

ConferenceTopic: Watershed Management and Coastal Zone Management

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Title: A Model for Sustainable Watershed Management: The Case of Drivers River, Portland, Jamaica

Introduction

A Watershed Area Management Model (WAMM) was developed under the Global Environmental Facility funded Project, “Integrating Watershed and Coastal Areas Management (GEF - IWCAM¹), implemented by National Environment and Planning Agency (NEPA), using lessons learnt from previous projects and practical applications implemented in the Drivers River Watershed Management Unit (WMU) of Portland. Two major challenges to sustainably manage watersheds over the years have been firstly the lack of a framework within which public bodies could collaborate with each other to achieve an integrated approach, and secondly the need to focus on attitudinal and behaviour changes of community members, individually and collectively. The aim of the model is to provide watershed practitioners, government agencies, non governmental organizations, funding agencies and the ordinary citizens a simple, practical and flexible method of working together to achieve sustainable watershed management.

The strength of the model lies in its approach whereby state agencies and communities collaborate in “pooling” together their limited resources to bring about the much needed rehabilitation of watersheds. Further the Model is practical allowing an implementer to deliver initiatives on a phased basis by addressing some aspects of the Model and later others as resources become available, thus ultimately implementing the Model in its entirety. It also provides a means of replication of watershed initiatives as experiences are recorded and shared.

The GEF- IWCAM/NEPA Watershed Model in terms of its ten components of **Engaging the Community** from the onset to ensure maximum participation and “buy-in”; **The Governance Approach** of a “Bottom Up” methodology; **Reconnaissance of Resources** to gain baseline data on available or potential natural resources; **Establishing Indicators for Assessment and Evaluation** which are then used to evaluate the progress towards achieving long term goals; **Capacity Building through Training** where community members are trained in aspects of

¹ The GEF-IWCAM Project is co-implemented by the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). It is co-executed by the Caribbean Environmental Health Institute and the UNEP Caribbean Regional Coordinating Unit (CAR-RCU).

watershed management; **Environmental Monitoring, Mitigation and Evaluation** in order to assess the status and trends of social and natural resources within the Watershed; **Capacity Building to Access External Funds for Community Project** to enable community groups to prepare project proposals and to seek funding from various donor agencies; **Developing Sustainable Livelihoods** which comprises the capabilities, resources, and activities required for a means of living which does not undermine the natural resources; **Capturing Lessons Learnt** which involves the collection, validation, consolidation and documentation of experiences, developments, and risks found during project implementation; and finally **Broadcasting the Experience** by sharing success stories and lessons learnt with others.

The Model will only be successful if all agencies are willing to work together and as such each agency was asked to make a commitment by the signing of a memorandum of understanding (MOU) which states that in keeping with each agency's mandate watershed management will be initiated using the WAMM. Ninety eight percent (98%) of participating agencies in the Drivers River Project expressed a willingness in principle to continue working in a similar manner to how they collaborated during the project.

The Model

Using the Drivers River Watershed experience the ten components highlighted above were seen to be necessary in achieving sustainable watershed management. These are examined below. See also Model Diagram in Figure1.

Engaging the Community

For sustainable watershed management it is very important to engage the community from the onset to ensure maximum participation and "buy-in". Communities should be engaged by means of Stakeholders Workshop using an Advanced Participatory Method. In this session information would be garnered on the current situation that exists within the watershed. Having the input from a wide cross section of stakeholders allows for diverse comments and discussion. This process will also allow the group to identify the key areas of interest in the watershed, in other words, what did people value most. A visioning exercise follows, as well as an analysis of issues that are currently blocking progress. Strategic actions are outlined to overcome obstacles; this is followed by a detail implementation plan.

At the end of this process the terms of reference (TOR) for the group will be developed. The TOR describes the purpose and structure of the group. It gives a clear path for the progression of the group, by stating what needs to be achieved, by whom and when. The development of the simple TOR should outline the following:

- The vision, objectives and deliverables: this outlines what the group hopes to achieve.

- Identification of stakeholders (primary and secondary), their roles and responsibility: this outlines who will take part in the implementation of the model.
- The development of plans for the use of available resources: this outlines how the identified objectives will be achieved.
- The development of activities into tasks with timelines: this will outline when objectives should be achieved.

