantiated this conclusion. It further appeared that the main reasons for poor practice were either due to (a) **tradition** i.e. people tended to do what they (and forefathers) always used to do; or (b) **circumstances** – economic survival made it wise to use available watershed resources for an income.

Of much importance is the fact that the term "watershed" and its definition are virtually unknown. Very few persons really "knew" what it meant. Definitions often focused on it being "*a place to store water*". There was little concept of persons "living in a watershed area", and therefore there were few situations in which persons felt that their actions had a serious effect on any other persons and/or the survival of a larger community. It was only when there was an event with very negative consequences e.g. excessive floods with loss of life or property. Historically, the Rio Grande valley has suffered the most, but even though these residents were very aware of what "could" happen, very few really understood the effects that their actions could have and how to try and avoid such negative outcomes. In some communities, the residents expressed the feeling that occurrences such as landslides, were just "*God's work*", and there was little that humans could do to prevent what would happen.

Rivers play a very central role in the activities of certain communities. These important rivers are not however, always the main river after which watersheds are named. Instead, residents tended to refer to the river that was mainly used for *recreational* and/or *domestic* and/or *economic* purposes. Despite the fact that residents used certain rivers so much and felt close to them, there was also a deep fear. This fear seemed mostly to have been created over time by actual *events* – some of which are "unexplained", *stories* of past occurrences as told by other residents, and myths – the latter relating mainly to the "*river-maid*".

The "river-maid" or "mya-maid" or "mermaid" stories were told in almost every community visited. Although there were some variations, there were mainly very striking similarities. It was said that the river-maid was found in key areas of rivers i.e. the "river-head" and/or other still/pure and/or "sacred" sections of a river. Older and/or middle-aged residents were found more likely to have had encounters with the "river-maid", but many younger residents were also quite aware of them. The river–maid was supposed to have very strong powers, including being responsible for deaths. Because of this, it caused people to be cautious in using certain areas of the river but generally did not totally prevent them from using the rivers. In this regard, the Rio Cobre was the least used, as the combination of stories, past events, and the myth of the river-maid seemed to reduce overall use of this river.

People used rivers in many different ways e.g. *bathing*, for provision of *drinking water*, and *washing* (mainly clothes). Rivers were also often used for individual/household incomes, the main such activities being: *farming, fishing, mining,* and *rafting.* Large and small farmers used rivers as a source of water for crops and animals. In these situations, however, the farms were often quite near to the rivers, and therefore any chemicals used on the farm would likely be washed into rivers. Some farmers were often quite unaware of the types of negative effects that this could have themselves, and for others using the river elsewhere.

Fishing was both a hobby and a source of income, with boys and men catching crayfish as well as a variety of scaled fish e.g. perch. ***Mining*** for sand and stones was also an important activity in some of the rivers, but most evident and on very large scale in the Rio Grande. ***Rafting*** was the other economic activity conducted in rivers, mainly on the Rio Grande, but to a lesser extent in recent times, on the Great River.

Use of other watershed resources was also investigated. A fairly wide range of *trees, bushes,* and *herbs* was found to either provide income or prevent expenditures, for households. The main uses were for furniture, medicines and health-maintenance e.g. tonics.

With all these activities in and around the watersheds, some concerns were raised about water quality. Residents were concerned about solid waste, but mainly sewage. People tended to measure the environment in terms of what they could see. The forms that were felt to create most nuisance and harm were: (a) individuals and/or households eliminating and/or dumping raw sewerage into the waterway; (b) *Pampers;* (c) PET bottles; and (d) Styrofoam containers. Overall, it was felt that there were not enough systems for managing these types of solid waste and therefore residents did not always have enough choice, so for example, many residents either burned or buried their garbage. It appeared that people were less concerned about liquid forms of output into the river-ways, e.g. chemicals, soapy residue. People also used some sort of feedback from public health officials in determining whether or not river-water was clean.

It was not always clear who should be responsible for keeping the environment clean. However, in looking towards the future, it seemed that two (2) types of persons were most likely to either volunteer or have a real interest in keeping the area in good condition: (a) young persons e.g. in secondary school and already having a keen interest in environmental issues; and (b) persons who regularly use the river for their livelihood – but especially rafts-men. In discussing this issue, it was clear that being an "environmental steward" would not be an easy task, especially since (a) it was unclear whether "guilty" persons would really listen without an "enforcer"; and (b) the fact that few people knew the existing environmental laws.

Communication was found to be an important factor in e.g. *what people knew, who knew,* and *what they did about what they knew.* Among the findings were: -

- Literacy levels in some watershed communities are low. Nevertheless, people with low literacy levels have clearly formed opinions, culture and reasons related to issues and actions.

- The communication between large-and smaller- farmers is not close and neither is it ongoing.

- Larger- farmers represent role models for some of the smaller farmers. A similar situation was found for persons of higher social/political status.

- Communication patterns within-community are not always effective, and community-based organizations have had limiting success in adequately and/or completely involving communities in decision-making and action. One of the problems relates to the apparent failure to use a truly participatory approach to problem solving. Therefore many persons are omitted from the processes, yet are often represented by the more educated ones and often environmentally aware – but without sufficient input.
  … One example relates to the Rio Grande valley, where the Social Development Commission (SDC) has been very active, this activity including formation of "clusters", each with a Public Relations Officer (PRO). However, it was found that although these persons have information, it seems not to be regularly shared with "normal" community members. Further, it does not appear that there is a mechanism in place for wider sharing. Those who have limited literacy seem to feel restricted and depend on community leaders for information. Observations suggest that those having such responsibilities do not always convey the sentiments and/or attitudes and/or experiences of those with less education…

Survey Findings

There were exactly one-half (1/2) male and females, almost one-half (49.4%) of total respondents being heads of their households. Most were less than 40 years of age (61%), and those who were employed were mainly farmers (21.2%), or in skilled/trade occupations (15.6%). A large percentage did not work, referring to themselves as "*unemployed*" (17.3%), "*students*" (13.0%), or "*housewives*" (7.7%). Almost one-third (28.9%) identified primary as their highest level of schooling, but 14.9% had undertaken vocational/skills training, and 5.1% had tertiary education.

Christian was the religion most identified (46.5%), but in the category that had been specially separated, Seventh Day Adventists, there was a fairly high proportion, 18.4% which increased to 32.4% in the Rio Grande valley. Income levels generally reflected the occupational classifications, and 33.2% indicated that they earned *"less than $10,000"* monthly, while another 26.4% had no income. The main means of transportation was by *public buses/taxis/vans*. At the household level, liquid petroleum gasoline (LPG) was the main cooking fuel (80.6%), the next main ones being wood (7.9%), and coal/charcoal (6.0%).

The majority of survey respondents (66.1%) owned their own homes, with another 24.1% either leasing or renting. Homes were mainly of block and steel (62.4%), but a large proportion was of wood (36.2%). Almost one-half (43.1%) had water piped into their homes, the figure being highest for the Wag Water area (53.4%) and lowest for the Rio Grande area (34.9%). Households mainly used their own pit latrine (48.1%) or their own flush toilets located inside the homes (35.7%). Burning was the main means of garbage disposal (60.5%).

Media preferences included the following radio stations: Irie-FM (39.1%) and RJR (23.3%), variations being observed by watershed. For television, TVJ was the preferred channel (49.8%). An estimated 29.3% did not read newspapers at all, this being much higher in the Rio Grande valley (41.7%), but where a favourite was identified, this was the Star (27.0%).

Just over two-thirds of the households did some farming, with "backyard farming only" being declared by 28.5%. Most farms were small i.e. less than three (3) acres. The main livestock owned were chickens (19.1%), goats (16.4%), and cattle (15.3%). Respondents indicated they were mainly kept in pens, or tied in fields. Few had the river running directly through their properties.

More males than females were involved in the various farming activities, the latter mainly being involved in "care/weeding" plots.

The survey indicated that watershed residents were more aware of basic environmental management concepts, issues and concerns i.e. what should be done, than suggested in the qualitative phase. Most regarded items about which they were asked as "natural resources", the least likely to be identified as such being *coral reefs*, and *seas.* It appeared that persons closer to these resources and/or most likely to be in contact with them, were more likely to identify them as resources i.e. Great River and Rio Grande residents.

The main uses of the river identified were: *swimming* (65.1%), *bathing* (61.2%), *relaxing* (48.6%), *washing clothes* (44.6%), and *fishing for crayfish* (42.3%). The Rio Cobre was the least used for almost activities. Further, males used the river more than do females for almost all activities, exceptions including the washing of clothes and dishes. Forest resources were used in all watersheds for *drinks/teas*, as well as for *medicines*, *coal /fire wood*, and for making *furniture* and *posts* (e.g. fence/yams), but uses differed by watershed.

Farmers seemed to mainly use "agricultural chemicals" and "fertilizers", with fewer using "herbicides" and "pesticides". They did not use protective clothing and /or other gears consistently.

Survey respondents were asked how they felt about a range of practices related to use of rivers. The ones mainly regarded as "good" included: *clean-up days, having a resident in charge, punishing households that litter*, and *having family fun-days*. Those practices thought to be the worst included: *passing faeces in the water, washing pesticide cans and/or other chemicals in the river, emptying garbage in the river* and *sewage into sink-holes or ponds.* Most of the visible items were thought "bad" for the environment. There was less concern about items such as chemicals used for banana and coffee, dirt/mud, and washing soap. Females were more likely to consider items harmful to the environment than were males.

When respondents were asked about responsibilities for environmental management, they mainly identified Government agencies as having the most important duties for the majority of tasks. However for community type activities, it was often felt that environmental groups and residents should be more involved. It was also found that respondents did not know much about the different environment-related agencies. They were most aware of: *4H Club, the Office of Disaster Preparedness and Emergency Management (ODPEM),* and *the Rural Agricultural Agency (RADA.)* They were least aware of: *Ridge to Reef Watershed Project (R2RW), the Environmental Foundation of Jamaica (EFJ), the Jamaica Conservation & Development Trust (JCDT),* and *the National Environment and Planning Agency (NEPA).*

There was extremely little known about the different acts/laws/regulations related to the environment, but those most identified were: *Litter, Forest,* and *Country Fires.* In speculating who they thought such laws should apply to, the majority response was "everybody".

There were further investigations related to communication of environmental ideas and concepts. Respondents were asked whether they knew of a range of terms typically used. Those most recognized were: *soak away pits* (69.6%)*, sink holes* (60.1%)*, reefs* (57.2%)*,* and *conservation* (56.3%). Those least recognized were: *tile ponds* (3.7%)*, grey water recycling* (8.2%)*, gabion baskets* (9.5%)*,* and *CBO* (14.1%)*.* Awareness levels varied between watersheds, as well as by education level.

Using the same type of question, farmers were asked about more specific farming terms used in environmental management. Those terms most recognized were: *mulching* (65.6%), *crop rotation* (54.3%), *hillside ditches or trenches* (47.5%), and *khus khus grass* (40.2%). The least recognized terms were: *vetiver grass* (2.4%), *gully plugs* (4.3%), *living hedgerow* (5.1%) and *individual basins* (5.5%).

Summary

In general therefore, residents knew about some terms and concepts, but did not always practice the required behaviours. Although it seemed that there have been efforts to communicate what needed to be done, and some of the development agencies were known, the messages or methods have apparently not been sufficient to encourage residents to do what was required. The main reasons seemed to be: (a) limited literacy and/or education; (b) the fact that many key "jargon" terms and phrases used, are not at all understood; and (c) the fact that the implementation methods have not been very participatory. In short, there is an important communication problem.

This has resulted in critical communication gaps between (a) those who are supposed to convey information; and (b) those primarily targetted to receive or be the beneficiaries of such information. This aspect therefore has to be given very keen attention and the best creativity when communication and/or any other problem-solving strategies are being developed.

Another aspect of much importance is the fact that little is known about laws and regulations related to environmental management. There seems often to be a sense of "being wrong" even though few know about the laws and acts designed to protect themselves and their resources. There is also limiting information about the environmental groups and agencies that are actually responsible for environmental management. It therefore means that attention also has to be given to promoting these groups so that more persons will know of their work, and the roles that they play. There are also other communication issues.

There is history to the work of some NGO's in the Rio Grande watershed. Unfortunately, the experiences have not always been good. As a result, it is important for future work to recognize the increased role (and watchfulness) of stakeholders. At the same time, there is also evidence that the activities within-watershed are not always participatory, and this approach necessarily

has to be changed in order to obtain full compliance and involvement in planned programmes. There are also important communication- and learning issues involved here in order to guarantee project success.

Other aspects that need to be considered in future work are the deeply ingrained (socio-) cultural perceptions, habits and pleasures of watershed residents. The Rio Grande for example, almost represents the heart of life in the valley. Any development work needs to recognize the many years of tradition and the extreme importance of the watershed-related activities to the residents. There are "status" differences within each watershed. Larger farmers for example, control a large portion of the resources in the respective areas. While they are often looked up to, and often provide a substantial amount of work for residents, they are sometimes engaged in environmental practices that are not particularly good. This fact is observed by e.g. smaller farmers. It therefore means that the practices of these larger farmers have to be adjusted as they in fact represent role models within the communities within which they operate. They will represent an important target audience for the messages, and special attention has to be given to the extent to which their farms uphold the respective laws.

Males also have to be given more attention than do females, as they use more of rivers and other resources, and do so more often. Females however, could be used to convey some of the messages e.g. at the household levels, as they seemed more likely to regard them as problems.

Even though there are several similarities, each watershed is unique:

- The ***Rio Grande*** seems the most "different". Very special attention therefore has to be given to this watershed. The farming and other economic practices found there indicate that there are problems, and more are likely. There is need for more extensive education, and very close monitoring. The valley, its history, and current showing could undoubtedly be regarded as a classic case study of cause-and-effect. But there is a wide range of factors that have created the current situation and they need to be taken into account, e.g. limited literacy, economic opportunities, and physical (road) access.

- There is only limited access to the larger river areas in the ***Rio Cobre***, since the river runs through (larger) private properties. Fewer persons therefore have their own small farms, instead being employed or otherwise occupied. Further, more people seem to fear this river than do the others.

- The ***Wag Water*** has many "new" farmers mainly interested and involved in coffee farming. It seems that in obtaining the lands, there was insufficient education provided about land practice and management – even though there is a long history of coffee farming by state (and other) agencies.

- The Great River seems to have a mix of farming types and activities. There are a few large farms, but there are also several small farmers. This watershed could be considered "in the middle" with respect to the strategies that now need to be developed and a good "testing-ground".

The study highlighted the importance of, and made recommendations related to, two (2) key factors in the success of environmental development work, to ensure real access to end-users:

1. Implementing good targetted communication strategies and methods; and

2. Having truly participatory approaches to implementation.

Acknowledgements

PSEARCH Associates Ltd. extends sincere appreciation to the Ridge to Reef Watershed project and the National Environment and Planning Agency for the opportunity to work on this study. A special word of thanks is offered to Maria Protz who provided such professional supervision and assistance. It was a thoroughly enjoyable and valuable experience.

Sincere appreciation is also extended to the very many persons who contributed to the successful conduct and completion of these works. Persons are too numerous to mention. However, it is hoped that a review of activities will indicate the extent of cooperation that was clearly required (and obtained):

- Provision and review of secondary materials
- In-depth interviews and informal meetings
- Individual and group meetings held with key informants (especially those in the Great River who attended twice, and still have not had a full discussion – my apologies)
- Recruiting for and conduct of focus groups in each watershed, participants being of all descriptions
- Observations and tours of watershed communities
- Survey conducted in all watersheds (with special mention for the interviewers who participated by visiting all the households – sometimes under very difficult circumstances)
- Data processing and management activities
- Data analyses & interpretation activities
- Report preparation activities

It is hoped that for those who did understand as well as those who were not sure about the intent of the study, the results and subsequent output will be of untold benefits to the respective communities as well as nationally – whether in the short-, medium-, or longer-term.

1.0 BACKGROUND TO STUDY

The Ridge to Reef Watershed Project (R2RW) is a five (5) year activity contributing to achievement of USAID/Jamaica's SO2: *improved quality of key natural resources in areas that are both environmentally and economically significant*. There are three (3) components attached to the Intermediate Results under SO2:

1. Assist targetted organizations to identify and promote sustainable environmental management practices by resource users.

2. Focus on activities to encourage effective compliance and enforcement.

3. Institutional strengthening at the national level.

The *Great River* watershed was the first of two (2) Jamaican watershed areas in which R2RW started working, the other being the *Rio Grande* Watershed in the east.

1.1 Towards Public Awareness

The R2RW project has made an important determination with regards to the role of, and effectiveness of efforts at, increasing public awareness and participation in its developmental programmes, and states: *in order to design communication and environmental education programmes effectively, it is essential for the project to first have a very clear understanding of what our target audiences already know and don't know about sustainable watershed management.* Through public awareness regarding watershed management, the R2RW seeks to, inter alia,

- Determine levels and extent of awareness
- Determine community uptake of sustainable practices by pilot communities
- Determine the relative priority attached to environmental issues
- Determine key communication forms and channels in related communities
- Galvanize communities towards the cause, and build social capital
- Recognize and enhance the status of relevant indigenous knowledge.

1.2 Primary Audiences & User-Groups

Watershed areas comprise a number of economically viable sites, and in this respect, tend to command relatively high interest and usage among a variety of sub-groupings. Any social marketing programmatic efforts must therefore be appropriately targetted and have its reach extend to these respective groups. R2RW has already identified the following primary and secondary audiences for future interventions:

Primary Audiences	Secondary Audiences
▪ Farmers	▪ Private sector on the coast
▪ Youth	▪ Police
▪ Upper watershed households	▪ Judiciary
▪ Lower watershed households	▪ Political representatives

Primary Audiences	Secondary Audiences
▪ Older folk with indigenous knowledge	▪ Civil service
▪ Private sector in the watershed	▪ NGOs
▪ Community leaders	▪ Tourists
▪ CBO leaders	▪ Media
▪ School children	

1.3 Assessment Needs and Request for Proposal

The R2RW Project recognized the current need for a survey of its primary audiences within the Great River and Rio Grande watersheds, as well as for similar future needs in other watershed areas. Specifically, there was expressed interest in the: *Rio Cobre,* and the *Wag Water.* It was felt that the issues might be relevant to more than one (1) geographic area, thereby making the planned investment far more meaningful at the national level. R2RW commissioned a study intended to address information deficits. The assessment was to identify:

1. The social actors and local opinions leaders of specific communities.

2. Preferred and existing communication networks and channels.

3. Traditional and indigenous uses/knowledge of watershed resources.

4. Cultural attitudes, beliefs and perceptions regarding the environment.

5. Watershed specific levels of awareness and practices, including definitions and levels of understanding, and concepts of responsibility related to: *good and bad environmental practices, sustainability, disaster mitigation, stewardship, compliance,* and *enforcement.*

6. Gender differences on all factors.

7. (Likely) priority issues and approaches for effective public awareness and communication.

8. General baseline data of existing awareness levels.

9. Indicators and benchmarks for subsequent effectiveness evaluation of R2RW's public awareness programmes.

1.4 Study Objectives

It was part of the objectives of this study to determine the descriptives and inter-relationships if they exist, between awareness, knowledge, attitudes and practices for the disparate target audiences and/or user-groups. More specifically, study objectives for the Great River watershed area were as indicated below:

1. To assess foundation attitudes, beliefs, perspectives, considerations, concerns, decision-making and evaluative methods applied by communities within the targetted watershed area to environmental and watershed issues, while reviewing their respective sources and communication channels.

2. To determine the levels of awareness, knowledge, attitudes and practices related to watershed management among key user-groups of, and communication audiences related to, the Great River watershed -- with specific reference to *inter alia*,

a. Issues of socio-cultural origin and relevance e.g. traditional and current indigenous perceptions, beliefs, attitudes and practices;

b. Basic understanding and perceptions of "sustainable environment practices", and the "watershed" concept, including related definitions and (mis) management consequences;

c. Economic and social reference points, and their relative importance;

d. Concepts of stewardship, and assignment of roles;

e. Issues of sustainability, responsibility, the onus for compliance, and contextual framework for enforcement;

f. Existing and ideal communication ethos and channels, and methodological approaches for future interventions;

g. Demographic and lifestyle backgrounds.

3. To determine key descriptive awareness variables, those that would be most prescriptive for use in future post-intervention programme evaluations, and the best approach to audience segmentation.

4. To make recommendations to the client regarding current population attitudes and practices, their origins and strengths, and the best methods to be pursued for conducting sustainable environmental/watershed management programmes with user-groups and audiences in the Great River watershed area.

2.0 METHODOLOGY

The study essentially utilized two (2) methodological approaches, as outlined below:

1. ***Participatory Qualitative***: comprising a battery of tools to include but not be limited to *focus group discussions, in-depth interviews, mapping, observations, ranking, transect- and trend-analyses,* and *visual capture.*

2. ***Quantitative***: to be conducted via a household-based survey in a sample of communities within the watershed area.

Collect and review secondary data	⇐	Client discussions & NGO meetings	⇒	Refine key issues for inclusion in study
		⇓		
Identify e.g. *key informants, players, community leaders*	⇐	**Introductory site visits:** e.g. *observations, usage time lines, dynamic discussions, visual capture, etc*.	⇒	Structure qualitative phase e.g. *develop topic guides, identify & recruit contact(s)* & FG participants
		⇓		⇓
Determine key concepts for inclusion in focus groups & survey	⇐	**Participatory study** e.g. *transect- and trend-analyses, mapping, ranking, in-depth interviews*	⇐	⇐
		⇓		
		Focus groups: conduct & analyses	⇒	Develop survey instrument
		⇓		
		Household-based survey: conduct & analyses	⇒	Develop preliminary report(s) for participatory review
		⇓		
		Review of findings: R2RW & community meetings		
		⇓		
		Prepare & present final report(s) to R2RW		

2.1 Participatory Qualitative Methods

The phases **#1** and **#2** were critical in determining scope and definition of activities for subsequent stages. These two (2) phases sought to identify key study issues from the current (a) operational; and (b) community perspectives. Consultations assisted in e.g.

- Preparatory message- and concept-development for field investigation;
- Identifying and managing issues for exploration at the community level;
- Determining cultural considerations inherent in e.g. *definition and use of terms; current communication channels; focus group compositions; ideal FG sites and schedules; issues and areas of potential conflict and/or destabilization; usage patterns within the watershed areas;*
- Observing any key sites for further study exploration, and likely constructs for their review.
- Preparing final work-plan

2.1.1 Participatory Study

This phase was designed to further explore and expand on concepts and constructs related to study objectives and findings from previous investigation phases. It comprised observations and visual capture (photography), as well as focus groups and use of other participatory methods e.g. *mapping, ranking, message/concept assessments*. Interviews and discussions (both dynamic/unstructured and scheduled/structured) were also held with individuals/groups such as e.g. *community leaders and elders, and representatives of R2RW's primary audiences.*

2.1.2 Focus Groups

A series of focus groups was conducted, and structured to reflect key issues. A flexible approach was used in composing groups, and developing/implementing the discussion guide. Sessions were held with inter alia, *community based organizations/representatives, private sector representatives, farmers, youth, children, female heads of households and other household members*. Discussion topics included:

- Perceptions, practices & information sources re river areas: traditional/current spiritual, cultural beliefs, benefits, etc.
- Current usage patterns related to watershed area
- Perceptions of "watershed" area, and inclusion in same
- Perceived positives and negatives associated with current practices
- Understanding of "environmental" concepts & issues
- Perceived relevance of "environment" issues e.g. vis-à-vis economic/social
- Aspects considered inclusive in "environmental/ watershed management"
- Perceptions and attitudes re: sustainability of resources, practices that could engender mismanagement, and relationship with disaster mitigation
- Relevance of compliance, responsibilities, stewardship, legal enforcement
- Analyses of current communication patterns and inter-relationships
- Comprehension and differential responses to hypothetical messages

- Potential behavioural responses, benefits, obstacles to message-delivery

- Suggestions/reasons for "the way forward" and communication strategies

2.2 Household-based Survey

Findings from earlier study phases were used in development of the survey phase, including the questionnaire. The survey was administered to **831** respondents from households located within selected communities from Great River, Rio Cobre, Rio Grande, and Wag Water watersheds.

2.2.1 Sampling

With the R2RW, a number of "targetted" communities were selected for study. Selected areas included (but not limited to) those in which they were already working/planned to conduct work, or were otherwise interested. Enumeration Districts (ED's) were then identified within the larger "community" allocations. All survey work was conducted using the ED descriptors. Further details of sampling were as follows:

- Households were selected within the ED's by choosing a random start point then visiting every n^{th} household, the interval being based on the number of listed households (using the Statistical Institute of Jamaica's 1991 census data).

- At the household level4, the person with the last birth date was selected for interview, once qualified i.e. *within the ages of 15 and 84 years, and able to see and hear clearly*.

- Replacement respondents were used (to a maximum of N=1) where the targetted individual was not available.

- Only one (1) interview was conducted per household.

- Interviews were conducted at different times throughout the day/evening and on weekends, in order to ensure reasonable representation of both males and females, and all ages.

2.2.2 Questionnaire

The questionnaire was developed on a range of issues, the content being developed via e.g. study objectives, feedback from in-depth interviews, observations, focus groups, and (questionnaire) pre-tests. It was structured to accommodate responses from a range of persons, including a special section for farmers. Another section captured data on demographic/lifestyle background, and current media usage. Sections were:

- **Identification**: community, watershed- and parish- locators

- **Introduction**: an overview of the study and request for cooperation

- **The Environment**: concepts, attitudes, and practices

- **Sustainability, Compliance & Communication**

- **Farming**: with some inclusion of backyard gardening

- **Background Information**: demographic and related data

2.2.3 Interviewers and Interviewing

A team of 23 interviewers was specially trained for the assignment. These persons represented experienced interviewers with the company, as well as persons resident in the respective communities and new to the company. The interactive training session lasted for one (1) day (3rd May 2002), and interviewers were also provided with a manual with relevant procedures and definitions. Sessions included:

- Background to the study
- Introduction to environmental issues and awareness
- General interviewing/administrative procedures & responsibilities
- Sampling and respondent identification
- Stage-wise review of the questionnaire and component questions;
- Asking the questions & recording answers; and
- Questionnaire management.

The data collection was mainly supervised at the office level, contact being made with interviewers on almost a daily basis. Data collection took place between 4th May and 4th June 2002. Although the majority of interviews were completed by 22nd May 2002, there was an extended delay thereafter, due to heavy rains in some areas.

2.2.4 Data Management, Analyses and Interpretation

All data management functions e.g. collation, coding, data entry, were conducted almost concurrent with data collection. The coding became a particularly tedious process given the large number of open-ended questions included in the instrument. Data entry was guaranteed to 99% accuracy level. Analyses were conducted using the Statistical Package for the Social Sciences (SPSS). Data analyses were mainly conducted according to: *age, sex, socio-economic status,* and *watershed area*.

2.3 Study areas & field-level implementation notes

The main study areas were as follows:

- **Great River:** *Chester Castle, Ginger Hill, Lethe, Montpelier, Pisgah*
- **Rio Cobre:** *Bog Walk*
- **Rio Grande:** *Berridale, Comfort Castle, Fellowship, Grant's Level, Tom's Hope, Windsor*
- **Wag Water:** *Mt. Airy, Mt. James, Mt. Prospect*

Adjustments made to the conduct of the study (when compared to proposed approach) included:

- **Transportation:** *Travel within the Rio Grande watershed especially, was quite difficult and expensive, and this necessitated adjustments to the survey methodology. A higher proportion of local residents were therefore used as survey interviewers in this area, given e.g. the schedule for public transportation.*

- **Key informant interviews:** *These were limited in number and scope. An early decision was made to delay some of these interviews until "findings from the field" could provide increased content for discussion. Some of the interviews originally planned have still not been conducted.*

- **Additional data:***A number of planned R2RW activities were visited to review the consultative processes, and the types of issues/interactions therein. Some of the participants attending these sessions included key informants.*

- **Implementation delays:** *Several factors delayed completion of the overall study. These were mainly overcome eventually.*

2.4 Reporting Format

The current report has been prepared to include findings from all study phases. The format of substantive sections is as follows: -

Executive Summary:

1. Background to study:

2. Methodology:

3. Results – Qualitative phase:

4. Results – Survey:

5. Discussion & Recommendations:

Appendices:

3.0 RESULTS -- QUALITATIVE

3.1 Watersheds: Observational Comparisons

The four (4) watersheds shared several similarities, as well as being distinctly different. Descriptors were mainly typified by *general landscaping* as well as specific aspects related to e.g. *residency patterns, primary activities, residents' perceptions,* and *usage.* Focus for this investigation was on the upper to middle-watershed regions, and it is therefore possible that certain activities/perceptions from lower-regions may not have been captured.

The closest levels of "interactions" with the respective rivers were found in the ***Rio Grande*** valley, where residents seemed highly aware of its existence, interacted closely with the river on a daily basis, and were often keenly aware of activities taking place within and around the body of water. Similarities across watersheds included:

1. Residents indicated very little felt-sense of relatedness to a river unless they lived in close proximity to, and quite regularly used it for normal, daily activities. If there was another smaller river/tributary located nearby, then that was the one to which they mainly associated themselves.

2. The fact that use of river-water for domestic activities is sometimes engendered by perceived failures in the public system e.g. (a) high water bills; (b) lack of constant and/or adequate supply, but the latter is the preferred source for drinking water.

3. There was an almost absolute lack of reference indicated by residents to a "watershed" area in which they might live. The concepts was mostly unknown, and so too were the features that might typify a watershed.

4. The only persons likely to articulate and/or otherwise indicate an understanding of a "watershed" were few: (a) those with fairly strong affiliation and/or experience and/or work ties (e.g. NWC workers) with environmental organization(s) or activities; and (b) students with an expressed interest in the environment.

5. There was limited awareness about the relative location of other rivers outside of the immediate area in which persons lived -- even the ***Rio Grande*** not being as well-known as might have been anticipated.

6. There were large-scale farming activities found to be taking place in most areas, main crops being *coffee, oranges*.

7. Relationships between large- and small-farmers largely appeared non-symbiotic.

8. There was perceived social distance between large-scale and small-scale farmers in the specific communities as well as in the valleys themselves.

9. There were strong perceptions indicated by community members including smaller farmers that environmentally-inappropriate (and even deleterious) practices were taking place on some of the large-scale farms -- but it was felt that nothing could be done due to social and/or political status of the persons involved.

Photo 1 - The Splendour of the Rio Grande River, Portland

3.1.1 The Rio Grande Watershed

The ***Rio Grande*** is fairly well known for its rafting activities. In recent times, and specifically as a result of floods in the late months of 2001, these activities have been severely curtailed – with significant felt economic impact. In addition, landslides have continued in the *Back* ***Rio Grande*** area, which have largely been attributed by residents to a combination of "chance occurrences" and "volcanic activities". The overall effects of the "dirty water" have included: (a) fewer tourists visiting for rafting (*not as beautiful*); (b) less fishing (*cannot see the fish*); (c) inability to wash clothes (*some persons do this for a living*); and consequently (d) increased concentration on small-farming activities.

Interestingly, even with the relative prominence of related rafting activities in the ***Rio Grande*** valley, the importance seemed mainly to be felt in communities and by residents that gained direct household benefit. This fact was actually much lamented by some of the residents in the *Berridale/Grant's Level* areas who felt that if those in other communities were more involved, they would likely not throw garbage and otherwise abuse the river in the way that they allegedly did.

The Rio Grande

The ***Rio Grande*** watershed had uniquely important features relative to the other rivers and their respective watersheds, *viz*. it was:

1. The longest river (when the *Back* ***Rio Grande*** is included);
2. The river apparently carrying the largest body of water, and via most tributaries;
3. The area where the river maintained an omnipresence e.g. relative to main road;
4. The area which generally had the worst road conditions;
5. Where residents lived and farmed in closest proximity to the river;

6. Where the main river (**R/G**) maintained an inter-community "centrality";

7. Where residents indicated the greatest degree of respect for the river;

8. The area with longest history of watershed-related events (positive & negative);

9. Where there had been most (known and/or reported) damage and destruction;

10. The area with the most amount of river-based economic and domestic activities;

11. The area with most sand/stone-mining activities.

12. The area with most small-farm activities, and least (declared) large farm activities.

13. The area with most evidence of furniture-making activities;

14. Where residents referred to the river with most "familiarity";

15. The area with seemingly most connectedness between-communities.

Photo 2 - An easy day on the *Great River*, Hanover

3.1.2 The Great River

The second "large" river in the study was the ***Great River***. This river was typified by the "boundary-line" that it created between parishes, viz. *Hanover, St. James, St. Elizabeth*, and *Westmoreland*. The demarcation was as much striking in its "naturalness" as well as in the extent to which it was representative of critical social barriers between parishes. One example is that fact that although the riverhead constituted an apparently important location, it was somewhat de-emphasized locally in most areas along the length because of the fact that it was in *St. Elizabeth*. Nevertheless, this dissonance was also obviated by the "grandness" or "greatness" of the river – and the remarkable size that it had attained despite its small source.

Discussions with residents of *Pisgah*, the declared riverhead in *St. Elizabeth*, indicated that they did not necessarily hold this perception, thinking it to be already quite a large body of water in their community. Observations indicated that one main area revered and much used for fishing and recreation by local residents, was indeed quite small – relative to other areas along the same river and to other rivers

The Great River

Other noteworthy features of the ***Great River*** included:

1. The fact that it did not maintain its "presence" within- or between-communities despite its relative size. Instead, community residents variably related to the smaller rivers flowing into the ***Great River***.

2. Larger-scale farming and other important income-generating activities typified the area – especially where the river was at its fullest.

3. Community residents generally had limited access to sections of the river where it ran through private property e.g. in *Belvedere Estate, Copse, Lethe, Montpelier* – and these latter dominated many of the larger bodies of water.

4. Households did not generally seem to reside as near to these riverbanks as they did in e.g. the Rio Grande valley.

5. There was lesser community-based use- and knowledge- of, events and activities relating to the river along its length.

6. There was less known history of loss, damage and/or destruction due to the river.

7. There was less evident use of the river for economic and/or personal gain, even though there used to be the quite-famous "*Evening on the Great River*".

8. There was less felt-sense of inter-community spirit and/or connectedness

9. There was however, a very strong sense of communal pride and environmental awareness by those in the lower ***Great River*** – due mainly to e.g. previously strong, shared economic activities that encouraged the vigilance, and current interest in revival of such activities.

3.1.3 The Rio Cobre

The area studied within the ***Rio Cobre*** watershed was the *Bog Walk* community, incorporating the well known "*Flat Bridge*" and "*River Road*". This river seems almost best known because of the Flat Bridge/River Road and their history as being a death-knell. There was much latent fear evident among residents. Importantly, this fear was not restricted to the actual river itself, but extended to the treacherous roadway along which residents (and others) had to pass through the community, the hillside and huge, unstable boulders largely making travel a less-than-pleasant experience. Interestingly, this also seemed the best-known river outside of the immediate watershed area (likely due to its importance as a public thoroughfare).

Rio Cobre

Other features noted within the ***Rio Cobre*** watershed included:

1. The large *citrus* farms owned and operated by corporate entities (e.g. *Nestle, Tru Juice*);

2. Other farming activities, centered around *chicken-rearing, coffee, dairy, meat*;

3. Perceived affect on quality of river water from farming activities as above, as well as from effluent due to bauxite mining activities, and the *Linstead* hospital.

4. The restrictive access to key recreational river areas (due to being on privately-owned lands);

5. The apparent lesser use of this river for recreational purposes, than other rivers;

6. The perception that this river was largely unclean, and not fit for human usage;

7. There was a very strong sense that this particular river was vested with a supernatural "force", which humans generally needed to know how to "reckon with". There were pervasive stories told of death by drowning of passing motorists, and clear apparent symbolism attached to such events. In summary, it was said that this river was one of the "most dangerous" in the island.

8. There seemed somewhat more references made to ancestry in this areas than in others, and these stories included those related to e.g. the *Bybrook Estate,* the *Flat Bridge,* a "*golden table",* and the *river-maid*.

9. There are several smaller rivers/tributaries that feed into the ***Rio Cobre*** in the *Bog Walk* area, and for this reason there is also sometimes less apparent connectedness to the ***Rio Cobre*** itself. Several persons indicated that it is really in the community of *Kent Village* that there was a felt-sense of the ***Rio Cobre***

10. Importantly, the *Bog Walk* community was the most urban of watershed communities studied.

Photo 3 - Rugged river-bed of the *Wag Water*, St. Andrew

3.1.4 Wag Water

The main ***Wag Water*** community studied was *Mount Airy*, with further investigations being made in *Mount Prospect*, and *Mount James*. Communities were combined based on the inter-relatedness in activities as well as proximities. These areas presented a picture of near-destruction with respect to negative environmental practices, especially in the context of reasons posited for the current situation.

These communities indicated very little affiliation with the ***Wag Water***. Instead, there was a much closer felt-link to the *Ginger River*, which flowed into the ***Wag Water***, but which was in much closer proximity. It also seemed that there was less overall use of the river for recreational purposes in this watershed. The main area popularly used was *Langley*, a property owned and operated by the NWC, the areas comprising e.g. an old stone house in fairly good condition, well-kept gardens, and a swimming hole. The spot is also used on occasion for weddings, and parties.

Wag Water

1. The hillsides were treacherously steep with much evidence of erosion, and there was clear and pervasive evidence of slash-and-burn hillside practices.

2. Coffee farming was said to be the main reason for the above practice. Based on recent developments in the area, there had been a near "rush" to clear hillsides to facilitate coffee growing activities.

3. The "original" coffee farmers were large landowners, many non-resident, but inclusive of Kingston-based corporations (e.g. *Dyoll*).

