

Integrated Management of the Yallahs River & Hope River Watershed

Rural Development Specialist Final Report (v2)

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LIST OF ACRONYMS

| | |
|--------|---|
| ABIS | Agricultural Business Information System (<i>under RADA</i>) |
| AIC | Agro-Investment Corporation (<i>under MOAF</i>) |
| AMID | Agricultural Marketing Information Division (<i>under MOAF</i>) |
| BJCMNP | Blue and John Crow Mountains National Park |
| CANARI | Caribbean Natural Resources Institute |
| CBA | Community-Based Adaptation (<i>UNDP Project</i>) |
| CBD | UN Convention on Biological Diversity |
| CBO | Community-based Organisation |
| CCST | Caribbean Council for Science & Technology |
| CDB | Caribbean Development Bank |
| CIB | Coffee Industry Board |
| CIF | Climate Investment Funds |
| CIDA | Canadian International Development Agency |
| CWIP | Coastal Water Improvement Project |
| EFJ | Environmental Foundation of Jamaica |
| EU | European Union |
| EJASP | Eastern Jamaica Agricultural Support Project |
| FAO | Food and Agriculture Organization (UN) |
| FCF | Forest Conservation Fund |
| FD | Forestry Department |
| FMU | Forest Management Unit |
| GEF | Global Environment Facility |
| GIS | Geographical Information System |
| GoJ | Government of Jamaica |
| IDB | Inter-American Development Bank |
| ISCF | Island Special Constabulary Force |
| ISWG | Invasive Species Working Group |
| IUCN | International Union for the Conservation of Nature |
| IWCAM | Integrating Watershed and Coastal Area Management |
| IWRM | Integrated Water Resources Management |
| JAMIS | Jamaica Agriculture Market Information System |
| JAS | Jamaica Agriculture Society |

| | |
|-------|--|
| JCDT | Jamaica Conservation and Development Trust |
| JET | Jamaica Environmental Trust |
| JNPTF | Jamaica National Parks Trust Fund |
| JPAS | Jamaican Protected Area System |
| JPAT | Jamaican Protected Areas Trust |
| KAP | Knowledge , Attitudes and Practices |
| LFMC | Local Forest Management Committee |
| LFMP | Local Forest Management Plan |
| LSDPF | Local Sustainable Development Planning Framework |
| MHEW | Now Ministry of Housing, Environment and Water |
| MOAF | Ministry of Agriculture & Fisheries |
| MSMEs | Micro, Small and Medium-sized Enterprises |
| MYADP | Morant Yallahs Agricultural Development Project |
| NBSAP | National Strategy and Action Plan on Biological Diversity in Jamaica |
| NGO | Non-Governmental Organisation |
| NEPA | National Environment and Planning Agency |
| NIC | National Irrigation Commission |
| NIWMC | National Integrated Watershed Management Council |
| NIWMP | National Integrated Watershed Management Programme |
| NCSA | National Capacity Self-Assessment Project |
| NLA | National Land Agency |
| NRCA | Natural Resource Conservation Authority |
| NSP | National Spatial Plan |
| NSPA | National System of Protected Areas |
| NWC | National Water Commission |
| OAS | Organisation of American States |
| ODPEM | Office of Disaster Preparedness and Emergency Management |
| OPM | Office of the Prime Minister (- <i>this formerly included the Environmental Management Division, EMD</i>) |
| PAC | Protected Areas Committee |
| PASMP | Protected Areas System Master Plan |
| PATF | Protected Areas Trust Fund |
| PCA | Pesticide Control Authority |
| PES | Payment for Environmental Services |

| | |
|--------|--|
| PIF | Project Identification Form |
| PIOJ | Planning Institute of Jamaica |
| PMO | Produce Marketing Organisation |
| PPCR | Pilot Program for Climate Resilience (<i>under PIOJ</i>) |
| R2RW | Ridge to Reef Watershed Project |
| RADA | Rural Agricultural Development Authority |
| RAMSAR | Convention on Wetlands |
| RPPD | Rural Physical Planning Division (MOAF) |
| RRA | Rapid Rural Appraisal |
| SDC | Social Development Commission |
| SIDS | Small Island Developing States |
| SLM | Sustainable Land Management |
| STATIN | The Statistical Institute of Jamaica |
| STEPS | St. Thomas Environmental Protection Association |
| TFT | Trees for Tomorrow Project |
| UCC | UCC Ueshima Coffee Co. Ltd. |
| UDC | Urban Development Corporation |
| UNCCD | UN Convention to Combat Desertification |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNFCCC | UN Framework Convention on Climate Change |
| USAID | United States Agency for International Development |
| UWI | University of the West Indies |
| VRA | Vulnerability Reduction Assessment |
| WAMM | Watershed Area Management Model |
| WMC | Water Management Unit |
| WRA | Water Resources Authority |

ACKNOWLEDGEMENTS

This report has been prepared within the framework of the design phase of the *Integrated Management of the Yallahs River and Hope River Watersheds* Project. The research was conducted between July 2011 and April 2012, and involved interviews and group discussions with more than forty individuals – including representatives of nine public entities and non-governmental organisations in Jamaica, as well as fellow consultants of the design team and the IDB officials involved. This was complemented, in parallel, by extensive desk-research.

The contents of this report reflect the collated information and its interpretation by the author. For further information and questions, please contact:

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Jamaica is fortunate to have so many individuals who are highly knowledgeable and with considerable experience in all aspects of the watersheds. My heartfelt thanks are extended to all those who took part in the research for this report, for having shared their expertise with such generosity, patience and openness.

1. PROBLEM DESCRIPTION

1.1. Current Situation

1.1.1. Overview of Project Area

The Hope River and Yallahs River watersheds have been given high priority on account of the ecological significance of the forests in the upper areas and their significant environmental values, particularly downstream. For clarity, this report divides the watersheds into the upper reaches (predominantly protected areas); and mid- to lower-reaches (where most of the agricultural activities occur). Infrastructure and urban settlements are concentrated near the coastline. Maps of the Project Area are given in Figure 1a (- Yallahs & Hope Rivers Watershed Management Units) and Figure 1b (- landcover of the Yallahs & Hope Watersheds).

- Blue and John Crow Mountain National Park and Blue Mountains Forestry Reserve

The Blue and John Crow Mountains National Park (BJCMNP), designated under the Natural Resources Conservation Authority (NRCA) Act enacted in 1991, covers an area of 48,000 hectares (486.5 sq. km). According to the BJCMNP Management Plan 2011-2016 (JCDT, 2011a), it includes the largest contiguous block of closed broadleaf forest in the country, providing a wider range of critical habitats for native, endemic and migratory species. About 33% of Jamaica's endemic flowering plants occur in these mountain ranges; and the area represents one of the last few remaining habitats for threatened endemic animals including the Jamaican Coney (*Geocapromys brownii*), the Yellow Boa (*Epicrates subflavus*), the Giant Swallowtail Butterfly (*Pterourus homerus*) and the Jamaican Blackbird (*Nesopsar nigerrimus*). Its main mountain ranges are cited as two of the key biodiversity areas within the Caribbean Biodiversity Hotspot; and in 2009, it was nominated by Jamaica as a UNESCO World Heritage Site.

The **Blue Mountains Forestry Reserve** has similar boundaries to the BJCMNP.

The two greatest challenges facing the BJCMNP are deforestation for agriculture, and the growth of invasive alien species (JCDT, 2011a). The negative impact of agriculture has spread over time from lower to higher altitudes: trees are cut down and burnt, soil erosion removes the topsoil and the land loses fertility within 2-3 years. New areas are then burnt (- often with fires getting out of control). The lack of ownership by the farmers in these areas means that there is no long-term investment, and so the old areas are abandoned – often so damaged that natural succession to native forest takes decades. The problem is heightened by aggressively colonizing grasses and ferns, some of which are invasive.

Figure 1a: Map showing Yallahs & Hope Rivers Watershed Management Units (*courtesy of Water Resources Authority, 2011*)

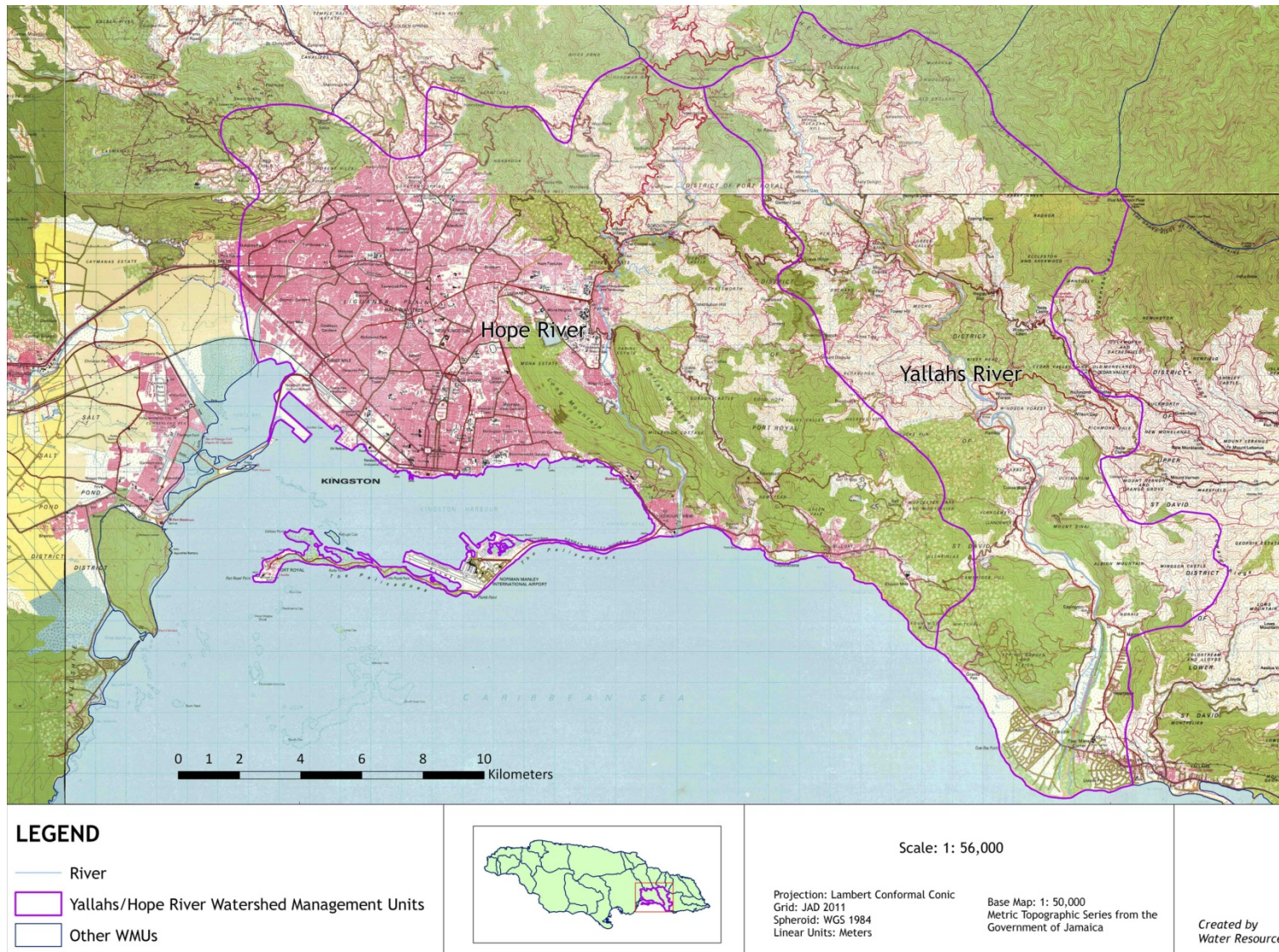
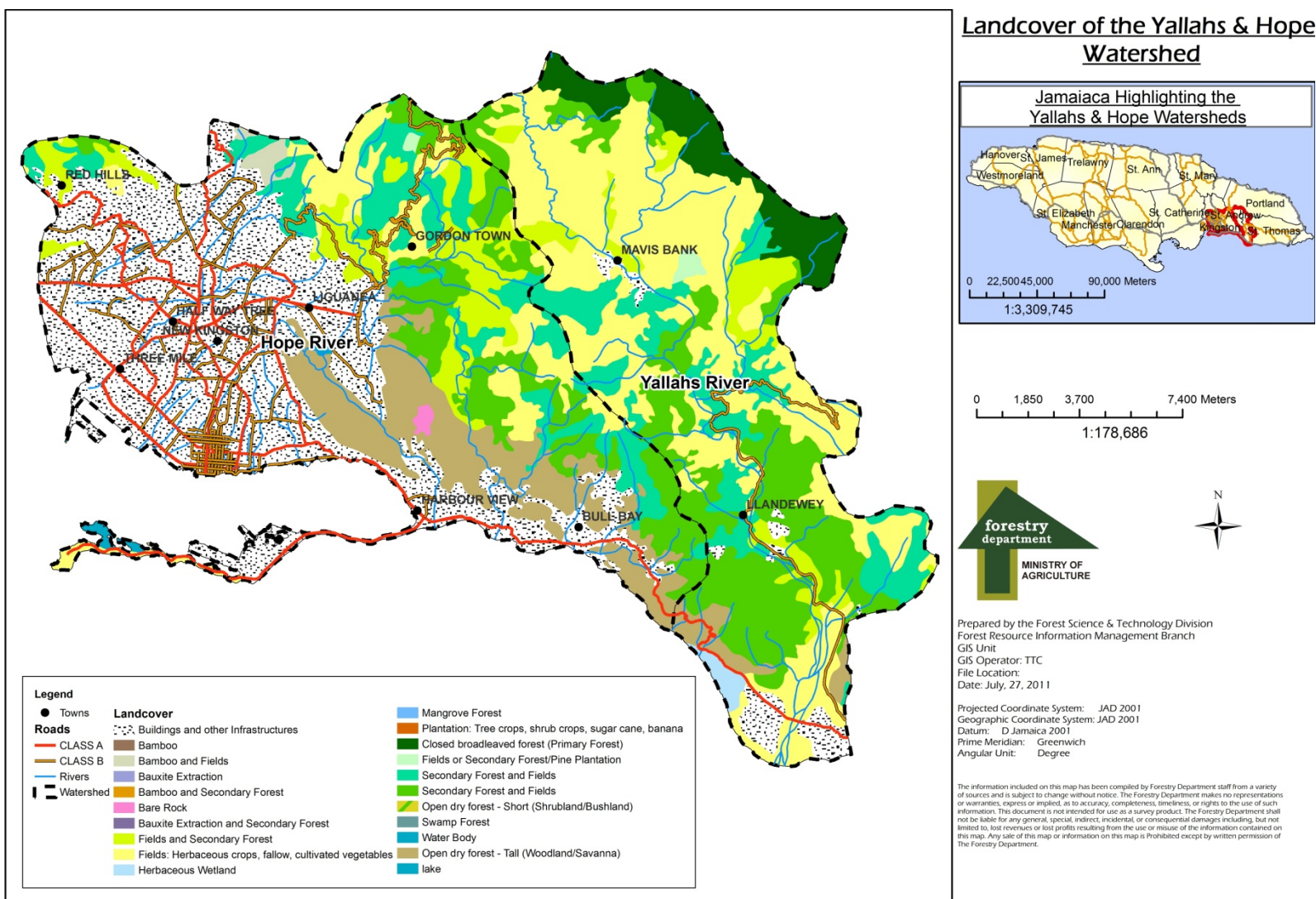


Figure 1b: Map showing landcover of the Yallahs & Hope Watersheds (courtesy of Forestry Department, 2011)



- Blue and John Crow Mountain National Park and Blue Mountains Forestry Reserve (cont.)

