



**CARIBBEAN NATURAL RESOURCES INSTITUTE
(CANARI)**

**INCENTIVES FOR WATERSHED MANAGEMENT IN
JAMAICA: RESULTS OF A BRIEF DIAGNOSTIC**

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Incentives for Watershed Management in Jamaica: Results of a Brief Diagnostic

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1. Summary and overview

The need for improved watershed management is well recognized in Jamaica, with an aim to *conveniently* provide *reliable* and *adequate* supplies of *clean* water for agriculture, industry, tourism, and urban and rural populations. Currently, water supplies are unreliable and insufficient during the dry season; water quality at the source is often poor, requiring costly treatment; and despite continuing improvements in delivery, many rural households still lack convenient access to treated water, with a significant percentage of the poor continuing to rely on untreated water from rivers and streams. These problems are likely to increase with a growing population, an aging infrastructure for water collection, treatment and delivery, political constraints to increasing the price paid for water, and a range of human activities impacting negatively on watersheds.

Government's responses in recent years have reflected the priority placed on the issue. Actions have included the development of a national watersheds policy green paper, the establishment of the high-level interagency National Integrated Watershed Management Council (NIWMC), the initiation of a USAID-Government of Jamaica (GOJ) five-year "Ridge-to-Reef" watershed management improvement project, and the strengthening of the National Environment and Planning Agency's (NEPA) Watersheds Branch.

There is a widely shared understanding among the lead management agencies of the practices taking place in watersheds that threaten water supplies and of the "best practice" behaviour that needs to be encouraged. While there has been progress on some fronts (most notably in increased awareness), the many actors involved in watershed management face considerable obstacles to being effective custodians. There is general agreement that - for cultural, political, and economic reasons - fully-fledged market-based approaches being employed in other countries do not offer promise for Jamaica at this stage. In the search for solutions, however, non-market, and pre-market, incentives for improved watershed management have been highlighted, but there has been little progress to date in identifying effective incentives and putting them in place. Nonetheless, there are a number of positive developments that can create a context for testing incentive-based approaches.

This paper presents the findings of a brief study conducted under Phase I of a global initiative of the U.K. Department for International Development (DFID), *Developing markets for watershed protection services and improved livelihoods*, which is being implemented by the International Institute for Environment and Development (IIED) in collaboration with local partners. The project is summarised in more detail in Appendix 1. The study consisted of a literature review and interviews with a selection of key stakeholders during the week of 4 March 2002 (see Appendices 2 and 3). The paper looks at watershed management in Jamaica from an incentives based perspective, and identifies several opportunities to strengthen existing and proposed watershed management initiatives through the use of incentives. It also suggests opportunities for Jamaica to contribute as a partner in a Caribbean learning group on incentives for watershed management, and through that in the larger global initiative of DFID and IIED.

2. Context

The water cycle

Implicit in GOJ policies on water is that Jamaica's water belongs to its people, and that the government has an obligation to make it available to the population. Water supplies collect in the aquifers and rivers of the country's mountainous interior, and these upper forested and agricultural areas are the focus for most watershed management activity. Water is abstracted from these areas by the National Water Commission (NWC), the National Irrigation Commission (NIC), and a handful of other water suppliers, treated, and delivered to users. The main uses of water are for agriculture (75%), urban households (15%), industry (7%), rural households (2%), and tourism (1%) (NRCA 2001). Payments from users to suppliers are barely sufficient to cover the costs of treatment and delivery. Capital improvement and watershed management costs are borne directly by the government. Government revenues are vastly insufficient to cover these costs properly, resulting in severe management constraints and a continuing reliance on external grants and loans. In effect, the water cycle and the associated financial cycles are not congruent with each other. Figure 1 indicates how the main downstream users are not paying directly for upstream watershed management costs. Yet - with increasing demands for quantity, quality, reliability and convenience - there is scope to do so.