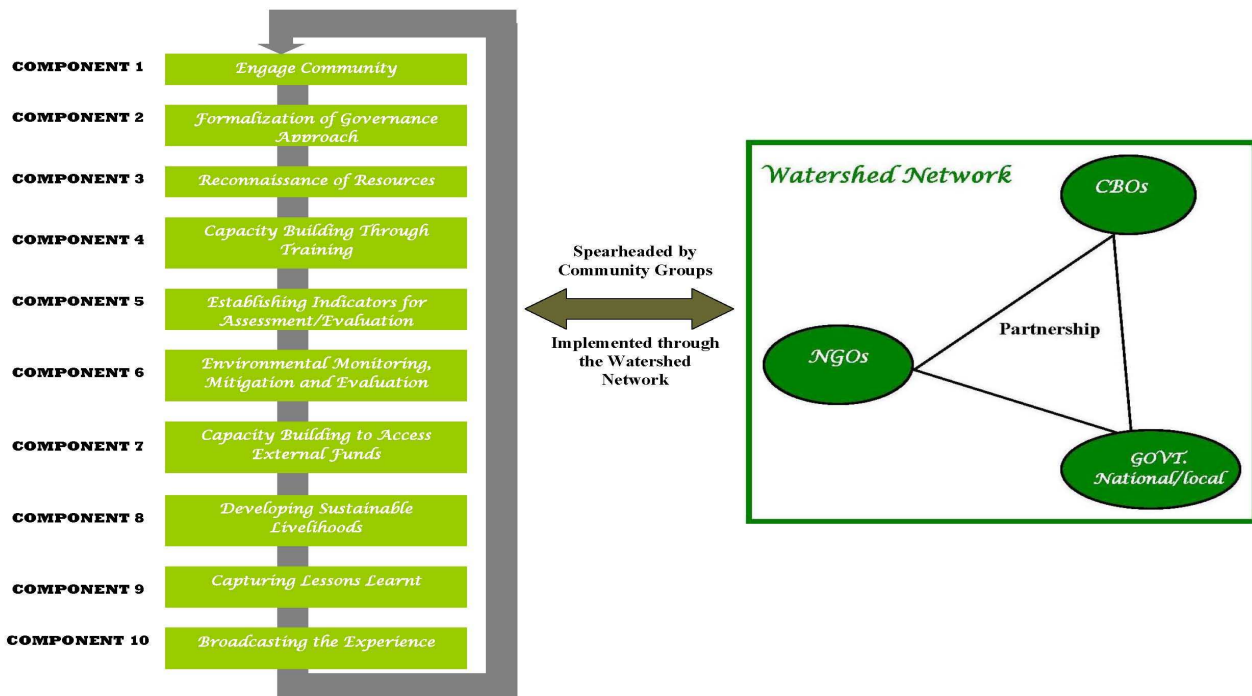


Figure 1: Diagrammatic representation of Watershed Model

Governance Approach

The management approach for the Model played an intricate role in the ultimate success or failure of its implementation. A Project of this nature was best served with the use of a “Bottom Up” Management style. As was stated earlier stakeholders are engaged, using the Advanced Participatory Method (APM). This approach encourages participation by all in the decision making processes, as each community member’s view is important and taken into consideration and decisions are made based on the consensus of the entire Community.

The use of an existing group is strongly suggested as there are a number of issues as it relates to the formation of new groups such as sustainability and expectation that the forming agency will always be there to supply all financial needs. This recommendation is base on the revision of

group formation from previous projects. The importance of group structures as well as the various types of groups for example, marginalized groups in ensuring a successful governance process should be emphasized. These groups, where they already exist: church/religious, farmers, sports/youth club, citizens associations – can be strengthened and enhanced over time to meet the developmental needs of the particular site. The democratic and transparent nature of groups must be emphasized as well in order to counter inherent distrust among ‘grassroots’ bodies. Inclusion must be the watchword. For Jamaica it is recommended that the governance structure of the Parish Development Committee (PDC) be used for this governing body, as this is where all the business of the parish is discussed and developed, incorporating the issues at the community level and essentially this is where watershed issues must be addressed, that is, at the community level. This is the mechanism through which the activities of the GEF-IWCAM Project were planned, implemented, monitored and evaluated. This structure has emerged after years of experiment and refinement at the national level.