As land is degraded outside the BJCMNP, and with very limited demarcation of the boundary, there is high temptation to encroach into the protected area. Although slash and burn agriculture is not practiced within the BJCMNP (apart from by illegal occupants – discussed below), it is common on land immediately adjacent to the Park. This greatly increases the risk of fires within the Park’s boundaries.

Due to the altitude and climate, the Blue Mountains are ideal for growing high-quality coffee – and today, coffee is the main large-scale crop in these areas. Shade coffee is seldom practiced due to the perceived threat of leaf spot disease, and the view that shade from the mist is sufficient. Some farmers clear all the trees from the land before planting coffee; they may then plant some banana and plantain as short-term crops whilst the coffee plants are young. This combination of removing tree cover altogether and growing coffee as a mono-crop increases soil erosion and results in a habitat that is not conducive to native wildlife, particularly birds. Another environment problem related to coffee arises from coffee pulp which is purported to be disposed of carelessly. Along with nutrient-rich effluent from the processing factories and also the fertilizers, rivers in these areas can suffer from eutrophication.

In addition to coffee, farming in the high middle/upper reaches of the watersheds tends to be condiments and vegetables. Observations from a joint agency field trip in early 2010 noted that “several unsustainable practices exist among a large number of farmers operating in the region. The most devastating (was) the complete clearing of the steep sloping hillside by the vegetable farmers of Westphalia and the coffee farmers of the regions going north, westerly and in the Rose Hill area”¹.

Other threats to the BJCMNP include: non-timber products harvesting, logging, fires, hunting, informal settlements and channel modification (JCDT, 2011). Additionally, tourism and “river poisoning” – a destructive fishing practice in fresh-water commonly, in which chemicals are poured in rivers to catch crayfish – respectively potentially and actively place pressures on the National Park and surrounding buffer zones.

- Mid- and lower reaches of watersheds

According to the most recent Agricultural Census 2007 (STATIN 2008), the parishes of St. Andrew and St. Thomas contain respectively 2.6% (8,354 ha) and 6.8% (22,257 ha) of Jamaica’s farm area; and 4.7% (10,772) and 5.3% (12,033) of the island’s number of farms. As of 2007,

¹ From “Squatting in the Blue Mountains: Squatter Management Unit – Recommendations on the way forward based on joint-agency field visit on January 29, 2010” (courtesy of RADA).

the average farm size was 0.78 ha in St. Andrew and 1.85 ha in St. Thomas. Between 1996 and 2007, both parishes showed a decrease in total farm area (by 23.9% in St. Andrew, and 11.4% in St. Thomas); an increase in the number of farms (of 69.2% in St. Andrew, and 27.2% in St. Thomas); and a decrease in the average farm size.

Agriculture in the watersheds' mid reaches is rain-fed, whereas irrigated and protected cultivation is found on the flatter lands nearer the coast. Details of the farming systems in the watersheds are described in Section 2 "Socio-Economic Profile of Farmers in Project Area".

1.1.2. Project rationale

As detailed in the GEF-5 Project Identification Form (PIF) for the *"Integrated Management of the Yallahs River and Hope River Watersheds"*, healthy watersheds fulfil numerous critical functions. In the case of the Yallahs and Hope River watersheds, rainfall in the mountainous upper reaches provides water for domestic, agricultural and industrial users. Indeed, the Yallahs and Hope River Watershed Management Units (WMUs) - two adjoining hydrological basins covering a contiguous area of 44,486ha - supply 37% of Kingston's water supply (population 667,000). The Yallahs River is also important for recharging the aquifers from which water is drawn for irrigation farming which is found on the WMU's lower slopes².

Described further in the PIF as well as the National Forest Management and Conservation Plan (Forestry Department, 2001), the integrity of these watersheds is threatened by numerous activities including: inappropriate farming methods (for subsistence and commercial agriculture), extraction of timber and fuelwood, mining and quarrying, and the clearing of land for housing and agriculture. In the upper watersheds, deforestation continues to be a major challenge and this has modified and degraded high biodiversity habitats, increased the vulnerability of rare and endemic species as well as opened up the forest to invasive alien species. The high intensity rainfall in the upper watersheds (estimated at over 7000mm per annum) contributes to soil erosion, and landslides, floods and debris flows are common³. Thus, deforestation contributes to damages and losses to infrastructure, housing, crops and land. Increased sediment load and agricultural chemicals in the rivers both reduces the water available for domestic use and results in higher levels of sediment and pollution entering the Caribbean Sea with possible damage to marine and coastal biodiversity. Of particular note for these two watersheds is the Palisadoes-Port Royal Protected Area, a designated RAMSAR site.

² Irrigation water for parts of St. Thomas - including Albion/Poormans Corner - is supplied by the Yallahs River watershed.

³ It has been estimated that 8% of the two WMUs are prone to floods and 49% to landslides; and 65% subject to soil erosion (with 163 tons/ha/year estimated in the Hope watershed).

Unless measures are taken to protect and maintain the watersheds stability and productivity, it is considered highly likely that they will continue to degrade. As forest cover is further reduced in the upper reaches of these two watersheds, the threats to biodiversity will remain or increase, and water supply, soil erosion and sedimentation problems will continue.

1.1.3. Project objective, components & benefits

The Project Objective is “to reduce pressure on natural resources in the Yallahs River and Hope River Watersheds of the Blue Mountains by increasing the practice of SLM resulting in improved management of Biological Diversity and enhanced flow of ecosystem services that sustain local livelihoods.”

This is to be achieved through the following four components:

- I. **Institutional strengthening & capacity building for integrating biodiversity into watershed management.** In particular, this aims to develop and implement an institutional framework that enables the key watershed management agencies to work together more effectively and collaboratively; collect quantitative and qualitative information on biological diversity, ecosystem quality, soil erosion and water to enable sound resource monitoring and management; update forest cover data and the status of high biodiversity areas especially for areas with endemic species; update information on, and monitor threats to land-use change, biodiversity and ecosystem integrity; provide spatially explicit data of watershed values and resources through a nationally accessible GIS database that informs decision-makers; and ensure that Development Orders and Land-use Plans for the area incorporate information that supports biodiversity conservation, SLFM and watershed management. This component will also support strengthening of local and national government capacity in using information on natural resources including biodiversity to support land-use decisions.
- II. **Creating economic & financial incentives to support sustainable biodiversity & watershed management.** This seeks to develop market-oriented instruments which will assure the supply and maintenance of the ecosystem services associated to forested or agro-forested and sustainably-managed lands in the area. As such, the economic value of key ecosystem services within the watersheds will be estimated and used to inform land-use decisions and provide information to design a PES scheme that enables long-term financing of forest conservation and sustainable land-use management practices. Additionally, it will create at least one new source of financial support for forest management through piloting a financing scheme that will ensure that fees are used to pay for forest and watershed management.
- III. **Improving community awareness, sensitivity and understanding of SLM techniques.** This component aims to develop an inventory of SLM good practices, disseminate material and inform community groups of the need for SLM, and provide training in SLM measures – to include soil conservation and alternative livelihood strategies.
- IV. **Implementing Sustainable Livelihoods, Agriculture, Forestry & Land Management practices in watershed communities.** This will implement demonstration projects in

communities, and provide small grant support to implement local SLM and alternative livelihood projects that reduce deforestation and erosion; improve forest and watershed management, by increasing land under sustainable forestry, agriculture and agro-forestry; as well as introduce commercially-viable crops that conserve soil.

The PIF also describes the outcomes and benefits of the proposed project. These include increased area of forest under sustainable management, maintenance of the generation of services from the forests; and the development of sustainable and diverse sources of finance for SLM, which would allow these benefits to persist beyond the project's end. It will affect over 300,000 domestic water users in Kingston by providing them with a more reliable water supply; and will also enable farmers in the rural areas improve their agricultural yields – and therefore, income generation - as a result of increased quantity and quality of water supply as well as soil conservation techniques. Given that the project is anticipated to reduce the risk of floods and damage to farmland, infrastructure and homes in the middle and lower watersheds, the livelihoods of rural populations in these areas will be less vulnerable to extreme weather events and natural disasters. Other benefits associated with biodiversity and SLM practices may include enhanced potential for eco-tourism initiatives for local communities.

In terms of institutional benefits and capacity-building, the project will facilitate collaboration between government agencies as well as with private sector on SLM and integrated watershed management. It is anticipated that best practices and lessons learned from this project will be implemented in the other WMUs around the island, including those which make up the remainder of the Blue and John Crow Mountains National Park.

This project contributes to several key national strategic plans, namely: National Biodiversity Strategies and Action Plan (NBSAP, NEPA 2003a), Vision 2030 National Development Plan (PIOJ, 2009), National Forest Management and Conservation Plan (FD, 2001), and Strategic Forest Management Plan 2010-2014 (FD, 2010). It also supports key international policies to which Jamaica is committed.

1.2. Organisation & methodology for Rural Development Specialist

As specified in the Terms of Reference, the overall objective for the Rural Development Specialist is “to identify community-level capacity, awareness, understanding and training needs for sustainable livelihoods, watershed management and SLM techniques and design the intervention activities and related requirements of Component III of the *Integrated Management of the Yallahs River and Hope River Watersheds Project* (the Project Area)”.

Although not specified in the TOR, the Rural Development Specialist was also asked to address the agricultural and non-agricultural sustainable livelihoods aspects of Component IV.

Table 1: Summary of Component III and IV from Project PIF

| Project Component | Expected Outcome | Expected Outputs |
|--|--|--|
| III. Improving community awareness, sensitivity and understanding of SLM techniques | Increased public awareness of the importance and benefits of sustainably managing the biodiversity, and the watershed and of good land management. | - Inventory of good practices developed & disseminated to 75% of community groups and local government staff; - 40% of watershed community groups trained in soil conservation, IWRM & watershed management |
| IV. Implementing Sustainable Livelihoods, Agriculture, Forestry & Land Management practices in watershed communities | - Reduced soil erosion and siltation in upper, middle & lower watersheds - Good land, agro-forestry and forestry management practices among watershed residents are widely used | - Demonstration projects in sustainable land use, forestry and agroforestry & alternative livelihoods ¹ operating in 33% (9,790 ha) of upper & middle watershed farming 66 communities. -700 ha reforested |

Source: GEF-5 PIF

More specifically, the Rural Development Specialist must seek to:

- Determine the socio-economic profile of farmers within the project area, including their income, land ownership structure, land use patterns, main cash crops, production and productivity .
- Assess existing organizations' capacities for implementing SLM and other land and watershed management techniques, including those to enhance biodiversity conservation; and identify lead land use managers that could eventually spearhead the implementation of SLM within the project area.
- Identify the current extension methodologies being applied in these watersheds. This should have an assessment on the effectiveness and replicability of these methodologies, including a gender perspective.
- Select the most appropriate SLM extension methodologies to implement the proposed agricultural and forestry activities of the project to enhance biodiversity and soil conservation by integrating social (including gender), economic, physical, and biological needs and values.
- Identify capacity and training needs for SLM implementation within the project area, as well as effective extension and communication methods to reach the target population.

In order to fulfil the objectives given above, interviews have been conducted with representatives of all the government ministries, statutory bodies, other organisations and individuals involved in provision of extension services and capacity building in the Project Area (as listed in Annex A). Some of these were undertaken through one-on-one meetings with stakeholders, and others within a group of stakeholders.

The study has also reviewed available literature, including academic papers, project plans and evaluations, development strategies and plans...etc. (listed in Annex B). Wherever possible, organisation's websites have been consulted (listed in Annex C). It must be noted, however, that the information contained in the latter was not always up-to-date or complete.

Treatment of TOR within this report

| Specific Objective | Relevant section(s) in this Report |
|--|--|
| Socio-economic profile of farmers | Section 2 |
| Existing organizations' capacities for implementing SLM and other land and watershed management techniques | Section 3 |
| Extension methodologies being applied in these watersheds | Section 3 |
| Most appropriate SLM extension methodologies | Section 4.1 and Section 5 – Project activities |
| Capacity and training needs for SLM implementation, and effective extension and communication methods | Section 2 (farmers) and Section 3 (entities involved in SLM extension); and Section 5 – Project activities |
| Sustainable agricultural demonstration plots | Section 5 – Project activities |
| Non-agricultural sustainable livelihoods | Section 5 – Project activities |

Definitions used for report

For the purpose of this consultancy, the following definitions are being used:

- **Extension** comprises the wide range of communication and learning activities organised in different disciplines for persons living in these rural areas. These include agriculture, (agro-)forestry, environment, resource utilisation and management, capacity building at community level, economic and business development.
- **Sustainable Land Management (SLM)** encompasses a broad group of practices, including soil and water conservation, natural resources management, integrated ecosystem management (with biodiversity conservation). As such, it involves a holistic approach to achieving productive and healthy ecosystems by integrating social, economic, physical and biological needs and values.

2. Socio-Economic Profile of Farmers in Project Area

2.1. Characteristics of farmers in Project Area

2.1.1. Demographics

As noted in the Agricultural Census 2007, the majority of farmers in St. Andrew and St Thomas are between 35-54 years although there is also a sizeable cohort of older farmers (55-74 years). With regards to gender, there are more male farmers than female farmers in both parishes, and across all age groups (approximately 2-2.5 male farmers for every female farmer).