4. There had been much recent interest and increased small-farmer involvement in coffee due to (a) property sale by the *Coffee Industry Board*; and (b) evidence of higher income from coffee production than from traditional crops

5. This situation has been further exacerbated by the near-poverty in which many people had previously existed.

6. There had been no known introduction and/or sensitization and/or education activities for new coffee-farmers, but it had been made known (formally and informally) that this crop required chemical treatment for best practices – which instructions were generally followed without heed for consequences

7. The area was also one with much forestry departmental interest and activity, firstly being a centre for *FIDCO* activities, and more recently of the *Forestry Department*. Older informants strongly felt that the destruction of related trees in the earlier days was responsible for reduced rainfall in the area.

8. Other important players with community history included: *NWC*, politicians, leading civil servants (e.g. *Ministry of Agriculture*) and those in "high-places" in NGO's. Importantly, adverse environmental activities have been said due to as well as overlooked, by such persons for many years. Smaller farmers and community members often regard large players as their role models.

9. Socially, it was also indicated that there is not only a tendency towards individual pursuits and care-taking (a.k.a. "selfishness"), but also that there are a few large families that ultimately "control" community activities. This despite the relative importance of the church.

10. It was also indicated that obeah practices are very prevalent – it possibly being somewhat responsible for the relative poverty.

3.2 Existing Levels of Awareness

The study populations generally showed limited knowledge and understanding of specific environmental concepts and their inter-relatedness. However, there was substantially more evidence of passing familiarity with key words, phrases, and sometimes concepts. From the two (2) types of group sessions conducted, *viz*. focus groups with residents, and key informant panels, it was clear that the majority of the knowledge resided with the key informants. This implied that at least some of the larger farmers and/or land-owners that were often blamed for poor environmental practices, knew of the negative effects of their activities – but preferred not to acknowledge them. Other types of residents likely to have such knowledge, included: *students* and *teachers of geography and/or the environment.*

A substantial communication gap was therefore identified between "*those who knew and/or who represented other communities/groups*", and "*those who were being represented*". This deficit was particularly evident in the ***Rio Grande*** watershed, where formal public relations and/or other communication systems were already in existence.

In general, awareness levels for environmental issues were triggered and/or significantly heightened among the normal population mainly by negative experiences. Otherwise, there was a sense of normalcy connoted by elements in the environment. The following examples indicate the main types of situations that seemed to increase awareness and/or concern, with specific reference to rivers:

- High dependence on (use of) the river for economic reasons e.g. *fishing, rafting.*
- Being dependent on the river for domestic purposes e.g. for *bathing, drinking water, washing.*
- Being accustomed to use of the river for recreational purposes e.g. *swimming.*
- Being downstream from waste and/or effluents emptied into the river;
- Being personally affected by the excesses in flow of the river, e.g. *households and/or farms being "washed out" due to river overflows*.

3.2.1 Natural and/or Wild Resources (Concepts and Identification)

Watershed residents generally recognized the main components of their immediate environment as being "natural resources", e.g. air, river, sea, soil/earth, trees. The extent of such recognition seemed to vary according to a number of factors, including e.g. proximity, extent of prominence, and extent of use.

There were varying values assigned to these elements – related mainly to the extent of dependence. Importantly, there also seemed the tendency not to regard some of the elements very highly, due to familiarity. It was said for example, that rivers are appreciated more by town dwellers, than by those residing in the countryside that had "ready" access.

There were varying degrees of recognition for the value of "economic benefits (gained) from the natural resources". Those who had a stake were markedly more aware and conscious of the frailties attached to use and management of, these resources. The situation was very evident for the specific communities that relied on rafting e.g. *Berridale, Grant's Level, Lethe*, and contrasted significantly with those where there was no immediate dependence on this activity e.g. *Chester Castle, Comfort Castle, Pisgah*.

The type of economic activities and/or benefits accrued from the natural resources seemed a determinant of attached importance. This perception held both for positive and negative use, as the latter was not always regarded as such. One key example relates to mining – where the values of quarrying and stones for example, seem significantly greater due to increased benefits realized by residents (either for selves or others).

3.2.2 The "Environment"

In many respects, there was rarely much difference between positive elemental definitions given for "natural resources", and those provided for "the environment". Concepts of "the environment" were fairly consistent, with three (3) types of descriptions mainly provided, viz.

- All natural elements "around" the self including e.g. *air, sea, sun, trees*, and *water*
- Selves and their relative impact on the surrounding areas e.g. *garbage,* and *human beings*
.
- Environmental management concepts e.g. *taking care of the environment, not littering the area around you.*

Those putting forward the 2nd type of definitions had generally already given the 1st category of definitions, and were extending the concepts. It appeared that those putting forward the 3rd types of descriptions however, were only vaguely familiar with the more-often used environmental slogans and words, but not really understanding of what was actually involved and /or how to contextualize the issues.

3.2.3 Relevance of Environmental Issues

In general terms, "environmental" issues were not regarded as personal and /or (general) community priorities. It was only the "key informant panels" that expressed any real sense of sustained ownership and/or importance. Most of the other (types of) groups first indicated that the environment was indeed important, but generally reversed this position when asked again "… *how important is the environment*?" Yet, there were no negatives attached to the lower importance – it was just not a priority in one's daily living. The single area in which there seemed consistent increased attention was **if and when** there was negative felt-impact.

The main agent likely to have such an impact was **water**, i.e. via *rains* or the *river*. There was assumed to be a type of power vested in water, over which most persons indicated they had no control. It sometimes generated fear, but at a minimum, there was respect that generated caution. This situation mostly prevailed in communities nearer to the middle of the river, or at least in those areas where there was good, strong flow e.g. *Berridale, Bog Walk, Fellowship, Grant's Level, Lethe.* The following types of rain-related events for example, were likely to raise concern (and had indeed consistently done so):

- If a river substantially increased its flow, size, or normal flow pattern;
- If residents suffered excessive damage to e.g. *crops, farms, houses* and/or *household effects, livestock*;
- If landslides directly affected persons and/or river (e.g. *colour, depth*);
- If there was loss of life.

3.3 Environment-Based Cultural Attitudes, Beliefs and Perceptions

Death was probably the single most important "story" component recognized and often-told across all watershed areas. And it was always related to the river. This event seemed to proclaim both the might and mystery of the river. It gave credence to the respect. The only other component regularly mentioned was that of the "*mermaid*" a.k.a. "*river maid*", but formerly known as the "*river mumma*". The first was the tale of the mid-section of the rivers, while the latter was often the story of riverheads. Stories or cultural themes based on other components of the environment and especially the elements of the watersheds were fewer and inconsistently recounted.

It largely appeared that both the conveniences and outward-looking perspectives of modern-day living e.g. *increased importance of urban centers, electronic media*, were usurping the benefits formerly thought accrued by some types of traditions. The extent of retention was therefore being reduced. There were three (3) types of persons seemingly less interested in discussing these traditions (and/or more ashamed of the reality of the traditions), viz.

a. The more highly educated and/or "traveled" persons living within smaller communities;

b. The persons vested with "public relations" authority for communities;

c. Those with an authentic unique heritage, e.g. *Maroons*.

3.3.1 Death in the Rivers

There seemed a preponderance of stories of death told about the respective rivers -- sometimes overwhelming in their frequency. In this context, the river was quite often endowed with a personality that it was said, "did not like strangers". The truth is that many of the reported deaths were indeed of strangers to the areas. There were two (2) perspectives from which these deaths and the involvement of strangers were related, viz.

1. Visitors to the area were held by the clutches of river – which latter "claimed" the lives – almost seemingly to feed/quench a desire. These were generally recounted as being strange occurrences without any apparent reason or rationale for many of the deaths. The ***Rio Cobre*** was one example that was said to have claimed many lives under almost impossible situations e.g. death by drowning where the water was very shallow. Credence to this type of belief was accentuated by the naming of certain spots based on the first person known to have drowned in that section of the river. In the *Mount Airy/Prospect* communities, it was said that once a person had drowned in the river, the spirit lived-on, but when it (the spirit) was ready to move, that was when there was inherent danger, as it had to "*claim another life to take its place at the original spot*". Interestingly, this was a story recounted in great detail by a young community member (12 years old).

2. The most prevalent explanation for such deaths was related to the visitors' unfamiliarity with the river and its respective sections. It was in this context that "whirling pools" for example, were highlighted. These areas were known to be dangerous and/or challenging even for residents knowing the "terrain" well – they were either to be avoided or managed with extreme caution. However, visitors (especially if unaccompanied) proceeded into the waters without such prior knowledge, and therefore often got into trouble e.g.

    - Caught by the force of currents, and unable to extricate themselves;

    - Developed cramps from (often-found) temperature differences between outside atmosphere and river. This was the more prevalent explanation given for visitors who

were “just passing by” and felt drawn to sample the compelling sight and expected coolness of the river;

- They hit their heads on boulders in the river;

- They became entangled in floating bamboo branches.

Whatever the reasons, the felt “friendliness” or “danger” of, as well as “respect due” to rivers were seemingly often measured by the number of lives that it was known to have claimed.

3.4 Religious, Spiritual and Cultural Beliefs

Based on changing attitudes, some former-day religious, spiritual, and/or cultural practices were apparently no longer as important.

3.4.1 Baptismal Practices

One area suggesting reduced emphasis was “baptismal practices” involving use of river water. River water was said the ultimate symbol for connoting purity and cleanliness. Although said to be once frequent, this practice is apparently being overtaken by churches’ increased use of their own pools for baptismal ceremonies. The main exception was found for the *Bog Walk*/***Rio Cobre*** *communities*, with its many area churches and residents said to be still using the river for baptisms.

3.4.2 Planting Trees with Navel Strings

The planting of trees with navel strings is also no longer much practiced and/or well known. Those few recalling the practice lived in the more rural, and/or less-traveled locations e.g. Mount Airy, Tom’s Hope. In the latter-mentioned location, one man indicated being told of his navel string being planted with an orange-tree on the plantation where his father used to be employed. Although seldom seen, the tree not only remains dear to him, but he also (a) considers himself as owning the rights to the tree and its produce; and (b) “visits” the tree when he is nearby. Use of the coconut tree was also mentioned. Members of the younger generation who know of the practice, almost scoff at it, many indicating that they did not even think of doing that when they had their own children.

3.4.3 Marking Gravesites

There is a certain type of palm-tree, the leaves of which were once regularly used to mark gravesites. Calabash, dragon, and Joseph’s coat were also mentioned. In recent times this practice has however, been largely replaced by use of commercially available wreaths.

3.4.4 Traditional Medicine

In spite of changing experiences and increased external influences, many persons have retained various plants and shrubs for medicinal purposes (See also “*Traditional and indigenous uses & knowledge of watershed resources*”). While not necessarily regarded as “medicines”, the apparent extent of their usage must certainly result in fewer visits to formal doctors. It was also found that many bushes and herbs used as “tonics” for “strengthening the body”, are not often regarded as “medicinal”.

It could be that it is the older/middle-aged persons who mainly know of, and use the wider range of these medicines and tonics, but some are also often-used by younger persons – their knowledge being via elders. One interesting caveat regarding use was that bushes be

combined/boiled in "odd" multiples e.g. 3 or 5 or 7 bushes together (vis-à-vis 2 or 4, etc.) – the reason being to ensure combating counter-balancing effects.

3.4.5 Folk Stories and Myths

The majority of "fold stories" centered on the "river-maid". A few others related to (a) caves and persons' experiences therein (e.g. *white gate and white rooster*); (b) the sighting of "duppies" e.g. within forest areas; and (c) the retained importance of ancestors and the work that they had done in a community e.g. on the *Flat Bridge* in the ***Rio Cobre*** area.

3.4.6 "Rivermaid"/"River-Mumma"/"Mya-Maid"/"Mermaid"

The "*river mumma*" is alive and well in Jamaica's countryside. Although now rarely referred to as such, the concept is a vibrant and clearly articulated one – even though not everyone knows and/or believes and/or is willing to discuss the stories. Interestingly, regardless of the storytellers' identity and/or profile and/or residential location, there are marked similarities to the story. Further, each tale to date has been told with distinct personalization of the experiences, and almost never as if it might be untrue – or just a tale.

Persons perceiving/experiencing the river maid were generally alone at the time. Within the group sessions, it was mainly middle-aged to elderly persons who had actually seen the river maid, although they could have been in their youth to early adult years during the experience. All indicated that they had never forgotten, nor would they ever forget, the experience. It was found that some of the younger residents (e.g. teenagers and young adults) were not only quite knowledgeable, but also believing of, the river-maid stories.

The *persona* of the river maid appeared mostly to be one of invisible "gate-keeper" charged with protecting the area, and its inhabitants (e.g. fish). It was a controlling force. Although not necessarily regarded as "evil", it was not seen as a friendly being – but respected by those who had either seen or heard first-hand about others' experiences. Adults rarely admitted to having their river-related activities curtailed because of the mermaid, but seemed to avoid visiting areas where and when it might be seen e.g. evening and nighttime.

About … the *River-maid/Mya-maid*

The following are the elements that were consistent descriptors of the "*river maid:*

- It is (really) a mermaid.
- It is female (most persons felt this way).
- It has long hair.
- It is one-half human (top ½) and one-half fish (bottom ½).
- It lives at the riverhead (apparently all), e.g. "*every riverhead has a river maid*".
- It sometimes leaves its comb (often gold) and maybe a few other "personal" articles, by the riverside.
- Anyone who takes up any of the articles (but especially the comb) will be visited in dream by the river maid, and instructed to return the comb, e.g. "*the river maid dream the man and tell him to put back the comb*".
- Failure to return the comb results in the borrower's death, or other (type of) demise e.g. mental illness.
- The river maid is rarely (but definitely has been) seen.

About … the *River-maid*/*Mya-maid*

- The river-maid is known to abhor being disturbed suddenly e.g. its dwelling place visited suddenly by a human. In such an event, there is said to be a very loud sound heard (or almost "experienced") by the human, involving something akin to a loud thud onto the water, with an immediate muddying/darkening of the entire body of water -- but yet the river maid is <u>not necessarily visible</u> in such situations. It has been said extremely difficult (if not impossible) to compare this with any other known experience, and continues to resonate chillingly with the person experiencing it, for a long time – maybe forever.

With lesser frequency, it was suggested that e.g.

- The river maid actually lives in/near bamboo trees in the vicinity of the riverhead.
- The river maid not only generally has a (gold) comb, but also a (gold) table
  - This latter was once responsible for e.g. the apparent "death by drowning" of a farmer, as well as the cow and goats that he had used to try and remove the gold table seen on a pond (*Westmoreland*)
  - It was also much referred to in the Bog Walk communities, where it was said the table emerged at around noon-time, but it was unwise to try and remove it from the water as it would undoubtedly cause the person to be pulled in and ultimately die.
- The river maid not only lives at river-heads, but also in *ponds*, and other areas with *clean, pure,* and/or *almost-still water*, which latter could include e.g. *fresh-water ponds, whirling pools*. In general the areas are not as frequented by humans as are other sections of the river.

In former days, this story was often–told to children, and some felt it was to discourage them from playing in the river – due to dangers of drowning, as well as encouraging them to go straight home. Those who had never had this experience and/or who were hearing of the river-maid for the first time were often extremely skeptical and disbelieving – instead indicating that these were merely "*Anancy*" stories told to children.

The "reality" of the river maid's existence was sometimes difficult to dispute, stories often being told independently of each other even within the same group session. Storytellers were often surprised by emergent similarities. Given the close proximities in which most persons within group sessions lived, it also appeared that the stories were not often told.

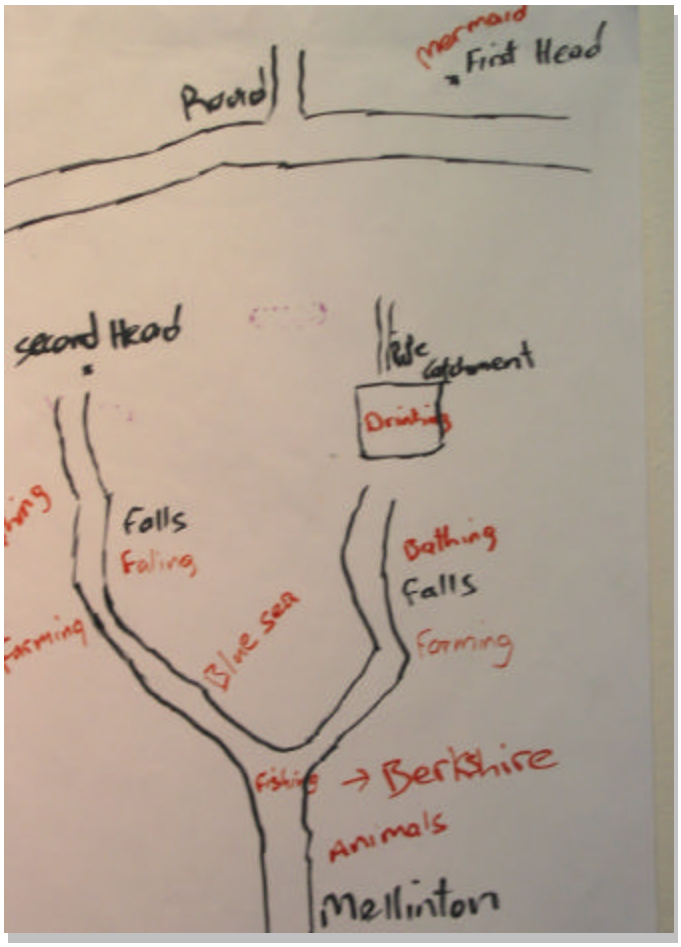


Photo 4 - Residents' drawing of *Rio Cobre* locations, St. Catherine

3.5 Traditional and Indigenous use s and Knowledge of Watershed Resources

The often-abundant supply of water, trees and bushes was a determining factor in people's use of these resources in watershed communities. Among the most illuminating descriptions of the "wealth" contained in and distributed by, rivers were as follows:

- One man who "*could not believe his eyes*" when he saw how much *bamboo* was washed downstream by the river, at a time when he especially needed it.

- The description of riverside fertility being (a) the best, and (b) at its most potent for planting crops after the river brings down excessive soil due to landslides/slippages, or in situations where multiple rivers brought soil into particular properties – thereby making these farms abundantly "blessed". Further, where these soils contained fertilizers from farms further upstream, there was no need to use any other additives.

Photo 5 - Farming hillsides in the *Pisgah* community, head of the *Great River*

Trees For Furniture and Other Uses		
Trees etc.:	**For …**	**Notes:**
▪ Bamboo	Yam sticks, rafts	
▪ Billy Clarke		Very tough wood
▪ Bitter wood	Furniture, herbal medicine	
▪ Breadfruit	Furniture	
▪ Broadleaf		
▪ Cedar	Furniture	
▪ Cottonwood	Caskets, canoes, partitioning	
▪ Dogwood	Charcoal	
▪ Fiddlewood	Life boats, lumber, fencing, charcoal	
▪ Guinep	Charcoal	
▪ Lignum vitae		
▪ Logwood	Fencing, charcoal	
▪ Mahoe	Furniture	
▪ Mahogany	Furniture	

Trees For Furniture and Other Uses		
Trees etc.:	**For …**	**Notes:**
▪ Mango	Charcoal	
▪ Pine	Furniture, houses, fence-posts, light-posts	
▪ Pimento	Charcoal	
▪ Rock sweet wood	Fence posts	
▪ Santa	Furniture	
▪ Star-apple	Charcoal	
▪ Sweetwood	Yam hills, caskets, houses	

Herbal Medicines		
Herbs, roots, vines, etc.:	**For …**	**Notes**
▪ Bamboo leaf	Fever	
▪ Black joint	Colic, fever	
▪ Blood wiss	Tonic	
▪ Boss of cedar	Impotence	
▪ Cerasee	Bathing, change of life, purify blood, bellyache	XS can lead to running belly
▪ Chaney root	Tonic (multiple uses)	
▪ Chicken weed	"Sugar", clear blocked tubes, change of blood	Used with grapefruit juice & string beans to "burn out the sugar".
▪ Cinnamon		
▪ Coconut root	Tonic, roots	
▪ Colly		
▪ Comfrey	Nerves, stress, kidney	An essential item
▪ Cuncheebo		For animals as well as humans
▪ Dandelion	Flush out the kidney	"So effective (one would) not need kidney transplant"
▪ English plant weed	For the eyes	
▪ Eucalyptus		
▪ Fever grass	Pep-up tea	

Herbal Medicines		
Herbs, roots, vines, etc.:	**For …**	**Notes**
▪ Fresh cut		Used with leaf of life & rock wife to "knock away fever".
▪ Guinea hen	Headache	Very strong
▪ Guinea weed	Headache	Bad smelling
▪ Iron weed	Teas	
▪ Jackiny (a.k.a. Jack in the Bush)	Colds, fever	
▪ Leaf of life	Colds, lucky leaf	Known as a "lucky leaf". Can be used as a guide to quality of (your) future life. Used with rock wife & fresh cut to "knock away fever".
▪ Lime leaf		
▪ Mary gold		Marigold?
▪ Mary-vane		
▪ Medina	Men's stamina, tension	
▪ Mint (black)	Tea	
▪ Mint (pepper)	Tea	
▪ Mint (sweet)	Tea	
▪ Nutmeg		
▪ Pepper elder	Gas	
▪ Piaba	Tonic	
▪ Quick stick	Any kinds of cold	
▪ Raw moon	Diabetes, horse-feed, hypertension, nerves, stamina, ulcer	
▪ Rock wife	Colds	Used with leaf of life & fresh cut to "knock away fever".
▪ Sarsaparilla	Tonic	Sometimes combined with Chaney root
▪ Search-mi-heart	Tea, colds, nerves, gas	
▪ Shade leaf	Colds	
▪ Shame-a-macka	Fever	
▪ Sinkle-bible	Changing of blood, tonic, skin	
▪ Snake wiss	Headache	
▪ Soursop leaf	Tea	
▪ Spirit weed		
▪ Strong back	Tonic	... the root and /or fine leaf
▪ Sweet basil		

Herbal Medicines		
Herbs, roots, vines, etc.:	**For …**	**Notes**
▪ Tan de buddy	Tea, tonic	
▪ Tree of life	Colds	
▪ Tuna	Joints, ligaments, shampoo, ease pain	
▪ Vervine	Teas	
▪ White wiss	Tonic	
▪ Wild tamarind	Colds	

3.6 Watershed Specific Levels of Awareness and Practices

There was very little evidence that the concept of "watersheds" was (well) known. Apart from a few of the key informant panelists, the other residents could only attempt definitions. Therefore the concept of "*residing in a watershed*" became redundant. In general, there were also few nurturing practices that seemed to take place within these areas – because the residents resided in a watershed.

Certainly, there was a sense of felt-ownership that resided with many of the middle-aged to older residents of upper-watershed areas. This sense of association did not however, convert to any significant care-taking types of practices, and neither was it present among the younger generation. It was often noted though, that in former days, the riverhead of the Great River was often cleaned and taken care of, from the Government's coffers, residents being paid to conduct the necessary activities. The fact that this was not done anymore was lamented.

Interestingly, those below the head, e.g. in the middle and lower-sections, indicated quite clearly that those in the upper regions had a responsibility to clean and take care of the river, given the types of dependency that residents lower down placed on the resource. One of the fairly consistent findings was that there seemed very little appreciation for and /or understanding of, the relative importance of the river and consequences of its state, to different users in different sections of its flow. Instead, there seemed more likely to be accusations leveled at the different users along the banks – especially those upstream.

3.6.1 Awareness of Watershed Definition and Knowledge of Watershed Management Unit in Which Persons Live

Only a few key informant panelists could provide a reasonable definition for a "watershed". It was evident that those providing such definitions were:

- More highly educated; and/or
- Had a history of extensive exposure to environmental education; and/or
- Were much involved in environmental issues with a lead role; and/or
- Were traveled.

Occasionally these more educated persons were students doing fairly well in secondary schools and/or who were involved in environmental clubs in the schools. Some persons indicated that they "*had heard the word (watershed) before*", but either (a) did not know, or (b) could not remember, what it meant. These were in the much larger majority. Suggested definitions often

evolved from a fracturing of the word (i.e. to become "*water*" and "*shed*") then applying relational definitions e.g.

- *A shed where water is kept (or stored);*
- *An area synonymous with a river/water-head;*
- *An area where water was (actively/mechanically) purified e.g. pumping station;*
- *An area that should be kept clean as it represented the source of community water supply.*

Photo 6 - The recreational/swimming "pool" at *Pisgah*, head of the *Great River*

In this context, it is important to note that in driving through the countryside, the varying signs clearly identified specific watersheds e.g. "***Great River watershed***", "***Rio Grande watershed***". However, it was also noted that <u>all signage was located on the main roads</u>. The study indicated certain important perceptions related to rivers, watersheds, and where people live, i.e.

- People almost do not relate to "*watersheds*" at all;
- They certainly do not relate to "*watershed management units*";
- People relate to **rivers**;
- The river(s) that people mainly relate to is that (or those) which they are closest to and/or which they regularly use;
- This latter would <u>not</u> always be the "main river" e.g. ***Great River, Rio Grande*** (*in which "watershed" they actually live*).

- This situation would largely be found once "their" river was of reasonable size and flow, during reasonable periods, allowing them access and use for the larger portion of each year.

This was very evident in the ***Great River*** watershed (but also in the ***Rio Grande*** watershed), where people for example, even disclaimed their eligibility for discussing the ***Great River*** based on the fact that "their's" was the "X" river, these latter including e.g.

- ***Bragging Tom River*** (for *Chester Castle* residents);
- ***Ginger River*** (for *Mounts Airy* and *Prospect*);
- ***Jones River*** (for *Ginger Hill* residents).

3.6.2 Understanding Water Quality/Good and Bad Practices

There was a subdued but often under-stated "understanding" of water quality issues throughout the watershed areas. Residents seemed to use two (2) types of indicators, viz. (a) what was visible; and (b) what was felt. The first was the more important. Therefore, solid waste that floated downstream was a major deterrent to river use. The most negative responses were observed when that solid waste was faecal matter. If the list of contaminants were to be ranked by order of residents' perceived seriousness, that list could possibly read as follows:

1. Raw sewage e.g. from homes built immediately on the riverbanks;
2. Faeces – *especially when visible along the river stream*;
3. *Pampers*;
4. Garbage (e.g. PET bottles, cans);
5. Chemicals – especially those used for coffee farms; and
6. Soapy residues.

"Ordinary residents" tended to mention the liquid contaminants e.g. (other) *agricultural chemicals, urine,* and their potential negative impact, less. Once more, the ones that were further downstream and had to manage the output leveled blame against those further upstream. On occasion, specific communities were indicated as being primarily responsible for the insult. There was rarely ownership to the contamination. It also needs to be said however, that there was not always any overwhelming sense that anything was intrinsically wrong with using the river for expulsion of certain types of waste. The underlying perception was that the natural and continuous flow of the river would wash away whatever was placed in it, into the open sea – the latter having no boundaries, therefore being the ultimate open receptacle.

In one situation, the "knowing" of good water quality was based on health inspectors' regularly testing of water quality, assuring thereafter that "everything was alright". This was interpreted to mean that the water was adequate for drinking and any other domestic usage. It also appeared however, that just the presence of such inspectors suggested sanction.

The converse to the above was encountered in one instance where several years ago, health inspectors had "condemned" the water from a certain spring (***Great River*** watershed). As a consequence, residents' interpretations and responses were multi-faceted, viz.

- The water from that spring should no longer be used for drinking.

- It was however, appropriate to connect their household pits to it, since it was already condemned, and therefore no one would be using it for drinking purposes.

One other source of contamination was mentioned in both of the larger watershed areas, viz. that resulting from **soil erosion**. In this regard, the ***Rio Grande*** is outstanding

3.6.3 Impact Of Coffee-Farms and their Effluents

Very special mention has to be made of coffee-farms and the alleged negative environmental impact of their activities. This was a recurrent theme in almost all watersheds studied. The scenario included the following:

- Firstly, apart from in the ***Wag Water*** communities studied, where the farms were both large and small, most coffee farms seemed mainly to be larger in size.

- The farms are often located in higher regions of the watershed – sometimes in the upper areas close to the riverhead, since altitude is such an asset.

- Locating these farms adjacent- or near to, rivers is beneficial to the farms/farmers, as the relative costs of providing other sources of water is thereby reduced.

- Many of the chemicals used with coffee production are said to be very dangerous – some small farmers admit to their being extremely dangerous i.e. "deadly".

- Once the farms are fertilized and/or otherwise treated with chemicals, and there is rainfall, then what happens with these chemicals is not within the farmers' control;

- Many of these community residents still consider themselves "blessed" by an abundance of rainfall.
- It was also noted that although larger farms sometimes make provisions for proper management of chemicals e.g. gloves, overalls, (and often insist upon use) the smaller farmers generally seem not to use these items, thinking them (a) too expensive; and/or (b) unnecessary given the small plot-sizes or portions being fed

- Although women and children are apparently not involved in using chemicals, e.g. in *Mount Airy*, they otherwise regularly work the farms – but no provision is made for the fact that they might be operating around active chemicals.

- *In one situation however, it was said that the owner of a (certain) medium-sized establishment obviously knew of the danger and harm associated with use of chemicals (this "obviously" being based on their lectureship status at a tertiary institution), but did not want to stand the cost of the required items, and therefore kept workers "in the dark" with respect to the risks. Importantly, these were otherwise understood when one of the workers attended a seminar on proper management of pesticides etc.*

In summing up the situation that coffee presented smaller farmers in the *Mount Airy* communities, one resident agreed: "coffee was their best friend and (yet) worst enemy".

Photo 7- Hillside cleared for coffee farming in a *Wag Water* watershed community

3.6.4 Understanding Solid Waste Management and Practices

Residents' "understanding" of solid waste management and practices was largely driven by their realities and/or experiences. In this respect, one of the overriding factors was the absence of public garbage collection systems in the majority of communities. In a few locations, it was mentioned that skips and/or large garbage disposal tins or other receptacles had (once) been provided, but either never or rarely emptied, such examples spanning up to a one-year period. In such situations residents were quite unsure of the relevance of such containers, indicating that they would undoubtedly have dry-rotted over such a period.

Solid waste as "garbage" was the main factor used to describe "environmental" issues. The greatest felt-sense of environmental mismanagement therefore, revolved around *litter* and *visible* garbage residues.

Community members regularly identified the following two (2) main methods for disposing of their own solid waste:

- Burning; and
- Burying.

In one exercise conducted to make "best practice" selections for garbage management, participants identified four (4) main methods, viz. *burning, burying, use as fertilizer* (*composting*), and *recycling*. Using matrix ranking, they selected … *fertilizers …* as the best method after internal discussions. Only a few farmers created compost heaps for varying crops – these latter mostly comprising all remains whether or not biodegradable.

There were some persons who lamented the existence of *PET bottles* and *Styrofoam* containers – these invariably being identified as the root cause of many of the existing problems with trying to manage solid waste. This was most clearly articulated among key community members with prior awareness/understanding of environmental issues. Apart from the unsightly evidence of garbage that they created, it was said difficult and/or unhealthy to burn these containers, given the intense smells created.

3.6.5 Understanding Importance of Watersheds to Disaster Mitigation

In general, the study indicated little real appreciation for the potential negative impact of certain land husbandry practices e.g. *deforestation*, on environmental degradation and natural disasters. Where present, the relationships were almost hypothetical, far-removed and distal in (a) the extent to which certain practices were seen likely to have an impact; (b) the likely consequences; and (c) the amount of time required to evidence impact. The predominant perception was that available natural or wild resources were so pervasive and bountiful, that replenishment would almost be automatic. The concept of "naturalness" almost included "plenty" and/or "unending". *Rivers, springs,* and *trees* fell into this category.

The naturally existing, watershed resources were generally regarded as gifts, and felt to almost be available in constant supply. Water was one resource that residents mostly felt could never be completely exhausted. This was especially evident where there were:

- Springs or rivers that had never been seen very low or dry;
- Rivers that regained their known size and/or strength after rains -- even after running relatively low.

In this respect, it was also found that although the cleanliness of rivers was a (negative) discussion point, the fact that the sediments and garbage (or "luggage") in the river were generally washed away after rains made the situation more tolerable, or "not so bad".

It was however, readily acknowledged that the **quality** could be (and often had been) adjusted significantly over time. This was mainly due not to the solid waste (or "garbage"), but the chemicals and sewage that flowed into the river from varying points. Because there was no clear sense of (a) what exactly a watershed was; and (b) living "in a watershed", then neither was the relative importance and/or impact of the watershed on environmental systems clearly understood by the majority.

Photo 8 - Preparing a hillside for coffee farming in a *Wag Water* community

In contrast, there was more apparent recognition that de-forestation could lead to supply problems. There were a few persons who could clearly articulate the operational framework, understanding that deforestation had a natural impact on e.g. longer-term availability of resources, and excessive rains. Some also recognized the relative impact of leaving hillsides bare of root-structures. These persons mainly included high school students, and key informants with fairly strong environmental backgrounds and/or exposure. Otherwise, the recognized impact of deforestation was mainly felt at the personal level e.g. people would have fewer trees for the purposes for which they were once used.

One of the concepts that seemed to be most appreciated, was the fact that *… if trees were removed in excess, then the pattern of rainfall could be affected …* The elements that were of most importance revolved around "*in excess*" and "…*could be*". But there was very little immediacy to the concerns. Use of the "degree" concept was often found in these discussion-points.

Riverside Farming
▪ The area around the riverbank was said to be extremely fertile.
▪ The river was said to "bring down" nourishments aplenty for the crops.
▪ The types of nutrients varied and represented a good mix of soil and its contents.
▪ The availability of water for the crops was assured, since even in relatively dry times, the underground water still had an important effect.
▪ There was no need for farmers to carry water or otherwise arrange crop-irrigation.

Riverside Farming
▪ Many farmers were no longer young, and the easy water access was highly valued. ▪ Even if there was loss due to heavy rains and the riverbanks overflowed, such a scenario was unlikely to occur frequently, and the longer-term, sustained gains far outweighed any occasional losses. ▪ Where there was loss to crops, lessons learned included knowing which crops to plant nearer to the river and which ones to plant a little further inland e.g. *those that grew underground (e.g. tubers), would not automatically be lost by flooding.*

The riverside agricultural practices extended to use of *chemicals*, and to *livestock rearing*. The use of chemicals was said to be critical in modern-day living, and partially dictated by consumer demand. Few consumers were said to want imperfectly formed crops for their tables. The few who could/did appreciate evidence of e.g. natural cropping methods, were older folks. When these latter purchased goods in the marketplace, they were said almost to need to see e.g. a hole here, or black spot there -- that was their evidence that they had not been treated with chemicals.

Importantly, some blame was leveled at the authorities that for example, had (almost) insisted that farmers use chemicals – especially with bananas, to ensure: (a) quick returns on investment; (b) visually appealing produce. There was some felt-resentment against these same authorities, as there were several negative residual effects of the directives, e.g.

- When farmers conformed to some of these (earlier) demands, there was not always the follow-up with respect to marketing/sale of produce;
- The raw materials required to ensure appropriate output was often costly;
- The use of bags for bananas resulted in additional solid waste for farmers' management – and these often remained in/around the river.

It was also found that farmers (and others) found nothing inherently wrong with tying a few livestock by the river. Similar reasons obtained as for crops, e.g. easy access to water.

Landslides: Multiple past landslides were reported and discussed in both the ***Rio Grande*** and ***Wag Water*** valleys. The stated reasons for the phenomenon were many, but included:

- Loss of soil cohesion due to removal of (too many) trees on the hillside.
- Excessive rains.
- Volcanic activity.
- God's work.

There was little stated human **culpability** said due to landslides. This was especially evident in the ***Rio Grande*** valley, where land-slippage was reported to have been taking place since the heavy rains experienced during October 2001. Although severely disrupting the lives of almost all residents north of the area (i.e. lower in the watershed), where the hillside soil enters the river, there was an apparent resignation to the fact that this was "life", and they just had to be patient and wait through the events. Yet, there was generally a subtle attempt to ensure that there was no mistaking the locus of the problem.

There is a history to landslides in both of these valleys. One of the sad events in *Portland* was related to the death of four (4) persons in a small district located near to *Fellowship*. After a

period of very heavy rains, the land by the roadside effectively crumbled, and both nearby residents and passers-by were killed. Two persons lived to relate the tale – one now physically impaired and the other (still) emotionally shaken. Yet, the house that was underneath the land that "came down" is still standing, and still occupied by the survivor This story is well known by most residents of the ***Rio Grande*** valley. There was however, little evidence that there were many "lessons learned" from the experience.

Sand- and Stone-Mining
One activity about which attitudes and explanations varied significantly both between-groups and within-groups was the relative effect of sand- and stone-mining on the flow and behaviours of rivers. There were essentially two (2) opinions: - 1. Removal of sand and/or stones was **good** since it better cleared the way for the river to move without obstruction, and reduced the likelihood of it overflowing or disrupting crops (or houses) by the side. It remained vertically focussed. 2. Sand/stone- mining was **bad**, since it increased the potential for more rapid and "harder" movement/flow of the river through the valley, thereby increasing the risk of damage especially in times of rain. Further, it increased lateral flow, and increased the (risk of) danger to nearby residents and crops. Residents' perceptions on this matter seemed to be influenced by many factors, among them being: - ▪ The type/nature of such activities in the area. ▪ The length of time (history) that such activities had been taking place (i.e. how intrinsic it was to the communities). ▪ The identity of the main/key players involved in the mining. ▪ The fact that most of the large miners were apparently licensed. ▪ The relative response by local officials to the activities. ▪ The relative involvement of community residents in the activities. ▪ The extent of evident disruption to communities involved. ▪ The perceived impact that the activities had on the flow of the river, and community residents' access and use of the river facilities. Sand/stone- mining was an integral part of the ***Rio Grande*** watershed, in/around the communities of *Grant's Level, Berridale*, and *St. Margaret's Bay*. Many residents had become accustomed to the activities. Some were uncertain of the impact. Interestingly, more than a few were reluctant to decry the practice. It was also said to be practiced in the ***Rio Cobre*** and ***Wag Water*** watersheds.