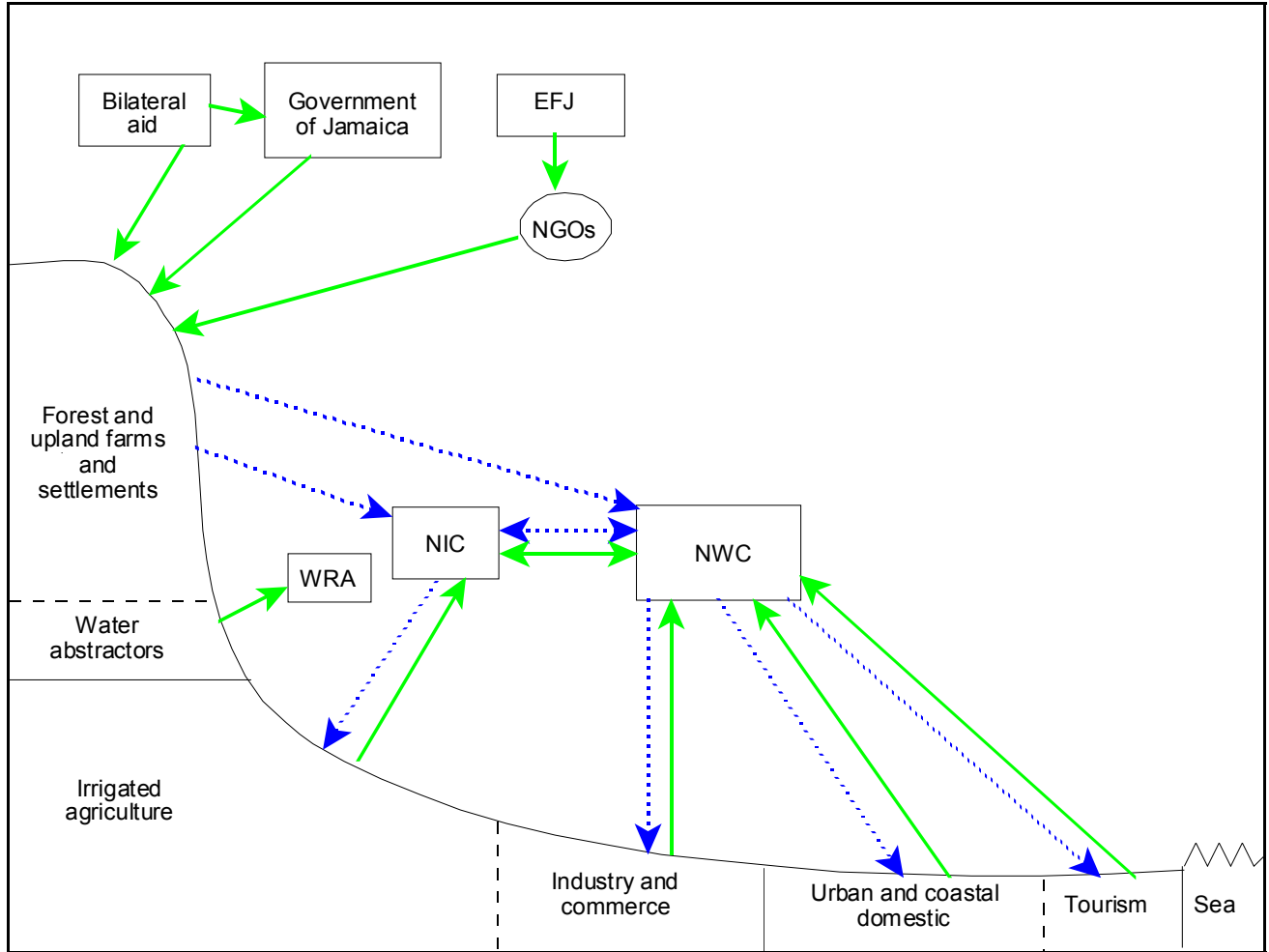
The main stakeholders

The main stakeholders in the water cycle, as described in Figure 2, include:

- *Forest and upper watershed managers:* agencies including the Forestry Department, NEPA, and the Rural Agricultural Development Authority (RADA) that are responsible for assuring the protection of forest reserves and protected areas, and the appropriate use of other land.
- *Watershed "guardians":* NGOs, community groups, funding agencies such as EFJ, and individuals that advocate for good watershed management; the Water Resources Authority, which regulates the abstraction and allocation of water; and the upland farmers and residents (both legal and illegal) who could act either positively or negatively for watershed management.
- *Water abstractors and distributors:* Most water is collected and distributed by the NWC and the NIC, but Parish Councils also play a role, and a few private water companies have started up in response to a recent change in government policy.
- *Water users:* Industry and commerce, irrigated farming, urban residential users, and the tourism industry.