Table 2: Farming Profile for St. Andrew and St. Thomas in 2007 - Age Group and Gender

| Number of Individual Holders by Age Group, Sex and Parish | | | | |
|---|----------------|----------------|---------------|--------------|
| Parish | Total | Male | Female | Not Reported |
| All Jamaica | 210,853 | 139,965 | 63,690 | 7,198 |
| Under 25 | 12,356 | 9,436 | 2,473 | 447 |
| 25-34 | 31,890 | 21,301 | 9,479 | 1,110 |
| 35-44 | 46,898 | 30,177 | 15,171 | 1,550 |
| 45-54 | 43,846 | 29,133 | 13,293 | 1,420 |
| 55-64 | 31,557 | 21,297 | 9,248 | 1,012 |
| 65-74 | 23,914 | 15,778 | 7,310 | 826 |
| 75+ | 14,123 | 8,913 | 4,708 | 502 |
| Not Reported | 6,269 | 3,930 | 2,008 | 331 |
| St Andrew | 10,261 | 6,983 | 2,787 | 491 |
| Under 25 | 399 | 319 | 55 | 25 |
| 25-34 | 1,551 | 1,090 | 403 | 58 |
| 35-44 | 2,501 | 1,688 | 703 | 110 |
| 45-54 | 2,276 | 1,543 | 623 | 110 |
| 55-64 | 1,618 | 1,092 | 443 | 83 |
| 65-74 | 1,114 | 749 | 313 | 52 |
| 75+ | 595 | 372 | 189 | 34 |
| Not Reported | 207 | 130 | 58 | 19 |
| St Thomas | 11,205 | 7,749 | 3,266 | 190 |
| Under 25 | 677 | 545 | 115 | 17 |
| 25-34 | 1,735 | 1,251 | 451 | 33 |
| 35-44 | 2,560 | 1,734 | 774 | 52 |
| 45-54 | 2,289 | 1,579 | 688 | 22 |
| 55-64 | 1,515 | 1,044 | 445 | 26 |
| 65-74 | 1,086 | 757 | 318 | 11 |
| 75+ | 702 | 458 | 230 | 14 |
| Not Reported | 641 | 381 | 245 | 15 |

Source: STATIN 2008

Although there have been various initiatives led by the Ministry of Agriculture & Fishers (MOAF) to attract more youngsters into agriculture, the average age of farmers is reportedly ever-increasing. The aging nature of the farmer population was mentioned in all interviews, albeit with slightly different consequences: one agency thought that the older farmers are limiting their farming activities to the (smaller) pieces of land closest to where they live; another felt that the rural areas are dying, on account of their population trending downwards and particularly with younger persons migrating to urban areas in search of more secure and better-paid jobs. Within the 25-40 year-olds who remain in rural areas, it was felt that many are attracted to higher-yielding, technology-rich farming – for example, the irrigated and protected cultivation, both which usually occur in the lower reaches of the watersheds.

The baseline studies and other surveys conducted by the MOAF for two projects⁴ in these eastern parishes (MoA 1997, 1998, 1999, 2000a and 2001) substantiate these verbal findings. Indeed, it was noted that there was an “overwhelmingly common perception that farming has very little economic benefit to offer young people. Even among those actually doing farming, it is not uncommon to hear that it is just filling in until they can get a job in ‘town’ or go abroad. Also other more attractive opportunities for young people in other areas such as tourism, transportation and other non-farm activities are also important factors that keep young people away from farming” (MoA 2001).

2.1.2. Education levels

The baseline Rapid Rural Appraisal conducted for the Eastern Jamaica Agricultural Support Project (EJASP; MoA 2001) recorded a relatively low level of educational attainment among the farmers in the eastern parishes⁵ - with approximately 74% of farmers attaining a complete primary level or less as their highest level of education. Furthermore, a significant proportion of these were functionally illiterate. Only about 3% of farmers interviewed had received any form of vocational and/or tertiary training.

Overall, this lack of education was considered the cause of many problems facing agricultural development in these areas - including:

- Farmers being unable to respond to traditional training methods and printed instructions.

⁴ These projects are the Morant-Yallahs Agricultural Development Project (MYADP) and its successor Eastern Jamaican Agricultural Support Project (EJASP).

⁵ EJASP was implemented in the parishes of St. Andrew (NE & NW), St. Thomas, Portland and St. Mary.

- Farmers keeping poor/no records, and therefore are unable to identify and track changes in their costs centres and in prices. Price setting was done on “gut feeling”, and could be completely divorced from the real costs of production.
- Being unable to read instructions gives rise to the improper use of agricultural chemicals – including unnecessary repeated applications of over-diluted chemicals or the use of toxic levels of chemicals on crops – as well as the improper disposal of chemical containers and excess chemicals.

It was reported that some of the farming communities were caught in a downward spiral, where the lack of education fostered ignorance and this further marginalized people in these areas. Children in such homes may not have adequate intellectual stimulation or the support/assistance from their parents; and this was compounded by the remoteness of many communities, poor roads, and high transportation costs. Whilst school registration was fairly high, actual school attendance was poor.

Another concerning factor was the low interest among school children in studying agriculture. Not only were many parents actively discouraging their children from farming, but there was an additional stigma of it being considered a last option, i.e. suited only for those who failed educationally and therefore could do nothing else.

2.1.3. Earning strategies and income levels

During its most recent poverty mapping exercise, the Planning Institute of Jamaica measured the number of persons living below the poverty line⁶ as well as Unsatisfied Basic Needs (UBN)⁷ island-wide. Maps for the parishes of St. Andrew and St. Thomas are given in Figures 2a & 2b (PIOJ 2008a). By both measures, poverty is concentrated in the upper reaches of these watersheds – and this is particularly pronounced in St. Thomas.

According to EJASP’s Baseline Study, a large number of persons in the sampled communities lived in or on the margins of poverty. Unemployment, under-employment, low productivity of labour in agriculture, low wages, and overcrowding in some homes were socio-economic concerns expressed by respondents. In many of the rural communities, small farmers and the unemployed made up the largest proportion of the rural poor in the parish.

⁶ This is based on data from the Jamaica Survey of Living Conditions 2002 as well as the Population Census 2001.

⁷ This is based upon ten variables selected to determine the well-being of each household: material of outer wall of households; type of toilet facility; shared toilet facility; main source of drinking water; home ownership; no. of bedrooms, education level of head of household; mean years of schooling of members of the household in the labour force; no. of persons in the household; and no. of children ≤ 18 years.

Figure 2a: Map showing Number of Persons below poverty line in St. Andrew and St. Thomas (PIOJ 2008a)

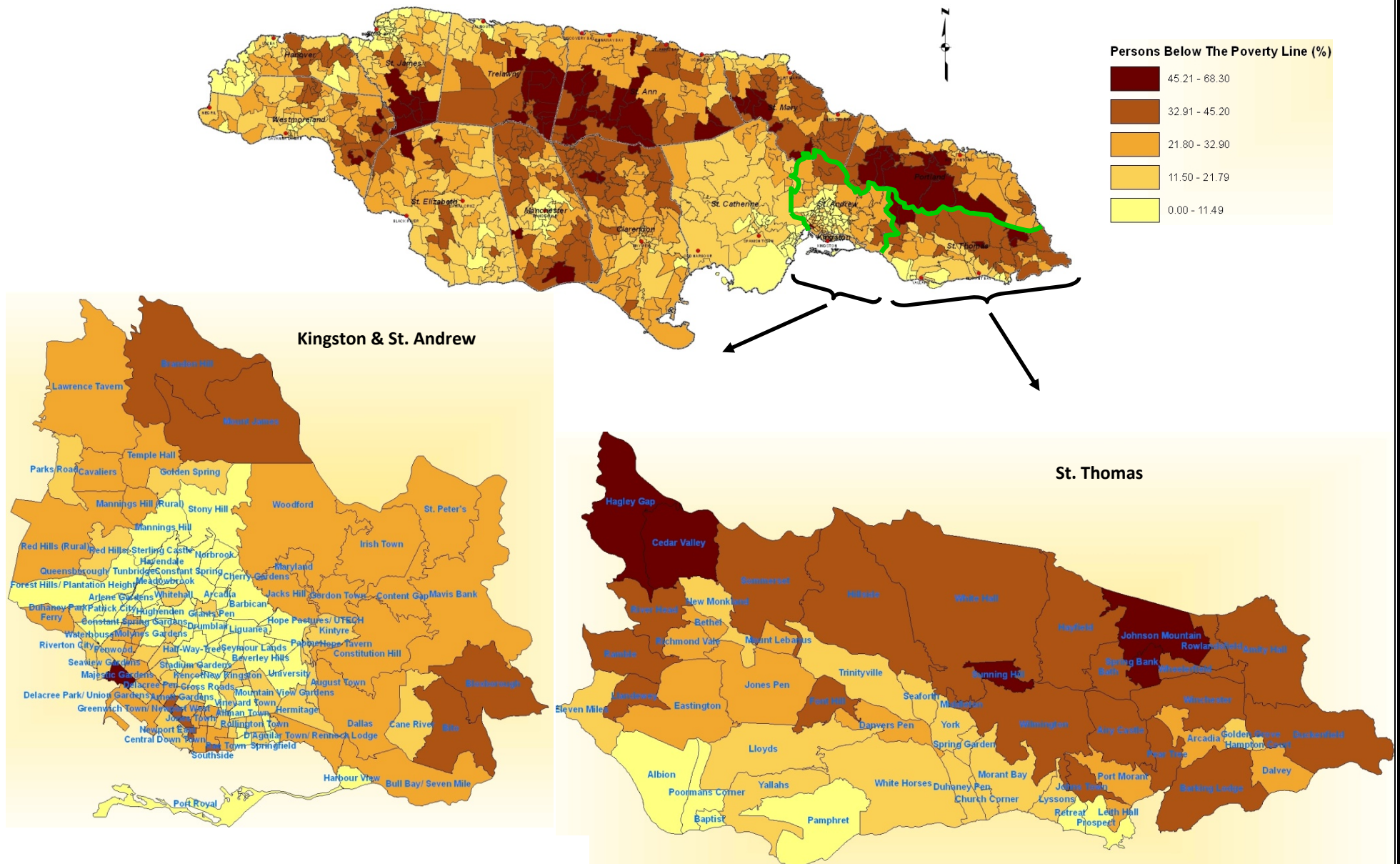
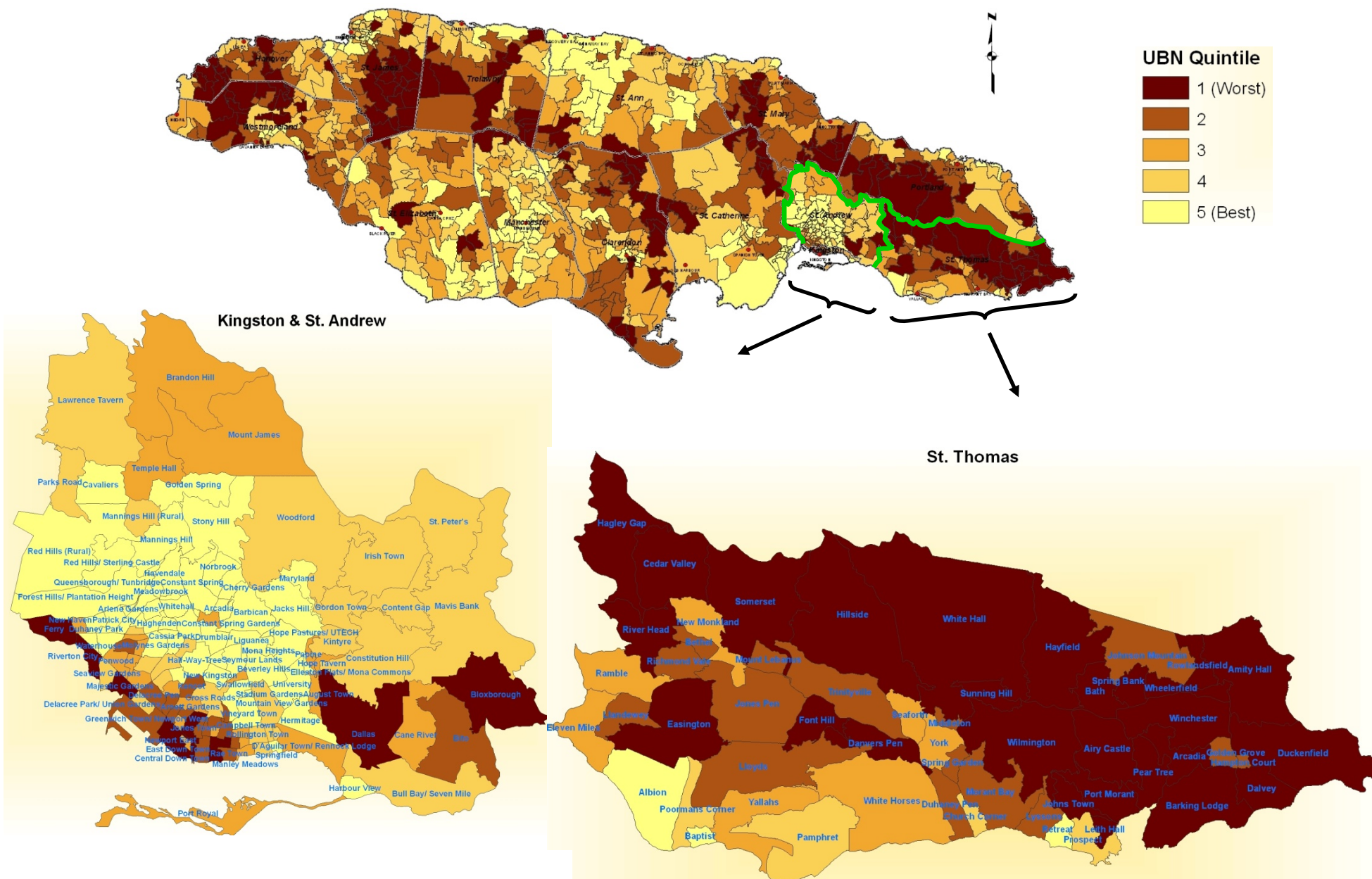


Figure 2b: Map showing Unsatisfied Basic Needs in St. Andrew and St. Thomas (PIOJ 2008a)



For the most part, the communities sampled for EJASP's Baseline Study⁸ comprised individuals and households consisting of: agricultural labourers who worked on the large banana and coffee plantations; land-less or near landless small farmers; micro-plots farmers with less than 0.5 acres of land; women farmers who headed households; women who were engaged in small mixed farming and petty trading/higglering. The earlier Morant-Yallahs Agricultural Development Project (MYADP) surveys (MoA 1997-99) found that women farmers tended to be older and also, more likely to be part-time. The latter was likely due to women comprising a significant proportion of the available agricultural force, especially on the coffee farms where they are used mainly for activities such as fertilization, weeding and harvesting.

Individual and household income earning strategies differ within communities, and are closely linked to access to capital. The study reported that "occupational pluralism, underemployment and unemployment are widespread in most of its communities. (...) People are engaged in diverse and complex strategies to make a living; and remittances from relatives overseas and working outside of the parish play a major role in the socio-economic welfare of farmers." Therefore, whilst farming may be a full-time activity for some, it is used by others to diversify and supplement other income streams from jobs including tradesmen, domestic workers, drivers, seamstresses, teachers etc⁹. Furthermore, not all those who farm live in the immediate environs: some may work in urban centres during the week and come to their farms only on weekends and holidays.