3.6.6 Understanding and Awareness of Sustainable Watershed Management Practices

The concept of "sustainability" was not really understood by the majority, most of the related issues having been earlier addressed. The dominant notion was that there was inherent longevity to most features of the natural environment. *Water* and *tree stocks* were the only elements believed by some to have any real potential for depletion. Further the concept of the ecosystem and relatedness of elements, their usage and their development, was not much appreciated – *it was almost as if the existence of "man (kind)" was secondary to that comprising these elements, and there was limited frailty in the longer-term existence of the latter.* Importantly, shorter-term deficiencies seemed to represent a more likely possibility, therefore the following types of events were understood to mean "something" important:

- *Human illness due to poor water quality;*
- *Death of fish from contaminated water;*
- *Noticeable change in rainfall patterns over time (decrease, different months);*

What is important is that individual actions were not generally regarded as being likely to have any significant negative impact on the longer-term sustainability of nature's elements. Once more, it was mostly about **degree**. The majority seemed to rarely consider the cumulative effects. Extrapolated "examples" follow: -

- A little *pesticide* in the water would not harm fishes
- A little *detergent* in the water would not cause any harm
- Handling a little *pesticide* without proper gears would not harm humans
- Making *furniture* from a few trees would not destroy a forest (or influence rainfall)

At the same time, there were very knowledgeable players within the respective communities, some of whose responsibility it has been to make this information known to others. In these respects, it became clear that current patterns and/or practices related to information dissemination have not been as successful as might have been hoped. While literacy has been limiting, the social platform and differentials have also created important barriers.

3.6.7 Perceived Obstacles to Implementing Watershed Management

There is a sense that people generally will do what they want to do, and there has to be enforcement in place to curb these natural tendencies. One classic example was of two (2) beaches – one designated as "*private*" and the other "*public*". Young people indicated that there were a few factors that would likely ensure that the former would remain in good condition, while the latter would be almost unsightly and in poor condition – even if it was the same set of people visiting the respective locations, *viz*.

The above focus related to visible presence and perception of enforcement. People were less likely to act negatively e.g. throw garbage around, urinate/defecate carelessly, if there were felt to be negative consequences. Yet the actions were not negative – it was just "*reality*". Other **obstacles** to implementation of (good) watershed management practices included:

1. The differential codes of conduct applied based on social and/or political standing
2. Different penalties applied based on social and/or political standing
3. Perceptions that "lower-status" cannot police actions of those with higher "status"
4. Effective policing likely being effective only if continuous and sustained
5. Enforcers being themselves guilty of poor environmental practices
6. Limiting knowledge of environmental laws
7. Low fines would not represent effective deterrents to many
8. Institutional programme failures e.g. providing garbage bins without collection
9. New community residents introducing negative practices e.g. garbage and/or sewage management

10. Older residents are often reluctant to listen to younger ones and vice versa

11. The fact that negative practices are sometimes due to (community) outsiders

12. Communication materials are not easily understood due to limited literacy e.g. *being able to read, understanding subtleties of conflicting words/images*

3.6.8 Understanding and Perception: Environmental Stewardship

There was fairly good intrinsic understanding and appreciation of the need for environmental stewardship. The word "*steward*" was unknown, but the definitions mainly centered on being a "*warden*". There were certain types of residents who wanted to (and often did) play a bigger role in carrying out this function, *viz*.

- Secondary-school students;
- Raft captains;
- Some members of groups/entities charged with environmental management.

Most residents felt that this type of enforcement was necessary, although not easy to implement. Without "teeth" in the laws and other means of enforcement, it was felt difficult to assure individuals' compliance.

Of all the types of persons with whom discussions were held, those most likely to fill the subtler role of "*attendant*" were young, school-based and already had an interest in environmental matters i.e. (a) secondary school students; and (b) young teachers. At the community level, the latter commanded a certain degree of respect. *This is not to imply that older teachers of similar leaning/ilk, could not satisfy the requirements, but these latter would likely have an "authoritarian" approach, and be less-understanding of children and their potential role.* Importantly, males with vested economic interest e.g. raft captains, could also play an important part in generating support for environmental issues and practices.

3.6.9 Understanding Compliance Issues

There was almost no real knowledge awareness of existing environmental laws among the general population. People were aware of, understood, and appreciated the need for, laws – even sometimes calling for them. However, but most did not realize that they existed. This was especially clear among groups comprising key community members, e.g. raft captains, even though they were not necessarily leaders in their respective communities. Key informant groups generally comprised some persons who had knowledge of existing laws.
It also has to be said that some of this "knowledge" was restricted to recognition of terms, e.g. "*Town and Country Planning Act*", "*Quarries Control Act*", "*Public Health Act*", "*Litter Act*". Interestingly, some focus group participants were actually calling for regulations as would be comprised in some of these acts prior to being asked about them in the context of the sessions. One such related to the "*Litter Act*", where it was felt that especially in areas rivers especially (but also on land), such a deterrent would help to stem abuse by those who seemed not to care, and /or who wantonly created garbage nuisances. The important obstacle of absence of a good public garbage systems, restricted compliance not only in rural areas, but also apparently in some townships.

Interestingly in the ***Rio Grande*** watershed, *Port Antonio* was identified as a generally clean town, where garbage disposal (a) pans were easily accessible; and (b) rules were enforced. Yet, it was also said that residents from *Port Antonio* itself actually used the inland areas e.g. *Fellowship,*

Tom's Hope, for garbage disposal areas. Some residents reported hearing cars coming in at night -- despite poor road conditions -- and occupants emptying garbage near the riverbanks.

There was also a felt-distance between community residents who were born and grew in the respective areas, and those who came in from other communities e.g. via *marriage*, or *work*. These latter were seemingly never fully incorporated into the community machinations and sentiment – regardless of how long they had lived there. This was found in practically all the communities visited. Therefore any negative behaviour of which they were guilty, were over-exposed.

The other type of "outsider" in the community was the non-resident farm owner. These persons however, also offered employment, and so are generally left to their own devices. There existed a cordial inter-relationship with residents. In speaking with some of these persons, it has also been ascertained that they sometimes play a minimal role in community-based activities, and often do not "mix". The social distances also create further barriers, and it has been said for example, that:

- Whereas locals use the river, "outsiders" do not (this despite the fact that much of their agricultural activities might be strongly supported by that as a resource);

- In crises, locals were accessible (resident), but "outsiders" often were not;

- Locals often wondered why the "outsiders" were there, and if it was for income-generating activities, then it meant that there was (latent) opportunity for others, if they followed suit.

The "**compliance**" concept was perceived at two (2) different levels, *viz*.

(a) Doing what should be natural for good communal relationships; and

(b) Not doing what would be punishable by law.

The framework within which one's rights would/should/could be protected seemed more enshrined in the former, but this could have been due to limited awareness of details of the laws themselves. It is also possible however, that residents felt that it should be unnecessary to resort to legal problem solving for matters that involve human decency – that would only be a last resort. The practice of throwing garbage/faeces into rivers was a case in point. There also seemed somewhat of a distance between legal applications and individuals' access to justice.
The relationship between "**survival**" and "compliance" was important, the following examples indicating this:

Survival and Compliance

1. *Clearing land to plant coffee:*

   a. Coffee is a choice crop and good income-earner, having potential even from small hillside plots;

   b. Other crops are providing reduced returns on investments & many persons have no other income;

   c. Coffee is legal, and land is available to them – even around their homes;

   d. The risk is perceived to be minimal or non-existent relative to potential.

2. *Using riverbanks for agriculture:*

   a. The land is available – lawfully or otherwise – and at that location is considered the "most fertile";

   b. One of the most important inputs – water -- is easily accessible;

   c. Any other option for obtaining that water would be "costly";

   d. Crops provide families with food that might not have been unavailable;

   e. With sufficient yield, crops can also generate a reasonable income;

   f. The potential loss would be occasional – and certainly worth the risk.

3. *Cutting timber trees for furniture, construction, etc.:*

   a. "Good" trees are available in near and ample supply;

   b. The value of and demand for certain of these trees is well-known;

   c. Alternate access to this input material would be costly (even foolish);

4. *Cutting bamboo to make rafts:*

   a. Rafting is considered special – an art requiring skill;

   b. It can generate reasonable household income;

   c. Bamboo rafts with special specifications are essential for rafting;

   d. There is a craft to making good rafts – worthy of inter-river comparison;

   e. Bamboo exists in abundance by the riverbanks;

   f. Efforts put into accessing bamboo is indicative of their importance.

5. *Washing clothes in the river for a living:*

   a. The river (generally) has clean water;

   b. The NWC has largely rendered stand-pipes non-functional;

   c. Metered piped water supply is available only to some;

   d. The cost of the NWC water is considered high to many;

   e. People need to have clean clothes;

   f. Women can wash clothes as a service for those who are employed;

   g. Everybody gets the chance to restrict NWC water for drinking & cooking.

6. *Being unmindful about use of harmful agricultural chemicals:*

   a. Chemicals have almost become essential for farming;

   b. They carry a cost, as do other farming components;

   c. Most small farmers do not have large plots;

   d. They only use small amounts of chemicals

   e. Why spend on gloves, masks, and overalls -- for those small amounts?

   f. Utensils can be washed in the nearby river – less exposure;

   g. Utensils can also be discarded in the river – get them out of harm's way;

   h. Children might go into their fields as there is no day care facility;

   i. Women and children work the fields as they do not have to pay them.

Photo 9 - An example of poor land husbandry practices in the *Wag Water* watershed

3.6.10 Understanding of Enforcement Issues

The institution called "*The Government*" was largely felt responsible for environmental enforcement. Other than this more generic labeling, there was only occasional mention of specific entities e.g.

- **JAS** (Jamaica Agricultural Society)
- **NWC** (National water Commission)
- **ODPEM** (Office of Disaster Preparedness and Emergency Management)
- Public Health Department
- **RADA** (Rural Agricultural Development Agency)
- **SDC** (Social Development Commission) – mostly mentioned in ***Rio Grande***
- **TPDCo**. (Tourism Product Development Company) -- known in some ***Rio Grande*** communities based on their ownership/operations of the rafting attraction

It was not very clear where "the Government's" responsibility's ended (or began) and those of individuals and/or other organizations might lie. In one respect, it seemed as if "The Government" was supposed to be the ultimate facilitator. Some of the other entities also had facilitating roles (e.g. JAS, NWC, SDC), but others were regarded as problem-solvers (e.g. ODPEM, RADA). Any further descriptors were either community/or issue-specific. There is one recollection of discussions held in a community not "officially" part of this study – the Great River community (i.e. at the mouth of the river). *The fact that the "Evening on the Great River" was no longer in existence was felt to mean by some residents (raft captains) that it was time for "The*

Government" to intervene and operate it, as the private operators clearly could not manage what was supposed to be such a successful event with clear money making opportunity.

Conversely, on the other side of the island, some raft captains in Portland were wondering of the viability of having a private (or even cooperative) management structure in place for the rafting facility, as the income due to captains was apparently inadequate at times.

One area in which responsibility was firmly with "The Government" (as enforcer) was for resolution of the PET and Styrofoam container issues. Several key informants felt that Government's approval of their use by businesses was the first mistake, and if there were restrictions that served as a deterrent to use (e.g. increased taxation), then there would be less of a garbage problem island-wide. Smaller bottles for which there was no longer a buy-back arrangement offered by manufacturing/retail companies, were also categorized similarly. Alternatively, the manufacturers should be given the responsibility of ensuring their adequate disposal – all "The Government's" responsibility.

There were also several situations mentioned where it appeared that the Government's policies had been adjusted over time, being less vigilant and/or involved in garbage management, and leaving more of the onus for garbage management with community residents. This related mainly to e.g.

- Cleaning rivers; and
- Adequate garbage disposal at the community level.

Enforcement of environmental management laws at the community level was not deemed likely to be an easy task. One of the main reasons related to the relative proximity in which people lived. What was noted however, was the relative importance of having a continued presence in the community, given the need for ongoing vigilance. Further, it seemed that many could readily identify the nuisance-makers, and this ongoing enforcement "presence" would assist those who could identify the culprits. As an add-note, it was interesting to observe that many who claimed alternative and/or good garbage management practices were also seen to be responsible for poor practices – i.e. those leveled against other community members.

There was almost no mention of Non-Governmental Organizations (NGO's) involved with environmental management activities. When the posters were viewed, some persons indicated that they thought they had heard about "NEPA" before. Some key informants in the ***Great River*** and ***Rio Grande*** watersheds knew of *Ridge to Reef*.

3.7 Gender and Age Differences in all of the Above

Throughout the study, there was a tendency for residents to defer to men, and especially community elders, for discussions on the river. It was as if this information was in their domain – they had "authority". It was also quite difficult to bring together a group that is rarely "problematic" i.e. women "heads of households" or equivalent e.g. in their 30's and 40's. The complete reasons are still unknown. Certainly, many would be unlikely to challenge resident male elders' historical perspectives on the rivers. Men's use of the river could be considered primary and women's secondary. The former is generally for very important income-generation activities that result in household-maintenance e.g. *farming, fishing, rafting*. Women mainly use the river for *bathing* and *washing* household clothes. On occasion, and especially in the ***Rio Grande*** valley, women use the river for recreational activities e.g. swimming. Special occasions (e.g. anniversaries and birthdays) for raft captains' spouses could mean a rafting trip and picnic on the river. This general situation seemed to pertain to the residents in their 20's to 40's.

Older folks seem not to use the river much for recreation. The younger ones who can swim (and especially boys and young men) use the river quite often and it actually represents an important site for *play* and *fun*. The very skilled boys/young men challenge each other regularly (and themselves) in the waters e.g. in *diving*, and *swimming*. Those who do not know how to swim often learn in this medium and for that reason/at that time, smaller rivers (or those that are "low") are preferred.

Girls and young women seem rarely to "really" use the river. It did not seem to be their domain, except for washing clothes. Few reported frequent visits – unless for picnics and other (very) social occasions. Very few non-swimmers had been there – and certainly did not know the "choice" spots. But it (and surrounding areas) still represented quiet and privacy – therefore was a good place for young lovers.

Another aspect that seemed to be important regarding use and connectedness was religion. In the ***Rio Grande*** valley, there are many *Seventh Day Adventists*. They do not eat shellfish and therefore had no interest in some of the main products of the river – *djanga* and *bussu*.

Girls and young women seemed more interested and aware about technical details of environmental management and good practice. This is undoubtedly related to their alleged increased performance over boys in school. However, it seemed unlikely that unless they were literally teachers, they would be accepted as the "teachers of men". Mid-aged women (e.g. 30's and 40's) were found to be very conscious of educational deficits, and environmental discussions seemed to suggest that they needed knowledge. This latter could have been a reason for ***Rio Grande*** PRO's seeming "protective" of those under their care.

3.8 Preferred and Existing Communication Networks and Channels

The society seems predominantly fixed to an oral tradition – in several ways creating a very "serious" barrier to accuracy and definition. The reason is that it is the storytellers' apparent authority that seems often to dictate the veracity of new information. In a situation with limiting literacy and/or access to factual information and/or use of source data, then stories and myths can -- and sometimes do -- take the precedence.

Within focus group settings where there was discussion between participants of several issues, some (especially elderly) persons left sessions indicating how much they had learnt. A few were even anxious to pass this "information" on to others. Just because they had heard it said (by their peers) in these fairly structured settings.

3.8.1 Reviewing Previously Developed Posters

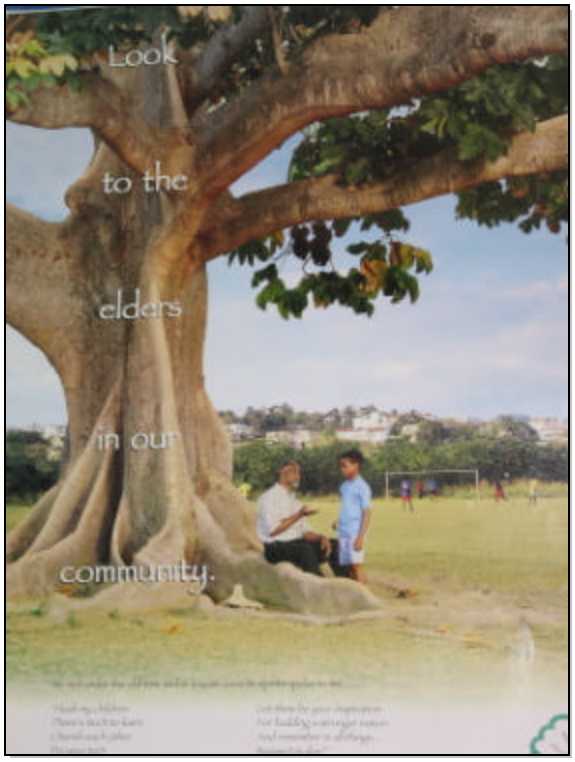
Visualization and specifically the use of pictures and moving pictures (e.g. *film/video*), is also highly regarded by many community members. One of the exercises conducted in some group sessions of the study, was review of existing environmental posters. In general, it was found that the most preferred poster was the one:

- With simplest pictorial description
- Which clearly indicated "what to do" and "what not to do"
- Had very little background, descriptive writings

Poster 1

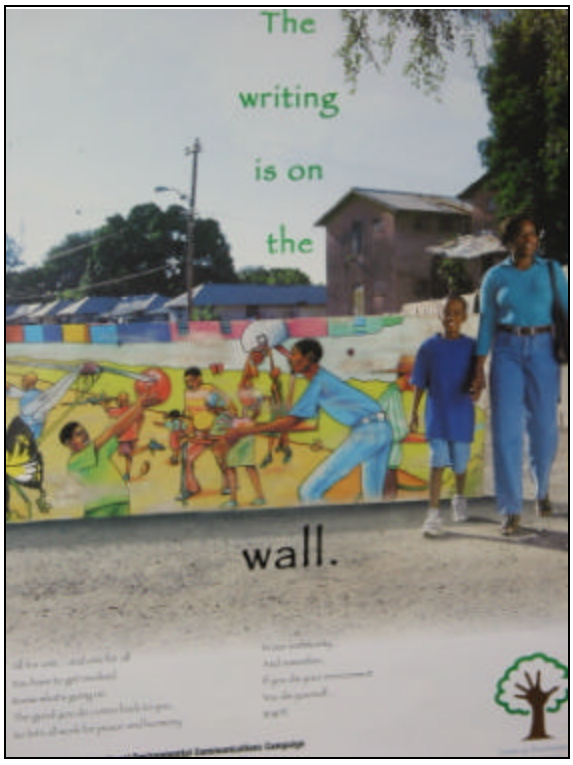
Poster 2

Poster 3



Poster 4

Poster 5



Poster 6

Poster 7

3.8.2 Committees

One of the channels of communication found in some watersheds was via committees. The most active were in the Rio Grande valley. However, it seemed that some of the structures/executive membership for formal groups (with special reference to the ***Rio Grande***) could well have considered a "literacy factor". The more "learned" ones seemed to be the ones invited to group membership and certainly to executive positions, e.g:

- The positive aspect of this finding was that there was a voice created for those who were less inclined to speak publicly.
- The negative aspect however, was that the executive membership effectively "controlled" the speech and (implied control for awareness/knowledge of) thoughts of those with lesser-education.
- As a result, many processes did not show much evidence of a participatory base, and in some focus groups as an example much effort had been given to allowing <u>everybody's</u> voice.
- It was often found that those who spoke "for" others, in fact did not adequately and/or appropriately and/or accurately represent their experiences, attitudes.
- A few of the louder voices really wanted to control.
- Importantly, some of these same persons were vested with "public relations" responsibilities, i.e. the right and responsibility to speak on behalf of the others.

This type of scenario however, also typifies the types of dangers arising from some "community-based meetings" where matters are discussed by the *few*, but the *several* leave not having made an input – yet considering themselves having been enriched. Further, decisions are sometimes taken in such meetings on the basis of input from these *few*, but without the feedback from the less certain or silent participants. One of the clearer indications from this study is that there has to be increased opportunity to provide "voice" to those who do not normally have their say. The "unknowing" of some of these quieter persons was very evident within several focus group sessions. Unfortunately, important output materials are also often developed on the basis of feedback from few, without much relevance and/or application to the larger majority. It is about implementation and of use appropriate and **truly participatory methodologies.**

In one session with "key informants", persons were asked to respond to a particular poster. The first (and "most vocal" and arguably one of the most "educated" but almost definitely the most "traveled") response indicated that the poster was "childish" without any appeal to adults. Further probing indicated this to be a very personal opinion not shared by any other participant. In fact, the others felt the poster to be (a) quite useful, (b) clear in its message, (c) appropriately depicted; and (d) for everybody including adults.

3.8.3 Other Organizations

There are a few other channels and/or organizations that are well known, often used, and trusted for information dissemination. These include:

- Church groups
- **JAS** (Jamaica Agricultural Society)
- Public Health Department
- **SDC** (Social Development Commission) – in the ***Rio Grande*** valley

Importantly, the perceptions held of NGO's within the ***Rio Grande*** valley, is quite poor. This is mainly due to the fairly long history of association and work by such entities – with many residents feeling that communities have gained very little as a result of such activities. There was also limited indication that many environmental NGO's were much known.

3.8.4 The Media

Local television stations were apparently used quite often in many of the deeper rural areas – the main reason likely being absence of cable. Programmes mentioned included: "*Hill-and-Gully Ride*", "*JIS*", "*News*", and "*Profile*". There was far less use of (and maybe access to and/or interest in) the local newspapers.

4.0 RESULTS – SURVEY

The study results suggested significant differences between the four (4) watershed areas on several factors. Breakdown of respondents in the areas is as shown in Table 1. Many findings reflect trends earlier highlighted in the qualitative investigation. However, some are new, and still others are surprising. Some of these latter are being further investigated to ensure veracity, and in this respect, some findings from the Wag Water watershed should be specially mentioned.

Table 1: Sample distribution by watershed, parish, community

Watershed	Parish/*Community*	N	%
Great River:		**293**	**35.3**
	St. James:	**58**	
	Bickersteth	29	
	Montpelier	29	
	Hanover:	**145**	
	Copse	27	
	Chester Castle	89	
	Ramble	29	
	St. Elizabeth:	**90**	
	Ginger Hill	54	
	Pisgah	36	
Rio Cobre:		**128**	**15.4**
	St. Catherine:	**128**	
	Bog Walk	128	
Rio Grande:		**279**	**33.6**
	Portland:	**279**	
	Berridale	18	
	Comfort Castle	43	
	Cooper's Hill	29	
	Durham	24	
	Fellowship	72	
	Ginger House	35	
	Tom's Hope	16	
	Other	42	
Wag Water:		**131**	**15.8**
	St. Andrew:	**131**	
	Golden Spring	37	
	Mt. Airy	37	
	Mt. James	48	
	Mt. Prospect	1	

Watershed	Parish/*Community*	N	%
	Other	8	

4.1 Sample Distribution and Description (Table 2)

Sex: There were equal proportions of males and females, which was somewhat surprising based on many survey distributions. The implication here is that more males were to be found at home than in the more urban centres.

Heads of Households: Approximately one-half (1/2) of the respondents were also heads of their respective households.

Age: In keeping with national data, the sample was quite young, 61% being under 40 years. Somewhat surprisingly, the proportion of seniors was quite low.

Religion: The largest category of respondents (46.5%) was identified as being Christian. Both the Jehovah's Witnesses and Seventh Day Adventists had been provided separate categories due to earlier suggestion of high membership in the Rio Grande valley. This proved quite factual, since more of the Rio Grande residents (32.4%) identified themselves as being Seventh Day than (a) any other religion; and/or (b) found in any other watershed area. The difference between watersheds was found to be highly significant.

Literacy and Education: Self-reports of literacy adequacy indicated that 86.8% rated themselves as being at least of average literacy for reading. The area with the highest proportion of non-readers (5.5%) was the Great River. Importantly, this rate did not correspond with the education levels, as more persons identified "Primary school" as their highest level in the Rio Grande (35.9%), and the Rio Cobre (31.5%) watersheds, than did those in the Great River (26.9%).

There were highly significant correlations between education and both age (X^2 = 221.6; df=30; $p \leq .001$) and literacy (X^2 = 378.5; df=25; $p \leq .001$). None of those failing to complete primary school rated themselves as being "very good" at reading, while only 6.8% of them said they were "good". The majority (63%) rated themselves as being "bad" or worse at reading. The area in which least persons seemed to have completed their secondary education and/or pursued higher levels, was the Rio Grande watershed.

Table 2: Sample distribution and description by watershed

		Great River	Rio Cobre	Rio Grande	Wag Water	Total
Sex:	(X^2 = 0.1; df=3; n.s.)					
Male		50.5	49.2	50.0	49.6	**50.0**
Female		49.5	50.8	50.0	50.4	**50.0**
Head of household:	(X^2 = 1.8; df=3; n.s.)					
Yes		50.0	51.2	50.4	43.8	**49.4**
No		50.0	48.8	49.6	56.2	**50.6**
Age (years)**:**	(X^2 = 44.9; df=18; $p \leq .001$)					
15 – 19		14.7	7.8	18.3	13.7	**14.7**

		Great River	Rio Cobre	Rio Grande	Wag Water	Total
20 – 29		22.3	21.1	18.6	34.4	**22.8**
30 – 39		24.7	31.3	19.4	22.1	**23.5**
40 – 49		22.3	20.3	15.8	13.7	**18.4**
50 – 59		7.5	10.2	12.2	4.6	**9.0**
60 – 69		6.2	5.5	9.3	4.6	**6.9**
70+		2.4	3.9	6.5	6.9	**4.7**
Religion:	(X^2 = 158.8; df=15; p ≤ .001)					
None		26.6	15.3	31.6	12.2	**24.2**
Christian		46.8	52.7	28.4	77.9	**46.5**
Jehovah's Witness		1.7	2.3	4.0	--	**2.3**
Rastafarian		5.1	6.1	2.5	3.8	**4.2**
Seventh Day Adventist		15.7	10.7	32.4	3.1	**18.4**
Other		4.1	13.0	1.1	3.1	**4.3**
Literacy: how well do you read?	(X^2 = 58.4; df=15; p ≤ .001)					
Not at all		5.5	0.8	1.4	0.8	**2.7**
Very bad		2.7	2.4	1.1	1.6	**1.9**
Bad		8.9	7.1	10.4	5.4	**8.6**
OK/Average/Adequate		28.4	35.4	48.0	38.8	**37.7**
Good		26.0	23.6	27.6	26.4	**26.2**
Very good		28.4	30.7	11.5	27.1	**22.9**
Education (last…):	(X^2 = 84.0; df=15; p ≤ .001)					
Primary (incomplete)		11.0	12.6	5.7	7.8	**9.0**
Primary (complete)		15.9	18.9	30.2	8.5	**19.9**
Secondary (incomplete)		23.4	15.7	34.0	35.7	**27.6**
Secondary (complete)		22.4	24.4	18.9	34.9	**23.6**
Vocational/Skills training		20.3	22.8	7.2	10.9	**14.9**
Tertiary		6.9	5.5	4.2	2.3	**5.1**
Occupation classification:	(X^2 = 115.0; df=30; p ≤ .001)					
Unemployed		12.1	18.9	19.5	22.8	**17.3**
Student		14.2	7.1	14.4	13.4	**13.0**
Housewife		7.3	11.8	9.4	0.8	**7.7**
Unskilled/Labourer/Domestic		6.9	5.5	8.7	7.9	**7.4**
Farmer		16.3	9.4	26.4	33.1	**21.2**

		Great River	Rio Cobre	Rio Grande	Wag Water	Total
Hustling/Small trade or stall		9.0	3.1	4.0	7.9	**6.2**
Skilled/Tradesman		19.0	32.3	8.3	7.1	**15.6**
Clerical/Administrative		4.2	4.7	2.2	1.6	**3.2**
Trained/Technical		6.6	3.1	4.0	--	**4.1**
Managerial/Own business		1.4	2.4	0.7	0.8	**1.2**
Semi-Prof/Professional		3.1	1.6	2.5	4.7	**2.9**
Personal Income (est. monthly)**:**	(X^2 = 126.3; df=15; p ≤ .001)					
NA/None		19.5	28.1	30.5	31.8	**26.4**
Less than $10,000/m.		21.8	32.8	40.9	43.4	**33.2**
$10,000 to $20,000/m.		20.5	20.3	20.1	17.8	**19.9**
$20,000 to $50,000/m.		16.0	9.4	5.2	3.1	**9.4**
$50,000 to $100,000/m.		--	2.3	--	--	**0.4**
No response		--	7.0	3.3	3.9	**10.7**
Household Income (est. monthly)**:**	(X^2 = 129.7; df=21; p ≤ .001)					
NA/None		8.5	18.8	5.8	7.7	**9.1**
Less than $10,000/m.		18.4	17.2	36.5	24.6	**25.2**
$10,000 to $20,000/m.		19.5	21.1	38.0	26.9	**27.0**
$20,000 to $50,000/m.		23.9	21.1	12.8	13.1	**18.1**
$50,000 to $100,000/m.		2.7	6.3	0.7	1.5	**2.4**
$100,000 to $250,000/m.		0.3	--	0.4	--	**0.2**
$250,000 to $500,000/m.		--	0.8	--	--	**0.1**
Mo response		26.6	14.8	5.8	26.2	**17.8**
Transportation: How do you mainly travel?	(X^2 = 10.2; df=9; n.s.)					
Bus/Taxi/Van		86.6	85.9	87.1	92.4	**87.6**
Private motor vehicle		12.4	14.1	10.4	6.1	**11.0**
		0.7	--	2.2	1.5	**1.2**
		0.3	--	0.4	--	**0.2**
Possessions (household):						
Radio	(X^2 = 3.2; df=3; n.s.)	95.5	93.8	93.2	96.9	**94.7**
Television (colour)	(X^2 = 6.5; df=3; n.s.)	87.9	89.1	83.3	91.6	**87.2**
Cable service	(X^2 = 80.0; df=3; p ≤ .001)	9.3	46.1	16.2	21.9	**19.3**

		Great River	Rio Cobre	Rio Grande	Wag Water	Total
Refrigerator	(X^2 = 31.3; df=3; p ≤ .001)	77.7	86.6	64.0	81.7	**75.1**
Main Cooking Fuel:	(X^2 = 37.8; df=12; p ≤ .001)					
Coal/charcoal		4.6	11.0	6.8	2.3	**6.0**
Electricity		2.1	3.9	4.7	5.4	**3.8**
Liquid Petroleum Gasoline (LPG)		79.3	83.5	76.6	89.1	**80.6**
Kerosene		2.5	0.8	1.8	0.8	**1.7**
Wood		11.6	0.8	10.1	2.3	**7.9**
Housing/Land tenure:	(X^2 = 50.1; df=12; p ≤ .001)					
Own home		67.4	55.9	72.6	59.2	**66.1**
Lease/rent		22.0	38.6	15.7	31.5	**24.0**
Squatting: Private land		1.7	2.4	4.4	1.5	**2.7**
Squatting: Government land		5.2	0.8	1.8	--	**2.6**
Other		3.8	2.4	5.5	7.7	**4.7**
Housing construction:	(X^2 = 22.2; df=9; p ≤ .01)					
Block & steel		59.9	68.8	56.8	73.3	**62.4**
Wood		39.7	28.1	41.0	26.0	**36.2**
Wattle & daub		--	0.8	0.4	0.8	**0.4**
Other		0.3	2.3	1.8	--	**1.1**
Water facilities (main):	(X^2 = 182.5; df=21; p ≤ .001)					
Piped into house		42.5	51.6	34.9	53.4	**43.1**
Standpipe: community/public		11.6	3.1	6.1	8.4	**8.0**
Standpipe: yard		26.4	42.2	32.0	35.9	**32.2**
Water trucked to community		0.7	--	0.4	--	**0.4**
River, spring, stream, well		3.1	0.8	18.0	0.8	**7.4**
Rain water		13.7	--	0.4	--	**4.9**
Water hauled to household		0.7	1.6	3.6	0.8	**1.8**
Other		1.4	0.8	4.7	0.8	**2.3**

		Great River	Rio Cobre	Rio Grande	Wag Water	Total
Drinking water (generally):	(X^2 = 15.9; df=9; p ≤ .001)					
No (special) treatment		69.4	64.8	73.6	81.7	**72.1**
Boiled		10.3	10.2	10.5	6.1	**9.7**
Use bleach/chlorine		18.2	24.2	15.2	12.2	**17.2**
Other		2.1	0.8	0.7	--	**1.1**
Toilet facilities (main):	(X^2 = 93.8; df=24; p ≤ .001)					
None/Scandal bags/open lot		--	--	--	1.5	**0.2**
Soak-away pit		13.7	9.4	2.2	6.9	**8.1**
Sink hole		0.7	--	--	--	**0.2**
Septic tank		0.3	--	0.4	2.3	**0.6**
Public latrine		--	3.1	2.5	--	**1.3**
(Own) Pit latrine		43.6	42.2	61.4	35.9	**48.1**
(Own) flush -- outside home		7.2	7.0	3.6	3.1	**5.3**
(Own) Flush -- inside home		34.4	37.5	29.2	50.4	**35.7**
Other		--	0.8	0.7	--	**0.4**
Garbage disposal (main):	(X^2 = 296.4; df=18; p ≤ .001)					
Government systems		3.1	53.1	2.5	31.5	**15.2**
Community systems		1.0	1.6	--	--	**0.6**
Burning		76.6	39.1	59.6	47.7	**60.5**
Burying		11.4	3.9	22.7	9.2	**13.7**
River		--	0.8	0.4	--	**0.2**
Sink-hole		4.1	--	1.4	3.1	**2.4**
Other		3.8	1.6	13.4	8.5	**7.4**
Favourite: Radio	(X^2 = 100.9; df=27; p ≤ .001)					
None		5.8	5.5	7.9	12.2	**7.5**
Hot 102		6.5	4.7	4.3	7.6	**5.7**
Irie – FM		37.5	31.3	47.7	32.1	**39.1**
Love – FM		13.3	11.7	0.4	11.5	**8.4**
KLAS		4.8	--	1.4	0.8	**2.3**
Kool FM		0.7	--	--	0.8	**0.4**
JBC – Radio 2		5.8	4.7	8.2	9.9	**7.1**

		Great River	Rio Cobre	Rio Grande	Wag Water	Total
Power 106		6.8	3.9	3.9	5.3	**5.2**
RJR		18.4	35.2	26.2	16.8	**23.3**
Roots FM/Other		0.3	3.1	--	3.1	**1.1**
Favourite: Television	(X^2 = 38.0; df=15; p ≤ .005)					
None		8.9	15.6	11.2	15.3	**11.7**
CVM		30.5	26.6	21.7	29.8	**26.8**
Love - TV		1.0	2.3	0.4	2.3	**1.2**
TVJ		54.5	40.6	53.1	41.2	**49.8**
Cable television		3.8	14.1	12.3	11.5	**9.4**
NA/no television		1.4	0.8	1.4	--	**1.1**
Newspaper Usage:	(X^2 = 59.3; df=15; p ≤ .001)					
Not at all		27.7	17.2	41.7	18.3	**29.3**
1 to 2x/month		13.0	22.7	19.6	16.8	**17.3**
1 to 2x/week		31.5	27.3	23.2	32.8	**28.3**
3 to 4x/week		8.6	10.9	4.0	13.7	**8.2**
5 or more x/week		6.5	4.7	3.3	3.8	**4.7**
Daily		12.7	17.2	8.3	14.5	**12.2**
Favourite: Newspaper:	(X^2 = 83.9; df=12; p ≤ .001)					
NA/None		27.3	25.0	41.5	29.0	**31.9**
Gleaner		22.2	28.1	20.0	22.1	**22.4**
Observer		15.7	11.7	6.2	5.3	**10.3**
Star		18.4	28.9	28.4	41.2	**27.0**
Other		16.4	6.3	4.0	2.3	**8.5**

Occupation: Just over one-fifth of the sample (21.2%) gave "farmer" as their substantive occupation, but quite a large proportion was unemployed (17.3%), the highest levels being found in the Wag Water area (22.8%). Other occupational categories mentioned with some frequency included: skilled/tradesmen (15.6%) and student (13.0%). The Rio Cobre area had the highest proportion of skilled/tradesmen (32.3%). The highest proportion of semi-professionals/professionals (4.7%) was listed in the Wag Water watershed.

Income: Income levels varied, but were generally low. The highest proportion of the respondents identified their personal monthly income as being "less than $10,000". Almost one-quarter of the sample (26.4%) indicated they had no personal income. Only 9.8% said they earned in excess of $20,000 monthly. Household income levels were similarly stratified, but the proportion in upper bands was now greater, with 20.8% of respondents indicating an income of more than $20,000 per month for the household.

As generally found, there was an absence of response by some of those interviewed. There was 10.7% non-response when persons were asked about "personal income", this figure increasing to 17.8% for the question about "household income".

Transportation: The large majority of the study population (87.6%) traveled via public transportation.

Possessions: Respondents were asked about a few key possessions. Almost everyone (94.7%) owned a radio, and a similar proportion owned colour television sets (87.2%). Cable service however, was quite limited, only 19.3% having access. Those in the Rio Cobre watershed were significantly different in this regard, as almost one-half (46.1%) had cable TV. The large majority also owned refrigerators (75.1%), those in the Rio Grande being the least likely owners (64.0%).

Cooking Fuel: Most persons used cooking gas (80.6%), another 7.9% using "wood" and 6.0% indicating their main fuel to be coal and/or charcoal. Use of electricity was limited to 3.8% of the sample.