Some of these stakeholders, or representatives of them, have been brought together under the umbrella of the National Integrated Watershed Management Council (NIWMC) and its associated working groups and links to local committees. However, the NIWMC, whose emphasis is on inter-agency coordination, does not mirror the landscape of the water cycle, as can be seen by comparing Figure 2 with Figure 3, a diagram that reflects the tremendous complexity of the formal policy and institutional framework for watershed management in Jamaica. For example, while the Ministries of Agriculture and Tourism are represented on the Council, actual farmers and hoteliers are not, except through the single seat of the private sector representative. (In addition, interests of farmers are indirectly represented by the Forestry Department through its Local Forest Management Committees and by NEPA through its Local Watershed Management Committees.)

Figure 1: Simplified diagram of the water cycle



.....> Water flows
——> Money flows

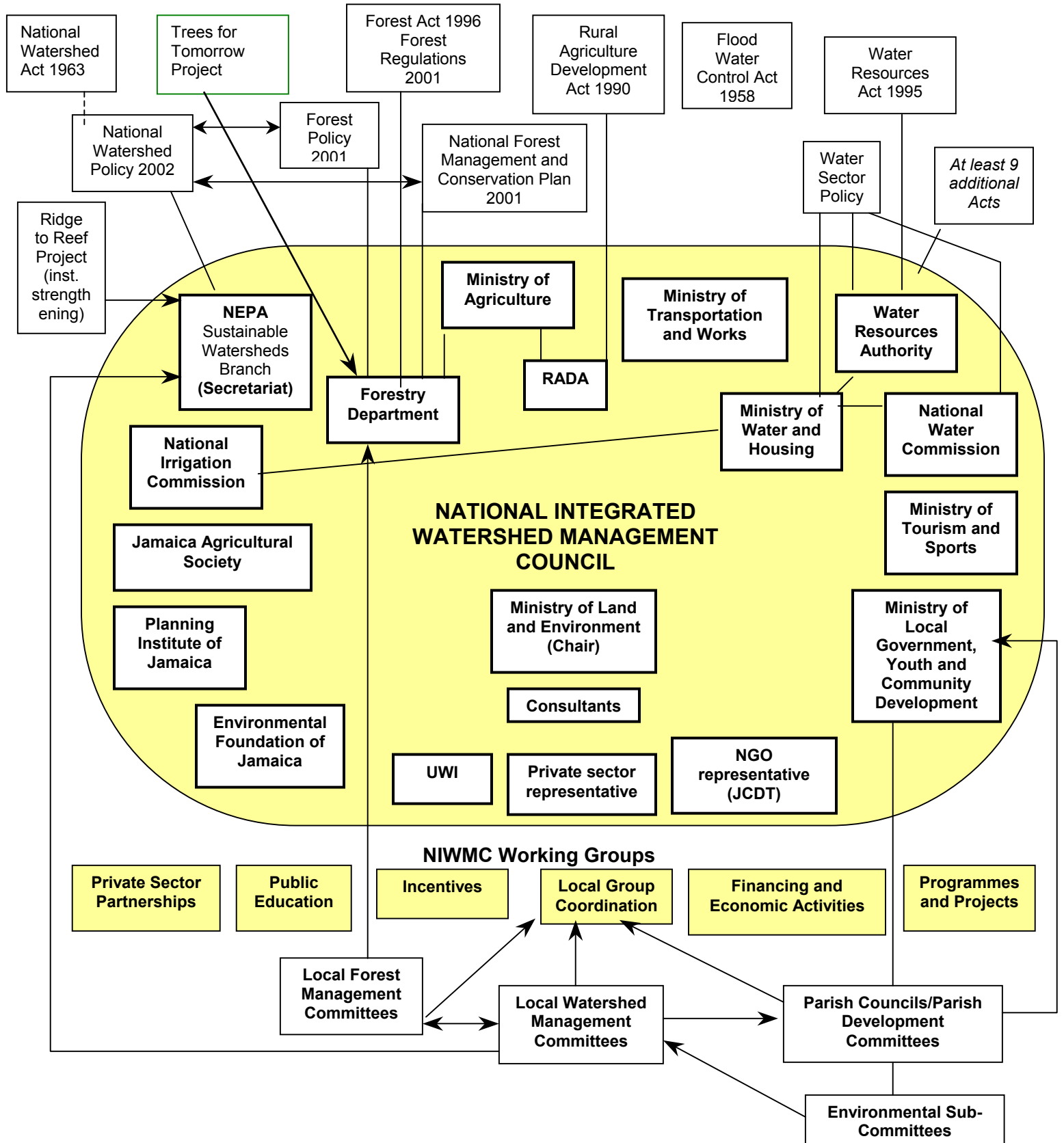
Figure 2: Main stakeholders in the water cycle