The APM is enhanced by the formation of subcommittees to oversee specific aspects of Watershed Management. All committees report back to stakeholders at a monthly Stakeholders Meeting. Subcommittees are established to facilitate better management of individualized components of the watershed. All Stakeholders are given the choice to select the sub committee they wish to work with, as they may have a special interest or they might be talented in a particular area. It is recommended that community members should not be allowed to be on more than two sub-committees to ensure maximum participation and to avoid clashes. The four Sub – Committee used by the IWCAM Project were:-

- Public Education and Awareness
- Governance and Enforcement
- Environmental Monitoring
- Sanitation and Sustainable Livelihood

It must be noted that committees are formed based on the needs of the watershed, as well as the amount of resources that exist. In some instances for example, The Sanitation Committee could be separated from Sustainable Livelihoods or Environmental Monitoring and Enforcement could also be joined. However, in all instances the needs of the watershed should be met.

Reconnaissance of Resources

A preliminary reconnaissance of resources should be conducted in order to gain information on available or potential natural resources. This facilitates the establishment of baseline data using the “snap shot” approach to know where resources are located and what type of data is needed to achieve the vision. Areas which are of importance include the following:

- Invasive Species
- Land use
- Zoning
- Forest assessment (ecological)
- Enforcement and governance
- Legislation and compliance

- Environment Impact Assessment
- Sewage disposal
- Stream flow monitoring
- Water Quality
 - Fresh
 - Marine
 - Use of indicator species
- Weather monitoring
- Socio-economic assessment
- Solid waste management
- Industrial assessment
 - Agriculture
 - Tourism
 - Construction
- Reef assessment

Table 1: Resources for Assessment

A Knowledge Attitude and Practices (KAP) Survey should also be conducted in order to provide some of this information. The KAP will capture the attitude and practices towards natural resources. In addition to the above bulleted areas the KAP should be combined to provide more meaningful data for decision making. A follow up exercise can be used to achieve a more comprehensive view, example using the same KAP survey to be administered by gender; results can then be made into a gender report. In some instance because of the lack of a particular baseline data, a secondary type of data will have to be used (see bulleted below organization with data). All this must again be based on the needs of the Watershed. It must also be pointed out that an integrated approach is recommended in keeping with the mandate of IWCAM and necessitated by watershed management which is also focused on ensuring that whatever leaves the watershed will not be detrimental to the marine environment, hence the incorporation of reef assessment and other marine assessment.

Baseline and or secondary data can be obtained from the organizations bulleted below:-

- | International Agencies | Regional Agencies |
|--|---|
| <ul style="list-style-type: none"> • Food and Agriculture Organization (FAO) • United Nations Development Programme (UNDP) • United Nations Environment Programme (UNEP) • United Nations Statistics Division • World Health Organization (WHO) • United States Agency for International Development (USAID) | <ul style="list-style-type: none"> • University of the West Indies (UWI) (All 3 campuses) • Caribbean Agricultural Research and Development Institute (CARDI) • Caribbean Community (CARICOM) Statistics Unit • CARICOM Fisheries Unit • Organization of Eastern Caribbean States (OECS) |

Table 2: Organization with Baseline Data

Capacity Building through Training

The community members themselves play an integral role in community assessment. The APM lends itself to the use of trained community personnel to conduct the KAP Survey to gather

relevant information about their individual communities. This allows for capacity building of stakeholders as well as promotes a sense of involvement and importance among stakeholders. Initiatives that build capacity within the watershed and also include training of community members in are:-

- Water Quality Monitoring sampling techniques
- Biological monitoring of water resources
- Conducting community assessment using questionnaire surveys
- Reading of stream flow and weather monitoring equipment
- Advocacy techniques
- Proposal writing for funding:
- Attendance of Conferences
- Hosting of workshops

It must be noted that in all the items bulleted above except for attendance to conference community members should be trained and they are the ones that should conduct these exercises. Example. community members were trained to read the water levels in streams or rivers where non-recording stream flow stations were installed. This therefore resulted in community members reading and recording stream flow levels two times per day.

It is strongly recommended that in all aspects of data collection and other activities where possible communities are to be trained and to be the ones that collect data. This is one of the major corner stones of the Model; that is, empowering communities member to do assessments as well as to implement meaningful change in their watershed.

Establish Indicators for Assessment and Evaluation

Indicators are paramount to the successful implementation of the Watershed Model. Indicators can be used to define and evaluate how successful the group is; as well as help to evaluate the progress of the group towards its vision and long term goals. Indicators can be set for each objective and coupled with a timeline for completion from the Action Plan. Reviews can be conducted on a quarterly, semi-annually, annually, or at time intervals best suited for the group. Reviews are aimed at measuring the level of success being achieved by the group, that is,. the number of indicators achieved in the designated time frame. Outlined below are some indicators that can be used to assess progress. Please note that the list is not exhaustive by any means but offers possible indicators for assessment of progress.