Housing and Housing Construction: A relatively high proportion of respondents owned their own homes (66.1%), the proportion being highest in the Rio Grande valley (72.6%). Much of the construction was with block and steel (62.4%), but most of the rest was with wood (36.2%). The proportion using wood for construction was highest in the Rio Grande valley (41.0%).

Water Facilities: Water was mainly obtained via piping into the home (43.1%), or using a standpipe in the yard (32.2%). Once more, it was in the Rio Grande valley that most households seemed dependent on the rivers and streams (18.0%). In the Great River however, there was a fairly high proportion that relied on rainwater (13.7%) as the primary source.

Photo 10 - Trying to supply household water needs – *Wag Water* community

Drinking Water: The majority of respondents (72.1%) did not specially treat their water (Table 2). Whereas this was understandable for the majority based on water source (Table 3), the trend was also similar for those getting their water from the rivers or springs.

Table 3: Treatment of household water relative to water source

Main Source of Household Water								
	Piped into house	**Public standpipe**	**Standpipe in yard**	**Trucked water**	**River/spring**	**Rain water**	**Water hauled to household**	**Other**
N:	355	66	267	3	60	41	15	19
Treatment								
No treatment	64.5	83.3	79.0	33.3	76.7	63.4	80.0	78.9
Boiled	12.1	7.6	6.4	33.3	6.7	17.1	13.3	5.3
Chlorine	22.0	7.6	14.2	33.3	15.0	19.5	6.7	10.5
Other	1.4	1.5	0.4	--	1.7	--	--	5.3

Toilet Facilities: The main toilet facilities identified were pit latrines owned by the households (48.1%), with a smaller percentage (35.7%) having their own flush toilet inside the home. Few soak-away pits were found (8.1%), but the proportion was higher in the Great River watershed area (13.7%).

Garbage Disposal: There was a great difference in garbage disposal systems between watersheds. The two (2) watersheds in closest proximity to the Kingston Metropolitan Area were those indicating highest degree of service from the official Government disposal systems, i.e. Rio Cobre (53.1%) and the Wag Water (31.5%). There was almost no such service (or use of service) in the other areas. Burning garbage was the most used method, with 60.5% identifying this as the main method. More than three quarters of the Great River population (76.6%) burned their garbage. Burying was also a much-used option (13.7%).

Media Favourites: Respondents were also asked about the media favourites (Table 2). Favourites were identified as follows: -

- **Radio**: Irie FM > RJR
- **Television**: TVJ > CVM
- **Newspaper:** Star > Gleaner

These data have to be interpreted cautiously however, based on differential media access (e.g. transmission, distribution, penetration). Limited access to cable television supports the findings of higher preferences for the local TV stations. It is also noteworthy that there is a relatively high percentage of non readership that could be further explained with the relatively low literacy found some areas. The Rio Grande area had the highest level of non-print media (newspapers) usage (41.7%).

Household Composition:The watershed households seemed mainly to comprise on average two (2) to three (3) adults, each with one (1) child aged 12 to 17 years, and another aged under 12 years.

Table 4: Household composition indicators by watershed

Household Composition		Great River	Rio Cobre	Rio Grande	Wag Water	TOTAL
# Adults	Mean	2.77	2.98	2.52	2.97	**2.75**
	Median	2.00	3.00	2.00	3.00	**2.00**
	SD	1.63	1.72	1.07	1.48	**1.47**
	Minimum	1	1	1	1	**1**
	Maximum	9	13	6	9	**13**
	Median	1.00	0.00	1.00	0.00	**1.00**
	SD	1.72	1.18	1.01	1.37	**1.35**
	Minimum	0	0	0	0	**0**
	Maximum	9	5	5	4	**9**
# Children less than 12 yrs	Mean	1.48	1.02	1.04	1.05	**1.19**
	Median	1.00	0.50	1.00	1.00	**1.00**
	SD	1.71	1.38	1.16	1.37	**1.46**
	Minimum	0	0	0	0	**0**
	Maximum	0	6	8	10	**10**

Farming Status and Activities There were varying farming patterns found among the watershed households (Table 5). The Wag Water and Rio Grande watersheds were the ones with most household-farming activity, while the Rio Cobre indicated least farming by households. At the individual level, 27.9% of the Rio Grande respondents identified themselves as being the main farmer, while 20.6% of those in the Wag Water communities did the same. Those "helping out" on household farms in the Wag Water watershed represented 26.8% of that sub-sample. The highest proportion of "backyard gardening" as the only type of farming was found in the Rio Cobre area (35.9%).

Table 5: Farming activity by watershed

	Great River	Rio Cobre	Rio Grande	Wag Water	TOTAL
Farming status:					
No farming at all	37.9	52.7	34.1	33.6	**38.3**
Backyard garden only	30.7	35.9	27.5	18.3	**28.5**
Backyard & h'hold farm	13.7	4.6	5.8	9.2	**8.9**
I am main farmer (h'hold)	10.2	6.1	27.9	20.6	**17.1**
I help out (h'hold farm)	7.5	0.8	4.0	26.8	**6.7**
Other	--	--	0.7	1.5	**0.5**
Household farming (plot size(s):					
None/NA	38.2	52.7	37.7	38.2	**40.6**
Backyard garden	31.1	35.9	26.1	13.0	**27.5**
Other farming location:					

	Great River	Rio Cobre	Rio Grande	Wag Water	TOTAL
< 2.9 acres	21.5	4.6	15.2	29.8	**18.2**
3 to 4.9 acres	4.4	3.8	8.7	16.0	**7.6**
5 or more acres	4.4	3.1	10.9	3.1	**6.2**
Farm ownership:					
Not applicable/None	51.7	74.0	45.3	44.3	**51.9**
Own/with title	15.1	9.2	15.0	14.5	**14.0**
"Own" even though no title	13.0	4.6	15.0	10.7	**12.0**
Family/with title	8.2	3.8	9.9	23.7	**10.5**
Leased/rent	7.5	6.1	9.5	4.6	**7.5**
Squatting: private	0.7	1.5	2.9	0.8	**1.6**
Squatting: Government	2.4	--	1.5	1.5	**1.6**
Squatting: owner unknown	1.0	--	1.1	--	**0.7**
Livestock:					
Not applicable/none	58.7	70.2	52.7	70.9	**60.3**
Cattle	17.7	3.8	23.2	4.6	**15.3**
Chickens	18.8	24.4	21.7	9.2	**19.1**
Goats	13.3	6.9	24.6	15.3	**16.4**
Pigs	9.9	6.1	13.8	10.7	**10.7**
Rabbits	0.3	0.8	0.4	--	**0.4**
Sheep	--	--	--	--	**--**
Other	2.0	--	2.2	2.3	**1.8**
Main methods for securing animals:					
Not applicable/None	58.0	73.3	52.7	72.3	**60.9**
Pens	18.4	16.8	20.1	13.1	**17.9**
Free roam	6.5	4.6	4.0	4.6	**5.1**
Tied – field	15.7	4.6	21.6	9.2	**14.9**
Near rivers	0.3	--	0.4	--	**0.2**
Near ponds	0.3	--	--	--	**0.1**
Other	0.7	0.8	0.7	--	**0.6**
Farm/river location (**best description**):					
Not applicable/no farm	57.0	74.0	51.1	45.8	**56.1**
Farming on riverbank	13.3	--	2.6	4.6	**6.3**
River thru' farm property	4.8	1.5	15.3	4.6	**7.7**
No river on farm property:	24.9	24.4	30.7	45.0	**29.9**

The Rio Grande was the area with the largest proportion (10.9%) of "large" farmers i.e. those farming five (5) or more acres of land. The Rio Cobre watershed had the least proportion of "titled" farms. The areas nearest to the Kingston Metropolitan Area, viz. Rio Cobre and Wag Water, had least livestock, while a substantial proportion of the Rio Grande farmers had cattle (23.2%) and goats (24.6%). Few of these livestock were said to roam freely, instead being secured by pens (17.9%) or tied in fields (14.9%). The Wag Water farmers were least likely to have a river running through the farm lands, while the Rio Grande farmers were most likely to have a river or other similar water source on their farms.

Respondents were also asked the relative frequency with which they took part in certain farming and/or farm management activities (Table 6). Findings indicated that except for ploughing, there were statistically significant differences between watersheds. The Rio Grande valley had the most intensive/extensive farming activities, with proportionately the largest majority of persons saying they "often" or "always" got involved in the respective farming activities. That sub-sample also however, had the largest proportions saying that they "never" got involved. It should be noted that the complete sample was included in these analyses therefore responses from those completely outside the sphere of farming activities were recorded as being "not applicable". As previously indicated, this mainly applied to the Rio Grande valley residents. The main and most frequently engaged in types of activities, based on total proportion saying they were "often" or "always" involved were: -

- Care/weeding (29.7%)
- Planting crops (26.3%)
- Reaping (23.0%)

There were statistically significant **sex** differences between respondents for (Table 7): -

- Ploughing (X^2 = 94.3: df=5; p < .001)
- Planting crops (X^2 = 61.7: df=5; p < .001)
- Care/weeding (X^2 = 58.9: df=5; p < .001)
- Use of farm chemicals (X^2 = 58.4: df=5; p < .001)
- Reaping (X^2 = 42.8: df=5; p < .001)
- Selling (X^2 = 62.5: df=5; p < .001)

There were statistically significant **age** differences between respondents for: -

- Ploughing (X^2 = 74.5: df=30; p < .001)
- Planting crops (X^2 = 87.2: df=30; p < .001)
- Care/weeding (X^2 = 91.7: df=30; p < .001)
- Use of farm chemicals (X^2 = 58.0: df=30; p < .005)
- Reaping (X^2 = 68.1: df=30; p < .001)
- Selling (X^2 = 88.9: df=30; p < .001)

Table 6: Respondent participation in farm and/or farm management activities

Activities		NA	Never	Rarely	Sometimes	Often	Always
a. Ploughing							
	G/ River	23.5	30.4	12.6	22.2	5.8	5.5
	R/Cobre	35.1	29.0	9.9	15.3	8.4	2.3
	R/Grande	17.8	34.9	10.5	20.7	**10.2**	**5.8**
	W/Water	28.5	30.8	10.8	20.8	6.2	3.1
(X^2 = 24.0: df=15; n.s.)	**All**	**24.2**	**31.7**	**11.2**	**20.4**	**7.7**	**4.7**
b. Planting crops							
	G/ River	21.2	21.2	7.2	25.3	15.4	9.9
	R/Cobre	34.4	23.7	6.9	15.3	15.3	4.6
	R/Grande	16.8	26.0	5.9	16.1	**21.6**	**13.6**
	W/Water	26.7	23.7	10.7	22.1	13.0	3.8
(X^2 = 43.4: df=15; p < .001)	**All**	**22.7**	**23.6**	**7.2**	**20.2**	**17.0**	**9.3**
c. Care/weeding							
	G/ River	21.8	21.2	8.5	18.1	12.3	18.1
	R/Cobre	34.4	23.7	9.9	13.7	13.0	5.3
	R/Grande	16.7	26.4	4.3	11.2	**21.7**	**19.6**
	W/Water	26.7	26.0	8.4	23.7	11.5	3.8
(X^2 = 66.9: df=15; p < .001)	**All**	**22.9**	**24.1**	**7.3**	**16.0**	**15.4**	**14.3**
d. Using farm chemicals (*sprays* etc.)							
	G/ River	24.9	37.9	12.6	18.8	3.4	2.4
	R/Cobre	45.8	38.9	5.3	6.9	3.1	--
	R/Grande	18.3	45.8	7.3	19.0	**6.2**	**3.3**
	W/Water	31.3	35.9	9.9	18.3	3.8	0.8
(X^2 = 54.8: df=15; p < .001)	**All**	**27.1**	**40.3**	**9.3**	**16.9**	**4.3**	**2.1**
e. Reaping							
	G/ River	24.9	19.8	5.8	27.0	10.9	11.6
	R/Cobre	35.9	25.2	4.6	16.8	13.0	4.6
	R/Grande	17.9	25.9	4.7	20.4	**16.4**	**14.6**
	W/Water	27.5	18.3	10.7	30.5	7.6	5.3
(X^2 = 48.6: df=15; p < .001)	**All**	**24.7**	**22.4**	**6.0**	**23.8**	**12.5**	**10.5**
f. Selling							
	G/ River	26.0	34.9	6.5	21.2	3.8	7.5
	R/Cobre	42.7	35.9	5.3	9.2	4.6	2.3
	R/Grande	20.3	32.2	7.6	15.9	**13.8**	**10.1**
	W/Water	32.3	28.5	7.7	19.2	6.2	6.2
(X^2 = 57.2: df=15; p < .001)	**All**	**27.7**	**33.2**	**6.9**	**17.2**	**7.6**	**7.4**

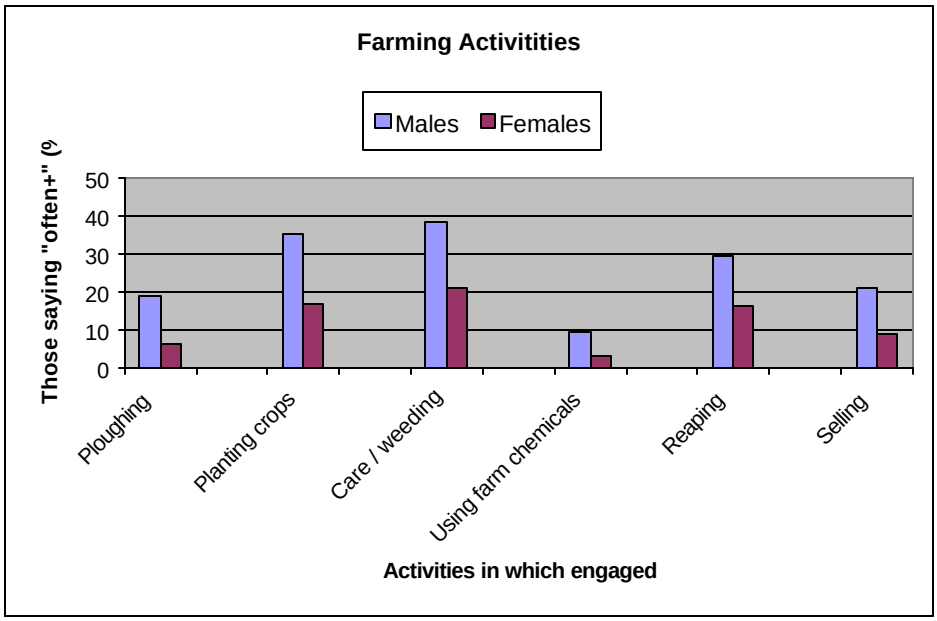


Table 7: Agricultural activities by sex

Activities			NA	Never	Rarely	Some-times	Often	Always
a.	**Ploughing**							
		Males	18.1	21.4	14.5	27.2	11.6	7.2
	(X^2 = 94.3: df=5; p ≤ 0.001)	Females	30.3	42.1	8.0	13.6	3.9	2.2
b.	**Planting crops**							
		Males	17.9	15.5	7.7	23.2	23.0	12.6
	(X^2 = 61.7: df=5; p ≤ 0.001)	Females	27.3	31.6	6.8	17.1	11.1	6.0
c.	**Care/weeding**							
		Males	17.8	16.1	8.4	19.0	20.7	17.8
	(X^2 = 58.9: df=5; p ≤ 0.001)	Females	27.7	32.0	6.3	13.0	10.1	10.8
d.	**Using farm chemicals (*sprays* etc.)**							
		Males	22.3	32.8	13.1	22.1	6.3	3.4
	(X^2 = 58.4: df=5; p ≤ 0.001)	Females	31.6	48.0	5.5	11.8	2.4	0.7
e.	**Reaping**							
		Males	20.1	16.2	6.5	27.4	15.5	14.3
	(X^2 = 42.8: df=5; p ≤ 0.001)	Females	29.2	28.7	5.5	20.2	9.6	6.7

Activities			NA	Never	Rarely	Some-times	Often	Always
f.	**Selling**							
		Males	22.5	25.7	7.7	23.0	9.4	11.6
	(X^2 = 62.5: df=5; p ≤ 0.001)	Females	32.8	40.7	6.0	11.5	5.8	3.1

4.2 Environment and Watershed Concepts

One of the questions to which persons were asked to respond, related to whether they regarded various "items", and/or features as being "natural resources" (Table 8). The large majority of respondents in all the areas indicated clear agreement for the main "wood and water" resources about which they were asked. Heading the list were trees, rivers, and agricultural soil, forests, and springs. There was less agreement on human resources (children and community residents), and the saline resources that were also further away from their area of residence.

There seemed to be somewhat stronger sentiment relating to garbage management than other concepts about which the respondents were asked (Table 9). They often strongly agreed or disagreed with that to which they were asked to respond. Some of the statements for which there tended to be only moderate agreement (combined with disagreements and/or uncertainties), were those for which there could have been: *lack of knowledge, lack of forethought, lack of a clear position*.

Table 8: How "*natural resources*" are perceived

Watershed Area						
	Great River	Rio Cobre	Rio Grande	Wag Water	Total	*P Values*
Regarded as natural resources …	*-- % saying "yes" --*					
Trees	88.1	87.8	87.6	97.7	**89.4**	n.s.
Rivers	86.7	88.5	88.0	97.7	**89.2**	< .01
Agricultural soil	81.6	91.6	82.2	96.2	**85.7**	< .005
Forests	86.0	67.2	84.1	95.4	**83.9**	< .001
Springs	87.4	65.6	83.7	94.7	**83.9**	< .001
Natural (scenic) beauty	67.9	74.8	78.2	92.4	**76.3**	< .001
River-stones & -sand	59.9	81.7	78.5	96.2	**75.3**	< .001
Children	79.9	80.8	63.4	58.8	**71.2**	< .001
Community residents	60.8	76.3	58.0	58.0	**61.9**	< .001
Seas	27.4	6.9	49.5	13.7	**29.3**	< .001
Coral Reefs	16.0	5.3	32.2	13.0	**19.3**	< .001
Other	1.4	3.1	3.0	3.3	**2.5**	< .005

Table 9: Centering the conceptual framework

	Somewhat Disagree	Disagree	Neither A nor D	Agree	Somewhat Agree	Mean
What they mainly agreed with:						
If people were punished for littering, then they would stop doing it.	0.8	7.2	5.9	56.1	29.9	**4.07**
If Government had more systems for environmental, garbage, and river management, then more people would do the right thing.	1.5	7.0	5.2	60.2	26.2	**4.03**
Cutting down too many trees can reduce the amount of rainfall.	1.6	9.7	7.0	50.2	31.5	**4.00**
Cutting down too many trees can increase floods or landslides.	1.7	8.5	9.3	51.3	29.2	**3.98**
How you take care of your personal household surroundings is often similar to how you care for the wider environment.	3.1	14.3	8.0	46.4	28.2	**3.82**
The church should tell people more about caring the environment.	1.9	9.2	13.7	57.2	18.0	**3.80**
People often prefer to be baptized in a river than in a (church) pool.	2.3	10.6	25.3	47.5	14.3	**3.61**
It is better to bury household garbage than to burn it, since it all goes back into the earth anyway.	8.0	19.8	15.4	41.4	15.5	**3.37**
There is very little that people can do to reduce the effects of a natural disaster on a community or country – it is God's work.	10.2	27.6	7.3	37.0	17.9	**3.25**
When flood rains and landslides damaged places and properties in Portland, it was because it was meant to be – it was God's work.	16.3	29.7	12.3	32.0	9.7	**2.89**
Almost every riverhead has a river-maid (*mermaid*) to protect it.	21.4	28.1	20.2	19.8	10.5	**2.70**
What they mainly disagreed with:						
It is difficult for humans (*people*) to really destroy the environment.	22.4	46.3	9.6	15.3	6.4	**2.37**
If community members suffer from illnesses such as typhoid or other bad fevers, it is God's will.	26.9	48.4	11.2	9.9	3.6	**2.15**
The river is a good place for garbage since it will wash away.	51.1	40.7	1.9	5.2	1.1	**1.65**
People should be free to do what they want with their garbage.	47.6	45.7	22.8	3.3	0.6	**1.63**

	Somewhat Disagree	Disagree	Neither A nor D	Agree	Somewhat Agree	Mean
It is OK for people to throw trash out of cars, since somebody else will pick it up.	54.7	39.3	2.3	1.3	2.4	**1.58**

Photo 11- Rafting preparations on the *Rio Grande*, Portland

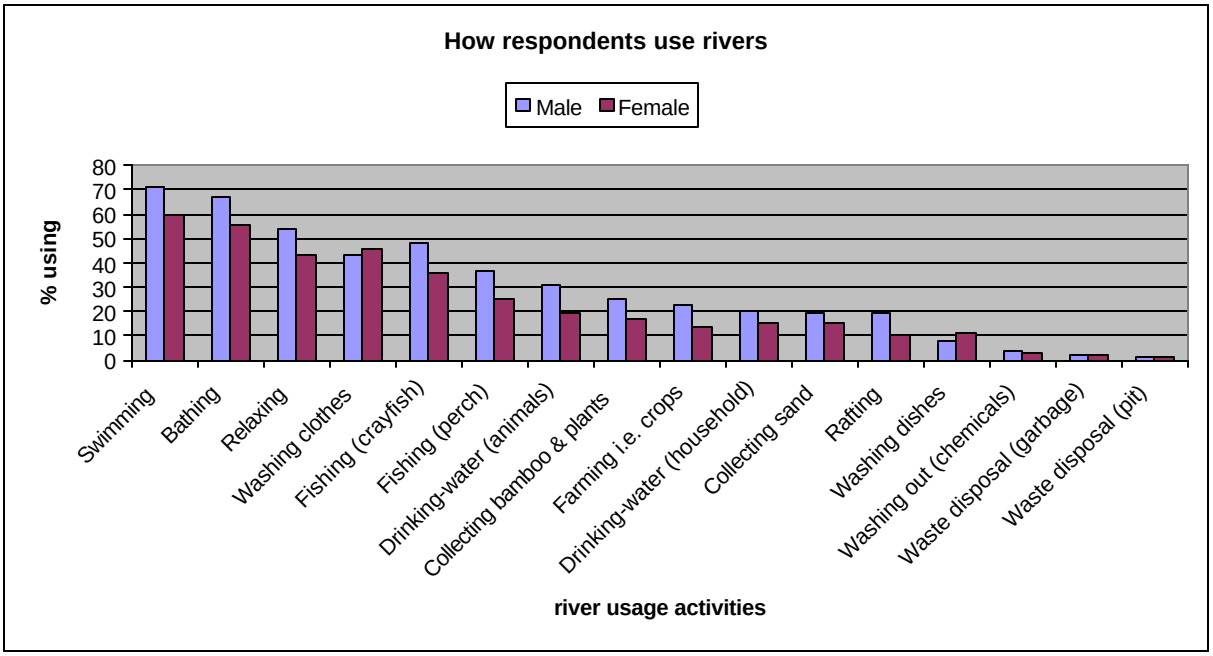
4.3 Watershed Management Practices and Attitudes

Review of watershed practices indicated that the most mentioned use of river water was for **recreation**, i.e. swimming, bathing, and relaxing (Table 10). The main domestic purpose for which river water was used was washing clothes. Thereafter, the main uses were economic e.g. fishing, farming (water for animals). The Rio Cobre was reportedly the least used river, even for recreational purposes. This is certainly in keeping with earlier findings that suggested a fear of the water and likely consequences of use. The Rio Grande on the other hand, seemed to be much more used, for recreational as well as domestic and economic activities.

Table 10: Use of river water -- by watershed

	Watershed Area				TOTAL	
	Great River	Rio Cobre	Rio Grande	Wag Water		*P values*
Ways respondents use river …	*-- % saying "yes" --*					
Swimming	67.1	46.6	72.0	64.9	**65.1**	< .001
Bathing	68.2	35.9	66.5	59.5	**61.2**	< .001
Relaxing	51.5	33.6	53.1	47.7	**48.6**	< .005
Washing clothes	54.0	14.5	51.6	38.9	**44.6**	< .001

	Watershed Area				TOTAL	
	Great River	Rio Cobre	Rio Grande	Wag Water		*P values*
Fishing e.g. crayfish	43.2	37.4	41.3	47.3	**42.3**	n.s.
Fishing e.g. perch	25.8	37.4	36.4	24.4	**30.9**	< .01
Drinking-water (farm animals)	31.8	17.6	26.9	13.0	**25.0**	< .001
Collecting bamboo & other plants	19.5	20.8	24.1	29.8	**21.3**	n.s.
Farming i.e. crops	25.1	15.3	14.2	13.7	**18.1**	< .005
Drinking-water (household)	16.8	14.5	22.8	12.2	**17.7**	< .05
Collecting sand	5.1	4.6	34.9	22.1	**17.6**	< .001
Rafting	14.9	4.6	25.5	0.8	**14.6**	< .001
Washing dishes	8.2	--	16.7	6.9	**9.5**	< .001
Washing out e.g. farm chemicals	5.1	--	5.1	0.8	**3.6**	< .01
Waste disposal e.g. garbage	3.4	0.8	1.8	0.8	**2.0**	n.s.
Waste disposal e.g. household pit	1.4	--	2.9	--	**1.4**	< .05
Other	0.7	--	0.4	0.8	**0.5**	n.s.



Results further indicated that males use the river far more than do females (Table 11). This was evident for most activities about which respondents were asked, and the majority of differences were statistically significant.

Table 11: River use by sex (respondents)

Ways respondents use river …	Sex		
	Male	Female	*P values*
	-- % saying "yes" --		
Swimming	70.9	59.3	≤ 0.001
Bathing	66.9	55.3	≤ 0.001
Relaxing	54.1	43.2	≤ 0.005
Washing clothes	43.1	46.1	n.s.
Fishing e.g. *crayfish*	48.6	36.1	≤ 0.001
Fishing e.g. *perch*	36.5	25.4	≤ 0.001
Drinking-water (*farm animals*)	30.9	19.1	≤ 0.001
Collecting bamboo & other plants	25.5	17.1	≤ 0.005
Farming i.e. crops	22.9	13.3	≤ 0.001
Drinking-water (*household*)	20.0	15.3	≤ 0.05
Collecting sand	19.6	15.4	n.s.
Rafting	19.3	10.0	≤ 0.001
Washing dishes	8.2	10.9	n.s.
Washing out e.g. *farm chemicals*	3.9	3.1	n.s.
Waste disposal e.g. *garbage*	2.2	1.9	n.s.
Waste disposal e.g. *household pit*	1.2	1.7	n.s.

Respondents were also asked about their households' use of the river (Table 12). Many did not know enough to respond for their households. Further, the response for many of the activities indicated that they "did not use it at all". In general however, the household usage patterns tended to mirror those for the respondents, in ranked usage.

Table 12: Household-level river use

Ways in which river used …	(ii) **You & your household use the river …**					
	DK/NA	Not at all	Rarely	Average	Quite Often	Very Often
	0	1	2	3	4	5
Swimming	18.1	16.2	21.3	19.8	15.7	8.9
Bathing	17.5	22.6	23.5	14.7	14.6	7.2
Relaxing	26.1	25.6	20.2	16.0	8.1	3.9
Washing clothes	26.6	29.1	15.6	10.2	10.6	8.0
Fishing (e.g. crayfish)	27.2	30.0	16.2	13.9	8.9	3.9
Fishing (e.g. perch)	33.9	34.1	11.0	9.9	7.0	4.1
Drinking-water (*farm animals*)	36.1	38.9	3.0	5.2	8.9	7.8
Collecting bamboo & other plants	36.6	40.7	14.3	5.3	2.3	0.7

Ways in which river used …	(ii) **You & your household use the river …**					
	DK/NA	**Not at all**	**Rarely**	**Average**	**Quite Often**	**Very Often**
Farming i.e. crops	38.6	42.3	4.2	4.2	7.5	3.3
Drinking-water (*household*)	37.5	44.3	6.2	5.3	3.9	2.8
Collecting sand	38.4	44.3	11.2	4.9	1.1	0.1
Rafting	41.2	44.2	6.6	4.3	2.0	1.7
Washing dishes	40.4	49.8	4.8	1.5	1.3	2.2
Washing out e.g. *farm chemicals*	43.7	52.5	1.8	1.2	0.7	--
Waste disposal e.g. *garbage*	43.3	54.8	1.3	0.2	0.1	0.1
Waste disposal e.g. *household pit*	43.8	55.4	0.2	0.2	0.1	0.1

The most consistent and/or sustained use of **forest** resources seemed to be for "drinks/teas" (Table 13) with just over one-quarter (25.9%) of the respondents indicating they were either used "weekly" or "daily". This proportion was much higher in the Rio Grande valley, with 39% of the sub-sample indicating they had these drinks/teas with such frequency. Overall, only 20.2% of the sample indicated that they "never used" the forests/trees for drinks or teas.

Table 13: Use of forest resources -- by watershed

		Frequency of Use (*est*.)					
Main Types		**Never/ NA**	***Occasion-ally***	***Yearly***	***Monthly***	***Weekly***	***Daily***
Drinks/Teas:							
	Great River	12.8	57.4	0.3	7.6	15.2	6.6
	Rio Cobre	26.0	45.8	2.3	4.6	14.5	6.9
	Rio Grande	14.7	31.3	3.3	11.8	25.0	14.0
	Wag Water	43.0	27.3	1.6	15.6	9.4	3.1
(X^2 = 125.7; df=15; p <0.001)	**All**	**20.2**	**42.2**	**1.8**	**9.8**	**17.4**	**8.5**
Medicines:							
	Great River	20.8	71.3	1.0	3.5	2.1	1.4
	Rio Cobre	53.4	32.8	1.5	7.6	2.3	2.3
	Rio Grande	30.3	46.9	5.2	12.5	4.1	1.1
	Wag Water	45.7	44.2	1.6	7.8	--	0.8
(X^2 = 102.0; df=15; p <0.001)	**All**	**33.0**	**52.8**	**2.6**	**7.8**	**2.4**	**1.3**

		Frequency of Use (*est.*)					
Main Types		**Never/ NA**	***Occasion-ally***	***Yearly***	***Monthly***	***Weekly***	***Daily***
Coal/Fire Wood							
	Great River	29.8	49.5	4.5	6.9	5.5	3.8
	Rio Cobre	84.6	9.2	1.5	3.1	0.8	0.8
	Rio Grande	45.4	27.8	4.4	8.8	6.6	7.0
	Wag Water	81.4	10.1	0.8	4.7	2.3	0.8
(X^2 = 184.0; df=15; p <0.001)	**All**	**51.8**	**29.7**	**3.4**	**6.6**	**4.6**	**3.9**
	Great River	41.4	37.2	16.9	2.1	1.0	1.4
	Rio Cobre	96.2	3.1	0.8	--	--	--
	Rio Grande	76.0	17.8	4.4	0.7	0.4	0.7
	Wag Water	88.5	10.7	--	0.8	--	--
(X^2 = 186.0; df=15; p <0.001)	**All**	**69.0**	**21.2**	**7.5**	**1.1**	**0.5**	**0.7**
	Great River	32.6	40.3	25.7	1.4	--	--
	Rio Cobre	76.3	17.6	5.3	--	0.8	--
	Rio Grande	46.2	20.1	23.8	7.0	2.6	0.4
	Wag Water	65.4	21.5	11.5	0.8	--	0.8
(X^2 = 135.5; df=15; p <0.001)	**All**	**49.3**	**27.0**	**19.6**	**2.9**	**1.0**	**0.2**

Use for medicines was also registered across a large proportion of the sample, only one-third (33.0%) saying that they "never used" the resources for medicinal purposes. Importantly, the frequency of use was mostly described as "occasionally", these situations likely being driven by need. Use of resources for coal/fire wood was reported by 8.5% indicating weekly or daily use.

The farmers in the respective watershed communities were asked about use of agricultural chemicals, including fertilizers, herbicides, and pesticides (Table 14). Almost one-half (45.7%) indicated they used agricultural chemicals "sometimes". Those using most often were located in the Rio Grande valley. Fertilizers were the chemicals most often used, with between one-third (1/3) and one-half (1/2) of the farmers in all watersheds except the Wag Water indicating they used them "often" or "always". Herbicides and pesticides were used less often.

Table 14: Use of agricultural chemicals, fertilizers, herbicides, and pesticides by watershed farmers

			Frequency					
	Agricultural chemicals & equipment		**NA**	**Never**	**Rarely**	**Some-times**	**Often**	**Always**
a.	**Use of *agricultural chemicals*:**		**0**	**1**	**2**	**3**	**4**	**5**
		G/River	9.0	5.6	27.0	46.1	6.7	5.6
		R/Cobre	21.4	--	7.1	64.3	7.1	--
		R/Grande	12.4	13.4	5.2	43.3	9.3	16.5
		W/Water	13.0	14.8	9.3	44.4	7.4	11.1
	(X^2 = 33.2; df=15; p <0.005)	**All**	**11.8**	**10.2**	**13.8**	**45.7**	**7.9**	**10.6**
b.	***Fertilizers* used:**							
		G/River	16.5	1.1	15.4	34.1	14.3	18.7
		R/Cobre	14.3	--	21.4	21.4	35.7	7.1
		R/Grande	8.7	1.9	2.9	36.5	45.2	4.8
		W/Water	17.2	8.6	24.1	39.7	8.6	1.7
	(X^2 = 68.9; df=15; p <0.001)	**All**	**13.5**	**3.0**	**12.7**	**35.6**	**26.2**	**9.0**
c.	***Herbicides* used:**							
		G/River	37.8	8.9	12.2	33.3	6.7	1.1
		R/Cobre	78.6	--	--	--	21.4	--
		R/Grande	21.2	3.8	7.7	43.5	21.2	2.9
		W/Water	69.0	10.3	5.2	13.8	1.7	--
	(X^2 = 67.1; df=15; p <0.001)	**All**	**40.2**	**6.8**	**8.3**	**31.2**	**12.0**	**1.5**
	***Pesticides* used:**							
		G/River	43.3	5.6	16.7	23.3	7.8	3.3
		R/Cobre	50.0	--	7.1	14.3	28.6	--
		R/Grande	31.7	4.8	7.7	34.6	14.4	6.7
		W/Water	48.3	8.6	13.8	24.1	3.4	1.7
	(X^2 = 24.9; df=15; n.s.)	**All**	**40.2**	**5.6**	**12.0**	**27.4**	**10.5**	**4.1**

Looking at the equipment and materials used in farming activities (Table 15), it was found that spray cans were used "often" or "always" by approximately one-third (34.6%) of the farmers. The "requisite" protective gear however, such as gloves, masks and overalls, were used with far less frequency. Wag Water farmers seemed more likely to don such gear than those in other farming communities located in the watersheds. The difference in practices between watersheds was statistically significant for all items.

Table 15: Gears used with agricultural chemicals, fertilizers, herbicides, and pesticides

			Frequency					
	Agricultural chemicals & gears		**NA**	**Never**	**Rarely**	**Some-times**	**Often**	**Always**
(iv)	**Use spray cans.**							
		G/River	13.6	18.5	23.5	22.2	9.9	12.3
		R/Cobre	--	9.1	9.1	72.7	9.1	--
		R/Grande	1.1	15.7	4.5	32.6	18.0	28.1
		W/Water	8.5	4.3	14.9	31.9	14.9	25.5
	(X^2 = 44.9; df=15; p <0.001)	**All**	**7.0**	**14.0**	**13.6**	**30.7**	**14.0**	**20.6**
(i)	**Use of gloves.**							
		G/River	4.8	13.3	22.9	36.1	7.2	15.7
		R/Cobre	9.1	9.1	36.4	36.4	9.1	--
		R/Grande	5.5	45.1	11.0	25.3	3.3	9.9
		W/Water	4.2	12.5	10.4	45.8	6.3	20.8
	(X^2 = 41.2; df=15; p <0.001)	**All**	**5.2**	**25.3**	**16.3**	**33.9**	**5.6**	**13.7**
(ii)	**Use masks.**							
		G/River	10.8	39.8	13.3	21.7	6.0	8.4
		R/Cobre	9.1	45.5	27.3	18.2	--	--
		R/Grande	3.3	48.4	6.6	27.5	3.3	11.0
		W/Water	2.2	6.5	13.0	47.8	8.7	21.7
	(X^2 = 41.6; df=15; p <0.001)	**All**	**6.1**	**36.8**	**11.3**	**29.0**	**5.2**	**11.7**
(iii)	**Use overalls.**							
		G/River	6.0	39.8	12.0	22.9	4.8	14.5
		R/Cobre	--	72.7	9.1	--	9.1	9.1
		R/Grande	5.5	71.4	6.6	11.0	1.1	4.4
		W/Water	4.3	10.9	23.9	41.3	6.5	13.0
	(X^2 = 59.1; df=15; p <0.001)	**All**	**5.2**	**48.1**	**12.1**	**20.8**	**3.9**	**10.0**

Respondents were also asked far more specific **attitudinal** questions about use of watershed resources. Many of these related to commonly practiced activities e.g. swimming (Table 16). They were asked to indicate whether they thought the practices to be "good" or "bad", and the degree of their feelings, e.g. "very good" or "very bad". For analyses, each response was also assigned a value from which means were calculated. As the variable is not a continuous one, these means however, can only be used as a **proxy** indicating relative strength of response. Findings showed (Tables 16a to 16d) that the only two (2) practices that were clearly regarded as "good" (based on the mean values) were (a) both related to keeping the river clean; and (b) both involved community participation to this end. Great River residents seemed to have less

conviction than those in other watersheds however, with respect to these practices. Importantly, there were no practices that had an overall rating that would be labeled as "very good".