A large proportion of youth was found to be unemployed in most of the communities sampled in St. Thomas. Many left school without basic qualifications; and the minority who were able to obtain employment usually did so outside of the parish. "Some drifted into farming, but for most this was not a viable option because of their perception – based on the observed poverty of their parents – that farming did not have much to offer. They create a drain on the meager resources available to other family members, and a stagnating pool of human resources develops." The study went on to note that "some, as a survival strategy, moved into illicit and criminal activities, resulting in increased crime in the parish."

2.1.4. Land ownership structure

As detailed further in the tables below, the 2007 Agricultural Census (STATIN 2008) found that the majority of farms in St. Andrew (73%) and St. Thomas (59.5%) are less than 1 ha in size. The next most common farm size is 1 to ≤ 5 ha, accounting for 20.8% in St. Andrew and 27.1% in St. Thomas. The latter is likely due to the prevalence of large coffee farmers (>2ha) in the Blue Mountains areas of this parish.

⁸ Although this description was given for Portland, it is believed to hold true for all the parishes in which EJASP was implemented – including St. Thomas.

⁹ In communities nearer to Kingston, persons were engaged in a wider range of professions.

It is important to note that 5% of farmers in St. Andrew are landless, compared to 10.1% in St. Andrew.

Tables 3a&b: Farming Profile for St. Andrew and St. Thomas 2007 – Farm Size & Area

Number of Farms by Size Group and Parish of Location

| Parish of Location | Total Farms | SIZE GROUP IN HECTARES | | | | | | | | |
|--------------------|----------------|------------------------|----------------|-----------------|------------------|-------------------|-------------------|--------------------|---------------------|------------|
| | | Landless | Under 1 ha | 1 to under 5 ha | 5 to under 10 ha | 10 to under 25 ha | 25 to under 50 ha | 50 to under 100 ha | 100 to under 200 ha | 200+ ha |
| All Jamaica | 228,683 | 28,070 | 151,929 | 43,731 | 2,922 | 1,283 | 338 | 170 | 100 | 140 |
| St Andrew | 10,772 | 538 | 7,866 | 2,238 | 89 | 31 | 5 | 3 | 2 | 0 |
| St Thomas | 12,033 | 1,221 | 7,155 | 3,258 | 253 | 101 | 24 | 7 | 3 | 11 |

Source: STATIN 2008

Area in Farms (in hectares) by Size Group and Parish of Location

| Parish of Location | Total Hectares | SIZE GROUP IN HECTARES | | | | | | | |
|--------------------|----------------|------------------------|-----------------|------------------|-------------------|-------------------|--------------------|---------------------|----------------|
| | | Under 1 ha | 1 to under 5 ha | 5 to under 10 ha | 10 to under 25 ha | 25 to under 50 ha | 50 to under 100 ha | 100 to under 200 ha | 200+ ha |
| All Jamaica | 325,810 | 47,712 | 86,011 | 19,721 | 19,166 | 11,896 | 11,742 | 13,707 | 115,854 |
| St Andrew | 8,354 | 2,629 | 4,000 | 598 | 460 | 175 | 218 | 274 | 0 |
| St Thomas | 22,257 | 2,301 | 6,673 | 1,721 | 1,400 | 825 | 429 | 420 | 8,488 |

Source: STATIN 2008

Some of the Crown Lands in the two watersheds have been leased to private individuals and companies by the Commissioner of Lands, National Land Agency (NLA). As their use has not then monitored, one agency spoke of a number of these companies causing environmental problems in these areas due to their inappropriate agricultural practices (e.g. coffee producers' indiscriminate planting, even in areas that should not have been cultivated at all or clear-felling rather than employing measures to protect the soils). Furthermore, the small farmers are oftentimes blamed as they are considered to be "easier targets". According to one interviewee,

the companies see the natural resources as “free” and so do not care about the effects of over-exploitation.

2.2. Land use patterns and crop production

The 2007 Agriculture Census (STATIN 2008) revealed that the most common land use in St. Andrew were crops (“pure stand” and “mixed stand”) followed by “ruinate and fallow”. In St. Thomas, “pure stand” crops were similarly the most common but this was followed by “ruinate and fallow”, then “mixed stand” and “pasture”. In both parishes, the cultivation of crops was most important – far ahead of animal farming/rearing. More farms and a much greater area were dedicated to “export crops” as compared to “other crops”.

Tables 4a-c: Farming Profile for St. Andrew and St. Thomas 2007 – Land Use & Main Activity

Area in Farms (in hectares) by Land Use and Parish of Location

| Size Group of Farms | Total Hectares | LAND USE | | | | | | |
|---------------------|----------------|----------------|---------------|--------------|---------------|---------------|-------------------|---------------|
| | | CROPS | | | Pasture | Timber Forest | Ruinat and Fallow | Other Land |
| | | Pure Stand | Mixed Stand | Food Forest | | | | |
| All Jamaica | 321,750 | 125,411 | 27,409 | 2,244 | 49,767 | 8,578 | 82,924 | 25,417 |
| St Andrew | 8,455 | 4,076 | 2,378 | 144 | 41 | 33 | 1,504 | 280 |
| St Thomas | 21,739 | 9,395 | 3,269 | 214 | 2,679 | 956 | 4,799 | 428 |

Source: STATIN 2008

Number of Farms by Main Activity and Parish of Location

| Parish of Location | Total Farms | Main Activity | | | | | | | |
|--------------------|----------------|---------------|----------------|----------------|-----------------|--------------|------------------------|----------------|--------------|
| | | Export Crops | Other Crops | Cattle Rearing | Poultry Rearing | Pig Farming | Goat and Sheep Rearing | Other Activity | Not Reported |
| All Jamaica | 228,683 | 60,971 | 106,834 | 2,927 | 19,277 | 9,551 | 18,503 | 1,076 | 9,544 |
| St Andrew | 10,772 | 5,345 | 3,753 | 48 | 646 | 309 | 270 | 109 | 292 |
| St Thomas | 12,033 | 6,380 | 3,418 | 106 | 914 | 394 | 601 | 101 | 119 |

Source: STATIN 2008

Area in Farms (in hectares) by Main Activity and Parish of Location

| Parish of Location | Total Farms | Main Activity | | | | | | | |
|--------------------|----------------|----------------|---------------|----------------|-----------------|--------------|---------------------------|----------------|---------------|
| | | Export Crops | Other Crops | Cattle Rearing | Poultry Rearing | Pig Farming | Goat and or Sheep Rearing | Other Activity | Not Reported |
| All Jamaica | 325,810 | 148,554 | 86,402 | 45,150 | 6,810 | 4,909 | 9,924 | 7,755 | 16,306 |
| St Andrew | 8,354 | 4,973 | 2,569 | 35 | 313 | 121 | 57 | 39 | 247 |
| St Thomas | 22,257 | 17,285 | 3,473 | 302 | 189 | 184 | 241 | 183 | 400 |

Source: STATIN 2008

EJASP's baseline study indicated somewhat different land use patterns in these parishes, with mixed stand cropping being the main land use system (in terms of area). Usually a mixture of short-term crops (such as vegetables, roots crops, hot peppers and other condiments), farmers preferred this because it provided a more steady income stream from their limited plot sizes. Second in importance were permanent crops in pure stands: coffee being the most common, followed by cocoa, coconut and fruit tree orchards. Third were semi-permanent crops in pure stand – particularly bananas and plantain. As with the 2007 Census, a significant proportion of the land in these areas was in "ruinate and fallow"¹⁰.

Likely as a result of previous project interventions¹¹, small farmers throughout the survey areas had planted significant amounts of trees and tree crops. Chief among these was coffee, although other crops such as cocoa, coconut, breadfruit, and a varied assortment of fruit trees were also planted. In St. Andrew, coffee and cocoa were the main traditional export crops grown by small farmers; and in St. Thomas, coffee. Both crops have established marketing arrangements, including the Coffee Industry Board, Cocoa Industry Board and Jamaica Agricultural Society.

In the years preceding the baseline study, there had been a decline in cocoa production: the increases in world cocoa production and subsequent lowering of prices resulted in the local price being non-economical and so many farmers left their cocoa gardens to grow into ruinate. Although prices have since improved, they are still considered low; and unless productivity of cocoa can be meaningfully increased, it is believed that the crop will continue to decline. This

¹⁰ This could have been the result of the severe drought which occurred when the one survey was being conducted and which could have resulted in such land being left idle.

¹¹ Including MYADP, the Hillside Agriculture Project and the North-East Jamaica Agro-Forestry Project.

will be a growing problem for an aging farming population with scarce land tied up in cocoa but who lack the resources to clear the land to switch to other crops.

By contrast, coffee remains a viable farming option – and when fully established, is a good cover crop with solid economic potential. There was a huge expansion in coffee planting in the end 80s and early 90's, after the passage of Hurricane Gilbert. Discussions with the Coffee Industry Board (CIB) indicated that this was largely due to the organisation having funds available – through a development loan - which could be used for this purpose. From the baseline report of the Morant Yallahs Agricultural Development Project (MYADP, MoA 1997), this rapid expansion of coffee cultivation on the slopes of the Blue Mountains was largely due to the large farmers (>2 hectares) who for the most part did not live in the area. EJASP's Baseline Study noted that the growing of Blue Mountain coffee is now dominated by larger farmers having in excess of 2ha of coffee. That said, significant amounts of the crop are grown by small farmers; and they supplement their incomes by working on the large farms.

In the past 3 years, the coffee market has fallen significantly due to the global financial situation which has caused Japan – by far the largest purchaser of Jamaica's coffee beans – to halve its amount. This has resulted coffee being packed up in warehouses in Jamaica.

2.3. Squatter/nomadic farmers

Mentioned by all those interviewed are farmers cultivating land in the Forest Reserves in the upper reaches of the watersheds, especially in the Blue & John Crow Mountains. Using shifting, slash-and-burn methods¹², they are known as "squatter", "nomadic" farmers¹³ or "hillsmen". Their plots are typically small (< 1ha), isolated and dispersed. They cultivate coffee, banana and cash crops such as dasheen, peas, scallion, thyme etc; and may have some goats. Although known within their communities, they do not usually belong to any farmer-related group.

According to the CIB, during the height of the coffee expansion, many young unemployed persons (in their 30s-40s) went into the Forest reserves to clear land and plant coffee. Whilst they started with small plots (say 2 acres), they expanded over time (to e.g. 5 acres) as their funds permitted. Some expanded to plant flowers, vegetables and mahoe; and a number took up permanent residence in these areas. On account of the size of their holdings, the CIB differentiates these persons from squatter farmers.

¹² As these farmers regard the trees as "free", they are more likely to burn them down.

¹³ The term used to describe such farmers varies: for example, FD refers to these farmers as "squatters", whereas RADA prefers to use the term "nomadic" or "hillsmen".

“Hotspots” identified include¹⁴: Cinchona, Bellevue Heights, Old England, Westphalia, St. Helen’s Gap to Morces Gap Trail, St. Helen’s Gap to Clydesdale Road and Round Hill.

There are various reasons put forward to explain why these persons farm as they do, including: lack of land tenure elsewhere (- although this not always the case); lack of alternative economic opportunities; less praedial larceny, and therefore more secure; preference to be undisturbed, “away from it all” in the wilderness; tradition of moving further into the hills which has its roots in post-slavery period; the ability to have direct control over their resources etc. Given that they farm on almost pristine land, these squatter/nomadic farmers enjoy high yields and their crops are excellent quality – leading some to conclude that they farm in such areas because of the greater financial returns.

The entities working in these areas have different levels of interactions with such squatter/nomadic farmers, determined largely by their respective mandates and field presence. These areas as patrolled by JDCT’s Rangers, and illegal activities where noted are recorded in JCDT’s monthly BCJMNP Enforcement & Compliance Reports. The Forestry Department’s officers are concerned with encroachment, compliance and enforcement; and RADA’s officers are mandated to assist farmers optimize their agricultural returns. All entities spoke of the difficulty in reaching these farmers – particularly as they disappear from their plots by the time the JCDT/FD/RADA officers arrive (possibly due to the fact that they will have completed their farming activities for the day by the time the officers reach those areas). Not being organized into groups, it is also hard both to work with these farmers and to get information to them.

A number of those interviewed mentioned that squatting has become politicized – and of squatter/nomadic farmers even being encouraged by local politicians to continue their activities. It was also reported that the agencies were themselves cast as scapegoats and blamed for the continuation of squatters in protected areas.

2.4. Challenges facing farmers in Project Area

In its Corporate Plan 2010-13, the Ministry of Agriculture & Fisheries (MOAF) conducted a SWOT analysis which lists the agricultural sector’s key threats as: globalization and ever-greater liberalization; high levels of reliance on imports; use of inappropriate technologies; negative impact of agricultural practices on the environment; degradation of environment/landscapes; inappropriate development on agricultural lands (business or housing); rural-urban migration of

¹⁴ From “Minutes of Forestry Reserve Steering Committee Meeting held March 18, 2010 at 2pm in RADA’s Conference Room” and “JCDT Report on the Degradation of certain areas adjoining the Cinchona Botanical Gardens, 2nd October 2009” (both documents courtesy of RADA).

young people; declining role of agriculture in rural economies/communities; praedial larceny; high cost of capital; and uncertainty of funding for projects and other support systems.

Although not necessarily confined to the Project Area, those interviewed for this study spoke specifically of the challenges which face farmers as detailed in the following sections.

2.4.1. Lack of/degraded roads and other infrastructure

Particularly affecting the upper reaches as well as parts within the mid-zones of the Hope and Yallahs watersheds, the degraded road infrastructure means that access may be restricted to motor bikes and in some cases, to walking/donkeys.

The afore-mentioned EJASP Baseline Study emphasises that the extremely poor state of the farm roads in most of the communities in St. Thomas placed considerable constraints on their ability to get their produce to market. "Main roads are abundant but they are not properly maintained". The same applies to secondary and community roads, many of which are in disrepair. By contrast, farm access roads are in such poor condition that they have rendered some farm units unproductive. "Some communities are completely cut off from vehicular access and the only way to transport out produce is by head or donkeys. (...) These roads are particularly treacherous when it rains, (...posing) a threat to even the donkeys which may slip and damage agricultural produce. For other communities, the poor state of the roads and the consequent lack - and high cost - of transportation have forced many of the farmers to sell produce at very low farmgate prices to the few buyers who are willing to brave the roads. All these factors contribute to poor quality produce eventually reaching the final marketplace, low returns to the farmers and increasing competition from imported product as well as produce from other parishes that have better road and transportation infrastructures."

The same study noted other infrastructure problems facing many of the communities in these areas, including non-existent telephone services¹⁵; piped water supply being poor and unreliable; communities' reliance on springs, rivers, communal standpipes and/or concrete tanks.