Stakeholders in watershed management: upstream to downstream	Desirable watershed management activities	Constraints/ disincentives	Incentives: current [planned]
Forest managers (government agencies, NGOs, and private foresters)	Develop and maintain proper forest cover through protection and planting Encourage others to do the same	Insufficient budgets/high cost of management	Free seedlings for private planting from Forestry Department [Forest Fund and Tropical Forest Conservation Fund]
Upland farmers (legal and illegal)	Develop and maintain proper tree cover Employ farm practices that minimize erosion and chemical run-off Discourage bad practices by others through social control Contribute to fire control	Many farmers compelled by need to plant short-term crops, not trees Lack of knowledge of good practice and watershed services Lack of secure tenure NGO support resources! scope limited	Free seedlings from Forestry Department and RADA FD extension on agro-forestry in Buff Bay/Pencar on pilot basis, and being extended to other watersheds NGO demonstration and outreach projects [Regularization of tenure]
Upland settlements	Plant trees near houses, on slopes Control building on slopes Practice proper sanitation disposal Store water for dry periods	Poverty limits building, sanitation options Poor access to information on proper construction and waste disposal Cost of water storage tanks	NGO sanitation demo projects and education
Water abstractors (public and private)	Monitor water quality and quantity Minimize wastage in delivery/bottling Pay (and charge users) full environmental and social costs	Social and political constraints to increasing water rates Increased cost and effort as a result of deteriorating quality and diminishing quantity	May be licensing conditions for private abstractors tied to good practice Potential consumer preference for suppliers providing better quality, more reliable water
Irrigated farming	Use water efficiently Recycle waste water Avoid contamination of water supplies and drainage Pay full costs of water	Collapsing industries discourage long-term investment/changed practice Most markets don't pay for externalities Imperative for low-cost production	Water rates schedule rewards efficiency Waste water available from NWC at reduced rates
Industry and commerce	Use water efficiently Recycle waste water Avoid contamination of water supplies and drainage Pay full costs of water	Inadequate enforcement Cost-saving imperative	Water rates schedule rewards efficiency Cheap waste water available from NWC

Stakeholders in watershed management: upstream to downstream	Desirable watershed management activities	Constraints/ disincentives	Incentives: current [planned]
Urban domestic	Use water efficiently Reuse water within house and yard Lobby for improved watershed management Understand full environmental and social costs Pay full costs Use storage tanks	Lack of awareness of watershed management issues and needs No disincentives to contamination Low willingness to pay full costs	Metering and rate schedule reward efficiency Education programmes by media, schools, government, NGOs
Tourism industry	Use water efficiently Reuse water (safely) within facilities Educate visitors about watershed management Pay full costs Use storage tanks	Price competition may causes resistance to paying costs, raising environmental standards Political leverage results in preferential treatment by Government	Metering and rate schedule reward efficiency External sustainable tourism certification schemes Customer pressure for environmental consciousness

Figure 3 Institutional landscape for watershed management in Jamaica

Note that this figure covers formal institutions only.



3. Threats to watersheds and management responses

Government management agencies have a clear picture of the behaviour and practices that threaten watersheds and water supplies, and their management actions are largely aimed at eradicating, controlling, or modifying these practices. Some of the issues of greatest concern include:

- illegal tree cutting from critical watershed areas and riparian zones for yam sticks, fuelwood, and timber
- hillside farming methods, including use of fire, that result in heavy soil erosion
- poor domestic sanitation practices and facilities in rural and urban areas, increasing the faecal coliform and nutrient levels in upper watersheds
- pesticide and fertilizer run-off, particularly in relation to poor farming practices and dunder contamination
- construction of buildings and roads on steep slopes
- river-bed sand mining

Management agencies have relied on education, extension and enforcement to address these issues. There is a widespread perception that awareness campaigns and participatory approaches have reduced some bad practices. The Canadian International Development Agency (CIDA) funded Trees for Tomorrow project has equipped the Forestry Department better to do its work of forest management, outreach, and enforcement, and the enhanced capacity of the Department is widely acknowledged. Local NGO initiatives to introduce improved pit latrines and soil conservation practices have supplemented government extension efforts. NGOs have also become involved in water quality testing, working together with government agencies. More rigorous planning regulations have also had a positive impact, for example, planned housing developments have septic systems or sewerage.