Table 16a: Attitudes related to watershed resource use (*what is "good"*)

		DK/Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Having regular river clean-up days.								
	G/River	5.1	1.4	1.4	21.8	31.7	38.6	3.89 ± 1.26
	R/Cobre	1.5	--	0.8	9.9	36.6	51.1	4.34 ± 0.89
	R/Grande	4.7	2.9	1.1	13.9	44.2	33.2	3.90 ± 1.23
	W/Water	--	1.5	0.8	1.5	36.2	60.0	4.52 ± 0.72
(X^2 = 67.3: df=15; p < .001)	**All**	**3.6**	**1.7**	**1.1**	**14.1**	**37.3**	**42.1**	**4.06 ± 1.16**
Having a resident in charge of keeping the river clean.								
	G/River	6.8	2.0	2.7	20.5	36.2	31.7	3.72 ± 1.36
	R/Cobre	3.8	0.8	3.8	11.5	43.5	36.6	3.99 ± 1.16
	R/Grande	4.3	--	1.1	13.0	44.9	36.6	4.04 ± 1.11
	W/Water	--	--	0.8	2.3	39.2	57.7	4.54 ± 0.59
(X^2 = 65.1: df=15; p < .001)	**All**	**4.5**	**0.8**	**2.0**	**13.7**	**40.7**	**38.2**	**4.00 ± 1.18**

Looking further at practices rated as being "OK", it was found (Table 16b) that three (3) of the four (4) involved residents' recreational use of the rivers. For most the majority response was between "OK" and "good". Nevertheless, there were significant differences between responses from the different watershed areas. The other activity that was regarded as being "OK" was the suggestion of "punishing households that litter river areas". The respondents mostly rated practices that were "marginally negative" but that could be regarded as "customary household and/or community activities" as being "bad" (Table 16c). These included: *spear fishing, washing clothes in the river, drinking river water,* and *cutting trees for firewood.*

Table 16b: Attitudes related to watershed resource use (*what is "OK"*)

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Punishing households that litter river-areas.								
	G/River	7.9	7.5	9.2	15.8	34.2	25.3	3.37 ± 1.53
	R/Cobre	2.3	2.3	9.2	7.6	50.4	28.2	3.85 ± 1.14
	R/Grande	5.1	2.5	6.9	7.6	45.8	32.0	3.83 ± 1.30
	W/Water	--	2.3	5.4	1.6	58.1	32.6	4.13 ± 0.87
(X^2 = 65.7: df=15; p < .001)	**All**	**4.8**	**4.2**	**7.9**	**9.6**	**44.4**	**29.1**	**3.72 ± 1.33**

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Having family fun-days by the river.								
	G/River	10.4	6.2	6.6	46.0	15.6	15.2	2.96 ± 1.42
	R/Cobre	5.3	1.5	2.3	24.4	48.1	18.3	3.62 ± 1.18
	R/Grande	5.5	1.1	9.5	18.7	49.1	16.1	3.54 ± 1.22
	W/Water	--	--	2.3	16.9	52.3	28.5	4.07 ± 0.74
(X^2 = 161.2: df=15; p < .001)	**All**	**6.3**	**2.8**	**6.2**	**28.9**	**37.7**	**18.1**	**3.43 ± 1.29**
Swimming in the river.								
	G/River	3.1	2.1	6.5	43.5	34.2	10.6	3.36 ± 1.03
	R/Cobre	2.3	0.8	17.7	35.4	39.2	4.6	3.23 ± 0.99
	R/Grande	1.8	0.7	9.1	32.6	43.1	12.7	3.52 ± 0.97
	W/Water	--	0.8	9.9	44.3	33.6	11.5	3.45 ± 0.85
(X^2 = 34.0: df=15; p < .005)	**All**	**2.1**	**1.2**	**9.7**	**38.7**	**37.9**	**10.5**	**3.41 ± 0.98**
Rafting on the river.								
	G/River	7.5	0.7	2.7	46.1	23.9	19.1	3.35 ± 1.27
	R/Cobre	14.5	0.8	5.3	31.3	40.5	7.6	3.06 ± 1.43
	R/Grande	6.5	--	2.2	25.5	49.1	16.7	3.60 ± 1.20
	W/Water	9.2	2.3	9.2	27.5	45.0	6.9	3.18 ± 1.31
(X^2 = 87.5: df=15; p < .001)	**All**	**8.6**	**0.7**	**4.0**	**34.0**	**38.2**	**14.6**	**3.36 ± 1.29**

Table 16c: Attitudes related to watershed resource use (*what is "bad"*)

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Spear fishing for fish/fishing for crayfish (*djanga*) in river.								
	G/River	17.7	10.6	11.6	38.6	16.4	5.1	2.41 ± 1.47
	R/Cobre	11.5	3.8	19.8	41.2	20.6	3.1	2.63 ± 1.26
	R/Grande	4.4	3.3	25.5	32.7	28.0	6.2	2.96 ± 1.15
	W/Water	9.2	0.8	7.7	36.2	42.3	3.8	3.13 ± 1.23
(X^2 = 100.2: df=15; p < .001)	**All**	**11.0**	**5.5**	**16.9**	**36.7**	**25.0**	**4.9**	**2.74 ± 1.33**
Cutting forest trees to make furniture.								
	G/River	3.1	16.0	24.6	26.3	20.1	9.9	2.74 ± 1.30
	R/Cobre	10.2	5.5	40.6	25.8	17.2	0.8	2.37 ± 1.16
	R/Grande	4.3	9.0	30.8	29.7	23.3	2.9	2.67 ± 1.14
	W/Water	16.9	10.0	30.8	28.5	13.8	--	2.12 ± 1.27
(X^2 = 84.9: df=15; p < .001)	**All**	**6.7**	**11.1**	**30.1**	**27.7**	**19.8**	**4.6**	**2.56 ± 1.24**
Washing clothes in the river.								
	G/River	4.8	17.4	23.9	27.6	21.8	4.4	2.58 ± 1.26
	R/Cobre	3.1	15.3	67.2	11.5	3.1	--	1.96 ± 0.71
	R/Grande	3.6	10.5	38.4	33.0	12.3	2.2	2.46 ± 1.03
	W/Water	--	16.0	56.5	20.6	6.1	0.8	2.19 ± 0.80
(X^2 = 121.8: df=15; p < .001)	**All**	**3.4**	**14.6**	**40.7**	**25.8**	**13.2**	**2.4**	**2.38 ± 1.07**
Cutting down trees for firewood or charcoal.								
	G/River	2.7	26.4	22.9	23.3	15.1	9.6	2.50 ± 1.35
	R/Cobre	5.3	3.8	55.7	24.4	9.9	0.8	2.34 ± 0.92
	R/Grande	5.8	11.3	41.6	27.0	13.5	0.7	2.32 ± 1.06
	W/Water	6.2	17.7	44.6	22.3	9.2	--	2.11 ± 1.01
(X^2 = 115.2: df=15; p < .001)	**All**	**4.7**	**16.4**	**37.7**	**24.5**	**12.8**	**3.7**	**2.36 ± 1.15**

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Drinking water from the river.								
	G/River	4.1	27.7	28.1	32.2	4.8	3.1	2.15 ± 1.10
	R/Cobre	3.1	14.5	49.6	22.9	9.9	--	2.23 ± 0.91
	R/Grande	4.4	6.2	45.8	29.1	13.5	1.1	2.44 ± 0.99
	W/Water	6.1	13.7	36.6	39.7	3.8	--	2.21 ± 0.94
(X^2 = 91.8: df=15; p < .001)	**All**	**4.3**	**16.3**	**38.7**	**30.9**	**8.3**	**1.4**	**2.27 ± 1.02**
Washing cars in/by the river (using river water).								
	G/River	3.4	25.9	39.2	20.8	7.2	3.4	2.13 ± 1.09
	R/Cobre	3.9	21.9	58.6	10.9	3.9	0.8	1.91 ± 0.84
	R/Grande	5.4	21.2	48.6	20.1	4.3	0.4	1.98 ± 0.91
	W/Water	0.8	21.6	47.2	24.8	5.6	--	2.13 ± 0.84
(X^2 = 36.1: df=15; p < .005)	**All**	**3.8**	**23.1**	**46.6**	**19.7**	**5.5**	**1.5**	**2.04 ± 0.96**

Table 16d: Attitudes related to watershed resource use (*what is "very bad"*)

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Farming on riverbanks or hillsides next to the river.								
	G/River	15.8	20.9	32.5	24.3	4.8	1.7	1.87 ± 1.19
	R/Cobre	3.1	22.1	53.4	12.2	7.6	1.5	2.05 ± 0.95
	R/Grande	4.7	28.3	38.4	22.1	5.1	1.4	1.98 ± 1.02
	W/Water	1.6	23.3	47.3	19.4	8.5	--	2.10 ± 0.91
(X^2 = 64.3: df=15; p < .001)	**All**	**7.9**	**23.9**	**40.1**	**20.9**	**5.9**	**1.3**	**1.97 ± 1.06**
Tying animals beside the river.								
	G/River	4.8	35.6	40.4	11.3	3.8	4.1	1.86 ± 1.08
	R/Cobre	2.3	26.7	64.9	4.6	1.5	--	1.76 ± 0.65
	R/Grande	4.7	23.4	48.9	20.1	2.6	0.4	1.94 ± 0.87
	W/Water	0.8	16.5	63.0	17.3	1.6	0.8	2.05 ± 0.71
(X^2 = 71.2: df=15; p < .001)	**All**	**3.8**	**27.2**	**50.6**	**14.1**	**2.7**	**1.7**	**1.90 ± 0.90**

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Mining sand or stones from the bottom of the river.								
	G/River	9.9	32.1	37.9	15.0	3.8	1.4	1.75 ± 1.04
	R/Cobre	3.8	21.4	56.5	11.5	6.1	0.8	1.97 ± 0.90
	R/Grande	9.8	18.5	39.5	24.6	6.5	1.1	2.03 ± 1.08
	W/Water	1.5	26.9	56.2	9.2	5.4	0.8	1.92 ± 0.84
(X^2 = 56.7: df=15; p < .001)	**All**	**7.6**	**25.1**	**44.2**	**16.7**	**5.3**	**1.1**	**1.90 ± 1.01**
Catching river fish when the river is dirty.								
	G/River	30.7	29.4	20.8	12.6	5.1	1.4	1.36 ± 1.25
	R/Cobre	2.3	17.6	54.2	15.3	9.9	0.8	2.19 ± 0.90
	R/Grande	12.7	11.3	47.3	22.5	5.1	1.1	1.98 ± 1.08
	W/Water	5.4	15.4	66.9	7.7	4.6	--	1.91 ± 0.79
(X^2 = 169.4: df=15; p < .001)	**All**	**16.3**	**19.3**	**42.1**	**15.6**	**5.8**	**1.0**	**1.78 ± 1.13**
Putting up houses very near to the river.								
	G/River	8.9	35.2	41.6	9.9	2.7	1.7	1.68 ± 0.98
	R/Cobre	0.8	46.6	51.1	1.5	--	--	1.54 ± 0.55
	R/Grande	1.8	41.3	44.2	10.1	2.5	--	1.70 ± 0.77
	W/Water	--	44.3	55.0	--	0.8	--	1.57 ± 0.54
(X^2 = 74.7: df=15; p < .001)	**All**	**3.9**	**40.4**	**46.1**	**7.1**	**1.9**	**0.6**	**1.65 ± 0.80**
Emptying sewage into sink-holes and/or ponds								
	G/River	3.1	71.3	18.1	4.8	2.0	0.7	1.33 ± 0.77
	R/Cobre	3.1	45.8	38.9	3.1	7.6	1.5	1.70 ± 0.98
	R/Grande	6.2	46.0	29.6	7.7	10.2	0.4	1.71 ± 1.07
	W/Water	2.3	61.1	33.6	--	3.1	--	1.40 ± 0.69
(X^2 = 76.3: df=15; p < .001)	**All**	**4.0**	**57.3**	**27.6**	**4.7**	**5.8**	**0.6**	**1.53 ± 0.92**

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Emptying garbage in the river.								
	G/River	0.7	75.7	20.5	2.4	0.3	0.3	1.27 ± 0.57
	R/Cobre	0.8	63.4	34.4	0.8	--	0.8	1.38 ± 0.60
	R/Grande	1.8	64.1	29.7	2.5	0.4	1.4	1.40 ± 0.72
	W/Water	--	72.5	26.7	--	0.8	--	1.29 ± 0.50
(X^2 = 24.3: df=15; n.s.)	**All**	**1.0**	**69.4**	**26.7**	**1.8**	**0.4**	**0.7**	**1.33 ± 0.62**
Emptying chemicals from farmlands into the river.								
	G/River	--	73.0	24.2	1.7	0.7	0.3	1.31 ± 0.58
	R/Cobre	--	68.7	26.7	1.5	2.3	0.8	1.41 ± 0.71
	R/Grande	3.3	70.7	22.8	2.2	0.7	0.4	1.27 ± 0.63
	W/Water	--	74.8	23.7	0.8	0.8	--	1.27 ± 0.51
(X^2 = 24.1: df=15; n.s.)	**All**	**1.1**	**71.8**	**24.1**	**1.7**	**1.0**	**0.4**	**1.31 ± 0.61**
Washing pesticide spray cans in the river.								
	G/River	--	71.0	25.3	2.7	0.3	0.7	1.34 ± 0.62
	R/Cobre	--	74.0	26.0	--	--	--	1.27 ± 0.44
	R/Grande	2.5	74.3	20.7	1.1	0.7	0.7	1.25 ± 0.62
	W/Water	--	86.3	13.7	--	--	--	1.14 ± 0.35
(X^2 = 35.4: df=15; p < .005)	**All**	**0.8**	**75.0**	**22.0**	**1.3**	**0.4**	**0.5**	**1.27 ± 0.57**

		DK/ Not Sure	Very Bad	Bad	OK	Good	Very Good	Mean
	Values	**0**	**1**	**2**	**3**	**4**	**5**	
Passing faeces (*doo-doo*) in the riverbed.								
	G/River	--	89.8	5.8	0.7	0.3	3.4	1.22 ± 0.79
	R/Cobre	3.1	83.2	11.5	--	--	2.3	1.18 ± 0.70
	R/Grande	2.5	81.2	12.0	1.4	1.1	1.8	1.23 ± 0.73
	W/Water	--	87.8	10.7	--	1.5	--	1.15 ± 0.47
(X^2 = 32.0: df=15; p < .01)	**All**	**1.3**	**85.6**	**9.5**	**0.7**	**0.7**	**2.2**	**1.20 ± 0.71**

On reviewing practices regarded as "very bad" based on their means (Table 16d), it was evident that community residents had a **very clear sense** of moral authority regarding watershed practices. All practices that could result in longer-term deleterious environmental effects were given very low ratings – regardless of watershed area. The most abhorred practices were those involving human excrement and/or the emptying of pollutants and other solid waste into the river water. There was almost a resulting continuum of what was good to bad, which at one end involved activities aimed at cleaning and/or maintaining cleanliness of the river, and at the other, activities that would visibly or otherwise clearly pollute the river. Only a few of these differences were statistically significant by sex.

Table 17: Perceptions about river-based practices – by sex

	Males	Females	P values
Having regular river clean-up days.	3.97 ± 1.18	4.16 ±1.13	P ≤ 0.05
Having a resident in charge of keeping the river clean.	3.97 ± 1.16	2.79 ± 1.30	n.s.
Punishing households that litter river-areas.	3.65 ± 1.38	3.79 ± 1.29	n.s.
Having family fun-days by the river.	3.37 ± 1.31	3.49 ± 1.26	n.s.
Swimming in the river.	3.43 ± 0.99	3.38 ± 0.97	n.s.
Rafting on the river.	3.28 ± 1.34	3.44 ± 1.25	n.s.
Spear fishing for fish/fishing for crayfish (*djanga*) in river.	2.79 ± 1.30	2.69 ± 1.35	n.s.
Cutting forest trees to make furniture.	2.64 ± 1.21	2.49 ± 1.27	n.s.

	Males	Females	P values
Washing clothes in the river.	2.40 ± 1.08	2.37 ± 1.06	n.s.
Cutting down trees for firewood or charcoal.	2.45 ± 1.16	2.26 ± 1.13	P ≤ 0.05
Drinking water from the river.	2.32 ± 1.02	2.22 ± 1.01	n.s.
Washing cars in/by the river (using river water).	2.11 ± 1.00	1.97 ± 0.92	P ≤ 0.05
Farming on riverbanks or hillsides next to the river.	1.99 ± 1.05	1.95 ± 1.07	n.s.
Tying animals beside the river.	1.96 ± 0.89	1.83 ± 0.91	P ≤ 0.05
Mining sand or stones from the bottom of the river.	1.95 ± 1.03	1.86 ± 0.99	n.s.
Catching river fish when the river is dirty.	1.88 ± 1.14	1.68 ± 1.11	P ≤ 0.05
Putting up houses very near to the river.	1.68 ± 0.80	1.61 ± 0.79	n.s.
Emptying sewage into sink-holes and/or ponds	1.53 ± 0.94	1.52 ± 0.90	n.s.
Emptying garbage in the river.	1.33 ± 0.61	1.34 ± 0.63	n.s.
Emptying chemicals from farmlands into the river.	1.33 ± 0.64	1.29 ± 0.58	n.s.
Washing pesticide spray cans in the river.	1.30 ± 0.62	1.24 ± 0.50	n.s.
Passing faeces (*doo-doo*) in the riverbed.	1.21 ± 0.73	1.19 ± 0.70	n.s.

Perceptions of these concepts were further explored in asking them about specific pollutants (Table 18). In this question, respondents were asked to indicate "how bad" they thought the items to be for the environment. Response categories were "not at all bad", "(just) bad", "very bad", and "extremely bad". Again, for analyses, they were each assigned values that were used to create "working" means.

Findings once more indicated the strength of community residents' disgust over the passing of, or evidence of excrement into river ways. Therefore, *faeces, sewage*, and ***Pampers*** were the three (3) items that were rated as being "most bad" for the environment. The less visible items e.g. washing soap, and (other) chemicals, were given the least negative ratings. Interestingly, the blue plastic coverings used for bananas, and dirt/mud from landslides were also given lesser ratings. This could have been due to a combination of factors e.g. lesser understanding or increased levels of culpability (e.g. blue plastic), and /or the "natural" component involved (e.g. landslides) and over which it could have been surmised that it was about "God's work". These findings certainly reflected similar themes from the qualitative phase of the investigation.

Table 18: Perceptions of what is considered "bad" for the environment

	DK/Not Sure	Not At All Bad	Bad	Very Bad	Extremely Bad	Mean
Faeces in the river	1.1	1.1	10.6	23.7	63.5	**3.47**
Sewage from pit latrines (*into rivers*)	1.3	1.0	10.5	24.8	62.3	**3.46**
Pampers in the river	1.6	1.1	16.2	29.3	51.9	**3.29**
Glass bottles	6.0	6.8	37.6	25.1	24.5	**2.55**
Plastic bottles	5.8	8.4	43.6	20.7	21.4	**2.44**
Smoke from burning household garbage	6.2	9.2	40.7	26.9	17.1	**2.40**
PET (*plastic*) bottles	11.0	12.5	40.0	18.2	18.3	**2.20**
Styrofoam lunch containers	16.3	8.6	39.3	20.8	15.1	**2.10**
(Using) washing-soap in the river	7.6	25.4	44.0	12.2	10.8	**1.93**
Dirt/mud from landslides	13.0	18.2	47.6	13.9	7.4	**1.85**
Chemicals used for coffee	15.7	22.3	34.8	17.0	10.2	**1.84**
Chemicals used for bananas	13.4	25.0	35.7	16.7	9.1	**1.83**
Blue plastic covering for bananas	21.8	39.4	25.9	7.5	5.5	**1.36**

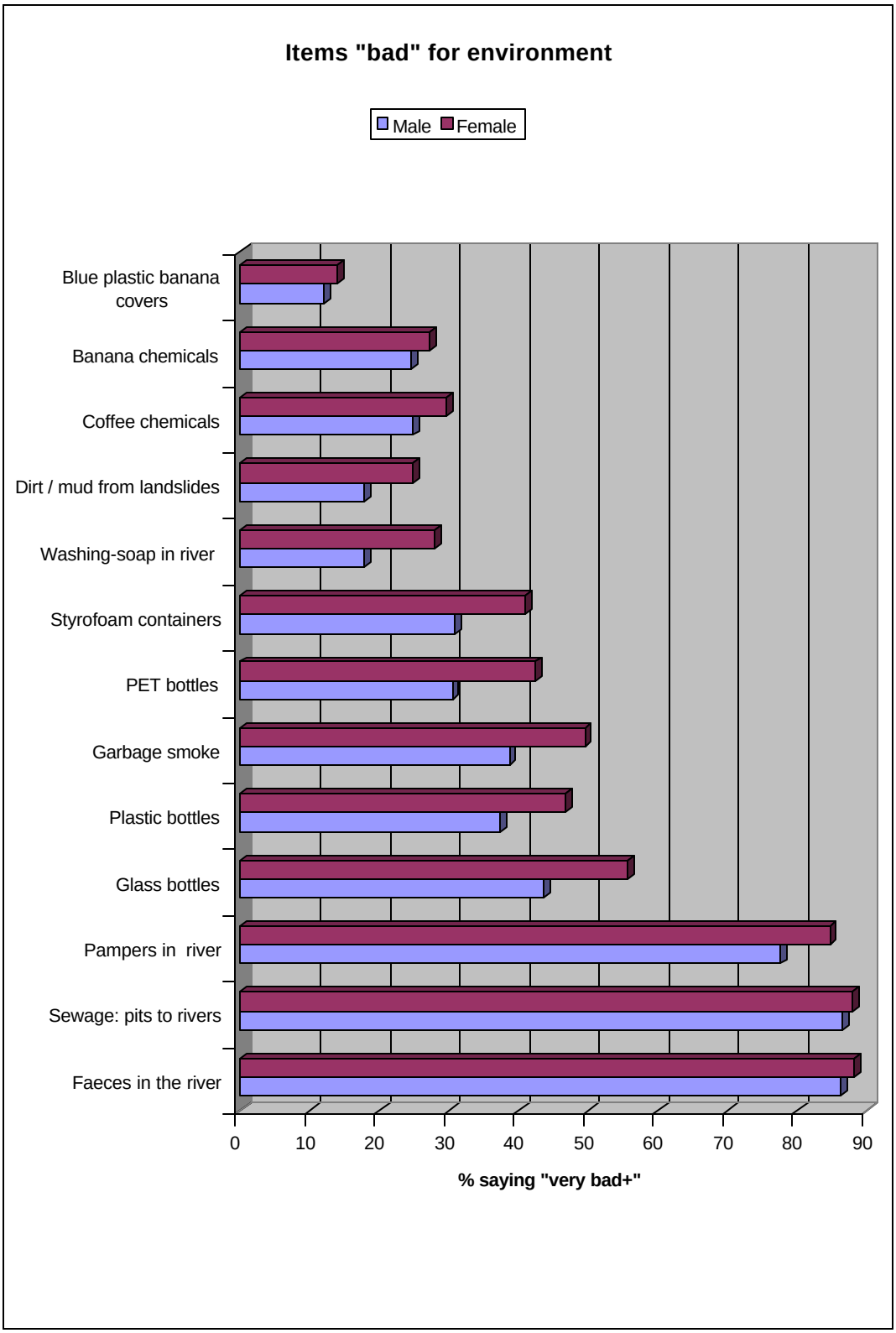

Items "bad" for environment
Male
Female
Blue plastic banana covers
Banana chemicals
Coffee chemicals
Dirt / mud from landslides
Washing-soap in river
Styrofoam containers
PET bottles
Garbage smoke
Plastic bottles
Glass bottles
Pampers in river
Sewage: pits to rivers
Faeces in the river
0
10
20
30
40
50
60
70
80
90
% saying "very bad+"

Table 19: Participants' responses to specific practices – by sex

		DK/Not Sure	Not At All Bad	Bad	Very Bad	Extremely Bad	P Values
		0	1	2	3	4	
Faeces in the river	Male	1.7	0.7	11.3	23.9	62.4	
	Female	0.5	1.4	9.9	23.7	64.5	**n.s.**
Sewage from pit latrines (*into rivers*)	Male	1.9	1.0	10.7	22.3	64.1	
	Female	0.7	1.0	10.4	27.4	60.5	**n.s.**
Pampers in the river	Male	2.7	1.0	18.8	28.2	49.4	
	Female	0.5	1.2	13.6	30.5	54.2	**£ 0.05**
Glass bottles	Male	6.3	7.5	42.6	23.7	19.9	
	Female	5.8	6.0	32.6	26.6	29.0	**£ 0.01**
Plastic bottles	Male	4.8	9.7	48.1	20.3	17.1	
	Female	6.7	7.2	39.3	21.2	25.5	**£ 0.05**
Smoke from burning household garbage	Male	7.5	8.7	45.2	23.7	15.0	
	Female	4.8	9.7	36.0	30.2	19.3	**£ 0.05**
PET (*plastic*) bottles	Male	13.3	14.1	42.0	17.2	13.3	
	Female	8.7	10.9	37.9	19.2	23.3	**£ 0.005**
Styrofoam lunch containers	Male	19.8	8.5	40.8	19.3	11.6	
	Female	12.8	8.7	37.5	22.3	18.6	**£ 0.01**
(Using) washing-soap in the river	Male	8.0	26.0	48.1	9.2	8.7	
	Female	7.2	24.6	40.1	15.2	12.8	**£ 0.05**
Dirt/mud from landslides	Male	13.8	18.8	49.5	11.6	6.3	
	Female	12.2	17.5	45.5	16.3	8.5	**n.s.**

		DK/Not Sure	Not At All Bad	Bad	Very Bad	Extremely Bad	P Values
		0	**1**	**2**	**3**	**4**	
Chemicals used for coffee	Male	15.2	24.6	35.3	15.5	9.4	
	Female	16.1	19.8	34.5	18.6	11.1	**n.s.**
Chemicals used for bananas	Male	12.8	28.0	34.7	15.9	8.7	
	Female	14.0	21.9	36.9	17.6	9.6	**n.s.**
Blue plastic covering for bananas	Male	18.1	43.36	26.3	7.5	4.6	
	Female	25.5	34.9	25.5	7.5	6.5	**£ 0.05**

4.4 Compliance and Institutions

Given the positioning related to right and wrong, data were further analyzed from the perspective of "who should be responsible for what", and "who" people would likely listen to and believe, in order to get a better sense of where the responsibilities were perceived to exist (Table 20). Although provided with several options, e.g. business/private sector, community residents, environmental groups, local agencies, schools, most management functions were referred to "Government agencies" by the largest majority of respondents. .

Table 20: Perceived roles and responsibilities for environmental management and education

Roles & Responsibilities …		Dk/Not Sure	Bus./Pvt. Sector	Comm. Residents/ Individuals	Env.. Gps.	Govt-Agencies	Local Agencies (P/C)	Schools	Other
For *doing* these things:									
a.	Maintaining farm-roads in good condition.	11.1	2.3	7.3	2.8	**52.8**	22.0	0.4	1.3
b.	Planting forest trees.	8.1	1.8	15.0	24.5	**37.6**	11.6	0.6	0.7
c.	Taking care of people's health.	7.6	1.3	25.2	4.0	**53.8**	5.7	0.1	2.3
d.	Having clean-up campaigns for rivers & beaches.	12.1	3.3	23.4	**26.9**	22.6	8.6	2.5	0.6

Roles & Responsibilities …		Dk/Not Sure	Bus./Pvt. Sector	Comm. Residents/ Individuals	Env.. Gps.	Govt-Agencies	Local Agencies (P/C)	Schools	Other
e.	Maintaining the riverhead in good condition.	15.8	1.8	23.8	18.2	**31.7**	7.2	0.5	1.0
f.	Being environmental wardens in the community.	18.9	2.3	**32.4**	17.8	18.2	6.1	3.0	1.3
Would listen to & believe:									
g.	Educating the public about proper use of natural resources e.g. *rivers, beaches*.	15.3	4.6	5.0	25.6	**30.7**	4.8	12.1	1.9
h.	Best hillside farming methods.	15.8	2.7	8.0	11.5	**50.7**	8.2	0.5	2.7
i.	How to keep your community clean.	10.6	2.3	**29.3**	22.5	28.6	4.0	1.6	1.1
j.	How to keep your community healthy.	10.3	1.7	24.0	20.0	**37.5**	4.5	0.9	1.2
k.	Methods for handling farm chemicals safely.	18.2	5.7	5.2	15.8	**45.4**	6.8	0.4	2.4
l.	How to prevent flooding in your community.	13.2	2.1	6.4	18.1	**51.6**	5.7	0.5	2.4
m.	What type of sewer facilities to use when building homes.	26.4	5.6	5.2	10.4	**35.4**	13.3	0.8	2.9

The activity most referred to community residents was "being environmental wardens" in the community. Environmental groups were seen as being the best lead in clean-up campaigns e.g. for rivers and beaches.

Interestingly, the "Government's responsibilities" were not perceived to be limited to management functions. When asked about educating the public on various aspects of good environmental management practices, they were once more "nominated" by the majority of respondents. The only area in which there was moderate variation form this theme was for "how to keep your community clean", for which activity it was effectively said that community residents themselves should take the lead role. Importantly, the proportion saying "Government" was just marginally less than those saying "community residents". The largest charge given to schools was to "educate the public about proper use of natural resources".

It should also be noted that overall, there were quite high levels of non-response, indicating that the respondents were uncertain of who should be responsible.

Given the conceptual framework presented respondents for the study, it could well be said that there was less than expected directives to "environmental groups" for some of the roles and responsibilities that were being assigned. Another question asked of the interviewees, related to their awareness of such groups (Table 21). The listed groups ranged from those with primary responsibilities and/or mandates for environmental management and education, to those that might have adopted tangential functioning around such activities.

Table 21: Awareness of different environment-related agencies – by watershed

Organizations	**Watershed**					
	Great River	Rio Cobre	Rio Grande	Wag Water	**TOTAL**	P value
	% saying "yes = heard of"					
4H Club	85.9	**94.7**	88.0	92.3	**89.0**	< .05
ODPEM: Office of Disaster Preparedness and Emergency Management	82.8	**94.7**	90.5	91.6	**88.6**	< .005
RADA: Rural Agricultural Development Agency	74.9	71.8	**85.4**	73.3	**77.6**	< .005
JAS: Jamaica Agricultural Society	74.1	79.4	76.4	**84.0**	**77.3**	n.s.
Forestry Department	58.4	56.5	**85.5**	82.4	**70.9**	< .001
SDC: Social Development Commission	56.0	55.0	**83.3**	48.9	**63.8**	< .001
SEP: Schools' Environment Programme	41.2	**46.2**	33.9	41.2	**39.6**	n.s.
NRCA: National Resource & Conservation Agency	41.6	**47.3**	36.7	28.5	**38.8**	< .05

Organizations	Watershed					
	Great River	Rio Cobre	Rio Grande	Wag Water	**TOTAL**	P value
	% saying "yes = heard of"					
PEPA: Portland Environmental Protection Agency	26.1	31.3	**50.9**	22.5	**34.6**	< .001
NEPA: National Environment and Planning Agency	35.9	**46.6**	26.7	27.5	**33.2**	< .001
JCDT: Jamaica Conservation & Development Trust	29.3	**42.0**	37.0	23.8	**33.0**	< .005
EFJ: Environmental Foundation of Jamaica	32.3	**35.9**	26.7	32.1	**31.0**	n.s.
R2RW: Ridge to Reef Watershed Project	**22.3**	18.3	18.8	11.5	**18.8**	n.s.

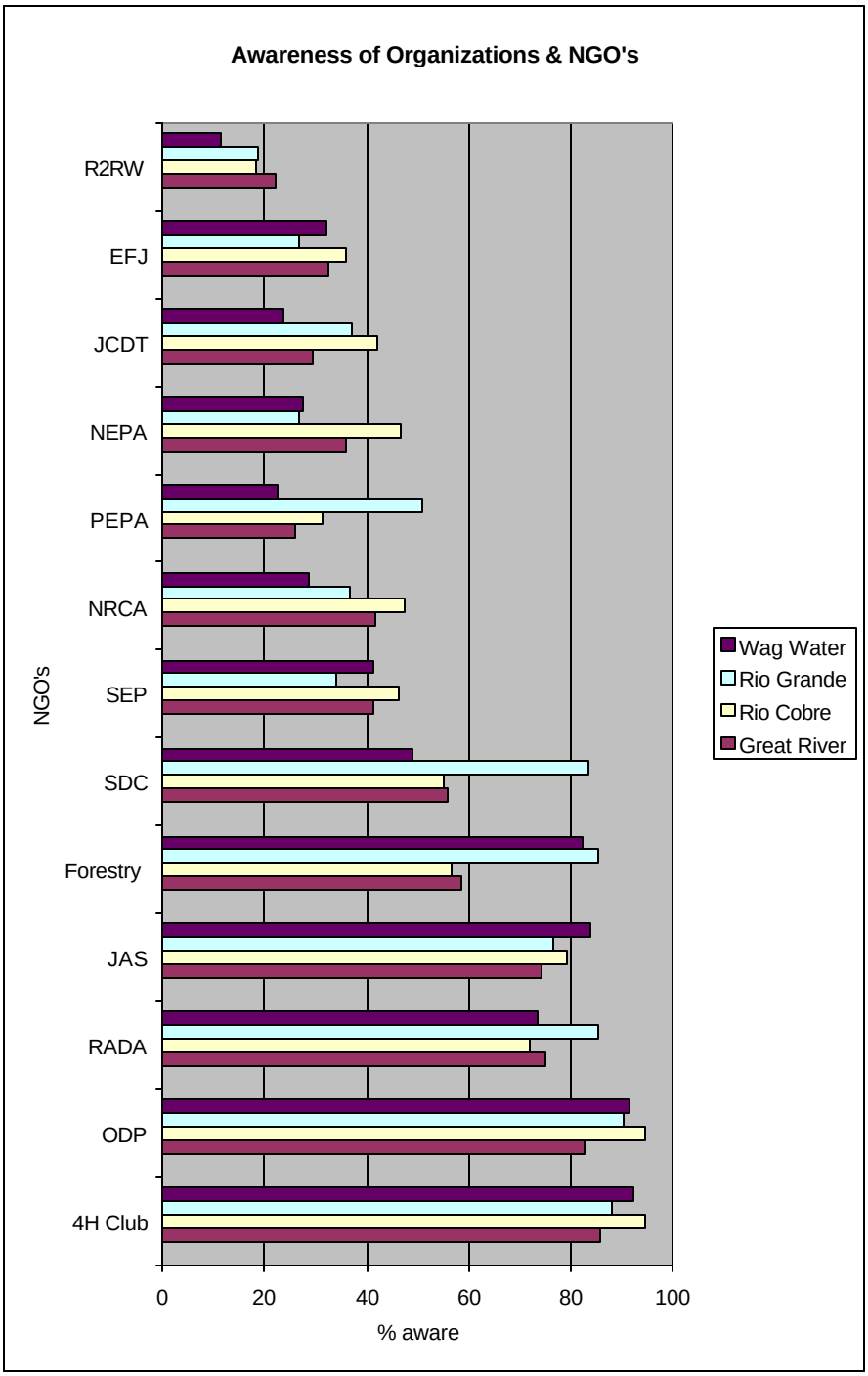

Awareness of Organizations & NGO's
R2RW
EFJ
JCDT
NEPA
PEPA
NRCA
SEP
SDC
Forestry
JAS
RADA
ODP
4H Club
NGO's
0
20
40
60
80
100
% aware
Wag Water
Rio Grande
Rio Cobre
Great River

Table 22: Estimates of relative importance of different institutions to environmental education

Organizations	*How important should … be in teaching or training people to care for the environment?*			
	DK/NA	Not at all	Quite	Very
4H Club	12.5	4.6	23.6	59.3
ODPEM: Office of Disaster Preparedness and Emergency Management	11.9	1.8	12.6	73.7
RADA: Rural Agricultural Development Agency	20.2	3.3	17.9	58.5
JAS: Jamaica Agricultural Society	22.1	3.2	18.6	56.1
Forestry Department	27.1	3.5	19.2	50.2
SDC: Social Development Commission	30.0	6.1	22.0	41.9
SEP: Schools' Environment Programme	47.8	6.3	15.5	30.5
NRCA: National Resource & Conservation Agency	52.8	3.5	14.3	29.3
PEPA: Portland Environmental Protection Agency	52.1	5.4	15.1	27.5
NEPA: National Environment and Planning Agency	54.7	4.9	13.6	26.7
JCDT: Jamaica Conservation & Development Trust	56.3	5.6	13.2	24.9
EFJ: Environmental Foundation of Jamaica	58.5	3.9	11.1	26.5
R2RW: Ridge to Reef Watershed Project	66.0	5.8	10.6	17.6

Except for one (1), the agencies of which most persons were aware included the longstanding, well-established, Government-affiliated entities e.g. *4H Club, Forestry Department*, and the *Jamaica Agricultural Society.* Also mentioned by the large majority of respondents were the Office of Disaster Preparedness and Emergency Management (ODPEM) and the Rural Agricultural Development Agency (RADA). This finding is important as it describes the relative penetration achieved by the agencies and/or felt-levels of interest by residents in their respective activities. The least known entities included the non-governmental organizations (NGO's) and/or programmes developed under the auspices thereof, and/or the agencies that would directly be referred to as being "environmental" organizations.

There were significant differences between watersheds with respect to their levels of awareness of the groups. The Rio Cobre seemed to have the highest overall response for seven (7) of the

groups, relative to other watersheds. The Great River and Wag Water respondents appeared to be far less informed.

Respondents generally did not know the laws and regulations governing use of the environment (Table 23). Just under one-third (1/3) of the sample failed to identify even one (1) such law, act, or regulation – without being aided. Almost one-half (1/2) could only identify one (1) law, act or regulation, and the majority or persons were unable to identify three (3) as requested. The most frequently recalled, and that clearly with "top of mind" recall, was the "*Litter Act*" (or variation thereof), with 23.6% of those interviewed mentioning it first. Also recalled by a reasonable proportion of the respondents were the: *Forest, Country Fires,* and *Public Health Acts*. The majority feeling was that most laws related to "everybody" (Table 24).