2.4.2. Lack of access to water, especially in mid- to upper-reaches of watersheds

There are clear differences in access to water in different parts of the watersheds - not only in terms of the absolute amounts, but also predictability and persons' ability to control the flow. The severe water shortages experienced in most of the parish of St. Thomas noted as a major constraint to agricultural systems. In some communities, the issue was the lack of access to

¹⁵ Although cell phone penetration into rural areas in Jamaica has vastly increased in the past decade, there are still many pockets where there is no reception.

potable water on account of the rivers being contaminated whether through domestic or agricultural chemical waste.

As noted in EJASP's Baseline Study, "the heavy dependence on rainfall or seasonal springs/rivers has made many communities highly vulnerable to droughts as well as to upstream land-use changes". Additionally, relying on rainfall "means that many farmers will plant the same crop at the same time, thus fuelling a situation of oversupply at some times and scarcity at others." For all communities in the watersheds, the study stressed the importance of solving the water problems as "the market demands steadiness in supply and uniformity of quality of produce. Shortfalls due to lack of water or a drought will quickly lead to consumers switching to alternative sources of supply, including imported produce. Once these markets have been relinquished, it is often quite difficult for them to be fully regained."

Such water issues have given rise to hard feelings between the different areas within the watersheds: those living in the upper reaches, who feel aggrieved that they must rely on rainfall alone, may be unwilling to conserve water for the benefits of those living lower down or in urban areas; and those living downstream, some of whom may benefit from irrigation schemes, may feel at the mercy of the domestic and agricultural practices of communities upstream.

There is apparently little rainwater harvesting in these areas, in spite of earlier efforts of the National Water Commission (NWC).

2.4.3. Lack of/insecure land tenure

The MYADP Baseline Study reported that 44% of farmers had no documentation for their land; only 12% had a registered title (MoA 1997). In all interviews conducted, the lack of land tenure was regarded as a problem – and whilst this varies between areas, it reportedly occurs throughout the watersheds.

Insecure or completely absent land tenure impacts the ecosystems there, on many levels. For example, it was noted that such individuals are more likely to clear trees and over-exploit the land without consideration for replanting/maintaining ecosystem integrity. Another implication is that individuals are unable to use their land as collateral in seeking farm financing.

Although individuals as well as community groups (such as church groups, NGOs, CBOs) can apply, many do not understand the process as it is complex – involving input from the Parish Council, RADA and NEPA (Planning as well as Ecosystems Management Branch) being sent to the Commissioner of Lands in the National Land Authority (NLA).

2.4.4. Poor implementation of agricultural best practices

Through previous government initiatives as well as the multitude of agricultural and forestry projects implemented in the Project Area, farmers have been exposed to good land management and soil conservation practices. Studies conducted under MYADP revealed that farmers were set in their ways and resistant to change¹⁶; and more recently, NEPA's "Knowledge, Attitudes and Practices" (KAP) survey conducted on its Farmer Training Days found that participants were well aware of many of the best practices covered in the training. However, the survey found that farmers were not necessarily implementing these practices.

Farmers' lack of implementation of agricultural best practices is considered one of the causes of the observed negative spiral of ever-degrading soils and therefore crop yields. To reverse this trend, farmers have to spend more and more on inputs (fertilisers, pesticides...etc.) – and with the unit cost of these increasing sharply, many are left in worse financial situations than years ago.

The widespread planting of coffee on fragile lands is considered to have caused many of the environmental problems within these watersheds – clearing of previously well-covered lands which led to soil erosion during the first years of the crop; overuse of chemicals such as fertilizer and pesticides which then contaminated rivers and streams etc. Similarly, "the largest users of chemicals are not the small farmers, who in most cases cannot afford them, but the larger coffee farmers who in the majority of cases do not live in the area. They are also the ones more likely to bring in heavy equipment to clear lands and construct access roads-often with little or no engineering inputs" (MoA 1997). The CIB noted that the "absentee" farmers – who are likely to be working in Kingston as doctors, lawyers...etc. – do not have time/interest to attend training sessions in good land husbandry; and the headman/supervisor left in charge of these farms, although they may be willing to be trained, will not implement recommended practices without the owners' go-ahead. It is therefore essential that the large coffee farmers are included in this current project if it is to succeed in significantly stemming environmental degradation in these areas.

2.4.5. Inadequate marketing support, particularly for domestic crops

The same EJASP Baseline Study identified marketing as a major constraint, particularly for domestic agricultural crops such as vegetables, condiments, legumes and tubers. Unlike the traditional export crops which have established marketing systems through the respective

¹⁶ 80% of the farmers in the project area were found to base their choice of crops on (...the ones) traditionally grown in the area; and 60% on prevailing good crop prices. Less than 1% of farmers said that they planted crops based on the advice of the extension officers (MoA, 1999).

commodity boards, the market for domestic crops was described as “disorganized and sporadic”.

According to the study, “most of the domestic crops are sold in the parish markets, the municipal markets in Kingston and at roadside stalls; and the majority of farmers sell their products to higgler, who purchase wholesale or on consignment from farmers and transport the produce to the various markets¹⁷. Some farmers or their spouses will transport their products directly to the markets or retail to consumers. Many farmers complain about higgler taking their goods on consignment at an agreed price, and then later returning and offering lower prices because of so-called “bad market”. Though this is a legitimate concern in many instances, dishonest higgler have used this as a ploy to cheat some farmers. This often results in loss of expected income to the farmer and builds discord between himself and his main marketing outlet.”

Where marketing is done through middlemen, the study’s analysis of prices along the distribution chain showed that as much as 60-70% of the final price to the consumer was taken in by these middlemen; and noted that the marketing risks and post-harvest losses, although high, did not justify such mark-ups. Farmers spoke of their frustration in seeing their products selling for much more than they had received, but not having the wherewithal to penetrate the market themselves.

2.4.6. Lack of access to credit

The afore-mentioned baseline studies emphasised the prevalence of small farmers being “unable to improve the size of their holdings or scale of operations because of a lack of capital to purchase land, employ labour or to purchase inputs and equipment”. Indeed, only 13% of farmers interviewed for MYADP and less than less than 5% for EJASP had obtained loans or other forms of credit for their farm operations during the two preceding years.

Despite the many agricultural credit systems which have been established over time to assist farmers, these were reported to have failed for various reasons – even those offering loans at concessionary rates and attractive terms. Most farmers expressed reluctance to borrow from the formal credit system for fear of losing their assets (usually land is placed as collateral) should their enterprise fail. Interestingly, many spoke of the high riskiness of farming – particularly with regards to the marketing of their products (this is further discussed below).

¹⁷ Communities in the surrounds of the Kingston Metropolitan Area (KMA) had an advantage in that the farmers and their spouses could engage in direct marketing: “selling their products directly to consumers on roadside stands and pick-up trucks parked along the roadside; (... through) informal contracts to supply the large supermarkets in Kingston, or selling in the Coronation, Papine, and Constant Spring markets.”

Additionally, the lack of formal documentation to support ownership of the land was a significant problem. This was particularly prevalent amongst the female farmers who often had less clear land titles. It was also reported that the female farmers were more likely than their male counterparts to borrow from the informal sector – including “partner”, loans from families or friends, and shop or farm store credit.

2.4.7. Prevalence of bush fires

As noted in the MYADP Baseline Study, runaway brush fires were responsible for a significant amount of crop damage in the area. Many farmers used burning as a means of land clearing – mainly through economic necessity as this method was quicker, cheaper and easier than paying manual labour to clear their lands. Additionally, some farmers saw burning as a means of reducing insect pests. The use of slash and burn techniques was significantly higher among the younger farmers.

The Coffee Industry Board noted that coffee farmers, whose coffee crop can be harvested at certain times of the year, plant cash crops for the other months. They use fires not only to clear the lands for these crops, but also to encourage the growth of fresh green grass for their goats.

From the interviews conducted for this consultancy, forest fires have been contributing more and more to deforestation on account of the extended periods of drought. Today, bush fires are considered one of the main causes to biodiversity loss in St Thomas.

2.4.8. Negative attitudes towards farming

In spite of the MOAF’s efforts to promote a different face to agriculture, there are many who still maintain that farming is largely for the uneducated, unskilled, physical labourers and will yield only low economic returns. As mentioned earlier, this is a problem for youngsters who are not only particularly affected by such negative stereotypes, but also want fast financial returns to sustain their desired quality of life.

3. EXTENSION PROVISION & METHODOLOGIES IN PROJECT AREA

3.1. Principal Providers of Extension Services

There are numerous public agencies and private entities working within the watersheds, each operating with their own legislative framework, objectives, resources and methodologies. The main ones involved in providing extension and capacity-building support within the Project Area are considered in turn as follows:

- Public sector agencies¹⁸: Ministry of Agriculture & Fisheries (MoAF), Rural Agricultural Development Authority (RADA), Forestry Department (FD), National Environment and Planning Agency (NEPA), National Irrigation Commission (NIC), and Coffee Industry Board (CIB).
- Non-Governmental Organisations (NGOs): Jamaica Conservation Development Trust (JCDT), and St. Thomas Environmental Protection Association (STEPA).
- Other entities: Jamaica Agricultural Society, Jamaica 4H Clubs, Botany Bay/Pamphret/Whitehorses Benevolent Society, and Ueshema Coffee Company.

For some, the consultant was unable to garner much information and so they have been mentioned by name for completeness of this list.

Public sector agencies

3.1.1. Ministry of Agriculture and Fisheries

With the agricultural sector's contribution to Jamaican GDP having fallen in recent years¹⁹, the Ministry of Agriculture & Fisheries (MOAF) is primarily focused on increasing efficiency, productivity and competitiveness. According to its Corporate Plan 2010-13, it seeks "to modernize the sector, expand the extension services, introduce or expand the application of technology, farmer education, improve production and productivity through targeted and focused intervention in specific crops production, infrastructural development, value chain development, greater use of market intelligence as well as a renewed emphasis on research and development and a strong focus on value added. A major thrust will involve (...) attracting and supporting investment in the agricultural sector."

The Corporate Plan also underscores the MOAF's commitment to fostering rural development, acknowledging that an integrated and coordinated approach – which involves agriculture,

¹⁸ The Water Resources Authority (WRA) has indicated that it does not provide extension support as a core activity, but does engage at times in extension through its projects. The National Water Commission (NWC) has not been consulted as yet.

¹⁹ Contribution to GDP was 5.0% in 2008 and 4.8% in 2009 (Ministry of Agriculture & Fisheries, 2010).

health, education, roads, water and other amenities – is required to address the multi-dimensional nature of rural development and ensures sustainability.

For the YALLAS & HOPE RIVERS Watersheds Project, a number of MOAF's Executive Agencies, Commodity Board and internal specialist units (may) have particular relevance:

- Rural Agricultural Development Authority (RADA): this is the MOAF's main arm providing extension services and acting as a catalyst for rural development (Section 2.2.3).
- National Irrigation Commission (NIC): this has responsibility for the MOAF's irrigation schemes, including works in the lower watersheds of the Project Area. Its *On-Farm Water Management Unit* also provides technical advice and capacity-building to farmers (Section 2.2.5).
- Coffee Industry Board: this regulates the Jamaican coffee industry, a large proportion of which is grown in the Project Area (Section 2.2.6).
- Praedial Larceny Prevention Unit: Along with the Squatter Management Unit²⁰, this is already involved in the joint agency response to the problem of squatter farmers (Section 4.2.4).
- Agricultural Marketing Information Division (AMID): formerly known as the *Data Bank & Evaluation*, this has considerable experience in conducting baseline studies and statistical analysis in the agricultural sector.
- Rural Physical Planning Division (RPPD): this provides services to farmers for a fee²¹, including soil, water, plant and fertiliser analyses, especially to make recommendations for soil & land management as well as fertiliser best practices; rural land evaluation assessments; land capability assessments; and technical guides.
- Beekeeping Unit: through its extension officers, this unit provides advice on good agricultural and management practices, disease control, marketing of bee products, business development, procurement of beekeeping equipment, and sourcing of grants/loans. This is done through a rolling programme of field visits and demonstrations, group training sessions as well as residential training sessions. There is a Beekeeping Extension Officer responsible for Region 4, i.e. Kingston, St. Andrew & St. Thomas.

In terms of the interface of agriculture and the environment, the Corporate Plan outlines the MOAF's intention to "train farmers in sustainable agricultural development techniques such as

²⁰ Until 2007, this was housed in the MOAF. It is currently in the Ministry of Transport, Works & Housing, with Mr. Basil Forsythe as its Director.

²¹ See http://www.rppdjm.com/pricelist_2010_1.pdf

Integrated Pest Management (IPM) and conservation techniques; (and also carry out an) environmental impact study for every project (which is) monitored carefully during the life of the project to ensure that negative impact is reduced to a minimum.”

The MOAF operates a **Jamaica Agriculture Market Information System (JAMIS)** to collect and disseminate pricing data of agricultural commodities traded in the local and regional market place, on a weekly basis.

Important to note from the afore-mentioned Corporate Plan is the SWOT analysis conducted of the MOAF – and in particular, its weaknesses. Those with possible impact on the success of this Yallahs & Hope Rivers Watersheds Project include: financial limitations which have caused deterioration in the quality, effectiveness and competitiveness in the provision of services; limited developmental training for technical staff; poor linkages between Divisions/Departments; lack of participatory style of management/decision-making; mistrust; limited staff mobility; and inability to maintain quality and experienced staff.

3.1.2. Rural Agricultural Development Authority

The Rural Agricultural Development Authority (RADA) is a statutory body of the MOAF. Its mission is to promote agricultural production as the main engine of growth in rural communities; provide or ensure the provision of technical, marketing, financial and infrastructural facilities and provide the social services required for the improvement of the quality of life of farm families. Amongst its strategic objectives, those which are most relevant to this Yallahs & Hope Rivers Watersheds Project are:

- Provide a technical advisory extension service aimed at encouraging and promoting agricultural practices that will facilitate self-sustaining growth and development within the farming community;
- Increase production and productivity, thereby enhancing growth and development within the agricultural sector;
- Stem environmental degradation in general and in critical watershed areas in particular and to pursue development strategies aimed at achieving long term conservation objectives and promoting efficient use of natural resources;
- Reduce unemployment and under employment, and minimize rural/urban migration by creating increased employment opportunities in agriculture and related activities.
- Develop an integrated approach to rural development through the fostering of operational linkages with other organizations concerned with rural development;
- Attract more young people to agriculture by establishing linkages with schools and the 4-H movement.

To access this full complement of services, a farmer must be **registered on RADA’s database**. To do this, the person must be actively farming – and this is checked in situ by RADA’s officers.

It is however possible for someone who is just starting out to start the registration process – s/he will not be verified, and so will remain “partially” registered. At that stage, RADA officers will still visit and e.g. assist with the start-up phase of the farming operations.

In order to be registered on RADA’s database, proof of land tenure is not needed - neither a title (demonstrating ownership) nor a lease agreement. This is only required for a farmer to access benefits such as are available under a farm programme or project.