Factors that constrain improved management

Despite these scattered successes, improving watershed management is constrained by a variety of policy, institutional, and social factors. Some of these are:

Constraints to government agencies doing their jobs well

- The Forestry Department and the NWC (which manages some upper watershed areas) have inadequate budgets for protection and patrol staff and other management costs.
- The budgets allocated to these agencies do not reward effort and accomplishment, and there is always an expectation to “do more with less”.
- This leads these agencies to “projectize” priorities in order to attract external funding, leading to fragmented, unsustainable efforts.
- Given their limited resources, management agencies are working through and with intergovernmental programmes, NGOs and community groups, but local organizations are sometimes weak and unstable and do not represent all relevant stakeholders, and important stakeholders such as farmers are difficult to reach because they are not well organized.
- The legal framework for watershed management is incomplete and includes few binding regulations.

Constraints to changing the behaviour of stakeholders

- Half the population lacks title to land or secure tenure, discouraging investment in improved soil conservation, sanitation, or solid waste management practices.
- A large percentage of the rural population lives in poverty, and behaviour and decisions are entirely predicated on day-to-day survival.
- Agricultural incentives, for example those that resulted in the expansion of the coffee crop, can encourage poor watershed management practices.
- Much of the population is still unaware of the upstream-downstream links within the water cycle, or even of their own position in and impact on their local watershed.
- While regulations abound, inspections and sanctions have become uncommon, and people no longer expect censure for actions they know are wrong. There is a lack of support from the judiciary and the police to ensure at least some compliance by public to laws and regulations.

Constraints to implementing cost recovery measures, as recommended in relevant policies and studies

- The public sees water as a “right” or a free commodity and expects government to be fully responsible for delivering it at minimal cost.
- The agencies managing water abstraction and distribution are affected by deteriorating infrastructure and other factors contributing to inefficiency.
- Government’s poor track record in managing earmarked taxes and levies has created a credibility problem that makes it politically difficult for the NWC to apply to the Office of Utilities Regulation for new water usage or related fees.
- Important economic groups such as the tourism sector have routinely and successfully used their political power to resist paying the full cost of managing their impacts on the environment.

4. Progress and opportunities

Despite these constraints, the country has made progress that can be capitalized upon, and that can offer lessons for other Caribbean countries, on a number of fronts.

While incentives have not been integrated into the overall management framework, a few incentives to stamp out bad practices and encourage good ones already exist. These include:

- the Forestry Department’s popular free seedling programme, which is available to all farmers and landowners regardless of income level, and which is used as a primary tool for building relationships with stakeholders
- small grants to NGOs from the Environmental Foundation of Jamaica (EFJ) and the USAID-GOJ Coastal Water Improvement Project and Ridge to Reef Watershed Project, for community-based projects aimed at improved practices in watersheds
- water conservation incentives built into NWC’s rate structure (metered water, higher rates for higher consumption, reduced rates for purchase of waste water for appropriate uses, e.g. cooling).

The watershed policy and management framework is well advanced (and well ahead of most other countries in the region), and includes the delineation and prioritization of watershed management areas, the development of a new watershed policy through a consultative approach, the establishment of the NIWMC and its working groups on key issues, and the Ridge to Reef project's analysis of laws and policies related to watersheds as a first step to achieving policy coherence. Jamaica is also taking advantage of regional and international initiatives (for example, the CEHI-GEF regional Integrating Watershed and Coastal Area Management project) to further its agenda. With so many initiatives underway, there is scope for duplication and confusion, however.

Stakeholder participation is openly encouraged and supported, through:

- consultative policy processes
- the establishment of a range of local advisory groups (e.g., Local Forest Management Committees, the Great River Watershed Management Committee, the Ocho Rios Environmental Advisory Group, IDB-sponsored water user groups), which offer an avenue for local stakeholder input
- partnerships with NGOs to sensitize stakeholders and demonstrate alternatives to destructive practices, with a focus on pilot projects

The Forestry Department is placing priority on watershed issues, which are given prominence in the 2001 Forest Plan and policy. The proposed Forest Fund and Tropical Forest Conservation Fund, once capitalized, can be vehicles to channel money towards improved management of forests in the upper watersheds.

As watershed landowners and managers themselves in a few watershed areas, the NWC and the Urban Development Corporation are agencies that have a stake in all stages of the water cycle. Unfortunately, however, they lack the financial resources to effectively manage their upper watershed lands or enforce land use standards on land leased to farmers. The NWC does however get limited management assistance from the Forestry Department (which has its own serious financial constraints).

The recent policy change that allowed private companies rights to Crown land for water abstraction opens up possibilities for incentives through competition. At the moment, however, standards of quality and operations are not well enforced.