Table 23: Awareness of the environmental "*acts*", "*laws*" or "*regulations*"

% mentioned			
Acts/Laws/Regulations	**1st**	**2nd**	**3rd**
None/no other/NA	31.5	46.8	60.2
Litter	23.6	10.0	4.7
Forest	14.2	7.1	5.7
Country Fires	10.3	1.5	1.7
Public Health	5.6	10.6	7.7
Flood-Water Control	2.8	6.7	0.7
Land Development & Utilization	2.5	3.4	1.7
Mining	2.1	3.5	3.9
Water Resources	1.8	2.2	1.3
Wildlife Protection	1.8	1.5	3.3
Solid Waste Management	1.6	1.6	2.8
Watersheds Protection	1.0	2.3	4.8
Quarries Control	0.7	0.8	0.7
Town & Country Planning	0.5	1.5	0.7
Other	0.1	0.5	--

Table 24: Who respondents mainly believed the environmental laws relate to

Who it mainly relates to? …								
Acts/Laws/Regulations	**N**	DK	Every-body	Watershed residents	Farmers	Adults	Children	Other
Litter	316	0.8	88.3	0.3	0.3	2.5	6.3	--
Forest	215	0.9	50.2	11.6	29.3	5.6	--	2.3
Country Fires	111	5.4	61.3	2.7	18.9	7.2	1.8	2.7
Public Health	197	1.5	81.2	1.5	--	11.7	1.5	2.5
Flood-Water Control	86	4.7	62.8	22.1	2.3	5.8	--	2.3
Land Development & Utilization	64	1.6	29.7	3.1	35.9	28.1	1.6	--
Mining	83	2.4	55.4	9.6	3.6	21.7	1.2	6.0
Water Resources	43	4.7	79.1	11.6	4.7	--	--	--
Wildlife Protection	55	3.6	78.2	1.8	3.6	5.5	3.6	3.6
Solid Waste Management	51	3.9	70.6	--	2.0	21.6	2.0	--
Watersheds Protection	68	--	50.0	41.2	4.4	2.9	1.5	--
Quarries Control	23	30.4	56.5	--	--	4.3	--	8.7
Town & Country Planning	23	4.3	56.5	--	--	39.1	--	--

4.5 Looking at Environmental Communication

There were two (2) sets of constructs about which respondents were asked to indicate their awareness and/or understanding. One related to words typically and generally used in matters relating to the environment and related concerns (Table 25), and another that included words and phrases more focussed on agricultural activities and pursuits (Table 27). All respondents were asked about the general terms, while the agricultural terms were only asked of those involved in household farming activities. Those involved in backyard farming were not asked about the agricultural terms.

The awareness levels were generally not very high. Only a few words/phrases had made their way into the vocabulary of any majority of respondents, and these were: *soak-away pits, sink holes, reefs,* and *conservation*. *Tile ponds, grey water recycling,* and *gabion baskets* were for all intents and purposes, unknown terms. Interestingly, two (2) of arguably the most-used terms not

only in environmental circles, but also in development work, NGO (non-governmental organizations) and CBO (community-based organization), were also virtually unknown acronyms.

When analyzed by education level (Table 26), it became quite clear where the difficulties existed. Few of those with low education understood meanings. Those with highest education were most likely to understand and this was consistently evident for all words. Importantly, there were some words that very few of those even with tertiary education, understood, e.g. *grey water recycling*, and *tile ponds*.

Table 25 Awareness of terms typically used in environmental communication – by watershed

	Watersheds					
	Great River	**Rio Cobre**	**Rio Grande**	**Wag Water**	**TOTAL**	**P value**
Soak away pits	71.7	79.4	64.2	66.4	**69.6**	< .05
Sink hole	73.3	68.7	44.1	56.5	**60.1**	< .001
Reef	58.9	48.1	67.9	40.0	**57.2**	< .001
Conservation	63.7	62.6	57.2	32.1	**56.3**	< .001
PET bottle recycling	30.5	40.5	41.6	29.0	**35.6**	< .05
Environmental steward	25.4	18.3	18.1	20.6	**21.0**	n.s.
Water harvesting	15.8	15.3	29.0	10.8	**19.3**	< .001
Kitchen composting	21.7	22.1	20.7	6.1	**18.9**	< .005
NGO	18.6	21.4	19.3	6.1	**17.3**	< .005
CBO	14.6	4.6	18.5	13.0	**14.1**	< .005
Gabion baskets	9.3	5.4	12.0	9.2	**9.5**	n.s.
Grey water recycling	9.0	9.9	7.7	6.1	**8.2**	n.s.
Tile ponds	4.3	3.1	4.8	0.8	**3.7**	n.s.

Table 26: Awareness of terms typically used in environmental communication – by education

	Education level						P value
	Primary incomplete	Primary complete	Secondary incomplete	Secondary complete	Vocational/ skills	Tertiary	
Soak away pits	59.4	62.7	63.0	76.8	77.3	**87.5**	(X^2 = 25.4: df=5; p ≤ 0.001)
Sink hole	61.4	55.3	59.4	59.8	65.8	**73.2**	n.s.
Reef	35.2	54.7	55.8	60.0	64.4	**82.9**	(X^2 = 28.8: df=5; p ≤ 0.001)
Conservation	41.4	46.5	50.2	61.9	69.2	**85.4**	(X^2 = 40.2: df=5; p ≤ 0.001)
PET bottle recycling	25.4	31.4	33.9	35.8	47.0	**52.2**	(X^2 = 16.2: df=5; p ≤ 0.01)
Environmental steward	8.7	12.6	18.8	24.5	29.4	**48.8**	(X^2 = 39.0: df=5; p ≤ 0.001)
Kitchen composting	14.1	17.1	12.8	18.5	21.6	**58.5**	(X^2 = 49.6: df=5; p ≤ 0.001)
Water harvesting	15.5	16.5	20.0	15.3	24.3	**39.0**	(X^2 = 15.5: df=5; p ≤ 0.01)
NGO	15.5	13.9	12.3	12.7	28.0	**51.2**	(X^2 = 50.3: df=5; p ≤ 0.001)
CBO	8.5	12.6	10.5	14.3	21.8	**27.5**	(X^2 = 16.4: df=5; p ≤ 0.01)
Gabion baskets	9.9	9.5	7.3	6.3	14.3	**22.0**	(X^2 = 13.9: df=5; p ≤ 0.05)
Grey water recycling	8.5	7.5	6.0	6.3	12.7	**14.6**	n.s.

	Education level						P value
Tile ponds	2.8	5.1	3.2	1.6	5.0	**7.3**	n.s.

The situation was only marginally different for the farming community (Table 27). The best-known terms were "*mulching*" (65.6%) and "*crop rotation*" (54.3%). Concepts of terracing and delineation were also fairly well recognized by quite a few farmers with terms such as "hillside ditches/trenches" (47.5%), "contours" (38%), bench- and stone-terracing (33.3% and 30.8% respectively) being among those words best recalled. Some of the terms were not at all well known, and these included: *vetiver grass* (2.4%), *gully plugs* (4.3%), *living hedgerow* (5.1%), and *individual basins* (5.5%). Also important was the relative lack of difference between watersheds in the state of "unknowing".

Table 27: Awareness of environmental/agricultural terms – by watershed

Words & Phrases	Watersheds					P value
	Great River	Rio Cobre	Rio Grande	Wag Water	*Total*	
% of h'hold farm respondents saying "yes = aware"						
Mulching	65.0	73.3	61.2	72.4	**65.6**	n.s.
Crop rotation	56.3	86.7	49.5	51.7	**54.3**	n.s.
Hillside ditches or trenches	45.0	33.3	48.0	53.4	**47.5**	n.s.
Khus khus grass	57.0	26.7	25.2	47.4	**40.2**	≤ .001
Contours	32.5	33.3	47.6	29.8	**38.0**	n.s.
Organic farming	29.1	66.7	37.3	29.3	**34.6**	≤ .05
Bench terrace	35.4	20.0	30.1	39.7	**33.3**	n.s.
Stone terrace	35.4	26.7	22.8	39.7	**30.8**	n.s.
Agro forestry	39.5	13.3	27.7	20.7	**29.0**	≤ .05
Partial weeding	25.3	33.3	23.3	29.3	**25.9**	n.s.
Composting	30.0	40.0	25.2	10.3	**24.2**	≤ .05
Intercropping	35.4	7.1	23.8	8.6	**23.0**	≤ .001
Green manure	32.9	20.0	19.8	13.8	**22.5**	≤ .05
Check dams	24.1	20.0	26.7	13.8	**22.5**	n.s.

Words & Phrases	Watersheds					P value
	Great River	Rio Cobre	Rio Grande	Wag Water	*Total*	
Grassed waterways	12.7	6.7	7.8	17.2	**11.4**	n.s.
Integrated crop management	15.2	--	9.7	3.4	**9.4**	n.s.
Alley cropping	15.0	--	5.9	3.4	**7.8**	≤ .05
Minimum tillage	8.8	6.7	9.7	3.4	**7.8**	n.s.
Individual basins	11.4	6.7	2.9	1.7	**5.5**	≤ .05
Living hedgerow	3.8	13.3	6.9	1.7	**5.1**	n.s.
Gully plugs	6.3	--	5.9	--	**4.3**	n.s.
Vetiver grass	3.8	--	3.0	--	**2.4**	n.s.

Photo 12 - Variety of flora in one watershed area

5.0 CONCLUSIONS AND RECOMMENDATIONS

The current study reviewed the many perceptions of watershed residents. There seemed to be relatively high awareness about basic environment and environmental management concepts, but far less details of how different environment components function together, and the possible behavioural outcomes. Further, there was not only limited awareness of related laws and regulations, but also compliance – even if people were to "do the right thing".

Among the key factors limiting understanding as well as compliance, were: (a) the limiting scope and effectiveness of communication strategies and activities utilized; and (b) relative failure to incorporate a fully participatory approach to strategic problem solving, to date. This situation seems to have been made worse by apparent literacy limitations. Here, the study indicated that many words and phrases typically used in community- and environmental- communication were not clearly understood except by those with higher-level education. The most descriptive example of this communication deficit was the word "*watershed*", where a wide range of definitions were provided. It was also found therefore that people related not to watersheds, but definitely related to "*rivers*". Therefore, one of the first recommendations of this study is that the terms "**watershed**" and "**watershed management units**" be abandoned as key communication terms at this time, in favour of using the important elements e.g. "*rivers*", "*seas*", or at least until there is better understanding of the concepts.

5.1 Towards Segmentation

There were important differences found in practices, attitudes, and the effectiveness of communication based on *sex* and *literacy levels* among other factors. It is therefore essential that these be incorporated into future communication strategies.

Sex: It is now clear that why people tend to make reference to the men in the community for discussion on rivers is because they are the ones who mainly and more consistently use it. Importantly, it also seems that their current understanding of, and appreciation for the impact of their behaviours on environmental management and sustainability is not much understood. But many are willing to be involved, and especially those who have such high reliance on these river- and other-resource activities for their livelihood. Adult men therefore have to be regarded as a critical target group in future intervention. Fortunately, they have a vested stake in the sustainability of these resources.

Literacy: This is a restrictive factor, but does not mean that those who are less fluent need to be excluded from the activities. Instead, their special needs have to be accounted for, and programmes developed with the educational differences in mind. The challenge to current approaches will be to ensure a fully participatory approach taking complete recognition of literacy levels. This extends to e.g. *use of technical words and phrases (*jargon*), communicating simply but effectively, including persons (regardless of literacy levels) in different activity stages.* In developing interventions, concepts of true participatory involvement need to be regarded as critical for sustainability, i.e. if there is no real stake there is no future and apparent gains will likely be eroded eventually. Further, the overall plan should indeed be to link with partners such as JAMAL, to increase exposure to environmental concepts and increase population literacy.

5.2 Reviewing Issues

These would include but not be limited to:

1. Appreciation and understanding of the impact of generally poor environmental practices and utility of "best practices" in watershed management, with specific reference to:

    a. Riverside farming activities and their potential impact

b. The impact of short-term river-based economic and domestic activities, on longer-term environmental deficits – *in a cyclical review.*

c. Impact of hillside farming practices on environmental degradation

d. Longer-term impact of deforestation and related activities on rainfall patterns and land degradation.

2. Water quality in general, and specifically:

e. Visible- and non-visible factors affecting the same;

f. Role of effluents on well-being and in the geneses of disease;
g. Role of farm chemicals on water quality.

3. Best practices for utilization, disposal etc. of farm chemicals.

4. Best practices and information sources re creating/managing household pits.

5. *Seeing behind the screen*" e.g. the need to, and developing the capacity for visualizing beyond what might be immediately visible. Although critical, limiting literacy (all types) will however, may this task particularly challenging.

5.3 Communication Strategies

Communication deficits plagued the study findings. It therefore means that a responsive communication strategy has to be developed to inform the public and thereby encourage participation and compliance. Aspects to be considered include:

- ***River-maid***: This is a useful story that could be de-mystified. It is so pervasive throughout the watershed areas that it would find support at all times and in all locations. The concept is one that could be used to encourage more **proper** use of the resource, e.g. the "river-maid" does not like it when … It could be a mascot and/or a storyteller since it is supposed to know everything that happens and be keeping watch. Importantly, sufficient "reverence" should be maintained to ensure that those who have for example, "seen" it, would not feel as if their experiences were being demoted.

- ***Rivers of Jamaica***: Few persons really know about them and the past histories etc., outside their own sphere. This could be a good all-island school-based project.

- ***Current modes of operation***: Care needs to be taken in building positive collaboration even among those who have good intentions but are using the wrong approaches (e.g. some community-based groups and NGOs).

The following outlines what could be considered key components for review in developing such a plan. It is not exhaustive.

Towards a Communication Strategy

Audiences	Intended Outcomes	Messages	Key Activities	Channels	Management strategies
▪ ***Adult males***	▪ Restrict non-sustainable use of watershed resources ▪ Recruit/train/ empower e.g. river wardens	▪ Protect their investments ▪ Ensure future of their livelihoods	▪ On-site participatory workshops with some trainer-of-trainer intent	▪ Rafters' Associations ▪ Tourism Product Dev. Co. Ltd. (TPDCO) ▪ Forestry Department	▪ Work through key interest/ economic groupings ▪ Differentiation re economic activities e.g. small farming, rafting
▪ ***Adult females***	▪ Increase presence as gatekeepers	▪ Protect family health ▪ Protect resource availability for offspring	▪ Education linked with household messages	▪ Church groups ▪ JAMAL ▪ Shopkeepers	▪ Encourage inclusion on agenda and partnership for environmental sustainability with these key groups
▪ ***Environmental action groups***	▪ Use of more appropriately targetted/ developed communication strategies ▪ Increase relevant understanding & management capacity ▪ Institutionalize improved practices ▪ Encourage/ facilitate sustainable activities (including income-generation)	▪ Increased presence & awareness of presence ▪ Audience segmentation ▪ Literacy restrictions ▪ Restrict jargon ▪ Segmentation & participatory concepts	▪ Workshops on communication for environmental management	▪ Forestry Dept. ▪ Coffee/Banana Grower Assoc ▪ Regional Environmental Protection Agencies	▪ Develop symbiotic but carefully targetted relationships with key units, to encourage participatory development & sustainability ▪ Increase community involvement

Audiences	Intended Outcomes	Messages	Key Activities	Channels	Management strategies
▪ ***Secondary level students***	▪ Increase stewardship & compliance including within-schools and community-levels ▪ Recruit/train/ empower junior community wardens	▪ Protect their future ▪ Facilitate communicatio n ▪ Restrict jargon	▪ School- and field sessions & simple literature for multiplier effects	▪ Schools' Environment Prog. (SEP) ▪ Junior Rangers' Training. Prog. (JRTP) ▪ Simple literature	▪ Work through and strengthen where necessary, existing interest groups
▪ ***Community-based organizations***	▪ More participatory approach to info. dissemination & project implementatio n ▪ Increase understanding of environment issues & negative effects	▪ Collective responsibilities ▪ True participatory approach for success	▪ Increase training in participatory methods ▪ Participatory workshops on sustainable environmental practices	▪ Social Dev. Comm. (SDC) ▪ Church groups ▪ Simple literature for dissemination	▪ Targetted work including collaboration with existing agencies
▪ ***Large farmers/farm managers/ property owners***	▪ Increase roles as "role models" = sustainable environmental community practices ▪ Understanding of segmentation & participatory methods & cultural nuances	▪ Improved farming practices ▪ Vigilance re workers' protective gears ▪ Cultural nuances	▪ Establish task forces with targetted & scheduled strategies	▪ Formal & informal workshops	▪ Facilitate review = legal framework & strategies for compliance & sustainability

Audiences	Intended Outcomes	Messages	Key Activities	Channels	Management strategies
▪ ***General population***	▪ Increase general awareness for river & other resource use ▪ Increase understanding of relationships between actions & outcomes ▪ Increased awareness of and compliance with laws & regulations	▪ Wardens & "river-maids" watching & protecting ▪ Protection of national & economic resources ▪ Economic costs of losses ▪ Replacement concepts & values	▪ Clean-up days with presence and exposure of community-based organizations, wardens, and environmental groups	▪ Jamaica Information Service (JIS) ▪ Local television programmes (wide-interest appeal) ▪ Newspaper features (interesting) with child appeal & use	▪ Maintain presence via promotional & public relations activities ▪ Media education & coverage ▪ Sponsorship of key population–oriented activities

Specific recommendations from this study include (but are not limited to): -

1. **Development of a differentially targetted communication strategy**, aimed at informing: -

   a. ***Watershed residents*** of the properties, qualities, histories, and (potential) future inherent to the unique location in which they reside, as well as the care, usage and monitoring responsibilities due to that residence.

   b. ***Environmental specialists/partners*** of the apparently relatively low communication impact that some of their efforts and/or programmes and/or concepts being used, might have had to date, with reasons, and the need to differentiate between target audiences and messages based on criteria such as: literacy levels, sex, and relative residential location.

   c. ***Key watershed end-users*** of their perceived statuses as community role models, and working with them to review the impact of their current actions, their levels of community involvement, and redefining with them the responsibilities inherent in those roles.

   d. ***A range of end-users*** of what the "compliance" construct/concept relates to in use of watershed resources, by e.g.

      i. Identifying the short-term deleterious effects, including at the individual/ household levels;

      ii. Creating clear links between usage patterns, and resource depletion/destruction in the medium- to longer terms;

      iii. Generating "models" to make this information clearly very understood regardless of literacy levels, even while not being "condescending";

iv. Use examples that are simple, and that will be clearly understood at the personal/household/community levels, so audiences can readily relate and respond to the messages;

v. Create support flyers that clearly link the importance of compliance to personal benefits/protection (e.g. "did you know that? ", for organizational/household use);

e. O***ther relevant support/implementation agencies*** (e.g. Banana and Coffee Industries) of their concurrent roles regarding environmental protection. This could be developed via processes to include e.g. workshops comprising all groups, and aimed at differentiating the respective roles, identifying core information to be conveyed to the consuming publics, strengthening/formation of watershed/parish-based committees.

2. **Revisiting use of the word "watershed" in the short-term**, at least until the communication programme is fairly advanced and/or audiences are far more aware of the essential concepts of "what a watershed is". The more familiar words and concepts e.g. rivers, forests, should now be highlighted. In the same simpler format as above, a communication "model" could be developed to include teaching about "what a watershed is", for very wide dissemination. This could include:

a. A simple but very visually explicit story-line (almost using child-like caricatures … once upon a time) telling about the development of a watershed from rivers, streams, trees.

b. Other features:

i. The story can be serialized.
ii. The river-maid has to be included.

iii. It can be broken into constituent parts but always using the same theme, and that all could be used to generate easy school and/or media games, promotional tools & gimmicks, tag-lines, etc.

3. **True participatory processes should be used for most** (but ideally all) **intervention and/or information dissemination activities**. This must take into mind that some of those currently involved in community-based initiatives have seemingly not been using true participatory methodologies in their activities to date. The examples have can be established via this programme, e.g. ensuring wider/fuller invitations and participation in workshops. It should also be noted that where necessary, these methods need to be taught, e.g. with support from agencies such as the SDC.

4. **Develop a framework for ensuring compliance within watershed areas.** This could include:

a. Identification and training of community-based wardens in collaboration with relevant partners;

b. Developing a series of symbols representing the "do's" and "dont's" for management of relevant resources, but with accompanying words identifying what/what not to do. These could be represented through signage, and tie-in with any posters, flyers etc, being created. Partners should also come on board for this e.g. TPDCo.

c. Hosting a series of workshops specially geared at working with the more likely "large" farmers, and others likely to be in breach. These should be supported with e.g. media coverage and promotional efforts, and enlist support from regional partners.

5. **Acknowledge the importance of "culture",** cultural nuances, and history in all activities, including those with the larger players. A more broad-based review of the stories could be developed by seeking e.g. the stories, the names and uses of shrubs and plants, and using this information in workshop sessions and for use with a larger public. The programme will have limited real success without such acknowledgment by the key players.

APPENDIX A

SUMMARY OF MAIN WATERSHED ACTIVITIES (*OBSERVATIONAL*)

	Great River	Rio Cobre	Rio Grande	Wag Water
A. FORESTS:				
Herbs & Medicines	Many reported			Many reported
Furniture			Big industry	
Other		Charcoal-making		Forest industry & strong presence
B. HILLSIDES & SOILS:				
Deforestation and/or Erosion	Rarely seen	Rarely seen	Some sections	Almost denuded
C. RIVER/SPRING USE:				
Agriculture:				
Chemicals	Site-specific complaints	Many complaints	Complaints re upper-area	Many complaints
Farming (*crops*)	Mainly large	Mainly large	Many small-farms	Large- and small-
	Much citrus	Much citrus & dairy		Much coffee
Livestock	Few reports		Many reports	
Domestic:				
Bathing	Used in sections	Hardly used	Much-used	Hardly used
Drinking water		High-quality spring water		High-quality spring water
Garbage (*sewage, solid*)	Many reports		Many reports + outsiders	Few reports
Washing (*clothes, dishes, vehicles*)	Much-used	Few reports	Much-used	Few reports

	Great River	Rio Cobre	Rio Grande	Wag Water
Economic (other):				
Collecting bamboo & other plants	Many reports	Many reports	Many reports	Few reports
Fishing (*crayfish, other*)	Mainly domestic	Near-industry	High levels	Mainly domestic
Mining (*sand, stones*)		Lower sections?	Very heavy	
Rafting	Industry-level		Industry-level	
Recreational:				
Relaxing	Fairly high	Little-used	High reports	Little-used
Swimming	Some sections	Mainly the strong	High reports	Some sections
D. SOCIAL ORGANIZATION:				
Churches		High activity	Strongly SDA	High activity
JAS				Strong reliance
NGO's			Poor reputation	
SDC			Strong presence	

APPENDIX B

RESPONSES TO OPEN-ENDED QUESTIONS

Q.1 A &B (i): If I asked you what is "your river", what would be your: (a) 1st choice? (b) 2nd choice?

Name of River

Response	Code
Ginger River	01
Plantain River	02
Fox River	03
Mount James	04
King Gully	05
Duncan Spring	06
Sulphur River	07
Rose Apple Spring	08
Wag Water	09
Baptism	10
Sarah River	11
Jackie Hole	12
Simon Spring	13
Matty Spring	14
Boar River	15
Mount Daking	16
Cornwall Road	17
Mackie Pond	18
Viadock	19
Rock Spring	20
Black Rock	21
George Gayle	22
Dower Bridge	23
Black River	24
Back River	25
Rock	26
Catta Spring	27
Lonely River	28
Rio Cobre	29
Fairhill River	30
Chin Chang	31

Response	Code
Corner	32
Spring Garden	33
Effort River	34
Dunn's River	35
Rio Grande	36
Sandy River	37
Dam Head	38
Martha Brae	39
White River	40
Blue Hole River	41
Seven River	42
Great River	43
Best River	44
Cherry Spring	45
Lethe River	46
Annie River	47
Dry River	48
Swift River	49
Barnett River	50
Flint River	51
Milk River	52
Say River	53
Grady	54
Bragging Tom	55
Magotty River	56
Jones River	57
Radlin River	58
Water Sink River	59
Landlease River	60
John John River	61
Camel River	62

Response	Code
Calendon	63
Falling River	64
Jericho	65
McNiel River	66
Bog Walk George	67
Rio Monia	68
Mona	69
Newhall	70
Bybrook	71
Rio Pedro	72
Knockaloa River	73
Cabarita	74
Sweet River	75
Chester Castle	76
Braginton River	77
Dove Hall	78
Roaring River	79
Shettlewood	80
Fort Lamb	81
Knollis River	82
Negril River	83
Silver Spring	84
Claremount	85
Billy Spring	86
Barries River	87
Estate River	88
Rio Magna	89

Response	Code
Seston Spring	90
Ensom City River	91
Scattawood	92
Prospect River	93
Orange River	94
Marli River	95
Robin River	96
Snake River	97
OTHER	98
Guava River ****	
Iron River **	
Powder River **	
Breadnut River ***	
MacCarnal	
Crawl Bottom **	
Bridge River	
Y.S. River ******	
Hackers Hall	
Bonnetti River	
Breadfruit River	
Lemon Hall River	
Banana Bottom ****	
Nega River	
Thomas River	
Mamee	

Q.1 A &B (ii): If I asked you what is "your river", what would be your: (a) 1st choice? (b) 2nd choice? Tell me the main reason for choosing those.

Main Reason for Choice

Response	Code
Nearest river to me // Lives near river	001
Used to use same a few years ago	002
It always has water in it	003
It is an entertainment hole and you can do fishing	004
Cool	005
The only river	006

Response	Code
For washing clothes // Washing	007
For drinking water	008
I am accustomed to it // Using it for many years // Heard of it all the time // Go there more often	009
Biggest one in community // Community River	010

Response	Code
I grow up there // I live here long time // Childhood	011
Born come see it // Because it is there	012
Used to visit the river frequently for swims // Swimming	013
Too deep	014
Closeness // More convenient	015
This river is close to farm	016
It is clean // Water is clean and nice	017
I Just know about it	018
For farming	019
Because of the falls // It has a lovely fall	020
I like it and it is nearer	021
Has a broad stream	022
Fishing	023
Bathing	024
The main river in Portland // It is the main river	025
Provide food and stone and sand	026
For relaxing // Fun // Rafting	027
I earn my living there e.g. rafting	028
It is the best river around and that is where our supply comes from // It is better	029
Tourist investment community, get money	030
It's interesting because of the big rocks	031
The history behind it	032
It is mysterious	033
I have family that live at Seven River	034
Have parties sometimes	035
The river is secluded	036
A spring water plant is near there	037
Cross it everyday	038
It is a beautiful river	039
We get water there // Water supply	040
It is a tourist attraction	041
When water lock off, we would use the river	042
Vehicles are washed there most times	043
It's a popular river	044

Response	Code
It has a lot of rocks	045
Connector to bottling plant	046
An industrious river	047
Catch water for box bananas	048
I went there after hurricane Gilbert	049
Can do many things	050
Agricultural	051
Because it has a lot of qualities	052
I heard it's nice	053
One that comes to mind	054
Supply hermitage dam // It is a source of water for the dam	055
Good for hiking	056
Because it's big // It is the largest	057
It's the only one that runs from East to West	058
Domestic Purposes	059
Carry stones	060
Entertainment	061
Supply West with water	062
Local river	063
Has large swimming area and it is cool	064
Because it is crystal clear	065
Second largest in the area // The other big river in the community	066
Collect bamboo and fishing	067
My river	068
It is in my parish	069
It is in my district	070
Main river coming out of this watershed area	071
One of the main streams that feed into the Rio Cobre	072
If it's not one it's the other	073
Because it has a nice spring section	074
A place of quiet and peace	075
Parents river	076
It is a great river	077
I was working there	078
It runs through the area // Part of it runs through mi land	079

Response	Code
Fountain on it	080
Nothing special, it's just there	081
Next nearest one	082
Domestic animals // Farm animals	083
Family use it	084
Watering // Spraying	085
Transporting – wood	089
Shrimp	090

Response	Code
It has accommodation	091
Construction	092
It is so private, we have look out and picnic	093
It keeps the trees green and nice	094
Used sometimes	095
It helps to build up the Rio Cobre. About 6-7 rivers make up the Rio Cobre	096

Q. 3 (i): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: What types of trees or bushes are mainly used - if used at all;

Drinks/Teas

Response	Code
Mint	01
Barsley	02
Jack ina bush	03
Chaney root	04
Cersie	05
Gross stake	06
Soursop leaf	07
Orange skin // Orange leaf	08
Search mi heart	09
Marigold	10
Spirit weed	11
Ovalla	12
Tree of life // Leaf of life	13
Lime leaf	14
Sour orange	15
Lemon	16
Susumber leaf	17
Fever grass	18
Vervine	19
Red head	20
Jointer	21
Grapefruit	22
Mango	23
Ranger	24
Joseph coat	25
Raw chaw	26
Strong back	27
Pepper elder	28
Fence post // Fence stake	29
Post stake	30

Response	Code
Ganja	31
Comfrey	32
Shamey Darling	33
Fresh cut	34
Cold bush	35
Cinnamon	36
Orellia	37
African bush	38
Sage // Black sage	39
Black mint	40
Johnsall	41
Must gettie	42
Rosemary	43
Bissy	44
Scorn the earth	45
Raw moon	46
Snake vine // Snake wist	47
Watergrass	48
Rose apple	49
Guava	50
Ginger	51
Quako bush	52
Cigar bush	53
Red water grass	54
Jakanno // Jack occonor	55
Dandelion	56
Chocolate	57
Coffee	58
Never dead	59
Garlic	60

Response	Code
Bamboo leaf	61
King of the forest	62
Cucumber	63
Cris stick // Quick stick	64
Naseberry	65
Blood wist	66
Black joint	67
Stomach weed	68
Trumpet leaf	69
St. Vincent	70
All man strength	71
Noney	72
Medina	73
Banana leaf	74
Ram goat National	75
Fasten pon coat	76
Penny royal	77
Nutmeg	78
Baba roots	79
Tiger balm	80
Thyme	81
Cane	82

Response	Code
Berry vine	83
Cocoa	84
Cow foot leaf	85
Fennel	86
Balsam	87
Madam Faith	88
Dog blood	89
Tobacco	90
Pimento	91
Breadfruit leaf	92
Wild pinda	93
Simmo contract	94
Cotton leaf	95
Sarsaparilla	96
Sorrel	97
OTHER	98
Cabbage	
Macka	
Pear leaf *****	
Jubawarin ***	
Macarty weed	
Donkey weed	

Q. 3 (i): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: What types of trees or bushes are mainly used - if used at all;

Medicines

Response	Code
Cersie	01
King of the forest	02
Raw chaw	03
Aloe Vera // Sincle bible	04
Never dead	05
Chaney root // chaney weed	06
All man strength	07
Strong back	08
Mealene	09
Dog blood	10
Pepper elder	11
Susumber leaf	12
Spirit weed	13
Search mi heart	14
Ginger	15
Jack in the bush	16
Medina	17
Sibble contract // simo contract	18

Response	Code
Red head	19
Jointer	20
Tree of life // Leaf of life	21
Soursop leaf	22
Ranger	23
Tuna	24
Marigold	25
Ringworm bush	26
Custard apple leaf	27
Trumpet leaf	28
Hose bath	29
Dan rock	30
Comfrey	31
Dandelion	32
Log wood	33
Fever grass	34
Cow foot leaf	35
John charlie	36

Response	Code
Bittermint	37
Peppermint	38
Wild barsley	39
Majo // manjo bitters	40
Black wist	41
Tan de buddy	42
Shoe block	43
Woodland cocoa // cocoa	44
Paran balke // Puran skin	45
Sober	46
Cool Bush	47
Ovalla	48
Water grass // Watercress	49
Crouse bushes	50
Guava bud	51
Grow stake // Gross stake	52
John charles	53
Pechen weed	54
Fence stake	55
Sarsaparilla	56
Bamboo leaf	57
Joseph coat	58
Sage	59
Cinnamon	60
Broom weed	61
Shamey darling	62
Banana leaf	63
Tangerine bush	64
Bissy	65
Jack occonor // Jocona bush	66
Snake vine	67
Horalia – rat ears	68
Habbohill	69
Breadfruit leaf	70
Lime leaf	71
Apple leaf	72
Chocolate leaf	73
Papaya	74
Fresh cut	75
Pruan	76
Worm bush	77
Rice bitters	78
Arrow root	79
Fit weed	80
Long joint	81
Penny royal	82
Tamarind	83
Noney	84

Response	Code
Bitter albut // Bitter wood	85
Red water grass	86
Garlic	87
Harmony leaf	88
Orange peel	89
Love grass // Love weed	90
Quick stick	91
Ganja	92
Rosemary	93
Nutmeg	94
Guinep	95
Vervine	96
St. Vincent	97
OTHER	98
Pimento ********	
Fasten pon coat ***	
Cowitch	
Ram goat national ********	
Dragon bush	
Tame velvet	
Qua – qua // Quaco ****	
Spanish needle ******	
Fern ****	
Corn air ***	
Hops ***	
Raw moon *******	
Blood wisp *******	
Wild thyme ********	
Black joint **	
Chicken weed ******	
Mandrew bitters **	
Lilly of the valley	
Fennel ********	
Tobacco ***	
Tumeric ******	
Cherry bark **	
Five finger	
Plantain flower	
Gungo leaf **	
Basillia button	
Pear leaf	
High wood	
Rack bush **	
Chew stick **	
Duppy gun	
Ginnyin weed **	
Maranga **	
Pretty alla	

Response	Code
Night shade	
Periwinkle	
Cotton leaf ****	
Burr bush **	
Iron Broom **	
Eucalyptus	
Cucumber leaf ***	
Three finger	
Lucas	
Mistle toe	
Khus khus grass	
Physic nut	

Response	Code
Carcoon	
Pull coat ***	
Oil nut	
Bachelor button	
Lemon grass	
Cabbage	
Macka **	
Mangana **	
Outside weed ***	
Cow tongue	
Lizard tongue	
Lick wish	

Q. 3 (i): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: What types of trees or bushes are mainly used - if used at all;

Coal/Firewood

Response	Code
Guinep	01
Guava	02
Gross stake	03
Rose apple	04
Mango	05
Sweet wood	06
Pimento	07
Dry wood	08
Star apple	09
Orange tree	10
Control the rim	11
Redwood	12
Wind break	13
Horse wood	14
Ranger	15
Coffee stick	16
Locas	17
Bully tree	18
Mahoe	19
Hog wood	20
Mahogany	21
Ackee	22
Breadfruit	23
Log wood	24
Soap wood	25
Bamboo	26
Dog wood	27
Worm wood	28

Response	Code
Pitch point	29
Apple wood	30
Coconut	31
Jointer	32
Coal	33
Cedar	34
Timber	35
Grapefruit	36
Wanica	37
Basacom	38
Almond	39
Armon	40
Baccra	41
Jointy	42
Any wood	43
Figle wood	44
Water – pee	45
Pear	46
Pine	47
Gungo tree	48
Raw moon	49
Cucumber	50
Shrubs	51
Brambles	52
Lignum Vitae	53
Plumb	54
Quick stick	55
Fence stake	56

Response	Code
Jackfruit	57
Ferril	58
Santa	59
Corrile	60
Fustic	61

Response	Code
Breadnut	62
Black heart	63
St. Vincent	64
Sanda marie	65
Bastard cabbage	66

Q. 3 (i): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: What types of trees or bushes are mainly used - if used at all;

Furniture

Response	Code
Spanish elm	01
Cedar	02
Mahoe	03
Mahogany	04
Pine	05
Apple	06
Basacom	07
Broad leaf	08
Sweet wood	09
Breadfruit	10

Response	Code
Gungo	11
Funk wood	12
Bitter wood	13
Sampat	14
Almond	15
Teak	16
Lignum Vitae	17
Yellow sandra	18
Deal board	19

Q. 3 (i): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: What types of trees or bushes are mainly used - if used at all;

Posts (Fence/Yams)

Response	Code
Never dead	01
Plumb	02
Gross stake	03
Bamboo	04
Ranger	05
Yam stake	06
Soap wood	07
Fence stake	08
Silverson post	09
Horse wood // Hard wood	10
Guava	11
Soak water wood	12
Apple	13
Shu-black	14
Log wood	15
Quick stick	16
St. Vincent plumb	17
Hog berry	18

Response	Code
Berch	19
Growing stake	20
Sweet wood	21
Pine	22
Rock wood	23
Pimento	24
Candle wood	25
Bullet wood	26
Fiddle wood	27
Hibiscus	28
Joseph coat	29
Redwood	30
Dog wood	31
Ackee	32
Packee	33
Santa	34
Donkey pee-pee	35
Grudgeful	36

Response	Code
Harmon tree	37
Mark tree	38
Round wood	39
Kassa macka	40
Maranga	41

Response	Code
Fine leaf	42
Mango	43
Gungo	44
Parrot wackle	45

Q. 3 (ii): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: The main reason for which these trees or bushes are often used;

Drinks/Teas

Response	Code
Tea	01
Roots	02
Nerves	03
Heart	04
Gripe	05
Cold	06
Energizer	07
Juice	08
Blood // Purge	09
Common	10
Gastroenteritis	11
Drinks	12
Tonic	13
Spice	14
Herb	15
Vegetables	16

Response	Code
Nice // Taste good // Good	17
Pain	18
Hot beverage	19
Skin bites	20
Lemonade	21
Relaxation	22
Asthma	23
Fever	24
Porridge	25
Soup	26
Cleanser	27
Cost less	28
Belly // All complain	29
Body	30
Pressure	31
Colic	32

Q. 3 (ii): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: The main reason for which these trees or bushes are often;