At present, RADA works with unregistered, “partially” and fully registered farmers. That said, it is moving towards working only working with registered farmers – even though it acknowledges the lack of land tenure which faces many farmers.

RADA has a strong presence in the field, with a network of Parish Offices headed by an experienced Parish Manager and Deputy. The country is divided into **98 Extension Areas** – of varying size, systems and community numbers. In terms of the Hope and Yallahs watershed areas, the Bull Bay, Gordon Town, Mavis Bank Extension Areas are in St. Andrew; and the Yallahs and Cedar Valley Extension Areas are in St. Thomas (see Figure 2 for map of Extension Areas in Project Area).

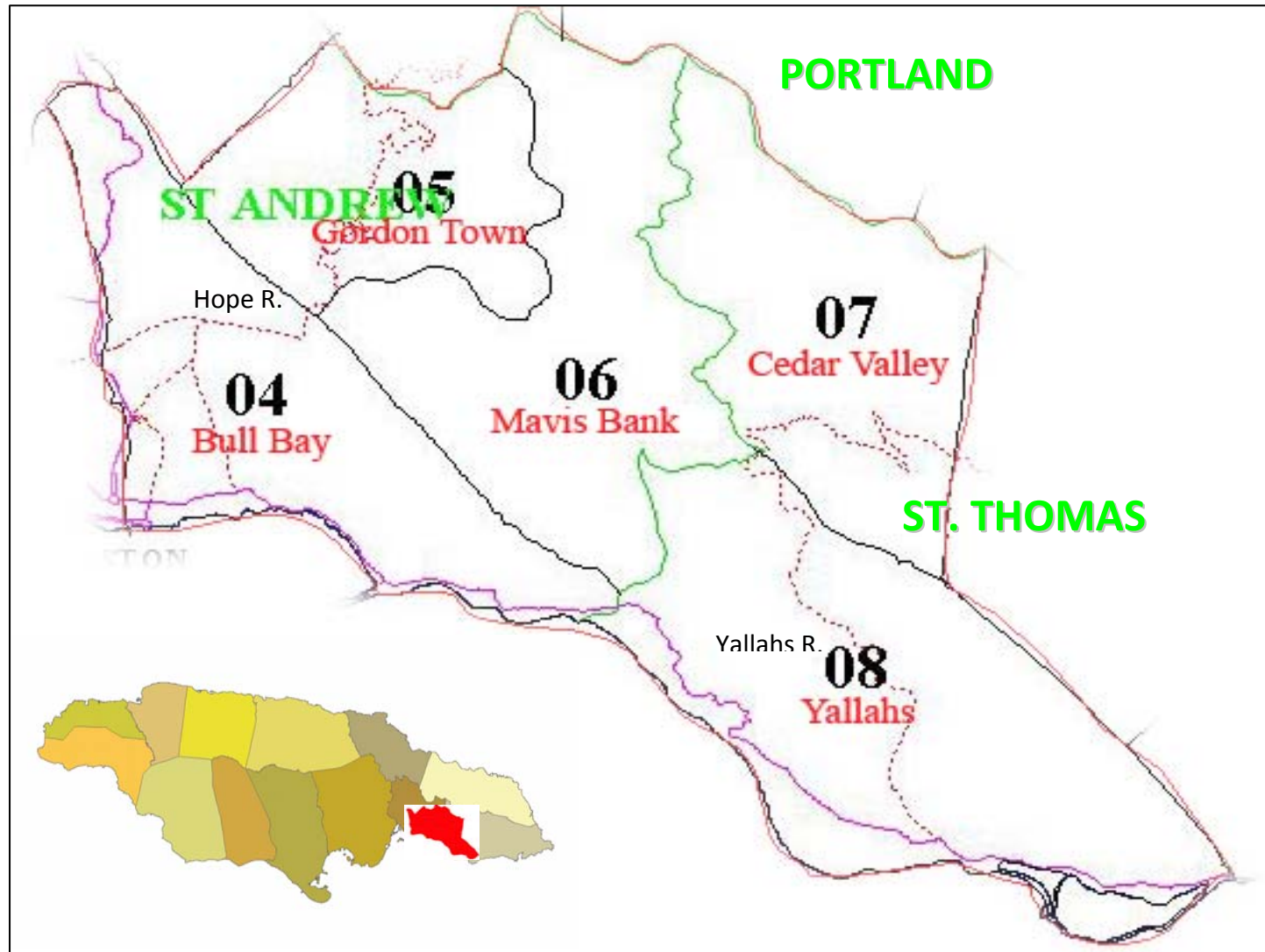
Each zone is covered by an **Extension Officer**²², generalists who cover all topics. Additionally, it has a number of specialists who conduct assessments, provide specific training etc. There are Livestock and Marketing Specialists in every parish; and five Land Husbandry Specialists, covering St. Andrew, St. Thomas, Portland, St. Mary, and the rest of the island (- this officer is based in Kingston).

RADA’s Extension Officers are on the road almost continuously: usually from Monday – Thursday, with Friday reserved for office work. In addition to their technical expertise, its officers are widely regarded as having extensive knowledge of the communities they serve (e.g. RADA 2008). Whilst RADA has its own vehicles in 12 of the 13 parishes, these are pooled between staff and are insufficient to cover their travel needs. As such, extension officers are required to use their own vehicles as much as possible for which they receive a travelling allowance²³ to cover the km charge and upkeep. If these break down, RADA covers the cost involved in hiring or borrowing a replacement car or in using a taxi.

²² In 2009, RADA increased the number of extension zones from 60 and hired a further 60 Extension Officers.

²³ Although this just about covers the costs associated with new vehicles, it is insufficient for older models.

Figure 3: RADA Extension Areas in Hope-Yallahs Rivers Watersheds (courtesy of RADA Division of Technology, Training & Technical Information, 2011)



In August 2008, a **National Agricultural Disaster Risk Management (ADRM) Programme**²⁴ was launched by the MOAF which sought to establish a structure and mechanisms for preparing adequately for natural disasters as well as dealing with disasters once they have occurred²⁵. Smaller **ADRM Sub-committees** were established in every parish, headed by RADA's Parish Advisory Boards and with stakeholders such as the Parish Councils and local farmer groups. These continue to function, holding regular meetings. Using RADA's database of farmers, text messages are sent to farmers – alerting them to the passage of a storm as well as advising them on what to do (e.g. “reap mature crops”, “take animals to higher ground”).

RADA also operates the **Agribusiness Information System (ABIS)**, which collects information on crops, agricultural production and marketing as well as agricultural stakeholders, and to distribute this information to interested parties.

- Produce Marketing Organisations

RADA is in the process of reviving a number of Produce Marketing Organisations (PMOs), as a means of more efficiently supporting farmers' marketing efforts. These vary considerably in size, as well as in organisational strength. Where PMOs formed through projects, some do not survive beyond project funding as their members were involved only/mainly for personal gain from the project (e.g. as happened post-EJASP; MoA 2003). Other PMOs are strong, and can have 100-150 members - although the numbers of active farmers is lower e.g. Mavis Bank has 100-150 registered farmers, and of these, about 30 farmers belong to its PMO.

In recent years, RADA has noted increased demands on its staff²⁶ whilst at the same time its resources have been squeezed. This lack of resources affects its entire operations – including the amount of travelling its extension officers are able to do as well as the availability of specialised training. In 2009/10, a new organisational structure was approved for RADA which has: 4 additional Land Husbandry Specialists*; Crop Specialists (for vegetable and root crops); Education Extension Specialist; Rural Sociologist; and a Script Writer (for technical publications). The funding for these new positions has not yet been provided.

²⁴ <http://www.jamaicalabourparty.com/base/content/national-agricultural-disaster-risk-management-programme-launched> and <http://reliefweb.int/node/323222>.

²⁵ This is managed by a special national Disaster Management Committee, with representatives from the Office of Disaster Preparedness and Emergency Management (ODPEM), MOAF (including the Fisheries Division), the army, agricultural input suppliers, the JAS, NGOs and other interest groups.

²⁶ The increased demands on RADA's staff are considered largely the result of the then Minister's vision for the agriculture sector to become more business-like and attract new entrants. It is however difficult to track farmer numbers, particularly as persons who have multiple income streams may not classify themselves “farmers”.

* The current lack of land use management specialists is a problem given the high demand for RADA's Land Husbandry Specialists – particularly in upper reaches where farmers have greatest problems. Its Land Husbandry Unit remains under-staffed and under-resourced²⁷. Ideally, each parish should have a Land Husbandry Specialist plus an Assistant; and these should have sufficient travelling allowance to attend adequately to their farmers.

3.1.3. Forestry Department

The Forestry Department (FD) is mandated to conserve and protect the island's forests; to manage the forested watersheds and forest lands; to direct and control the exploitation of forest resources through the introduction of appropriate systems for the renewal of those resources; for the promotion and regulation of forest industries; for forest research, public education and forestry training and education. Its Strategic Plan details five key objectives for 2010-2015, including:

- **Increased participation of the private sector and NGOs**, particularly as much of the existing forest cover, land requiring restoration of forest cover to maintain environmental integrity, and land suitable for commercial forestry or agroforestry is privately owned or otherwise outside the direct control of the FD^{28,29}.
- **Increased community participation** (especially those living in or adjacent to forests) and **public awareness** in general.
- **Development and implementation of forest management plans**, involving public input, both for the conservation of natural forests and the development of forest plantations.
- **Maintenance and restoration of forest cover**, with a view to protecting watersheds and conserving biodiversity. This may be done through plantations or agro-forestry.

In terms of extension, the FD focuses predominantly on and within protected areas – including policing for illegal activities³⁰. Its extension priorities target the following groups:

- **Private landowners** island-wide through the FD's *private planting programme*³¹, in which free seedlings³² and technical advice are given to landowners who want to plant

²⁷ For example, the Kingston-based officer who covers the rest of the island has a travel allowance for only 500km.

²⁸ The FD manages about 1/3rd of Jamaica's forest reserves, i.e. those on Crown Lands (- the rest is on private lands). A study conducted in the 1990s concluded that approximately 69,000 ha was suited for commercial exploitation – and of this, approximately 67,000 ha was on private land.

²⁹ As all government land is vested in the Commissioner of Lands (National Land Agency, NLA), the FD has only limited powers over the land that it manages. When squatting occurs, a notice is served requesting that the offender leaves the land within 90 days. Although usually is sufficient, some cases will be taken to court for an eviction (- through the NLA). If the problem cannot be resolved, the FD can return land to the NLA.

³⁰ This is done through the FD's Enforcement branch, which studies encroachment, squatters, illegal removal of trees...etc.

trees on their property. Landowners can indicate their preference of tree species; this is validated (or changed) during the FD's on-site technical visits. Through this programme, the FD works with a wide range of clients – including farmers such as coffee growers. Landowners must have minimum land to accommodate 50 seedlings to participate in the programme. That said, the FD does also work with small clients – albeit that these are not registered as private planters within the programme.

Note: In addition to benefiting farmers, this private planting programme has been successful in increasing local environmental awareness. It has also served as an incentive for promoting further involvement in forest-related activities and local forest management (Headley, 2003).

- **Communities living in or adjacent to forests** as these are considered essential to forest conservation. This may involve formation of new or strengthening existing Local Forest Management Committees (LFMCs, discussed below), as well as working with other community-based groups such as schools, Jamaica Agricultural Society etc.
- **General public**, seeking to raise awareness regarding the importance of flora and fauna as well as the value of healthy ecosystems. Strong emphasis is placed on public education as awareness is considered vital to compliance.

When the FD changed in May 2010 from a department of the MOAF to being an autonomous Executive Agency, its Field Operations Division was expanded to accommodate 2 Foresters³³ and 10 Forest Technicians for the SE Region (in which the Hope and Yallahs watersheds are located). However, although this structure is in place, the FD has not been able to populate all these positions as the budget has not yet been approved. It therefore continues to operate with 4 field operatives for the Hope & Yallahs areas – 1 Supervisor and 3 Foresters (equiv. to “Forester” and “Forest Technicians” respectively in the new structure). As these currently cover all the FD's core activities as well as any project activities, they are travelling continuously and are very (- over) stretched.

Also in Field Operations are two Rural Sociologists, one for each of the Eastern & Western zones. These primarily work with communities to increase their understanding of the FD, forestry in general, the value of forest cover...etc. They are responsible for the LFMCs.

³¹ Introduced in 1996, this was based on the preceding “State Assistance to Private Forestry” in which cash incentives was given – on reimbursement basis – to encourage planting and tending trees.

³² Timber trees are recommended for upper watersheds, whereas ornamental species are most used in lower watersheds and for urban forestry.

³³ One Forester would be responsible for “client services” (which included the private planting programme, recreation, public awareness etc); and the other for forest establishment, research and management.

The FD's Legal & Enforcement Division was operationalised in 2009 in accordance with the organisational structure governing the Executive Agency. The Division currently has 40 Forest Rangers - 11 of whom are allocated to the South Eastern Region. The focus of the enforcement personnel is primarily on compliance and enforcement of the forestry legislation including raising public awareness with regards to the legal framework³⁴.

- Local Forest Management Committees

The Forest Act 1996 promulgates the appointment of “a forest management committee for the whole or any part of a forest reserve, forest management area or protected area” and lists their functions. Of these, the two most important roles initially proposed for the LFMCS were to provide assistance relating to the development of Local Forest Management Plans and to monitor their implementation. The first such LFMCS were officially formed in 2000, in the Buff Bay and Pencar sub-watersheds (Headley, 2003).

Community members are involved from the start: with guidance from the FD, they develop, review and finalise their constitution; they hold regular meetings, and are governed by an elected executive. They are also involved in extension, training, public awareness – interacting with schools and other CBOs. In the early stages of formation, the LFMCS receive support from the FD for meetings; and the FD will continue to provide technical advice and support to assist them in their functions (e.g. training in succession planning, proposal writing etc). Where the group is seeking to initiate economic activities such as eco-tourism (forest trails, tour guiding), nurseries, apiculture – the FD may facilitate their access to forest lands.

Still regarded as important instruments through which communities can become involved in the utilization and management of nearby forest reserves, the FD has since facilitated the establishment of seven such LFMCS. Considered highly successful and very effective in reducing forestry-related problems, the FD is now regularly approached by NGOs and CBOs around the island interested in being formalised into LFMCS. Due to its resource limitations, it nonetheless focuses on developing new Committees in “critical emphasis areas” – for example, where there are conflicting uses of land or around key issues (e.g. fires, squatters).

Note: Three new LFMCS are being formed/strengthened under the EU-funded Climate Change Adaptation & Disaster Risk Reduction Project – including two in Yallahs (Westphalia and Haws Delight).

³⁴ This paragraph has been checked by Mr. Damart Williams, FD's Compliance and Enforcement Manager.