Local and international pressure on some industries, particularly tourism, is causing them to embrace environmental standards through certification schemes (e.g., Green Globe, Blue Flag) and through support to local environmental initiatives. The Ministry of Tourism is looking into capitalizing on this trend by creating licence renewal conditions tied to “voluntary” investments in the community or environment.

5. Needs and directions

The major needs and directions identified by main stakeholders and drawn from this review, include the following:

- *Clarify watershed-friendly behaviour which should be encouraged:* There needs to be a common understanding about what sort of behaviour to encourage, and what to discourage, to improve watershed services. A first step is for stakeholders to agree on, and then to make widely known, both the acceptable and unacceptable land use, water use, sanitation, and waste disposal practices that affect watershed management. NWC apparently has good information

over many decades, which can correlate land use types with water quantity and quality.

- *Improve awareness of stakeholder roles:* Education is needed to help people understand their own roles and responsibilities within the water cycle (upper watershed actors as producers of watershed services, middle watershed actors as stewards of water, and lower watershed actors as responsible consumers). Without that understanding, there is limited scope for encouraging people to adopt good practices or to accept paying the full cost of watershed services. NEPA's Watersheds Branch and the Ridge to Reef project are placing priority on this need.
- *Enhance government's credibility:* Consumer willingness to pay is now constrained by a widely held lack of trust in government's commitment and ability. Effective demonstrations of government's commitment to improved watershed services are needed. Opening up the water abstraction and distribution business to private companies may begin to increase willingness to pay, as long as government does its part to set and apply standards and regulations.
- *Bring watershed stakeholders together:* There have been some positive experiences at the local level with bringing the main actors in the water cycle (producers, stewards, users) together to discuss issues, define needs, and make deals: for example, the "watershed forums" sponsored by South Trelawny Environment Association for south Trelawny. A similar forum at the national level could create a broader dialogue on vision, policy, and need than NIWMC - as an interagency coordination mechanism - is able to.
- *Consolidate scattered pilot work:* The many valuable pilots now underway, through Forestry's Trees for Tomorrow project, the Ridge to Reef project, EFJ's Dunn's River project, and a number of local NGOs, are spatially scattered and are hitting different places and needs along the water cycle. A mechanism for bringing these efforts together for learning, for stakeholder sharing, and to inform policy processes, would enhance their usefulness substantially.
- *Develop standards or codes of practice:* Codes of practice (to define minimum acceptable levels) or standards (to set an upper threshold) of watershed stewardship will be needed to set the basis for certification and labelling schemes (such as the "Great River" branding concept for produce from that watershed, which is being considered in the Ridge to Reef project) and other incentives. These could be developed through a multi-stakeholder approach and applied to the activities of different producers and consumer groups.
- *Establish sustainable funding flows consistent with a broad valuation of multiple watershed services:* The value of watershed services needs to be assessed and agreed to by stakeholders as a basis for starting to establish rates and fees that are sufficient to fund quality watershed management. There are now methods available to estimate this, without going into a major research project - although more detailed assessments can help the design of specific schemes. Without such an assessment, the public will continue to look on water as a free environmental service. With a watershed valuation, and a more detailed assessment of associated demands and financial flows than could be done in the current brief review, potential incentives can be identified.

6. Incentive possibilities to explore

This analysis has confirmed the perception of many lead stakeholders that incentives can and must be an important component of watershed management approaches. On the one hand, incentives need to be based on local needs and motivations, and on what works locally (hence the value of pilot projects). On the other hand, bigger national schemes are needed to avoid the fragmentation of current and past efforts and to demonstrate to stakeholders that they are contributing to something

significant. Incentives should be designed to both encourage good watershed practices and to build a sense of the value of watershed services and the obligation of users to contribute to their costs.

Pilot incentive-based activities to improve watershed management

Some possible ideas that could be tried on a pilot basis include:

- *A “reef-to-ridge” donation programme*, in which hotels and other downstream users are encouraged to support upper watershed management activities, perhaps in the case of hotels by contributing some funds saved through their “conserve water” initiatives with guests. This could be carried out in conjunction with the Ministry of Tourism’s efforts to increase the industry’s support to the community, and with EFJ’s proposed “Champions of the Forest” programme, which could provide recognition to contributors. International tourism certification schemes increasingly recognize such efforts in a positive light in their assessments. The potential for tax write-offs could also be explored. An existing arrangement between Sandals’ and local farmers offers a precedent.
- *Branding and marketing of agricultural, horticultural, and industrial products and bottled water*, based on agreed and applied standards of practice (the “Great River” brands idea). There are several possible incentives, apart from the obvious market-led incentives from sales to discriminating markets. They include streamlining government procedures for allocating rights, and for planning and development control.
- *Grants and tax write-offs for the establishment of community mini-dams and household water storage tanks*, to reduce problems of reliability and reduce NWC’s water delivery costs. These ought to be associated with standards for their construction and use, and could be combined with appropriate public education campaigns.
- *Awards aimed at building the notion of stewardship of the water cycle*, through competitions to find the best examples of good practices and behaviours. The competitions might also identify behaviours to stamp out.