Medicine

Response	Code
Gas	01
Liver Spot	02
Tonic	03
Cleanser // Bath	04
Pain	05
Cold	06
Ring worm	07
Blood	08
Jerk Meat	09
Strength // Energy	10
Heart	11
Nerves	12

Response	Code
Baby gripe	13
Sprain	14
Fever	15
Brain	16
Stamina	17
Wash hair	18
Eye	19
Bitters	20
Roots	21
Worm	22
Dandruff	23
Diarrhoea // Belly ache	24

Response	Code
Keep warm	25
Chicken Pox	26
Poisoning	27
Wash out // Stomach	28
Pressure	29
Disease	30
Taste	31
Purge	32
Vomiting	33
All Purpose // Medicine // Everything	34
Asthma	35
Swelling	36
Open back // Backache // Back	37
Herpes	38
Headache	39
Teething	40
Diabetes // Sugar	41
Itching	42
Impotence	43
Bumps // Facial	44
Sinus	45

Response	Code
Prostate	46
Colic	47
Rash	48
Mumps	49
Ulcer	50
Cut	51
Stoppage of water	52
Antibiotic	53
Toncils // Sore throat	54
Erection	55
Sickness	56
Body	57
Toothache	58
Kidney	59
Bladder	60
Constipation // Blockage	61
Liver	62
Diet	63
Measles	64
Give appetite	65
Arthritis	66

Q. 3 (ii): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: The main reason for which these trees or bushes are often;

Coal/Firewood

Response	Code
Coal // Fossil Fuel	01
Common	02
Hard // Tough	03
Cooking // Roast breadfruit	04
Stay long // Last long // Burn Long	05
Fire // Firewood	06
Fruitless	07
Wood	08
Easy to burn	09

Response	Code
Baking	10
Blaze	11
Pimento	12
Hut	13
Available	14
Nearest	15
Replace gas	16
Good // Good fire	17
Pretty	18

Q. 3 (ii): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: The main reason for which these trees or bushes are often;

Furniture

Response	Code
Tough	01
Common	02
Quality	03

Response	Code
Dresser	04
Strong // Durable // Lasting	05
Table	06

Response	Code
Bed	07
Furniture	08
Pretty	09
Good tree	10
Hardwood	11
Coffin	12
Door	13
Flooring	14
Food	15
House	16
Whatnot	17

Response	Code
Broad leaf	18
Window	19
Roof	20
Board	21
Rafters	22
Chair	23
Chest'o'drawers	24
Any	25
Not rotten	26
Counter	27
Take polish table	28

Q. 3 (ii): We know people use trees, branches, shrubs, bushes and the like, in many different ways. From what you know, tell me about how this household uses them: The main reason for which these trees or bushes are often;

Post (Fence/Yams)

Response	Code
Post	01
Common	02
Yam // Yam stick	03
Beans	04
Fence	05
Other use	06
Make clothesline // Line stick	07
Strong	08
Longuity	09
TV pole	10
Catch banana	11
Pasture	12
Bear fast	13
Spring	14

Response	Code
Grow plants	15
Yard	16
Hut	17
Coop	18
Seat	19
Easy to use	20
Easy to get	21
Hold dirt	22
Easy to catch	23
Good	24
Don't rot	25
Good craw	26
It grows	27

Q. 4(a): What do you think the following words mean? Just tell me what you think.

Bush

Response	Code
Trees and grass that are grown wildly // Grass // Trees	001
Rural area	002
Farming // A farm	003
Something that grows from the soil	004
Fresh feeling	005
Means all green plants/shrubs // Just like bush	006
Place where nobody lives	007
Good thing	008

Response	Code
Leaves	009
Something that can use	010
Far in the woods	011
Means green wildlife leaves or plants	012
A good herb medicine for people // Medicine // Medicinal plants	013
Foliage	014
Means woodland // Standing wood	015
Different kinds of bush // Variety of grass	016

Response	Code
Planting of bananas, yam	017
To go to work	018
Something growing that have no good purpose	019
Gully bean, fresh cut, rosemary, these are bush	020
Where people plant things // To cultivate	021
To use for your body	022
Where my mother used to go and plant things	023
Things used as medicine	024
Small tree growing in the farm // Small plants	025
An uncultivated area	026
Forest	027
A place that have no farm road	028
Going to the farm to reap or plant crop	029
Mi dada ground	030
Going to the bush like you have a farm // People go to farm	031
Lie you say I am going to bush the farm	032
Thick growth of grass // Cluster of grass	033
Like you not to cut the bush off the hill, it causes soil erosion	034
A lot of trees and plants // A lot of grass // Large area of greenery	035
A grassy vegetation	036
It's a must, it's from creation days	037
Something to cut down // Need to be chopped down for more environmental purposes	038
Herbs	039
Shrubs growing where it's not wanted	040
Hiding place for criminal	041
Land not in use with small trees and weeds	042

Response	Code
Trees of no economic value	043
A place where all sorts of insects goes about	044
Place of quiet	045
Cleaning side-walk/roadside	046
Big wasteland	047
Tea bush	048
Feeding fi cow, goat an hog	049
Ruinate land	050
Bush fire	051
A place of no economic activity	052
Weed	053
A bad place	054
Anything that animal feed on	055
Anything to deal with nature	056
Looking at a place not very clean	057
By things that you don't use	058
Feed that don't good	059
Something that chop down	060
Crops, coconut, bananas, orange trees	061
All purpose thing	062
Plant	063
Country	064
Terrain land	065
Back yard // Herb and bush around the yard	066
Isolated land area	067
Clothing for the earth	068
In a di gully	069
Plant that is not important	070
Some plant woman use fi dash weh belly	071
Trees that do not bear fruit	072
Anything that you did not plant	073
Something that is naturally grown	074

Q. 4(b): What do you think the following words mean? Just tell me what you think.

Environment

Response	Code
The surrounding areas // Surroundings // Community	001
Small community with a lot of trees	002
The dirt	003
Something you plant	004
The atmosphere // Air	005

Response	Code
To keep clean // Place to clean up	006
Cleanness // Clean air // Tidiness	007
A place	008
Lovely area // Clean place	009
Where people and animal live // The whole, people, tree, bush, animal	010

Response	Code
Do more	011
Some kind of insect	012
Things that grows	013
Tree and water	014
The area in which you live	015
Keep away from drugs	016
My yard	017
Just like tree and whatever around us	018
Out the door	019
When you cut tree that go to the rainfall	020
Mostly bush	021
Bad place	022
Virus	023
Just a word that means how life run	024
Pollution	025
Very important thing	026
All living thing that exist	027
Land, trees, buildings that around us	028
People around // Like people	029
Dirty mind people	030
To take care of our community	031
Beautiful things about nature and the surrounding	032
When there is a lot of trees	033
A place accommodating population where one organism interact with each other	034
A surrounding along with it's biotic and abiotic structures of how organism live	035
Area protected by government	036
Must always be cleaned // Should keep	037

Response	Code
clean the place	
An area that is not properly developed	038
Land space	039
People, place, things	040
A lot of people located at one place // Plenty people	041
A place free of pollution	042
Area surrounding township	043
Suggest cool, refreshing and so on	044
Area in which you live and the atmospheric condition of it	045
Things around you	046
Attitude of the people	047
The world // The earth	048
Good season	049
Looking at nothing good and you want to get away from it	050
View the country, mountain, the place	051
Nice fresh air	052
Lots of bad word	053
How our community is functioning	054
Thing used by people	055
Environment is land and airspace where fresh air blow freely	056
Sunlight and plants	057
Means the circle	058
Not to cut the trees from the woodland	059
It's where people animals and plants are	060
Area outside	061
The area just like the river	062

Q. 4(c): What do you think the following words mean? Just tell me what you think.

Environmental Health

Response	Code
Clean surrounding // Clean area // To keep environment clean	001
Fresh air, proper drainage	002
How the dirt make you feel	003
Strength	004
How the environment affect your health	005
Healthy // Good health	006
Sickness // Disease	007
How the place make you feel	008
Healthy surroundings to preserve internal health	009
That will give health and strength	010
Protecting peoples health, rivers and erosion	011
How you keep your environment/community	012
Fresh air // Keep the air or place clean	013
Things around the environment	014
Health around home/surrounding	015
You don't get any disease from the surrounding	016
How you suppose to take care of your body	017
Fever you get	018
Treating things according to their use	019
Being aware of the positive impact of the environment	020
Taking care of the atmosphere	021
The type of hygiene practice in and around	022
Garbage disposal and fire smoke affecting the surroundings // Surrounding and atmosphere don't smell good	023
People with AIDS and other bad disease	024
How you dump your garbage // How you dispose your waste	025
Like using the river to wash, you should know you should not through anything dirty in it	026
Clinic // Community clinic	027
Toilet	028
State of all things that are around us	029
How safe the environment is	030
Things around that good for your heart	031
Sanitary	032

Response	Code
If you are free from pollution	033
People live bad and work obeah on people	034
Taking care of natural resources	035
Everybody	036
A safe means of protecting ones surrounding	037
Good place, not a lot of garbage or chemical	038
Proper hygiene	039
Pollution // Polluted environment // Rubbish	040
This is a state of well being of all the organisms within an environment	041
Atmosphere which is clean from contamination that makes one healthy	042
The area where there is less pollution	043
Living style	044
How we practice a proper care of our garbage from mosquitoes	045
The freedom of garbage and sewage from our home and community	046
Protected area and how clean it is kept	047
Necessities of human beings	048
Drinking things for your health to get back strength	049
What is in the atmosphere, if it is clean or like out Cement Company with lots of dust	050
Protecting rivers and seas from pollution	051
Some people is not in good health	052
How you keep fit // Good physical condition	053
Environment not clean you get a lot of disease/germs	054
A world free from crime and violence	055
Eat, drink the best	056
The air breathe in	057
Develop the community	058
Keep the environment in balance, not cut trees	059
Burn or spray grass	060
Kinds of chemicals	061
Different kinds of germs you can get from the air	062
Study about the space around you	063

Response	Code
Area where we live, condition, hygiene, cleaners of place	064
Garbage that grow mosquitoes, settles water	065
Place or people mind	066
Community unclean	067
Relating to the environment, the way a person eats, keeps self	068

Response	Code
Trees that give us food, not sick	069
Physical, mental position	070
Condition affecting the space around us, good or bad	071
How fresh and clean the air is	072
Clean area with people, plants and animals	073

Q. 4(d): What do you think the following words mean? Just tell me what you think.

Forest

Response	Code
A dense population	001
Trees and wildlife and water	002
Bushes // Grassland	003
Pine trees	004
Woodland // Woods	005
Abundance of trees // Trees // A lot of tress and plants	006
A lot of animals	007
A mountainous area with lots of trees	008
Lumber	009
The hilly part of the mountain // Mountains	010
Work hard	011
A woodland mountainous area that protect the rivers	012
Bamboo	013
Farming // Place where you can do farming	014
Rain, forest, trees	015
To get better air	016
Wild animals afar	017
A part of government agricultural system	018
Source of rainfall	019
A far place like a desert	020
A place that have special trees for special use and good purpose	021
A dark place	022
A place where plenty trees and animals are found	023
Pure bush and tree	024
An area where people go for recreation, hiking	025
A place where people, animals and plants are beneficial to each other	026
Where people cut down plenty trees	027

Response	Code
Like where the birds and animals live	028
Mostly trees for watershed	029
A distant place where wildlife and trees are found	030
Jungle where many different plant exist // Variety of trees	031
A place where trees are grown for furniture/lumber	032
More plant a tree than destroy	033
People live in bush	034
A place to let go animals // Raising animals	035
Keep community cool and provide water	036
A place where a lot of trees are grown and to promote rainfall	037
Surplus of wood products	038
Designated area to plant trees or natural grown for economic purpose	039
Where you can get a lot of things to use at home or otherwise	040
Reservoir for trees	041
Jungle // Big trees in the jungle	042
Trees, animals, people work there	043
Forest is where you get food and meat	044
Government land	045
Forest is a place that you cannot go as you like without permission	046
Country	047
Keep land fresh, more healthy	048
To plant some useful trees	049
Place where we get stick to buy // Place where we get trees to buy	050
A place with overgrown trees and snakes	051
Crownland where forest trees plant on the hillside	052

Q. 4(e): What do you think the following words mean? Just tell me what you think.

Natural Resources

Response	Code
Something is grown naturally and be used to make something else	001
Trees, water and wind // Trees, river, etc	002
Rain and sun // Rain	003
Banana plantation	004
Not manmade	005
Crops without fertilizer	006
Something that is created or grown naturally e.g. plants, rivers, sea	007
Water // Water area	008
Stone, water, trees, bushes	009
Trees // Plants	010
Animals and plants	011
Something useful // Useful things	012
Mony	013
Fruits	014
River // Rivers, springs, ponds	015
Things we use to do in our daily lives	016
Water and sunlight	017
Storage of food	018
Something you do naturally	019
Things that grow naturally // Things from nature	020
Not using chemicals	021
Something we can make a living off	022
People	023
Things made by God	024
What the earth have to offer	025
Beach go made it	026
Something that exist by nature, it can be renewable	027
Like the trees, woodland where no house is	028
Unchanged resources that comes from the earth	029
Dirt, marl, woodland, sand are examples	030
Just relax over the time and season	031
Seas, forest and animals	032
Things you can obtain from the surroundings	033
Stop from littering	034
Any material that has not been processed	035
Elements and material that comes from the earth	036
Things around you in the air	037

Response	Code
Relationship with one another in the community	038
Good people, river breeze	039
Sheltering, clothing and food	040
How you keep the things them around you	041
The energy and information that we derive from peoples place	042
Natural farming	043
Natural bush	044
Community on a whole	045
Like trees that bring rainfall	046
Like bauxite, cane, orange // Bauxite, limestone, blue mahoe	047
Place where you can get ground provision	048
Whatever you have like mi land wid mi little jackfruit trees	049
A yuh own earning	050
Fish, minerals etc	051
Sun, moon and stars	052
Air we breathe and water, things like those	053
Something you own	054
Natures provision to help us prosper	055
Money	056
Like light, hospital	057
Things that we eat or use	058
Like calaloo, banana, eskellion and apples	059
Wonders of creation	060
Things that come free from God but costly to man e.g. water	061
Anything taken from the earth and it's state has not changed	062
Raw material	063
Your income	064
It's like a park	065
Trees, animal, birds // Mountain, grass, fruits, food	067
Things from which you use to build up the economy	068
Place well protected	069
Trees, air, river, hills // Soil, water, trees, mountains, rivers	070
Water, fish, grass, trees // Man, animal, fish, trees, rivers	071
Things made by man	072

Response	Code
Things that you build that are our own resources	073
Sky, rain, cloud, hill, water, mountain	074
Something nice, keep clean	075
Where the water come from underground	076
Things on land	077

Response	Code
Natural beauty	078
Materials used for different purposes	079
They are real things	080
Water, light, telephone	081
Land that can be cultivated	082
Water, metal	083
Fountain springs, mountain, land, trees	084

Q. 4(f): What do you think the following words mean? Just tell me what you think.

Sanitation

Response	Code
A clean area // Cleanliness	001
Clean, free of pollution // Clean, free of germs	002
Toilet // Keep toilet clean	003
Deals with sand	004
Methods of cleanliness	005
A place that was made to pass urine and faeces	006
Do something different	007
Keep the environment clean // Clean environment	008
The way the place is kept	009
How you dispose of garbage/waste	010
To clean things // To clean surroundings	011
Cleanliness and proper hygiene // Being clean and smell good	012
Proper hygiene	013
Getting rid of germs and bacteria	014
Unsanitary // Place not looking good, need to start clean it	015
If I have like an outside toilet, it should have proper cover	016
Must not urinate or excrete in the river	017
Bathroom	018
Sand that you use	019
Measure conducive to preservation of	020

Response	Code
health	
Tidiness // Tidy private place	021
The conditions under which waste materials are kept	022
Is very important in many ways	023
Water quality	024
How clean you are // A clean person	025
Taking care of mad people	026
Better health care	027
How you deal with things on a day to day basis	028
Public health concern	029
Cleaning and washing	030
Place not clean, the same environment	031
To save things	032
How the community get along water road	033
Garbage, place to keep clean // Garbage	034
Keep place pretty	035
Good clean place that people live	036
Pleasant household facilities	037
Place like you would have enough convenience	038
Standard of the water	039

Q. 4(g): What do you think the following words mean? Just tell me what you think.

Water Quality

Response	Code
The type of water people get in an area	001
Clean and cool	002
Carry water from far	003
Sterilize water // Treated water	004
Amount of water in the community	005
Enjoyment	006
The standard or level of water	007
Clean water // Fresh water // Good water	008
Water to drink	009
The standard that is to be drinken and not to be drinken	010
Where the water comes from // The means of getting water	011
Good or bad water // Water	012
The amount of water	013
It depends on the quality of water	014
The taste of water	015
Good water system	016
How you keep the water // State of the water	017
Whether it is clean or unclean	018
Is something we should take care of	019
Waste that are purified and water which are not purified	020
Purified water coming form reservoir	021
The amount of purity in water	022
Make sure you boil your drinking water	023
Water must be kept clean	024
Purification of water	025
Not to through any garbage in water	026
How healthy it is for humans	027
Proper hygiene	028
Clean, pure water, some salt, some heavy	029
What water is used for	030
Have to do with if the water clean or so. If chlorine in it	031
Pipe water // Pipe	032
Have water frequently	033
This refers to the hygienical condition of the water	034

Response	Code
Poor because sometimes we have to wait until God sends rain	035
Spring (poor) // Natural spring water	036
How pure the water is? Water free of bacteria /sediments	037
River // River water	038
Should be odourless, tasteless and colourless and must be free from impurities	039
Needs to be improved	040
Best of water	041
The looks of water	042
Like the water situation	043
Refreshing	044
All has to do with your water supply, whether from wells, rivers or pipes	045
Like recycle water	046
Water is not coming from a good place	047
The chlorine // Chlorine water	048
Stream that is well protected by law	049
If the water is polluted or not	050
Water is not good to drink/bathe	051
We would have to put bleach or disinfectant	052
Get water to bathe	053
If fit for consumption	054
Hard or soft water	055
Rain water	056
Stagnant water, pure water	057
When water is inspected to see if it is good for drinking	058
Natural and goodness // Freshness of water	059
Water that is not qualified to use	060
Cannot live without water, it's life, good or bad	061
Water used for cooking, washing and cleaning	062
Can be used for drinking and cooking	063
Different kind of water	064
Palatable	065

Q. 4(h): What do you think the following words mean? Just tell me what you think.

Watershed

Response	Code
A place where water originates	001
Cover by trees // Trees that cover water // Trees	002
Forest where water comes from // Forest	003
Presentation of water and rainfall in the area	004
Rain // To get rainfall // Rain water	005
A place that water is stored // Settles // Catchment	006
Waterfall // Place where water falls from	007
The riverhead where the rain appears from // Riverhead	008
Burst pipe or river // River, water from the pipe	009
Shed that keeps the water cool from the sun	010
Woodland	011
The storage of tree parted by river	012
A place or thing that keeps the water in a river cool	013
Water in clean vessel	014
River that supply many communities	015
Some place that flood-out people stay	016
The area where the water run	017
Protecting the water	018
Is a spring that run into the river	019
Water far away // A far place with water	020
To protect the environment in the area	021
Water // A lot of water	022
A shed is over the water e.g. a bathroom	023
A shed made up over water to stop leaf from going in it	024
A place make up over the water	025
The rainforest area that holds the water for rivers	026
Don't cut down trees	027
It is like a catchment for water when rain falls	028
A stream or pond	029
You do not waste it	030
Things covering over place where water is kept // To cover drinking water	031
A place near a forest where we get water	032
Where water is collected for general use e.g. pumping stations	033
The green areas around rivers	034
House over waterhole	035
Waterbed // Riverbed	036
Land near river	037
River or stream // River or springs	038
Where many rivers meet together to form one body	039
Under a house	040
Like when you put a drum outside and water falls into it	041
The tree around keeping the water alive	042
Trees over the rivers	043
Water coming from a hill for protection	044
Place where we get water from frequently	045
Any place or piece of land that attracts a body of water	046
Made up of trees, forest, rocks, land and animals	047
River and swampy areas	048
When we contain water like in black drum	049
A tank	050
The caring of the rivers especially the trees around	051
A place surrounded by water	052
Catching water from the house	053
Some means by which water derives to form a natural resource	054
To help our water quality in the area	055
A place where water is gathered and form springs // Underground springs	056
An area where trees, plant enhance or improve the water flow	057
Area that drains water in rivers or lake	058
A reservoir	059
The place water run from to be purified	060
Where we get water from // Source of water	061
Stand pipe	062
Like dirty water	063
Area weh dem nuh cut nuh tree off a di land dem	064
Bush used to shelter from rain	065

Response	Code
Area surrounding the sources of water // Area surrounding rivers	066
Out-let	067
Two streams joined together // A body of water where all springs/rivers meet in one	068
Drains	069
Fertile area	070
A place in river sheltered by trees	071
To purify water // Keep water clean	072
How we protect and do not destroy the trees along the riverside	073
Pump house	074
Like irrigation business	075
The trees that helps to draw the rain	076
Thirst	077
Designated area where all rainfall comes through one area // A place that is preserved so that rainfall can be conducive	078
Like wasting water	079
Houses	080
The mountain // Mountain area	081
A place that is backed up by wall	082
An area where majority of the rainfall is concentrated	083
Place to keep water out	084
A line separating two rivers	085
A tank with pipe cover	086
A building made up over a pool of water	087
The trees in the forest that protect the water	088
Good quality water	089
Water-cycle	090
Something that protect the water from dirt	091
Drumful where you shed it off	092
A little house that put over the water	093
Like rain water you have to make a channel or strainer	094
Something that shelter you from getting wet	095
To back up water so that it is not exposed	096
Where people move around	097
Planting of all sorts of grass	098
Hillside along rivers and streams with plenty trees growing	099
Building where drinking water is collected to keep away from insects	100
Something to lead water into a tank	101
Hilly terrain along rivers	102
Water coming from hillside to gutters	103
Is hillside, two sides of a river // Forest around the rivers on both side	104
Watershed is the area around the rivers with plenty of trees	105
A source where many water meet to serve people	106
Area protected by government for rainfall	107

Q. 6 I (a)(i): I want you to think about both I. Rivers and II. Forests. Give me one way in which you think each might be of good or benefit to (a) your household or community (b) Jamaica

Rivers (a) Household or Community

Response	Code
Good water resource	01
Supply with water // To give water // Don't have pipe	02
Washing	03
Pay less for water	04
Provides water in times of shortage	05
The children can swim // Swimming	06
Provides fish // Fishing	07
Bathing	08
Domestic	09
To drink // Drinking water	10
They can get food	11
Water, fish and stones	12
Feed to the dam // River help to store water in the dam	13
For relaxing	14
Swim and fish	15
Money from white people	16
Provide recreation activities // Place for sport activities	17
Earn money	18
Keep clean // Cleansing	19
Catch and sell fish	20
Sell the river stones	21

Response	Code
Unpaid for water	22
Health	23
Less flooding	24
Farming // Watering plants	25
Provide area where water can be treated and supplied from	26
If proper care is taken we can get more water	27
Fresh water fish can be accommodated	28
Tourist	29
Employment	30
Irrigation	31
Source of cooling out	32
Building materials	33
Sand, gravel, wash	34
Cannot live without water	35
Rafting	36
Transportation	37
Help a lot of people	38
Spraying	39
Cooking	40
Sand and stone	41

Q6. I b(i) & (ii): I want you to think about both I. Rivers and II. Forests. Give me one way in which you think each might be of good or benefit to (a) your household or community (b) Jamaica.

Rivers (B) Jamaica

Response	Code
Sand , gravel // get sand from it	01
Stone, fishing	02
Tourist attraction // Tourism	03
Swimming	04
Fishing // Fish for food	05
Bathing	06
Drinking // Drinking water	07
Rafting	08
It would help	09
Good health	10
Produce a lot of water // Water supply	11

Response	Code
Food	12
Good water resource	13
Birds, animals need it	14
Entertainment // Enjoyment	15
Relaxation	16
Recreation // Picnic // Sight seeing	17
Mining	18
Washing	19
Agriculture // Farming	20
Help to wash away garbage	21

Response	Code
Make money // Earn money // Collect foreign money // Economy	22
Good source in times of shortage	23
Selling stones	24
Selling sand	25
Hydroelectricity // Electricity	26
Use sand to make buildings	27
Irrigation purpose	28
Go to beach	29
Road maintenance	30
Beauty // Beautification	31
Good production	32
Useful for other domestic use (cook)	33
Provide fish for export	34
Water sports	35
Serves as a habitat for crayfish	36
Employment	37
Climbing the falls	38
Source of energy	39

Response	Code
Keep down pollution	40
We get materials from the river to do many things	41
The river keeps the country clean	42
The trees help to build the economy	43
All kind of use // Everything	44
Transportation // Shipping	45
Keep people/place clean	46
Fish, sand, stone	47
Reservoir	48
Extinguishing fires	49
Domestic // Farm animals	50
Baptism	51
Cleansing	52
Watering	53
Factories collect water from rivers for commercial use	54
The river is a resource to the country	55
To manufacture goods	56

Q6. II a (i): I want you to think about both I. Rivers and II. Forests. Give me one way in which you think each might be of good or benefit to (a) your household or community (b) Jamaica.

Forests (A) Household or Community

Response	Code
Provides firewood // To cook with	01
Clean air // Fresh air	02
Sticks	03
Make money	04
Wood // Get lumber // Lumbering	05
Provides rainfall // Produce rain	06
Provide work // Jobs	07
Provides lumber and medicine	08
It can help live healthy lives	09
Coal // Fuel	10
It is a watershed // Watershed area	11
Furniture	12
The climate will be okay	13
Farming // Yam to plant	14
Supply air and water	15
Trees	16
Parks	17
Provides scenic beauty	18
Provides good soil	19
They get fruits	20
Protect from landslide	21

Response	Code
Hunting // Help the hunters	22
Getting house // Shelter	23
Get cool breeze // To keep the area cool	24
The forest contribute to water supply // Water // Give us spring	25
Camping // Picnics	26
Help to protect water	27
Herbs	28
Food	29
Keep wind from damaging homes // Forest break the wind	30
Helps in farming, space creation	31
Create space for wildlife // Shelter for wildlife	32
Hiking	33
Attract birds so they don't go to houses	34
Building	35
Light post // Post	36
Health	37
Keeps out excess sunlight and rain from houses // Shading	38

Response	Code
Retreat and relaxation	39
Mi nuh si weh it benefit wi	40
It protects wild animals	41
Gives plants and rain	42
Provide moisture for plants	43
Saves foreign exchange	44
Export timber	45
Prevent landslides and flooding	46
Cut stick to make coop and fence post	47
Carry my children to show them lizards and other things there	48
Protect soil and community	49

Response	Code
Help keep insect away from town	50
Attract tourist	51
Lots of trees for sale	52
Meat from the forest, good for your health	53
Can get stick	54
Carbon dioxide	55
Pencils, matches, etc.	56
Help protect from pollution	57
To fence place	58
The forest is a resource to the community	59
Prevent breeze	60

Q6. II b (i)&(ii): I want you to think about both I. Rivers and II. Forests. Give me one way in which you think each might be of good or benefit to (a) your household or community (b) Jamaica.

Forest (B) Jamaica

Response	Code
Lumber (foreign exchange) // Produce lumber // Sell lumber	01
Furniture	02
The place to camp	03
Hunt // Hunters	04
Farm	05
Cut trees // When they cut one	06
Livelihood	07
Shields against hurricanes and strong winds // Protect the area	08
If they plant one // Plant more trees	09
Provides scenic beauty	10
Produce rain // Rainfall	11
Work for people // Employment	12
Good health	13
Provides certain bushes for medicine // Medication	14
It can attract tourist // Tourism	15
Plants // Trees	16
It can export // For export	17
Coal // Charcoal	18
Protect the water	19
Prevent erosion // Prevent landslide	20
Make house	21
Make money // It can be a source of capital // Earn foreign dollars	22
Agricultural	23
Watershed area	24

Response	Code
Make casket	25
Source for wildlife // Shelter for wildlife	26
Get lightpost	27
It protect the river	28
It protect animals // Helps animals	29
Get cool breeze // Keep environment cool	30
Hiking	31
Helps to supply water	32
Through logging	33
Education area	34
The Forestry Department	35
Waterfall	36
Hydrocycle	37
Food // Fruits	38
Roots and herbs	39
Lot of trees	40
Hide from police	41
Provide a place where people can do research	42
Fences // Properties can get fence post there	43
Save money	44
Shade	45
Decorations // Carvings	46
Carbon Dioxide	47
No disasters	48
Clean air // Fresh air	49

Response	Code
Relaxation and helps people to unwind	50
Nobody nuh go a forest again	51
You can rear animals in the forest	52
Less pollution	53
Building materials	54
Protect soil // Keep the soil	55
Economical	56
It gives you insects and wild birds to take to the zoo for people to see	57
Minerals	58

Response	Code
Natural resource	59
Income for country	60
Good for science experiments	61
Protect from breeze	62
Fertile land	63
Make boats	64
Biodiversity	65
It protects the environment	66
Make it unique	67
Sustain life	68

Q. 2(a): These words are sometimes used <u>when people talk about environment</u>, land, rivers or farming. Tell me what you think they mean.

CBO

Response	Code
Community Based Organization	01
Insanitary	02
Save	03
Country Bank Office	04
Community Banana Office	05
Gas	06
Like the sports club	07
Place where people go with environmental problem	08
Central Bank	09
Community groups	10
Like citizen association	11
Chemical	12
Consensus Building Organization	13
Credit Board Office	14
Come before it over	15
Coffee Board	16
Central Bureau Office	17

Response	Code
Central Bakery Office	18
Keep the environment clean	19
Central Banana Office	20
A group of people who is in charge	21
Caribbean Based Organization	22
People come together and do something	23
Community meeting	24
Conservation Based Organization	25
Caring brushing obstacles	26
Carbon Monoxide	27
Citizen Broadcasting	28
When you dig a trench	29
Communication Board	30
A TV station	31
An agricultural phrase	32

Q. 2(b): These words are sometimes used <u>when people talk about environment</u>, land, rivers or farming. Tell me what you think they mean.

Conservation

Response	Code
To conserve // Save // Don't waste things	01
Use what is necessary // To use things wisely	02
To save and preserve	03
To save soil and water	04
A place where people live	05

Response	Code
Helping somebody	06
To preserve	07
When you can't do-do	08
Protecting your environment	09
A way of contouring land	10
To plan	11

Response	Code
Taking care of our resources // Take care of something/everything	12
Considering what to do	13
Protection of nature and wildlife // Protection of the forest	14
To save energy	15
Saving on usage of light	16
Protecting soil // Soil conservation	17
Saving water and electricity	18
To control our money spending	19
Saving water for future use	20
Cutting back on consumption	21

Response	Code
Ploughing of land, caring soil	22
Use only the amount needed	23
Cutting trench on a hillside	24
To protect yourself	25
Use less water // use less	26
To protect things	27
Store something	28
Talking	29
Things for natural environment	30
To prevent erosion	31
To use up something	32

Q. 2(c): These words are sometimes used <u>when people talk about environment</u>, land, rivers or farming. Tell me what you think they mean.

Environmental Steward

Response	Code
Person in charge of environment	01
Someone who protects the environment	02
Wire parked with stones	03
Hospital person	04
Persons used to educate people	05
People who go around to inform people about the environment	06
Good people // Being good in the environment	07
Environmental warden // Nature worker	08
Someone who embrace the environment	09
To provide resource for our community	10
Someone who sees that the	11

Response	Code
community/surrounding is clean	
Area leader	12
Undercover security guard	13
Police work	14
Man of God	15
Take care that nobody litters	16
Forest ranger	17
People take care of people	18
Litter wardens	19
Keep environment clean	20
Caring for someone	21
Somebody who look after good health	22
Conservation warden	23

Q. 2(d): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Gabion Baskets

Response	Code
Use to catch fish // Fish traps	01
It hold the silt	02
Grind, wire with stones	03
To protect the river from erosion	04
Basket for gathering something	05
Helps to protect a landslide or area that the river destroy	06
Something used to retain water	07
The wire caging for stones	08
Things used to train the river	09
Take to the market	10
Straw basket // A type of basket	11
Maybe qurine	12
Gift basket	13
What they use to back the river	14
Someplace where water settle	15
Use to build dam	16

Response	Code
River banking // To keep the river bank firm // To keep the river edge	17
To part the river	18
Strain water	19
Basket made from bamboo	20
Use stone to build wall in wire basket	21
Groin/soil conservation method	22
Protection for place	23
Pack stone to keep the river	24
Basket used to keep water in place	25
Basket used to clean out river	26
A garbage basket	27
Something for household use	28
A basket for food or hamper	29
Stone wall	30
Bush basket	31
Contour slippage of land	32

Q. 2(e): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Grey Water Cycling

Response	Code
To make water clean	01
Purify water that was used before // Sterilize water	02
Mud	03
Organic matter	04
Using chlorine to recycle water	05
Reuse of water // Recycle of water	06
Putting water in a bottle	07
Toilet water reuse // Recycling sewage	08

Response	Code
water	
Use water to water lawns/flowers	09
Reusing bathroom water	10
Putting water through a process	11
Sewage water // Dirty water	12
Changing water	13
Water from cesspool for gardening	14
Water used all the time	15

Q. 2(f): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Kitchen Composting

Response	Code
Waste from kitchen	01
Things from the kitchen that you put together	02
Put pretty things in the kitchen	03
Like digging pit through a garbage	04
Put away kitchen waste	05
Dividing kitchen rubbish	06
To use as manure // Manure heap	07
Garbage from kitchen used as fertilizer/manure	08
Organic break down	09
The reuse of garbage	10
Gather and put garbage in the right place	11
When you don't have a proper kitchen	12
Keepment of the kitchen	13
The spoil things that are used instead of fertilizer	14
Biodegradable material e.g. yam skin	15

Response	Code
Reusing decomposed kitchen things	16
Putting kitchen item one place	17
Waste substance used ins tead of chemicals	18
The food mother peels, she use it	19
Where you cook	20
Building up of outdoor kitchen	21
A lot of kitchen	22
Houses which are close by	23
Kitchen not decent enough	24
Utensil like pot and stove	25
Water come from sink	26
Having water in kitchen	27
Some form of security	28
How your kitchen is located	29
Kitchen storage	30
The burning of kitchen garbage	31
The kitchen area clean	32
Something to do with the kitchen	33

Q. 2(g): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

NGO

Response	Code
Non-governmental organization // Not government	01
National Government Office	02
Head of organization	03
People going not working for the government	04
Somewhere government has nothing to do with	05
Private organization	06
No government organization	07
Organization that does not get help from the government	08
Natural growth of operation	09
Nitrogen, Gas and Oxygen	10

Response	Code
New Government Owner	11
Next Generation Officer	12
National geographic Organization	13
National Building Office	14
Non governing organization	15
These are people who help in protecting the environment	16
National General Office	17
Negative	18
Negro	19
Never go over	20

Q. 2(h): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Pet Bottle Recycling

Response	Code
Recycle plastic bottle	01
Recycling used bottles	02
Bigger bottles	03
Making old bottles new // Recycling old PET bottles // Recycling PET containers	04
Take back the bottle someplace	05
Polyethylene	06
Sterilize dirty bottles	07
If you have small children you should not put pesticides in plastic bottles	08
Carry to full again	09
Reuse the bottle // Wash and reuse	10
Collecting of plastic bottles/bags	11
Use of bottles to make other things	12

Response	Code
Bottle we use on PET	13
Put in bins that made to collect them	14
Remake something after cleaning it up	15
Reusable containers	16
Returning bottles to agent	17
We collect and sell them back	18
Pesticide bottle recycling	19
Wash, label, sell again	20
Clean the place	21
Burn plastic	22
Waste can use, even sell	23
Make over thing	24
Store your bottles in one place	25
Petroleum bottle recycling	26
Buy back drink bottles	27

Q. 2(i): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Reef

Response	Code
Have to do with the sea/river	01
Where the river ended	02
A bad place	03
The indulation of the sea/river	04
Where the fish live	05
Something in a river	06
Something like a boat	07
Sea reef	08
No life on it	09
Underwater sea life	10
Low rocks in sea // A group of rocks	11
Bad gully	12
Precipice // Cliff	13
Rocky part in the sea	14
Coral reef in the sea // Coral	15
A plant	16
Something in the sea, it is green	17
Something below the sea	18
A rising in water that reduce its flow	19
The name of a beach	20
A beach in Port Antonio // A beach	21
A high hill // High place // Place on	22

Response	Code
mountain	
Used to protect marine life	23
A place in the sea // A land out in the sea	24
The dividing between deep and shallow water	25
Deep water on both sides and shallow in the middle	26
Reef break the force of the water	27
When you go to the beach you can swim out to the reef	28
Protection for beaches and home for marine life	29
Something people ride on at river	30
Watershed	31
Where the water meets the shore	32
Place where fish feed	33
Aquatic plants of the sea	34
The edge of the river	35
Shallow place in sea or river	36
A boundary for ships in the sea	37
Line for corals on sea shore	38
An aspect of ocean life	39

Response	Code
Something that grow in water or sea	40
A place for fishing	41
The bottom of the sea	42
Good for relaxing	43
Water source	44
Garden under sea	45
The edges of rock, sand above the level of the sea	46
Important part of sea	47
Clean sea, clean	48
Barrier in sea	49
Sea shore // A place along sea course	50
Tourist to visit	51
A deep water	52

Response	Code
A border	53
Place you go for enjoyment	54
It help to keep the sea water from washing away the beaches	55
Water coming off a rock	56
A fall	57
What run the river	58
Things that grow on rocks	59
A ridge of rock or sand near the sea	60
A place in here, waterfalls	61
Place beside the sea	62
Mountains in the sea	63
Where the river ends	64

Q. 2(j): These words are sometimes used <u>when people talk about environment</u>, land, rivers or farming. Tell me what you think they mean.