3.1.4. National Irrigation Commission

The National Irrigation Commission (NIC), another Executive Agency of the MOAF, was established in 1986 with the following objectives: “To manage, operate, maintain and expand existing and future irrigation schemes and systems (...) established by the GoJ; (and) To fix and collect the rates or charges and to be paid for the use of such water.” Focused today on developing irrigation systems to provide the most efficient and effective service possible to the agricultural community”, its core functions include:

- Delivering irrigation water to farm gates - i.e. production and operations which supply water from source to farm (whereupon it becomes the responsibility of the farmer);
- Developing Water Users Associations (WUA)/Groups in order to encourage farmer involvement and foster on-farm water management;
- Maintaining irrigation infrastructure.
- Developing new irrigation systems.

The NIC manages six national Irrigation Districts, areas considered key for irrigation and in which it has District Offices: St. Thomas (Yallahs), South St. Catherine, South Clarendon; St. Elizabeth (Hounslow) and Trelawny (Braco).

As of 2010, it now houses the On-Farm Water Management Unit³⁵ which aims to promote sustainable water use through modern technology - thereby promoting efficient water and energy use on agricultural lands in the Irrigation Districts. The Unit’s activities include:

- **Providing training in irrigation technology**, including best practices, integrated management (crop care, agronomic practices) to:
 - o **Farmers** – including farmer groups
 - o **Agricultural extension officers**, including RADA*, sugar estates, private companies
 - o **Schools**
 - o **NGOs & CBOs**, for example environmental organisations, social groups etc
- **Investigations of water sources** to determine the sustainability of small water sources (springs, ponds) for development into irrigation projects. This is done with the WRA.
- **Design of irrigation schemes** (including water source, head works, main line, sub-mains, pump etc) and **on-farm systems** (sprinkler/drip delivery).

³⁵ When under RADA, this Unit was responsible for irrigation nationally. It is now limited to the NIC’s designated irrigation districts.

- **Rainwater harvesting systems:** two pilot programmes have been installed³⁶ and are now being monitored for feasibility. Early findings suggest that these schemes work well for farm families, especially when the farm is in the vicinity of farmers' own homes (- their roof serves as the catchment, with guttering to collect the rainwater).
- **Visiting individual farmers to provide technical advice**** – these range from small-holding to large estates, but must be registered with RADA.

* Given that it was located in RADA until last year, the On-Farm Water Management Unit maintains close ties with RADA. Providing ongoing training to RADA's Extension Officers means that they are able to provide basic irrigation training to their farmers as well as serve as a quick response mechanism for this Unit/NIC.

** Once an irrigation scheme is up and running, the Unit maintains close contact for a further 6-12 months through scheduled visits. Even beyond this, it remains available for further support should the farmer/farmer groups need assistance.

The On-Farm Water Management Unit has a wide range of expertise; and also works closely with RADA (which determine what crops can be grown in an area) and the MOAF (especially the Rural Physical Planning Unit and Bodles Research Station), NEPA (for environmental issues) and the WRA (for water sources). It employs an integrated and holistic approach to training – working in collaboration with these other entities for e.g. crop care, land husbandry, marketing, water quality, group dynamics, conflict resolution etc. These joint workshops benefit from the sharing of skills, expertise and information.

- Water Users Associations (WUA)

Irrigation schemes are beneficial for group formation as farmers are encouraged to come together to e.g. purchase storage tanks. The NIC targets **lead farmers** (male or female) – i.e. those who are more vocal, willing, cooperative and well-respected in an area. If none exist, it will seek to establish a **Water Users Association (WUA)**. This is a formalised group, which is registered with RADA and has an elected secretariat (President, Treasurer and Secretary). The WUAs hold meetings and keep records, and all members receive training and technical support from the NIC (and others).

The NIC pays particular attention to the self-sufficiency of these WUA's, ensuring as far as possible that these groups are able to stand on their own feet. The breadth and depth of

³⁶ Funded through FAO and the GoJ/MOAF, the 2 rainwater harvesting projects are: (i) N. Clarendon – uses an earthen receptacle to collect rainwater for farmers. Although relatively simple, this has nonetheless extended their water usage to about 6 months of the year (they were formerly rain-dependent); and (ii) St. Elizabeth – a more complete system, with catchment and storage systems, (solar) pumps and on-farm drip irrigation system.

training goes a long way to achieve this goal; as does the fact that the group is put in contact with the suppliers of their irrigation equipment. In fact, the WUAs rarely fail; and the NIC is usually only called back when a group wants to expand their current irrigation system.

The NIC also seeks financial support – usually through projects - to strengthen these groups. Its National Irrigation Development Programme (NIDP) funds a specialist who is responsible for WUA formation and capacity-building.

Specific to Project Area

In Yallahs, the NIC has a relatively small irrigation scheme covering W. and S. Albion, Phillipsfield, Heartease and Norris. The water is principally used for irrigation of crops, although some is used for domestic purposes. The irrigation there is also used for greenhouses (protected cultivation). For some reason, the communities can get water for irrigation but not always for drinking (- this comes from a different source, and is under NWC's responsibility). Some farmers in the Phillipsfield area have noted that when pipes were laid to take water to Kingston, there was less available in Yallahs.

The NIC's second project in St. Thomas is in Roselle (White Horses) where a spring is captured in an entombed area and fed to 59 farmers (each with ¼ acre) and one school (for its school garden). This has been established under the EC/FAO Food Facility Project.

The **Yallahs Water Users Association** has about 90 active members drawn predominantly – although not exclusively – from Phillipsfield which is where irrigation was first introduced into the area. Its members are all farmers, involved in the production of tree crops such as mangoes, ackee, soursop, cherry, guava; as well as cash crops including cucumber, sweet pepper, onion, tomatoes, okra and some cantaloupe melons. The group meets on the 1st Tuesday of every month. The irrigated area³⁷ in Phillipsfield covers 90 acres, and is in the process of being expanded. In adjacent East & West Albion and Heartease (Norris), the well and pumps are in place but the pipes are not yet connected. The NIC manages the irrigation infrastructure, but is in the process of training the WUA to take over the control from the NIC.

Like the other agencies, the NIC's On-Farm Water Management Unit experiences human resource constraints. It comprises only 4 persons (plus a project-based consultant): 3 officers (one for Eastern, Central and Western Regions) and a Manager. All are field-based, and on the road continuously. To cover its current work load adequately, the On-Farm Water

³⁷ Irrigation in this area is mainly overhead (sprinklers), and some drip. Water usage is metered, with individuals paying for what they use. When the WUA takes over from the NIC, members will be required to pay the maintenance costs for the irrigation system as well as the electricity to drive the pumps.

Management Unit would need 7 officers – a recommendation that has apparently been made to the MOAF. Additionally, the Unit suffers from insufficient budget to cover its travelling costs and equipment (e.g. GIS instruments).

Mention was also made of an increase in water demand over recent years, due both to increased agricultural production as well as to rains now being more unpredictable (- attributed to climate change). This is particularly noted in southern and central parishes. In parallel, there has been an increase in the frequency and strength of storms – which can cause considerable damage to irrigation equipment.

3.1.5. National Environment and Planning Agency

The National Environment and Planning Agency (NEPA) was formed by the merger of the Natural Resource Conservation Authority (NRCA), Town Planning Department, and the Land Utilisation & Development Commission. It currently oversees seven pieces of legislation. Although it has no “extension officers” per se, several of NEPA’s divisions conduct field work and interact with communities: Public Education Branch, Ecosystems Management Branch, Protected Areas Branch, and Pollution Prevention & Monitoring Branch.

The Ecosystems Management Branch’s travelling officers each cover several WMU’s in their designated areas: Western Section (from Montego Bay office), Northern Section (from Trelawny office) and Eastern Region (from the Claremont and Portland offices). The rest of the island is covered from HQ (Kingston), on a more *ad hoc* basis. With HQ also supporting all the other offices, NEPA does not consider that it has a sufficiently strong presence along the south of the island - including in the Yallahs River and Hope River watersheds.

In addition to responding to requests from the public, NEPA conducts **routine monitoring** of ‘hot spots’ across the island. When in the field, officers complete a routine monitoring form with the location’s name, GPS positioning³⁸ as well as a visual description of whatever “sticks out” (e.g. land slips, flooding...etc.)³⁹. These are fed through the Coordinator (?) to the Branch Manager, and form the basis for NEPA involving the other agencies, according to need.

NEPA’s officers are also involved in monitoring after specific climatic events (e.g. earthquake, extended rainfall etc), for use in NEPA’s planning activities. They also collect risk management

³⁸ This GPS reference locates where the officer is standing, rather than the area of concern. It may not always be included by default, although this is not due to lack of equipment.

³⁹ As they are currently only narrative – and therefore subjective in nature – it would be helpful for these reports to routinely include photographs.

data for the Office of Disaster Preparedness and Emergency Management (ODPEM), as this agency also produces information on landslides, flooding occurrences...etc.

NEPA organises periodic **Farmers Training Days**, usually on-farm and focused on specific topics – for example, good land management, best practices in chemical use...etc. Depending on the topic, these involve the other agencies who have in-depth expertise – whether FD, MOAF, Pest Control Unit and most often RADA.

NEPA's Ecosystems Management Branch also organizes **Environmental Awareness Days** which take place in community settings such as libraries, town halls, schools etc. Open to anyone interested in the environment, these attract a wide cross section of society. They are organized quarterly - usually on weekdays, from 9am until around 3pm (participants are provided with lunch), and are highly interactive through use of multimedia, flipcharts, display etc. The topics are decided by NEPA's officers, with input from and/or implemented with the Public Education Branch.

In its early days, NEPA used to have **demonstration plots**. These were largely phased-out of its activities, although it still does some demonstration projects in e.g. soil management conservation measures such as check dams, and reforestation.

3.1.6. Coffee Industry Board

The Coffee Industry Board (CIB), a commodity board under the MOAF, was established under the Coffee Industry Regulations Act of 1948 to regulate the Jamaican coffee industry. Its mission is to encourage the development of the Jamaican coffee industry, promote the welfare of persons engaged in the industry, and protect the quality and integrity of Jamaican coffee. Its principal roles today are to promote, regulate, monitor and guide the development of the coffee industry of Jamaica and to assure quality of Jamaican coffee. This is done through **licensing and monitoring** of coffee dealers, processors, works and nurseries, as well of trademark registration and use⁴⁰; **quality certification** which involves defining standards, growing areas and recommending specific plant varieties as well as certifying the quality of all green coffee for shipment (both for pesticide levels as well as to safeguard shipments from contraband); and providing **advisory services** regarding crop condition, planting, pre- and post-harvesting techniques, pest and disease control, and environmental management.

The Eastern Region is where the Jamaica Blue Mountain® Coffee is grown in a geographically-specific and gazetted area within the parishes of St. Andrew, Portland and St. Thomas (3000-5000ft). According the CIB's website, St. Andrews has an estimated 2,553.2 ha in coffee which

⁴⁰ The CIB owns the trademarks Jamaica Blue Mountain® and Jamaican High Mountain Supreme®.

is produced by 23 main groups (140 sub-groups/districts), has 2,916 farmers on record, and is served by an Advisory Officer from HQ. St. Thomas has 1,517.9 ha in coffee which is produced by 20 main groups (126 sub-groups/districts), has 1,878 farmers on record, and is served by an Advisory Officer based in CIB's office in Morant Bay, St Thomas.

The CIB's Advisory Department covers the entire island through its Regional Advisory Officers, Advisory Officers, Advisory Assistants, and a Training/Public Relations Officer. Through its website, the CIB offers publications and articles on various topics – including integrated pest management and hillside vegetative barriers. The CIB holds regular meetings and provides training to the larger farmers (who are responsible for approximately 70% of coffee produced); and also conducts group training for smaller farmers (< 5 acres) and the dealers' extension personnel. Topics include good agronomic practices - Integrated Pest Management, weed control, pruning & cut-back, soil & water management, plant nutrition – and care/use of equipment. These involve personnel from other entities, such as RADA, Pesticide Control Authority, Input suppliers, and the coffee companies.

In 2002/03, when the CIB was restructured into its current configuration, its extension capacity was greatly reduced: from > 120 officers island-wide to 11 officers today. It was thought at the time that the coffee dealers⁴¹ would service their supplier famers – providing them with technical advice and inputs (seedlings, pruning saws etc); and in turn, they would benefit from larger volumes and better quality coffee bean from their farmers. Of the 10 dealers who are actively purchasing coffee today, the CIB considered only 4 are providing such services.

One of the problems observed is that as different dealers purchase from the same farmers (i.e. farmers sell their beans to various dealers), there is no incentive for the dealers to invest in any one/group of farmers. The CIB hopes to get around this by writing into the dealers' licenses, which must be renewed by the CIB every 2 years, conditions for their provision of support to farmers (e.g. international requirement to have 1 extension officer for every 300 farmers, minimum certification level of their officers...etc.). The CIB is also looking in the longer-term to zoning dealers, so that they can only purchase beans from within their zones. There is however resistance to this as all dealers want to deal with Blue Mountain® coffee farmer on account of the higher prices their beans command. There is concern therefore that such a measure may cause High Mountain coffee farmers to disappear within 4-5 years.

⁴¹ Some of the dealers have their own large farms, but work with adjacent (small) farmers to boost their production. They often have long-standing relationships with these farmers.

There are currently two Rainforest Alliance-certified farms in Jamaica: UCC and Clifton Mount Estate (near Newcastle). A third – St. Clouds Estate (near Mavis Bank) - is trying to become certified; and a number of others have shown interest. The CIB is not involved in the process, other than conducting spot-checks on the farms' disposal and bathroom facilities; assisting in the training of workers, and setting of work schedules.

Non-Governmental Organisations (NGOs)

3.1.7. Jamaica Conservation Development Trust

Perhaps the best known NGO in the Project Area is the Jamaica Conservation and Development Trust (JCDT) which manages the Blue and John Crow Mountains National Park (BJCMNP) under delegation from the NRCA through NEPA; and has a collaborative management agreement with NEPA, the FD, and most recently, the Jamaica National Heritage Trust.

The overarching goals of preserving the area as a national park are to protect the remaining natural (closed broadleaf) forest for its biological diversity, for its intangible cultural heritage as well as for the maintenance of ecosystem services including water supply and recreational opportunities. Analysis conducted for the afore-mentioned Management Plan concluded that the following strategies are essential to reduce such threats: a) increased enforcement of environmental legislation, particularly related to boundary encroachment; (b) rehabilitation of degraded forest penetrating the core natural areas; and (c) adoption of more environmentally sustainable livelihoods by resource users.

Of particular relevance to this consultancy is the Management Plan's fourth objective: *"to raise public support for conservation of the BJCMNP's natural and cultural heritage, and improve resource management and the sustainability of livelihoods, particularly in Buffer Zone⁴² communities"*. This is to be achieved through the National Park's Education Programme, which aims to empower and mobilise individuals and communities to participate in environmental management and sustainable livelihoods through targeting: (i) Buffer zone communities, in particular youth, existing Community-based Organisations (CBOs) for environmental action, students and teachers; and other community members; and (ii) The general public through public-awareness programmes, using the media. In its sixth objective, the Management Plan affirms a strong commitment to policy and operational coordination, involving key public and private sector as well as community stakeholders.