A national campaign – ‘rebuilding the Spinal Forest’

These pilot ideas could be incorporated into a national campaign to increase visibility, attractiveness to stakeholders, coherence, and thus impact. The current EFJ-FD initiative to rebuild the Spinal Forest could provide the focus for a suite of mutually reinforcing incentive-based actions, which could include - in addition to those noted above - such elements as:

- *Seeking donations* for the purpose of buying up lands critical to upland watershed services, to be managed by the Forestry Department and perhaps NWC. This could include a percentage, even if initially a very small one, out of water abstraction license fees, as suggested in the Forest Plan, as well as user fees on construction projects in watersheds, which have been considered by Government. The Forestry Department might also consider leasing land, through the Commissioner of Lands, that is less critical to its overall forestry aims in order to reduce its expense burden and rationalize its estate.
- *Providing financial incentives*, through the proposed Private Forest Initiative of EFJ’s Spinal Forest project, for upper watershed landowners to move out of uneconomic cattle raising or agriculture and into afforestation and fruit trees based on good land use standards, or to give up the use of their lands for a period of time for forest restoration. These should have a strong component of community involvement.
- *Giving priority to addressing the tenure issues of upland farmers*, including squatter

communities, and tying the securing of tenure to meeting watershed-friendly land use standards (with the possibility of loans or Social Investment Fund grants to help poor farmers meet those standards.)

- *Tax incentives to improve land use* by larger upper watershed landowners, to be developed through consultations with landowners and relevant government agencies.
- *Seeking Kyoto Protocol Clean Development Mechanism funds* for afforestation/ reforestation projects that meet sustainable development and land use control criteria. One of the two objectives of the CDM is sustainable development. The CDM regulations require the host government to determine the frameworks within which CDM projects should contribute to sustainable development. The Spinal Forest idea would be ideal.
- *Concentrating action in the highest priority watersheds*, drawing on the NEPA environmental and social classification system, in order to assure the greatest impact.

7. Conclusion

Jamaica could potentially benefit, and benefit others, from participation in the IIED/DFID project *Developing markets for watershed protection services and improved livelihoods*. The project aims to establish a learning group of interested Caribbean countries, within a larger global learning group. Jamaica can share with other countries its experience in identifying watersheds and defining priorities, developing integrated policies and plans, and participatory approaches. It can also benefit from the experiences of other countries as it seeks to incorporate incentives based approaches into its watershed management policies and programmes. The further exploration and testing of the approaches suggested above could be assisted by further involvement in the project in Phase 2. This needs to be discussed and a proposal made by September 2002.

Appendix 1

Markets for watershed protection services and improved livelihoods *Summary of an IIED project supported by DFID*

Phase I: Exploration of the potentials

A central plank in strategies to reduce poverty is to improve access to reliable supplies of clean water. Another is to reduce vulnerability to environmental risks such as flooding, landslides and water pollution. Both of these require better management of watersheds. Today, services provided by watersheds are often under threat, and existing regulatory approaches to addressing the problems are often insufficient. Yet participatory and market-based approaches are also emerging throughout the world.

IIED, with its partners in developing countries, have identified the need to integrate and promote all approaches which can improve watershed land use and livelihoods - fitting new market-based approaches together with existing policies, incentives and institutional mechanisms that work. DFID shares these concerns and has commissioned IIED to explore how to do this. CANARI and SEDU-UWI have been identified as regional partners to help in this exploration in the Caribbean.

A four-year programme of research and action in a range of countries is therefore proposed to increase understanding on how market-based approaches can support better watershed land use and improved water services for the benefit of poor people - and where they cannot. The programme will include international network building, experience sharing, and an action-learning component involving people in regions that can gain from working together. Four action-learning regions are proposed - South Africa, India, Indonesia and the Caribbean - to be co-ordinated by regional partners, with back-up from IIED. Substantive Phase 2 work in the action-learning regions will depend on the support of the relevant DFID country/regional programmes, or other development assistance agencies.