Sink Hole

Response	Code
It is a pond // Like a pond // Dry pond	01
Hole that things disappear in	02
Bury garbage in // Use as disposal // Use as storage of waste	03
Dangerous part of river	04
Like a pit	05
A large hole in river/sea // Deep river hole	06
A hole with water and quick	07
Do-do in hole	08
Waterhole with a soft surface // A place that soft	09
A large hole or dumpsite	10
Gully	11
The hole in the kitchen sink	12
A deep hole for rotten garbage	13
A deep hole // A hole far in the ground	14
A dry hole that sometimes have water	15
A place where water runs from to the bathroom	16
A mud place	17
A swampy place	18
Sinking sand in a river	19
Sea-ball hole	20
A place where water underground overflows	21
Quicksand	22
A place caused by landslide that sinks	23

Response	Code
A place where water soak through // A hole that take in water	24
A hole with no bottom // A bottomless hole	25
Settled water sink away	26
Things that go down in the earth	27
Sea-ball e.g. maway hole	28
Found on beaches	29
A hole that take away flood water	30
Something if you fall in you can't get out	31
Something weh you sink inna	32
Place where people throw garbage	33
Natural hole	34
A hole that people can drown in	35
Deep muddy hole in the river	36
Spinning hole or quicksand	37
A well	38
A place between a cluster of rocks and it look like it nuh have nuh bottom	39
A hole that leads underground	40
Mysterious hole // Strange hole	41
Dangerous place	42
Hole that ends in sea	43
Hell hole	44
Place where people throw dead animal	45
A dumping place for criminals	46
Hole that leads to sea	47
Cave	48

Response	Code
A hole that carry you somewhere else	49
Found in the hills to control water and soil erosion	50
A dark hole	51
To dig a hole	52
A massive hole formed by natural disaster	53
Pipe	54

Response	Code
It is thing in sea	55
Deep hollow position, mainly strong place	56
To go under the surface or to the bottom	57
Air hole	58
In river for sinking objects	59
Large stone holes	60
Like a land, water with gravity	61

Q. 2(k): These words are sometimes used <u>when people talk about environment</u>, land, rivers or farming. Tell me what you think they mean.

Soak Away Pits

Response	Code
Faeces passes through pipe to this pit	01
Hole where water soak away	02
Toilet // Toilet pit // Pit latrine	03
Place where water escape from pit	04
Something that soak away // Waste matter that is soak away // Pit that soak away waste	05
The kitchen water	06
Pit pack with stones	07
Place where sewage escape from to another area	08
A deep hole that faeces can soak away	09
A sewage // Hole for sewage // Manhole	10
Dissolve waste in the soil	11
A pit that don't full, it soak away	12
Waste water store	13
Flush toilet that soak away	14
Grease trap	15
Area that catch watch leads underground	16
The pit in yard for toilet to flush	17
Pit use to dispose chemical waste	18
Like that you use in pit latrine	19
Place to throw dirty water	20
Pits that will empty itself	21

Response	Code
If soak away, it will go back in the river	22
Pits that allow soaking	23
A pit that don't contain water	24
Bacteria decomposing	25
A hole dig for water leakage	26
A place for disposal	27
Storage for household faeces // Do-do hole	28
Pits without bottom	29
Banking that tore off	30
Pit without concrete	31
Pit to take away overflow from septic pit // Take things from the toilet	32
A small pit that leads bathroom water to bigger pit	33
Addition to flush toilet	34
Pit dig to catch water	35
Land wasting away	36
Thing put into the pit	37
Something we use one time	38
Water go back in earth	39
Pit that have a sink hole	40
Something like sea-ball hole	41
Deep hole that leads from toilet	42

Q. 2(l): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Tile Ponds

Response	Code
A pond with lots of stones	01
Body of water	02
Pit latrine	03
Fish pond	04
Storage of water	05
Tile that you use to tile floor	06
Place where sewage empties	07
They prevent water from soaking away	08
Man-made ponds	09

Response	Code
Sewage ponds	10
Ponds with tile at corners	11
A body of water not running	12
Pan you put garbage in	13
A pond that never dries	14
Pond with fishes and turtles	15

Q. 2(m): These words are sometimes used when people talk about environment, land, rivers or farming. Tell me what you think they mean.

Water Harvesting

Response	Code
Store water // Pen up water	01
Collecting water	02
Transport water // Trucking water to dry areas // Trucking water to community	03
Where the water settle	04
Take water from the river // Draw water from pond	05
Water surround a place // Plenty of water	06
Don't have any water and you just glad when it come back	07
A place where water is kept	08
A pump house where we get water	09
Waterhole	10
Fruits with water	11
The water collected for dryness	12
Recycled water	13
Wasting water	14
Means of which we get water from natural resource	15

Response	Code
Using of water	16
A tank	17
Harvesting at church	18
Catchment area	19
Managing drinking water	20
Catching water // Ways of accumulating water	21
An area where water keep flow	22
A lot of water at one place	23
Rainfall producing area	24
Harvesting pure water	25
Protecting water supply	26
The gathering of water	27
Water storage plant	28
Promoting every type of water, salt water, rainwater, etc.	29
Selling water	30
To purify the water	31
Source that you get water from	32

Q. 3(ii): Tell me which organization you think community residents would mainly listen to and believe for these environmental messages.

For Doing These Things

Response	Code
Public works department	01

Response	Code
Forestry department	02

Response	Code
Ministry of health	03
National water commission	04
Farmers	05
Hospital	06
Clinic	07
Rangers	08
RADA	09
EFJ // EDF	10
CBO	11
NAPA	12
Ministry of transport and works	13
Residents // Community // Public	14
Parish Council	15
Environmental agencies	16
NEPA	17
NRCA	18
4H clubs	19
Ministry of agriculture	20
JAS	21
KSAC	22
Doctors	23
ODPEM	24
TPDCo.	25
Sanitation inspector	26
PEPA	27
MP	28
BECo.	29
Church	30
Ministry of mining and energy	31
Army // JDF	32

Response	Code
Public schools	33
Marine parks // Beach authority	34
Civic groups	35
Fellowship junior high	36
Raft captain	37
FITCo.	38
Grace	39
Police	40
SEP	41
SDC	42
Government agencies	43
NWA	44
RWR // R2RW	45
Private sector business	46
NGO	47
Neighbourhood watch	48
Club // Youth club	49
JTA	50
Ministry of Education	51
Tourist board	52
JCDT	53
Blood bank	54
CRI	55
SS	56
UDC	57
NHDC	58
Ministry of National Security and Justice	59
Ministry of Labour	60
Cancer society of Jamaica	61
Children	62

Q. 3(ii): Tell me which organization you think community residents would mainly listen to and believe for these environmental messages.

Would Listen to and Believe

Response	Code
RADA	01
CBO	02
JAS	03
ODPEM	04
KSAC	05
The people of the community // Neighbourhood watch	06
Farmers	07
Public health // MOH	08
EDJ // EFJ	09
NRCA	10

Response	Code
Residents	11
4H Club	12
Agriculture people	13
All // Government agencies	14
PEPA	15
Ministry of education	16
Ministry of agriculture	17
Coffee Industry board	18
Ministry of works	19
P.J. Patterson	20
Bruce Golding	21

Response	Code
Sanitation inspector	22
Pastor	23
Builder // Contractor	24
SDC	25
Parish Council	26
Forestry department	27
NEPA	28
Environmental groups	29
MME	30
CPM // MPM	31
Red Cross	32
TV // Media	33
PCA	34
NHT	35
Area leader	36
NWC	37
Scientist	38
Banana board	39
JIS	40
Grace // Businesses	41
Hardware stores // People you buy it from	42

Response	Code
MP	43
BECo.	44
School // Fellowship Primary junior high	45
SEP	46
Self	47
NHDC	48
Entertainer	49
Plumber	50
NGO	51
JCDT	52
Tourist board	53
UDC // Town planning	54
Lions Club	55
Roger Clarke	56
Doctor	57
Youth club	58
Beach authority	59
Church	60
Ministry of water and housing	61
Ministry of tourism	62
Private sector	63

Q. 3: Tell me now about the main types of crops and trees that the household grows.

Main Crops

Response	Code
Banana	001
Yam	002
Carrot	003
Calaloo	004
Coffee	005
Vegetables	006
Plantain	007
Dasheen	008
Pack Choi	009
Tomato	010
Red peas // Peas	011
Orange	012
Pumpkin	013
Cabbage	014
String bean	015
Okra	016
Sweet pepper	017
Corn	018
Turnip	019
Ginger	020

Response	Code
Cane	021
Cocoa	022
Pineapple	023
Tobacco	024
Pepper	025
Papaya	026
Tangerine	027
Soursop	028
Sorrel	029
Chiney Guinep	030
Sweet potato	031
Cassava	032
Coconut	033
Potatoes	034
Gungo peas	035
Breadfruit	036
Ackee	037
Mustard	038
Watermelon	039
Cho-cho	040

Response	Code
Cuban	041
Cucumber	042
Jackfruit	043
Apple	044
Mango	045
Cashew	046
Citrus	047
Lime	048

Response	Code
Peppermint	049
Lettuce	050
Passion fruit	051
Indian kale	052
Peanut	053
Eskellion	054
Radish	055
Beans	056

Q. 3: Tell me now about the main types of crops and trees that the household grows.

Main Trees

Response	Code
Coffee	001
Mangoes	002
Apples	003
Orange	004
Ackee	005
Coconut	006
Plumb	007
Tobacco	008
Plantain	009
Chocolate	010
Breadfruit	011
Tangerine	012
Pear	013
Mahogany	014
Cedar	015
June plums	016
Banana	017
Soursop	018
Pear	019
Cherry	020
Grapefruit	021
Papaya	022
Pine	023
Bamboo	024
Mahoe	025
Jackfruit	026
Lime	027
Almond	028
Pepper	029
Grow stake	030
Mamie	031
Star apple	032
Teak	033
Nutmeg	034

Response	Code
Sweetsop	035
Cassava	036
Cashew	037
Sweet wood	038
Guinep	039
Soup wood	040
Trumpet	041
Cocoa	042
Pimento	043
Eucalyptus	044
Tamarind	045
Gungo	046
Willow	047
Bissy	048
Oil nut	049
Bullet wood	050
Hog plumb // Hog berry	051
Citrus	052
Naseberry	053
Guava	054
Broad leaf	055
Log wood	056
Never dead	057
Water p	058
Dasheen	059
Cane	060
Passion	061
Lemon	062
Deal board	063
Basacom	064
Cotton	065
Cinnamon	066
Corn	067
Custard apple	068

Response	Code
Harmon tree	069
Mint	070
Priciala	071
Black wattle	072
Chinna	073
Burn eye	074
Lignum Vitae	075

Response	Code
Locus	076
Palm	077
Dog wood	078
Stinking toe	079
Birch	080
Cho-cho	081

Q. 5(a): Now we'll talk about your use of agricultural chemicals, fertilizers, pesticides and the like for farming.

Use of Agricultural Chemicals

Response	Code
Helmet	01

Q. 5(b): Now we'll talk about your use of agricultural chemicals, fertilizers, pesticides and the like for farming.

Main Fertilizers Used

Response	Code
Urea	01
NPK	02
All purpose	03
15-5-35	04
11-22-22	05
Sulphate ammonia	06
Urea sulphate	07
Sulphate	08
Round up	09
16-9-18	10
12-14-14	11
Animal manure	12
10-20-20	13
9-18-20	14
Manure // Organic	15
Vegetaleth	16
Potash	17
14-28-14	18
Zinc	19
Potash	20

Response	Code
Young plant	21
Nitrate	22
16-5-19	23
12-14-28	24
12-24-12	25
Insecticide	26
Fowl dung	27
7-7-14	28
Nitrogen	29
Phosphorous	30
Ammonia Nitrate	31
Brown grain	32
Salt	33
Ashes	34
Mulch	35
6-6-18	36
Z-4D	37
Agro grace	38
Hi-Pro	39

Q. 5(c): Now we'll talk about your use of agricultural chemicals, fertilizers, pesticides and the like for farming.

Main Herbicides Used

Response	Code
Round up	01
Karate	02
Shell white oil	03
Basudin	04
Gramoxzone	05
Urea 155	06
Reglon	07
Orchard oil	08
Guiquart	09

Response	Code
Touch down	10
Soap powder	11
Glyphosphate	12
Diuron	13
Gasopak	14
Z-4D	15
Benlate	16
Mocap	17
Malathion	18

Q. 5(c): Now we'll talk about your use of agricultural chemicals, fertilizers, pesticides and the like for farming.

Main Pesticides Used

Response	Code
Malathion	01
Basudin	02
Tyadane	03
Leaf fertilizer	04
Blue powder	05
Paraquat	06
Gramaquat	07
Karate	08
Dithane	09
Gramoxzone	10
Copper	11
Sevens	12
Round up	13
Shell white oil	14
Course oil // Oil	15
Folar	16
Furadan	17
Rugby	18
Mocap	19
Imazalil	20
Aluminum	21

Response	Code
Z-4D	22
Calixin	23
Boraic powder	24
Banana oil	25
Benlate	26
Poison	27
Tilt	28
Lannate	29
Mankocide	30
Selecron	31
White lime	32
Belmark	33
Diuron	34
Gasopak	35
Kocide	36
Ashes	37
Screw worm	38
Levox	39
Insect powder	40
Rat bate	41

Q. 6(a): For each one that I mention, please tell me what you think they mean.

Agro Forestry

Response	Code
Farming in the forest	01
Agriculture relating to forest // Agricultural produce	02
When planting tree crops	03
Control forest	04
Planting nuff trees	05
Plant tree for sale // Plant tree for export	06
Replant tree when you cut one	07
The process by which trees are grown for forestry	08

Response	Code
Product derived from forest trees e.g. lumber	09
Woodland	10
Food crops like pear, orange	11
Food forest	12
Pine trees grown scientifically	13
Agricultural forest	14
Forest plant by somebody // Man planting forest	15
Plant timbers with coffee	16
Intercrop food-stuff with trees	17

Q. 6(b): For each one that I mention, please tell me what you think they mean.

Alley Cropping

Response	Code
Planting in alley	01
Reaping a crop	02
Short crops e.g. calaloo	03
Cropping at the same month every year	04

Response	Code
Reaping crop before time	05
Planting crops	06
Cropping at one time	07
A type of farming	08

Q. 6(c): For each one that I mention, please tell me what you think they mean.

Bench Terrace

Response	Code
A farrow made to plant crops	01
Terrace land to make it level	02
Methods use to stop flooding	03
Making trench to hold water	04
Break the plant crop on level	05
Trench to take away water	06
To prevent water from washing away the crop	07
Type of contour	08
Planting in rows to prevent soil erosion	09
Making steps on a hillside to prevent landslides	10
Digging of trenches on hillside	11
Cutting the land like steps	12

Response	Code
This is a form of conserving the soil // Method of soil conservation	13
Used to minimize water run-off	14
Bench like barrier to protect soil	15
Keep up the soil	16
Cut track in the land	17
Hold the fertilizer in the soil	18
Slant slope of land	19
Flat top on mountain	20
Hillside place used to farm	21
Terracing on slopes/hillsides	22
Slow down soil erosion	23
Having a bench meeting	24

Q. 6(d): For each one that I mention, please tell me what you think they mean.

Check Dams

Response	Code
To control the amount of water that runs through the farm	01
Community catchment	02
Spring	03
To control water coming from the hills	04
Place where you store water // Tank to hold water // Trench that hold water	05
Water dam	06
To keep water flow in tap	07
Farmer goes to check on dams	08
Collect dirt run-off	09
Check water-flow	10

Response	Code
Reduce the flow of water	11
Chlorine tank	12
A place to provide water	13
To check the dam for leakage	14
Trench to control water // Water control	15
A method of drainage	16
Keep the soil	17
Something in drain – check water	18
Something like well	19
River training used in gully	20
The checking of goods	21
To break the speed of water	22

Q. 6(e): For each one that I mention, please tell me what you think they mean.

Composting

Response	Code
Vegetable manure	01
Using other crops for fertilizer	02
Rotten vegetable	03
A hole or place dug to make manure	04
Putting things in a heap	05
Bury up	06
Decaying leaves or grass as manure	07
Manure	08
Using kitchen garbage on farm // Waste from kitchen as fertilizer	09
Disposing of garbage	10
Type of plant growth	11
This is the braking down of material by micro-organism	12
Making organic matter	13

Response	Code
Organic materials properly broken down into humus	14
The use of organic matter in farming	15
How you get one plant from another	16
Type of propagating plant	17
Putting things in separate places	18
A waste management process	19
Garbage container	20
Storing of garbage	21
Use leaf to manure crop	22
Using grass around plants	23
People who built furniture	24
Using garbage on farm	25
Gathering leaves and trash	26

Q. 6(f): For each one that I mention, please tell me what you think they mean.

Contours

Response	Code
A barrier	01
Survey	02
Outline	03
To line out field according to crops	04
Terrace soil	05
Mapping	06

Response	Code
To avoid erosion // Wall to prevent soil wash away	07
Prevent slippage	08
Trench // Ditch	09
Straight line (digged) to use for planting	10
Dig holes on the farm where the farmer prepared crop	11

Response	Code
Planting grass	12
Walls built between crops	13
Something to break the soil	14
Concrete water channel	15
The packing of rock	16
Planting in circles on hill	17
Imaginary line constructed across a slope (stones)	18
Running water from one section to another	19
Control water	20
Protect the soil	21

Response	Code
Something has to do with height	22
Plant crops that follow contour line in slope	23
Track through land	24
Concrete trench	25
Drainage area on a map	26
Drainage system around the land mass	27
Something about the sea level	28
Rows and line	29
Cut trench on hillside land	30
Transportation of tourist	31
Grass barrier across hillside	32

Q. 6(g): For each one that I mention, please tell me what you think they mean.

Crop Rotation

Response	Code
To rotate the place you plant crops	01
Change of crop at this place // Moving crops	02
Crop turn over	03
Rotating crops according to soil	04
Planting one crop at a time	05
Transferring a plant from a seeding bed to different soil	06
Plant at different times	07
To put crop in proper spacing	08
Spring crops	09
Different crops	10

Response	Code
Reap one and replace another	11
Putting crops in land	12
Plant crops over and over	13
Transplanting plants	14
Plant in lines // Plant in rows	15
Plant grass to prevent soil wash away	16
When the crop is out of season	17
To plant back	18
Reaping	19
Planting crop in sequence	20
Way how you plant crop	21
Planting and having crop all year round	22

Q. 6(h): For each one that I mention, please tell me what you think they mean.

Grassed Waterways

Response	Code
Grass to break the water	01
Contour grass	02
Mat grass to hold banks	03
Made of grass	04
Grass in water // Water way filled with grass	05
Marsh	06
Mulching	07
Water making way through grass	08

Response	Code
Sea	09
When grass is planted in water way to prevent erosion	10
Swamp	11
Plant grass through cultivation	12
Throwing grass on field to keep cool	13
Place that water runs everyday	14
Place where grass is planted	15

Q. 6(l): For each one that I mention please tell me what you think they mean.

Green Manure

Response	Code
Manure green looking	01
Lawn grass // Grass	02
Chicken droppings // Fowl manure	03
Manure that is not dry	04
To prevent landslides piling during heavy rains	05
Decay plants	06
Use green bush through farm	07

Response	Code
Green grass manure	08
Bush fertilizing	09
Faeces from animals	10
Mulching	11
Green vegetation broken down into organic matter/manure	12
Bury the green grass underground	13
Cow dung	14

Q. 6(j): For each one that I mention, please tell me what you think they mean.

Gully Plugs

Response	Code
Insect	01
Pest	02
To prevent the water out	03
Dumps in gully	04
When the gully is blocked	05
To plug the pipe line	06

Response	Code
Planting crop in gully as barrier	07
Farm in the gully	08
Machine to plug grounds	09
To stop water from going into gully	10
Landmarks in the gully	11
Put stakes to prevent erosion	12

Q. 6(k): For each one that I mention, please tell me what you think they mean.

Hillside Ditches or Trenches

Response	Code
A place dug to control water // Drain to lead away water	01
Trench dug to guide one way	02
Make farrows // Dig trenches	03
Trench used to keep out water	04
Digging to keep water	05
Contains the water that runs from the water to the ground	06
Crops plant on top	07
To cut a terrace in the farmland	08
Cut trencher from flooding	09

Response	Code
Trench on hillside // Drain	10
A place or thing used to store water	11
Dig trench and don't open them	12
Water channels	13
Run water into	14
Run water off plants	15
To get off water off land	16
Help flow of water	17
Used to prevent soil erosion	18
Making space in soil	19

Q. 6(l): For each one that I mention, please tell me what you think they mean.

Individual Basins

Response	Code
Own basin	01
A place used to plant bananas	02
Soil conservation	03

Response	Code
Dug out basin-like formation on hillside	04
A basin dug and used for planting	05
A drainage method	06

Response	Code
To catch water // to catch water, it show how much rainfall	07
Measurement	08

Response	Code
A surrounding where water flow from hillside down to flat	09
Basin used by only one person	10

Q. 6(m): For each one that I mention, please tell me what you think they mean.

Integrated Crop Management

Response	Code
Planting more than one crop in the same area	01
Crop management // How you manage your crop	02
Bank	03
Someone who manage a farm/crop	04
Sound like science	05

Response	Code
Crops grown scientifically	06
Studying and planting the crop at sometime	07
Export crops	08
One crop after another	09
Taking care of many crops	10
Plant different different crops	11

Q. 6(n): For each one that I mention, please tell me what you think they mean.

Intercropping

Response	Code
To plant a crop that bear quickly	01
In between crops // Plant crops between	02
Planting different crops together	03
Reaping // Final crop	04
Short plants under taller plants	05
Planting a lot of crops	06
Mix farming	07
Springtime or drought	08
Taking out for family purpose	09

Response	Code
Conserve soil fertility	10
Crop of different types planted between each other e.g. coffee/banana	11
High breed crop	12
Due time for crops	13
Cropping food at one time	14
Crop one after another	15
Cropping at the same time every year	16
Farming your own crop	17

Q. 6(o): For each one that I mention, please tell me what you think they mean.

Khus Khus Grass

Response	Code
Used to do contour terracing	01
It bind the earth	02
Grass to hold the soil	03
Grass that is good for fever	04
Bed/fine grass	05
Manure	06
Type of grass	07
Sharp grass	08
Tough grass // Tough grass especially on banks	09
Tall grass	10

Response	Code
To manure the field	11
When you weed and pack up grass	12
Grass used to cover yams	13
Grass that river left behind	14
It is used to keep the soil from erosion	15
Big grass root that smell sweet	16
Grass that grow like giny grass	17
Baby grass	18
Bad weed	19
A grass used to make tea	20
A grass used to make perfume	21

Response	Code
Grass that grow near the river	22
Cow feed	23
To protect a hilly land	24
All purpose grass	25
Planting grass barriers // Used as contour barriers	26
Used as soil conservation	27
Line mark grass // Landmark grass	28
Fencing and binding grass	29

Response	Code
To hold the river bank	30
Lawn grass	31
Some big bad green	32
Grass that is not useful	33
Grass to make mats	34
Grass to build hut	35

Q. 6(p): For each one that I mention, please tell me what you think they mean.

Living Hedgerow

Response	Code
Fence post	01
Growing barriers	02
Children	03
Planting hedging // Plants growing along fence	04

Response	Code
Something planted on roadside	05
Planting of trees	06
Living beside a gully	07
The planting of flowers	08

Q. 6(q): For each one that I mention, please tell me what you think they mean.

Minimum Tillage

Response	Code
Not to plough too deep // Less ploughing	01
Little amount of digging of dirt	02
Just a little forking	03
Amount of farming	04
How far to dig when planting	05

Response	Code
The tilling of soil	06
Amount of plough land	07
Small amount of worked land	08
Amount of land used for farming	09
Lowest level of digging	10
A place where money is kept	11

Q. 6(r): For each one that I mention, please tell me what you think they mean

Mulching

Response	Code
A method of preventing moisture from leaving the root of crop	01
Cut grass to prevent erosion	02
Rot on the ground	03
Plunging manure into the soil	04
Manure	05
Digging soil with grass	06
Molding young plants	07
Grass to cover the soil	08
Putting grass/manure around crop	09
Cover the earth with things	10

Response	Code
Leave grass to rot // Leave things to rot	11
Using grass as a fertilizer or manure	12
Spread cover the ground // Spreading manure	13
Wrap bush around banana root // Use grass at the root of crop	14
Use waste leaves and grass to build up soil	15
Digging around plant roots	16
Organic fertilizer	17

Response	Code
To keep the crop cool	18
Throw dirt at the root of a plant	19
Ploughing the soil	20
A form of weed control	21
The caring of the soil	22
Natural manure e.g. grass	23
Add dry material to plant	24
Manure to let place fat // Something to fatten soil	25
Use vegetation covering to cover the soil	26

Response	Code
Use bush to keep soil cool	27
Grassed the land	28
To keep plants in order	29
Eating or chewing	30
To tease up the earth	31
Throw garbage at tree roots	32
Rotten bush around plants	33
Get top soil and mulch plant	34

Q. 6(s): For each one that I mention, please tell me what you think they mean.

Organic Farming

Response	Code
Not using fertilizer on crop	01
Using organic matter to farm	02
Use organic manure into soil to grow better produce	03
Crop that is always prepared	04
Animal do-do // natural fertilizer	05
Using dried grass as fertilizer	06
To use manure on crop	07
Farming without chemical or fertilizer	08
Composting	09

Response	Code
This is farming done without the use of inorganic fertilizer	10
A mixture of manure	11
Having less equipment	12
The natural manure	13
Natural farming	14
Things used to make plant feel cool	15
Manure from plants and animals	16
Using cow dung // Cow and goat doo-doo	17

Q. 6(t): For each one that I mention, please tell me what you think they mean.

Partial Weeding

Response	Code
Not to completely take out all the weed	01
Weeding land partially // Weeding with hands	02
Weed ordinary // Weeding the farm	03
Clean up the area	04
When you use spray on grass	05
Removing of grass	06
Time of weeding	07
Separating older weed	08

Response	Code
Circle weeding	09
Short hand work of weeding	10
Weeding farm in sections	11
Weed with hoe or machete	12
Clean weeding	13
Weed around the plants only	14
Leaving grass in field	15

Q. 6(u): For each one that I mention, please tell me what you think they mean.

Stone Terrace

Response	Code
A farrow filled with stones	01

Response	Code
Stone to guide the water	02

Response	Code
Pack stones in line	03
Using stone to make embankment on farm	04
To use stone to guide the path of grass	05
A lot of gravel/stone in the soil	06
Backing stone along hillside	07
Pack stone to hold the soil	08
Pack stone wall // A wall	09
Soil conservation	10

Response	Code
Use of stone to form barriers across a piece of slope	11
Rock stone farm	12
To pack back of terrace with grass	13
Stone contours // Contour barrier with stone	14
Stone filled land area // Stony place	15
A wall built to keep up the land	16
Walkway or road	17
Make terrace with stones	18

Q. 6(v): For each one that I mention, please tell me what you think they mean.

Vetiver Grass

Response	Code
Animal grass // Cow grass	01
Type of grass // Type of bush	02
Tough grass	03

Response	Code
Bad weed	04
Grass used to make tea	05
Medicine grass	06

Q.1(f): Occupation I: Exact Occupation?

Response	Code
Farmer	01
Sales representative	02
Shop keeper	03
Housewife	04
Taxi operator // Driver	05
Student	06
Barmaid // Bartender // Waitress	07
Health aid	08
Driver // Taxi driver	09
Street vendor // Hustler // Labourer	10
Office Helper // Domestic // Nanny	11
Dressmaker // Tailor // Fashion designer	12
Mechanic	13
Practice nurse // Dental nurse	14
Cabinet maker	15
Mason	16
Construction worker // Contractor	17
Electrician // Electrical appliance technician	18
Woodwork // Carpenter // Joinery	19
Security officer // Police officer	20
Miller	21
Coffee Picker // Coffee reaper	22
Body work	23
Hairdresser // Cosmetologist	24

Response	Code
Steelman	25
Catering	26
Cake maker // Baker	27
Data entry clerk	28
Raft's man	29
Fisherman	30
Manager	31
Teacher	32
Secretary // Clerical // Clerk // receptionist	33
Supervisor	34
Salesman // Sells product // Merchandiser	35
Quantity surveyor	36
Library assistant	37
Interior decorator	38
Pharmacist	39
Bank clerk	40
Butcher	41
Engineer	42
Entertainer // Selector	43
Plumber	44
Cashier	45
Upholstering	46
Agro research	47
Welder	48

Response	Code
Lab technician // Technician	49
Budding & Graphing	50
Self employed // Business man	51
Pump attendant // Ramp attendant	52
Herbalist	53
Shoe maker	54

Response	Code
Painting	55
Musician	56
Sculptor // Craft producer	57
Forest field officer	58
Hotel worker	59

Q. 1(y): Main hobbies (not occupation)

Response	Code
Watching TV	01
Playing domino	02
Football	03
Volleyball	04
Smoking	05
Cooking	06
Talk to people // Reasoning // Counseling	07
Relaxing	08
Listening to music // Operate music	09
Playing ludo	10
Reading // Studying	11
Sleeping	12
Going to beach/sea	13
Baking	14
Playing games // Playing	15
Singing // DJ	16
Listen to radio	17
Playing cards	18
Cricket	19
Hang out	20
Driving	21
Dancing	22
Take care of babies/children	23
Weapon shooting	24
Netball	25
Writing letter/poems	26
Actor // Acting	27
Making leather craft	28
Eating	29
Partying	30
Cycling // Riding // Horse back riding	31
Travelling // Sight seeing	32
Praying // Meditating	33

Response	Code
Drinking	34
Gardening // Farming	35
Going to church // Ministering	36
Meeting people	37
Washing	38
Ironing	39
Swimming	40
Sewing	41
Basketball	42
Scrabble	43
Using computer	44
Crocheting	45
Crying	46
Sporting // Going out	47
Fishing	48
Hunting // Shooting birds	49
Hiking	50
Nature walk	51
Tennis	52
Barbering	53
Playing guitar // Playing musical instrument	54
Having sex	55
Running // Jogging // Track & field	56
Teaching	57
Woodwork	58
Drawing	59
Skipping	60
Weight lifting	61
Selling	62
Shopping	63
Dramatizing (64)… … Skating (65)	64

Q. 1(z): Main groups/association memberships

Response	Code
JAS // JAT	01
Mount Airy/Mount Prospect citizen association	02
Youth club	03
Sports club	04
Key club	05
RADA	06
History & Tourism & Environmental club	07
Choir	08
Track	09
Citizen association	10
Tom Hope Improvement social club	11
PEPA	12
4H Club	13
Netball team/club	14
PNP youth group	15
Kiwanis Club // Lions club	16
Girl guides // Scouts // Cadets	17
Missionary group	18
Church group // Religious group	19
Cass alumni	20
Tropical forest	21
Young farmer association	22
Football team	23
ODPEM	24

Response	Code
Domino club	25
Cricket club	26
Women Movement // Women Federation	27
Student Council	28
PTA	29
Linstead AIDS action committee	30
Sparkling house family	31
African Culture club	32
Round robin	33
School board	34
JTA	35
Drama club	36
Raftmen group	37
SDC	38
Volleyball club	39
Spanish club	40
Taxi association	41
Local advisory committee	42
Lodge	43
Dance club	44
Past student association	45
Wildlife Club	46

APPENDIX C

REVIEW OF SOME FOCUS GROUP ACTIVITIES

Watershed Activities

Young People		Middle Age	Elders
1.	Environmental Club	Get involved in environmental Clubs	Apart of Environmental Club
2.	Projects	Special events – concerts, banquets, bingo	Get in contact with special agents e.g. RADA
3.	Special Activities	Trips	Special activities – getting groups to clean up
4.	Parties	Sports	Group gatherings
5.	Entertainment		Church trips
6.	Sports		
7.	Trips		

1.	Invitations	Invitations	Invitations
2.	Advertisements – posters, flyers	Advertisements – posters, flyers	

Groups		Messages	Media
1.	Farmers	a) Do not burn bush near the rivers b) No dispose of chemical c) Do not cut away trees from the rivers.	a) Posters b) Meeting (incl) Public Inspector c) Speaker or JIS
2.	Mothers	a) Do not litter garbage on the street or in the river b) Do not throw feaces in the river	a) Posters b) Lecturing from a nurse before clinic.
3.	Carvers	a) Do not cut trees near rivers b) Do not dispose your garbage in the river	a) Health Inspectors b) Posters
4.	Shop - keepers	a) Keep your surrounding clean b) Always have your food – handlers permit	a) Public Inspector lecturing.

Done: Chester Castle Dist.,Chester Castle P.O.Hanover

1951	*Breeze blow*
1957	*Big earthquake*
1960's	*Stop quarrying in Shettlewood*
1979 (June)	*Floods/road cut in two/Long Hill cut in 2/New Market cut/Farming destroyed (2 yrs.)/time = water to draw/houses damaged/Bragging Tom = main road (for days)*
1988 (Sep.)	- *Gilbert/every tree almost flat/houses down/house top = off/got n = 1 good crop after/none since (not bright…)*
1992/3	- *Pumpkin marketing = gone at a loss…*

Year	Dislocated	Weather	Roads	School	Health	Agriculture Jobs	Electricity	Water	Money	Government	Telephone
1940		Hurricane Bad storm	Stone road-people break stone for road construction	School only Fellow-ship & Moore Town	Break out of Yaws in Rio Grande Valley	Banana production going on – Export to U.K.					
1950		51 storm		Small school at Windsor		Bollo start-people employ to work on farm coconut farms, men employ to look about animals		Pipe water introduced	Money changed from pound schilling & pence to Dollars		
1960	People from a small district called Constant Spring started to move down into Windsor community	A lot of heavy rainfall	Asphalt on main road								
1970					Clinic at Fellowship & Moore Town	Bananas started putting into boxes	Electric light comes into the Valley			Age for voting change from 21 to 18	
1980	People from John's Hall move down to Windsor	Hurricane Gilbert & Allen									

Year	Dislocated	Weather	Roads	School	Health	Agriculture Jobs	Electricity	Water	Money	Government	Telephone
2000		Bad flood in Rio Grande Valley	Alligator bridge declare unsafe to traffic also Friday land-slide								
2002	Flood devastated Port-land										Cell phone introduced in the Valley

Audience	Change Required	Context	Overall Community Approach	Key Messages	Media	Participant	Strategic Management
Schoolers 4 - 12	To be taught in all school curriculum	Song: Bits of paper lying on the floor, pick them up	Drama	Always put your rubbish into the garbage bins	JIS Children TV Discovery Children Pub. Church groups	Very enthusiastic	Speak with PTA & Principal Interact with clubs Lobby – Min. of Education
12 – 19	Take some responsibility	Live today for life tomorrow	Competition- Essays Story slogans	Less rubbish, less pests Env. Clean and beautiful	Children's Own DJ Sign or radio TV Comp. government	Interested but reluctant to accept	To impose watershed management in school curriculum
Teachers	Sensitizing (composting)	Reuse Reduce Recycle Reject	Publication Workshops Field trips Literature		PTA Forum JIS Church Service groups	Community coordinating With students, media etc.	Publication Evaluate group competition

Audience	Change Required	Context	Overall Community Approach	Key Messages	Media	Participant	Strategic Management
Farmers	Organic material Save money Healthy products	Less chemical Less pesticide More money in pocket	Field demonstration Direct contact	From the roots so is the fruits	RADA Farm groups Food stores Market place JIS SDC	Very reluctant to change old habits	
Homes	Think before you shop Form env. habits	Reuse Reduce Recycle Reject	Proper labels Flyer – adv. CBO's NGO"s Small businesses	It begins at home Start today for tomorrow	TV Magazine CBO NGO Small bus. Radio	Skeptical	

SEASONAL Rainfall - River Flow

2002 - *Jan* *Feb* *March*
Moderate **Moderate** **Moderate**

2001	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
Rain	000	000	00	00	0000	000	000	000	00000	00000	00000	00000
Upper	M	M	Low	Low	M	Low	Low	Low	High	High	High	High
Mid	M	M	Low	Low	M	Low	Low	Low	High	High	High	High
Lower	M	M	Low	Low	M	Low	Low	Low	Flood	Flood	Flood	Flood
2000												
Rain	000	000	000	00	0000	000	00	00	000	000	00000	00000
Upper	M	M	Low	Low	M	Low	Low	Low	M	High	High	High
Mid	M	M	Low	Low	M	Low	Low	Low	M	High	High	High

2001	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
Lower	M	M	Low	Low	M	Low	Low	Low	M	High	High	High
1999												
Rain	0000	0000	00	00	000	00	000	00	000	0000	000	0000
Upper	M	M	Low	Low	Low	Low	M	Low	M	H	H	H
Mid	M	M	Low	Low	Low	Low	M	Low	M	H	H	H
Lower	M	M	Low	Low	Low	Low	M	Low	M	H	H	H
1998												
Rain	00000	0000	00	00	0000	000	000	000	000	0000	00000	00000
Upper	Flood	H	Low	Low	M	M	M	M	M	H	H	H
Mid	Flood	H	Low	Low	M	M	M	M	M	H	H	H
Lower	Flood	H	Low	Low	M	M	M	M	M	H	H	H
1997												
Rain	000	00	0	0	0	0	0	0	00	00	00	00
Upper	M	Low	Low	Low	Low	Low	Low	Low	Low	M	M	M
Mid	M	Low	Low	Low	Low	Low	Low	Low	Low	M	M	M
Lower	M	Low	Low	Low	Low	Low	Low	Low	Low	M	M	M

R2Rw

Ridge to Reef Watershed Project