Sample Indicators

- Administering of KAP and training of 70 resident yields 20% increase in KAP over the Project's life in the Watershed
- 4 Town Meeting : Targeting 150 – 200 persons per meeting
 - Number of solution implemented over 18 month period

- 4 workshops on the Environment and Enforcement
 - Reprint 300 pocket guides/posters on environmental laws
 - Number of environmental breaches/issues being resolved in a 18 month period

- Increase knowledge of residents through training sessions and workshops:
 - 4 workshops of at least 40 farmers offering training in:
 - Best Agricultural Practices
 - Land Husbandry Techniques
 - Green House Technology
 - Organic Farming.
 - Increase the number of farmers accepting practices- 10 farmers accepting 2 practices
 - Decrease in the volume/level of sedimentation
 - The implementation of workshop on solid waste disposal and management.
 - Decrease in the volume of solid waste in the Watershed
 - The conducting of 3 workshops in different areas to train 100 fishermen in and the resultant number of farmers adopting methods.
 - Appropriate waste disposal methods
 - Proper fishing practices
 - Sustainable harvesting methods
 - Alternative livelihood practices.

It must be noted that these are only sample indicators and the various needs of a particular watershed may not be addressed here. It is recommended that collaboration be made with state agencies as well as community's stakeholders to develop indicators. A whole suite of indicators have been developed by the GEF – IWCAM Project Coordinating Unit for the region and these should be used, tailoring to fit the watershed's needs.

Environmental Monitoring, Mitigation and Evaluation

It is important to monitor and assess the status and trends of social and natural resources within the Watershed. Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. The results gained from monitoring and evaluation will allow for the making of more informed decisions on measures to be taken to mitigate against environmental degradation within the watershed. It is also imperative that each component be assessed on a quarterly basis to determine whether desired outputs were achieved or not. Assessment of the reasons for non-achievement should be analyzed and the path defining the way forward should be plotted in collaboration with all stakeholders.

Outlined below are monitoring activities that should be done in order to assess the state of the watersheds and ultimately what is impacting the marine environment. It is very important that quarterly evaluation be completed as it becomes less tedious and also lessons learned can be incorporated into other activities following.

- **Monthly Water Quality Monitoring:** The monitoring of the natural resources includes laboratory testing of these resources for environmental stresses particularly in fresh water and marine ecosystems. Possible parameters that can be used include total suspended solids (TSS), faecal coliform, pH, nutrients (phosphate and nitrate), pH, and biological oxygen demand (BOD). These parameters are indicators of how human activity within the watershed is affecting both the terrestrial and aquatic ecosystems. These samples should be collected by trained community volunteers.
- **Monthly Stream Flow Monitoring:** Stream flow monitoring is done in conjunction with monthly water quality monitoring to provide information on stream flow levels which assist in understanding stream conditions during sampling. This data when correlated with the water quality monitoring data will help to verify whether the results are an accurate representation of the state of the water resources or if the results are being negatively influenced by weather conditions. Data should be collected using both automated and manual stream flow monitoring equipment.

In the Drivers River Watershed a number of activities were also undertaken to combat negative results from monitoring exercises as well as to address issues identified in the KAP Report. Examples of these were monthly Committee and Stakeholders Meetings, poster, essay and debate competitions, commemoration of environmental signature days, advocacy training, summer camp, Town Meetings and Clean-up days. The process was truly integrated.

Capacity Building to Access External Funds for Community Project

Once a work plan is developed community groups can seek funding from various donor agencies. If funding is available then community based organizations and non-governmental organizations in the watershed can benefit from grants being offered. In this component community groups are able to design a project and have the opportunity of implementation.

In instances where funding are provided by state agencies community engagement is necessary to outline requirements and the steps in developing the proposal documents. It should be pointed out that as much as possible the criteria for selection of proposal should be simple, realistic and not overly burdensome. All of this information can be disseminated by means of a Workshop; the relevant forms should be explained and agency stakeholders should be available to assist local stakeholders in the necessary information needed. This may mean incorporating key agencies such as the Finance for assistance to community organization. Deadline for the receipt of proposal must be clearly stated and reiterated.