The aims of Phase 1 are:

- To explore the relevance of the project in the Caribbean, building on preliminary IIED exploration in January 2001, which identified interest in Grenada, Jamaica, St Lucia and Trinidad;
- To conduct brief national diagnostics in four Caribbean countries to assess the links between suppliers and users of watershed services, to map out related initiatives, and to identify learning needs and opportunities
- To explore what a regional project might do, to develop and share learning on the potentials and limits of market-based approaches
- To identify key partners and resource people for moving forward

Appendix 2

Persons met with, March 4-8, 2002:

Selena Tapper and Ian Gage, Environmental Foundation of Jamaica
Marilyn Headley, Albert McKenzie, and Michael Barrett, Forestry Department
Jacqueline daCosta, Leonie Barnaby, and Donna Blake, Ministry of the Environment
Althea Johnson, Ministry of Tourism
Learie Miller, Thera Edwards, Winsome Townsend, and other staff, NEPA
Desmond Malcolm and Marcia Richards, National Water Commission
Hugh Dixon and staff, Southern Trelawny Environmental Agency (STEA)
Dave White, farmer, Thompson Town
Dr Douglas, private forest owner, Buff Bay
Mark Nolan, Ridge to Reef Watershed Project
Stewart Forbes, ENACT Programme
Scott McCormick, Coastal Water Improvement Project

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Appendix 3

Questions guiding the brief diagnostic for Jamaica

1. What are the big watershed issues?

- Reliability of water supply?
- Water quality?
- Landslip, erosion, etc?
- What services are scarce?
- What are the 'priority' watersheds and how determined?

2. Where has watershed management (WM) improved?

- What improvement (re scarcity)?
- How, by whom, through what kind of activity?
- [Any particular project, programme, incentive responsible?]

3. Is there good information correlating land use to watershed services?

- Generally, and in specific places?
- Who generates it and how?
- What form does it take?
- Any watershed valuation work?
- [Any particular project, programme, incentive responsible?]

4. What groups have been targeted to improve WM? [see *Figure A* below]

- Who are the producers of watershed services (small farmers in uplands, forestry)?
- What are their motivations in relation to WM?
- Who are the users of watershed services (irrigated plantation agriculture, tourism, industry, government services, domestic)?
- What are their motivations in relation to WM?
- What key behaviour changes are required for each (encouraging good practice, stopping bad practice...)? And who has decided this?
- Who has been actively targeted - as a group, or within a geographical area?
- [Any particular project, programme, incentive doing such targeting?]

5. What incentives have been proposed or used to improve WM?

- Who has been pushing incentives approaches and why?
- Type of incentive used in practice? (intangible, physical, information, training, rights, financial, market-based)
- Who targeted (supply-side, demand-side)?
- Period/regularity?
- Awareness of incentive by target group and take-up levels?
- Constraints to take-up e.g. rights, resources?
- Compatibility with other sustainable development objectives and participatory approaches?

6. What impacts have incentives had?

- On changed WM practices?
- On the quantity and quality of watershed services?
- On other environmental variables e.g. biodiversity?
- On economic objectives (sector/livelihood)?
- On social objectives e.g. equity?
- Distribution of costs, benefits and risks?
- How is information on impacts being generated?

7. What are the relations between producers and users of watershed services? [see *Figure B* below]

- Where there is competition or conflict between users, how is water allocation determined?
- Is there competition between suppliers - in what form?
- What means of communication/intermediaries link stakeholders?
- Local institutions to bring stakeholders together - role and effect? Links to other local institutions?
- National institutions to bring stakeholders together - role and effect? Links to other national institutions?

8. How can learning/capacity for incentives for WM be improved?

- What kind of learning does [Jamaica] already offer?
- What kinds of capacity are in place to handle incentives?
- What further learning needs are there - from the Caribbean, globally?

Figure A: The 'water cycle', stakeholders, incentives and finance flows.

- *Sketch the water cycle from water interception to 'final use'.*
- *Place major producers/users of watershed services within*
- *Note the service provided by producer, and scarcities faced by user*
- *Note their motivations in relation to watershed management*
- *Note incentives that match motivations (and perverse incentives against motivations)*
- *Show finance flows between stakeholders*

Figure B: Institutional relations regarding WM.

- *Sketch Venn/flow diagram showing formal and informal institutional roles, relationships. and information flows regarding WM*