There is also the need to create a committee for the revision of these proposals. Relevant agency personnel should be a part of this committee e.g. personnel from the Ministry of Finance and donor agencies. The result/approval from this committee should be conveyed to the stakeholders as soon as possible. In the approval of grants it is important to include projects from all level of

the watershed. Important components to incorporate in the Grants Programme are rain water harvesting, recycling, climate change, solid waste management and tree planting. An agreement outlining the amount of funding, the payment schedule, the time frame, the scope of work and the responsibilities of both grantee and donor should be discussed and signed. Please note that each funding agency has particular criteria. If it is at all possible to have the funding agency addressing the groups as to the criteria and other special requirement this option should be explored.

Developing Sustainable Livelihoods

Livelihood comprises the capabilities, resources (material and social) and activities required for a means of living. Sustainable livelihood is one that can cope and recover from stresses and shocks and at the same time maintain or enhance its capabilities and resources while not undermining the natural resources. The development of sustainable livelihood speaks to the creation of employment; the reduction of poverty; creating a sense of well being and capabilities; the ability to adapt to changes, vulnerabilities and be resilient; while ensuring the sustainability of natural resources. An example of sustainable livelihoods within the Watershed can be seen in **Farmers Training Day**: This activity fulfils the increased knowledge and best management agricultural practices component of developing sustainable livelihood. Farmers and other stakeholders throughout the watershed are exposed to training from experts in the respective fields; these trainings include Land Husbandry Techniques, Organic Farming and Green House Technology. Agricultural products are also distributed at these training. All training is aimed at ensuring sustainability of the agricultural activities and hence the generation of sustained income within the watershed. Other Sustainable Livelihood initiatives includes paper making, the production of liquors, wines, juices and purees, nature trails apiculture, horticulture and mangrove nursery.

Capture Lesson Learnt

One of the drawbacks of a number of great watershed initiatives is the lack of recording. The capturing of lessons learnt allows for the collection, validation, consolidation and documentation of experiences, developments, hints, mistakes and risks found during the implementation of a project. Capturing of lessons further provides a method of replication of good practices while at the same time outlining pitfalls to be avoided. There are various methods use to capture lessons learnt, these include experience notes, case studies and success stories. Data for lesson to be compiled can be garnered from reports, data collected, minutes and Farmers Training Days. It is important when capturing the lessons learnt a triple-bottom approach be taken, that is equal weighting be given to social, economical and environmental aspect of a project. Some of the areas that the lesson learnt could address include:

- How was community concerns addressed?
- Describe any innovative technology and its “appropriateness” or “inappropriateness” that emerged
- Describe any educational and awareness building activities created to change behaviour
- Describe improvements in watershed and causes.

- Describe any linkages as a result of the project
- Describe any income generating opportunity as a result of the project.
- Describe any community opportunity to conduct monitoring in the watershed
- Describe any increase in understanding and appreciation of any resource in the watershed.
- Describe any problem occurring in the watershed and how it was resolved.

Broadcasting the Experience

The sharing of success stories and lessons learnt is an important component of the sustainable watershed process. Once the lessons have been captured it is time to broadcast, as it will be of no use unless the information becomes accessible to others. This increased awareness encourages change in behaviour of stakeholders in other watershed to that of proper watershed management practices. Stakeholders in other watersheds can easily identify with the experiences and hence understand the social, environmental and economical benefits to be gained from proper watershed management and be motivated to take positive actions to effect same. Some methods that can be used to broadcast experiences include:

- Best Management Practice Sharing Exercise
- Programme on Local Cable Network
- Outside Radio Broadcasts
- Development of Brochures and handouts
- Participation in Conferences
- Documentaries
- Web sites
- Expositions
- Library donation

Conclusion

Outlined above is the IWCAM Model which has encapsulated years of watershed and coastal zone experiences into a simple flexible model. It is built on the strength of state agencies, communities and non-government organizations taking an active role in sustainable managing watersheds, while at the same time fulfilling respective mandate, thus, eliminating overlapping and wastage of resources. The Model is intrinsically Caribbean and is envisioned to be implemented regionally. In today's harsh economic climate this integrated approach has to be taken if meaningful interventions are to be implemented. In Jamaica the way forward has been the endorsement of a Memorandum of Understanding amongst the aforementioned groups; which it is hope will ensure implementation of the GEF-IWCAM/ NEPA Watershed Area Management Model in the remaining twenty five watershed management units.