The JCDT has 21 staff, including 5 Park Rangers who patrol the National Park – either in vehicles or motorbikes. Ideally, this number should be increased to 15 as this would permit their rotation through *all* the ranger stations in the BJCMNP (i.e. not only in Holywell). Funding for

⁴² The Buffer Zone is 1km around the boundary of the BJCMNP.

these rangers comes through NEPA, within the subvention received by JCDT to manage the Park⁴³. In September 2011, the JCDT signed a new Memorandum of Understanding with NEPA for access to a fleet of motorcycles which will supplement JCDT's current monitoring activities as they will be used by Rangers to traverse approximately 50% of the Park⁴⁴.

The JCDT works very closely with a number of communities in the Park's Buffer Zone – including Buff Bay (Farmers' Association), Bowden Pen (Farmers' Association), Woodford, Cascade and Red Light. Whilst it is willing to engage with any community, it has built a strong track record with these communities – principally through various projects for which it has raised funds. The JCDT has been working with some of these communities for 10-15 years; and projects include *Reducing Climate Change-Driven Erosion and Landslide Risks Through Sustainable Agriculture for Safer Slopes* (funded by UNDP/GEF SGP Community-Based Adaptation (CBA) Programme), *Capacity Building in Primary Schools Project* (Forest Conservation Fund), *Rainwater Harvesting & Supply System in Holywell* (co-funded by the Environmental Foundation of Jamaica, EFJ, and the Inter-American Foundation), *Hazard Mapping and Reforestation for Disaster Risk & Reduction in the Blue Mountains* (also funded by the EFJ), and *Blue Mountains Sustainable Tourism Institutional Support* (again, funded by the EFJ). As relevant, these are described further in Section 3.

In addition to implementing projects in these communities, the JCDT also provides support to their CBOs to prepare proposals and raise their own funds. This process, as described by the JCDT, is largely driven from within the communities themselves.

As a result of this ongoing involvement and the continuous field presence of its rangers, JCDT has good relations with these communities - characterised by trust, openness and willingness to share information, provide feedback...etc. The JCDT holds regular community meetings (at least once/quarter), organised by its ranges and covering topics of interest/use to the community – including environmental issues.

The JCDT also collaborates with other NGOs and CBOs, including the Buff Bay Local Forest Management Committee, St. Thomas Environmental Protection Association (STEPS) and Portland Environmental Protection Association (PEPA).

⁴³ As this does not cover JCDT's needs – not even its core activities – much time is spent on writing proposals which supplements its budget and allow it to implement many of its activities through projects.

⁴⁴ See http://www.nepa.gov.jm/newscenter/Press_releases/current/PR20110916-nepa-jcdt-mou.asp.

3.2. Wider Stakeholders involved in Extension Support

3.2.1. Jamaica Agricultural Society

The Jamaica Agricultural Society (JAS), a statutory body of the MOAF, has a mission to – amongst other things - protect and promote farmers’ interests; provide extension training and other services to farmers; and assist farmers in gaining access to resources. Of relevance to this Project, its objective is to “ensure that farmers are mobilized into groups through the JAS’s island-wide branch structure so as to receive technical know-how as well as environmentally friendly support programmes that will sustain the productivity of their farms”.

The St. Thomas branch of the JAS meets every 3rd Thursday of the month.

3.2.2. Jamaica 4H Clubs

Another of the MOAF’s statutory bodies⁴⁵, the Jamaica 4H Clubs’ mission is “to mobilize, educate, and train young people between the ages of 9 – 25 years in agriculture, homemaking, leadership and social skills, which will prepare them for or influence them into careers in agriculture and agro-related occupations, and provide a cadre of trained young leaders, capable of contributing to national development”. As of mid-2008, the 4H Clubs had more than 60,000 members island-wide, the majority of whom were based in schools.

In October 2008, the 4H Clubs launched the National School Garden Programme⁴⁶ which aimed to implement or resuscitate approximately 1,000 school gardens over a three-year period. Working with teachers and students alike, one of the Programme’s specific objectives was “to encourage environmental awareness in sustainable agriculture”.

3.2.3. Other entities

Also active in the watersheds are a number of other NGOs and CBOs, including:

- St. Thomas Environmental Protection Association (STEPA), which implemented a Coastal Zone Management Project in 2008 which highlighted the issues of bush fires.
- All-Island Bee Growers Association
- Botany Bay/Pamphret/Whitehorses Benevolent Society: In 2009, the Society’s Water Supply & Sanitation project was awarded the Michael Manley Award for Community Self-Reliance with the best credentials in Environmental Conservation, funded by the Environmental Foundation of Jamaica (EFJ).

⁴⁵ In the MOAF’s 2011/12 Budget, there is a provision of J\$ 167,643,000 for the J4H clubs

⁴⁶ See <http://www.moa.gov.jm/news/data/launched%20-%204H%20school%20garden.pdf>

3.3. Challenges facing Existing Extension Providers

In spite of numerous completed and ongoing initiatives intended to safeguard and promote the integrity of these watersheds, several factors continue to stymie efforts – within individual entities as well as to achieve an integrated, coordinated approach.

Within extension providers

3.3.1. Lack of holistic approach to natural resource management

Management of natural resource presents the challenge of balancing the potentially opposing needs of economic and environmental services. This requires access to and the possibility to derive socio-economic benefits, whilst at the same time maintaining the integrity and equilibrium of ecosystems to ensure their sustainability, protecting biodiversity and mitigating environmental risks (adapted from Forestry Dept., 2001). With much land now showing reduced fertility, increased soil loss and over-fertilisation, it is clear that this exploitation/conservation balance has not been achieved. To address this problem, the agencies responsible for Jamaica's natural resources must embrace a broader and more integrated approach to looking at and interacting with the landscape – whether from an environmental or an agricultural perspective.

Specific to agriculture, one interviewee felt that insufficient attention is given to understanding the farm as a holistic, integrated system⁴⁷. Mirroring donors' move towards on-farm interventions, MOAF/RADA no longer prioritises off-farm land husbandry methods (such as gabion baskets, retainers, check dams) and nor does it focus strongly on land preparation, soil fertility or soil conservation. In the absence of this, there is real risk that the ABIS market projections will not be realistic as the soil status simply cannot support the anticipated production levels.

3.3.2. Insufficient and/or non-sustainable funding

The various entities involved in these watersheds all spoke of the problems they face through lack of funds – in absolute terms as well as predictability and continuity. Indeed, this was considered one of the (if not, *the*) greatest challenge impeding their abilities to fulfil their core functions. With their budgets already reduced - and expected to be reduced further - concern was expressed that this would further hinder their activities in the future. As a result, the entities have all already scaled down the number of officers who are able to monitor, control and provide extension support. For example, NEPA emphasised that their presence on the

⁴⁷ This would involve an assessment of climate resources and land resources, as well as the existing land use and farm management practices (e.g. land use enterprises, market orientation and demand, farming practices, labour resources, yields and production, household income, migration patterns, conservation effectiveness etc).

south coast is not strong; and RADA spoke of already being too stretched to *adequately* guide farmers to “do the right thing”.

Not only does this limit entities’ work in the field, but it also means that much time is spent on raising funds through projects. In itself, this sometimes pits one entity against another to order to secure new project resources.

In terms of the Protected Areas, the BJCMNP receives funds from the GOJ and also charges a user fee for some recreational areas within it. The National Parks Trust Fund was established to support the operating costs of National Parks. However, these do not adequately cover even the operating expenses required let alone strong field enforcement.

3.3.3. Lack of current data on land use, land use change, location and status of many (valuable and sensitive) natural resources, including those on private lands.

At present, much of this data is qualitative and may be incomplete, patchily distributed, inconsistently analyzed, stored in diverse places or out of date. Where quantitative data exist, they are not always easily accessible or in a form which may be readily analyzed. In the entities interviewed, information is still recorded on paper and so exists primarily (or exclusively) in hard copy.

Although there are efforts underway to digitise some of the information routinely collected (as in NEPA), it is unclear whether the scanned images can be searched for particular words or phrases. Furthermore, the reports are narrative and so are considered subjective (i.e. dependent on what the travelling officer sees/considers important to record).

3.3.4. Absence of or out-of-date plans, in particular Physical or Spatial Plans, Development Orders⁴⁸ and Sustainable Development Plans⁴⁹

This is in part due to the paucity of data described above, as well as a lack of capacity at the planning level which recognises the need for – and is able to – adopt a comprehensive, holistic approach for optimal land-use zonation. As such, there is concern that high-value conservation areas are currently not being adequately protected, thereby putting at risk their biodiversity, water resources and sensitive ecosystems.

Note: According to NEPA, Development Orders are supposed to identify areas for conservation and protection. As Draft Orders have been prepared for Portland, Kingston & St. Andrew (KSAC)

⁴⁸ For example, Kingston’s Development Order was created in 1968 (as per the PIF).

⁴⁹ Although local government authorities have the mandate to create Sustainable Development Plans, these have been developed to date in only two of fourteen parishes due to lack of funding and expertise (as per the PIF).

and St. Thomas – although not yet promulgated – these should be checked for their treatment of such biological hot spots.

3.3.5. Limited or lack of enforcement capabilities

Principally affecting the entities charged with an enforcement role – in particular, the FD and NEPA – this is caused by insufficient resources to adequately patrol as well as by weak legislative powers (i.e. they don't have "teeth"). Examples of this include:

- If the FD's officers note an encroachment, it can only report the incident to the National Land Agency (NLA). It is up to the NLA to take action (- whether serving a notice, taking the offender to court etc). Although this most often works, there have been cases where the FD has had to re-define the geographical boundaries of its operations in order to avoid areas for which it can no longer be responsible. Similarly, where the FD comes across watershed problems which affect the forest reserves, it must refer these to NEPA.
- NEPA has the right to give out mining licences but yet has no power to enforce the rehabilitation of the mined-out lands⁵⁰.
- RADA also highlighted the lack of enforcement as undermining its efforts. With "only" a public education campaign and its track record of working closely with farmers, RADA is unable to take any action should persons choose to violate good land use practices.

Note: In 1951, the Yallahs Valley Land Authority was established as a semi-autonomous body, under the Ministry of Agriculture with both an advisory and a regulatory function. This could give technical advice as well as cause to be enforced - through power to recommend the enactment of by-laws - certain types of soil management practices. The Authority had a very high ratio of extension officers to farmers as well as cash grants, improved planting material and credit – all to encourage and finance soil rehabilitation and conservation, and good farming practices" (Edwards, 1995). This said, an evaluation conducted in 1961 concluded that the Land Authority had failed in achieving many of its objectives in controlling soil erosion and introducing proper land use measures – principally due to the Authority: (i) having elected to follow a programme based on education and subsidies to the almost complete exclusion of regulation; (ii) not employing regulatory powers provided by the law (except in controlling burning); (iii) not being able to bring about basic change in farmers due to their scepticism of innovations from official sources; (iv) focusing on the introduction of new measures, but not their maintenance.

⁵⁰ The FD is keen to have introduced an up-front charge specifically designated to cover the costs of rehabilitating such lands.

To achieve integrated watershed management approach

3.3.6. Unsatisfactory legislative framework for watershed management

The Watersheds Protection Act (1963), the principal law governing watersheds in Jamaica, is primarily focused on “the conservation of water resources by protecting land in or adjoining the watersheds. The Act is intended to: ensure proper land use in vital watershed areas; reduce soil erosion; maintain optimum levels of groundwater and promote regular flows in waterways.” Given that the Act has not been substantially revised since its promulgation, it is considered outdated for a number of reasons: it lacks a participatory approach to watershed management which involves local communities; it relies heavily on prohibiting (with fines) and regulating to protect the declared watersheds rather than including incentives and public education; and does not reflected the changed institutional arrangements since the early 60’s⁵¹.

Input from the NEPA team for this report⁵² indicates that the Watershed Policy is currently being revised, with instructions being drafted for the Watershed Protection Act.

In spite of – or possibly as a result of – the many pieces of legislation pertinent to watershed management⁵³, there are gaps, overlaps and sometimes even conflicts in terms of areas and responsibilities. For instance, both the Forest Act and Natural Resources Conservation Authority Act have stipulations for managing "Protected Areas" but yet do not make clear distinctions their respective jurisdictions. The same holds true for who exactly has responsibility for soil conservation work in watersheds: NEPA (given that these are lands in the declared watersheds) or RADA (given that the rural areas are under RADA's jurisdiction). Another example of this unsatisfactory legislative situation is the National Land Agency (NLA) – responsible for management of Crown Lands – can grant permission for forest cover to be removed without consulting the Forestry Department.

3.3.7. Unsuccessful prior experiences with integration

Although the concept of an integrated approach to natural resource management is certainly not new to Jamaica⁵⁴, prior experiences have apparently been unsuccessful and/or short-lived.

⁵¹ http://www.nrca.org/policies/watershed/policy_information.htm

⁵² Feedback received from A. Donaldson, Manager (Acting), NEPA’s Ecosystems Management Branch on Final Report v1 (5.4.12).

⁵³ These include: Wildlife Protection Act (1945). The Mining Act (1947); Land Development and Utilization Act (1966); Town and Country Planning Act (1988); Country Fires Act (1988); Rural Agricultural Development Act (1990); Natural Resources Conservation Authority Act (1991); Water Resources Act (1995); and Forest Act (1996).

⁵⁴ For example, the *National Integrated Watershed Management Council* which was set up in 1999 and involved various agencies - NRCA (NEPA), PIOJ and RADA. Focused principally on two watersheds - Rio Grande and Great River – this ceased meetings in 2007. This is discussed further in Section 3.1.8 *Ridge to Reef Watersheds Project*.

Several of those interviewed spoke of the problem of “turf protection” – i.e. where agencies (or their heads) attempted to build their own “empires” and control everything. Mention was made too of a general aversion to sharing – reportedly more prevalent in upper management rather than at the more technical levels.

Whilst there is now a draft Integrated Watershed/Water Resources Management (IWRM) framework, there is still no entity responsible to coordinate policy across sectors and to ensure that goals are met. Furthermore, it is not clear how any entity will be held accountable or what the repercussions will be should evidence indicate that an ecosystem is being degraded.

3.3.8. Lack of clarity regarding recent institutional changes

In July 2011, a number of the environmentally-oriented public entities were brought under the auspices of the Ministry of Housing, Environment and Water (MHEW, formerly the Ministry of Water and Housing). Of particular relevance to this project, MHEW includes NEPA, FD, and the Environmental Management Division (EMD, formerly under the Office of the Prime Minister). As it is still early days, little information on the implications of this is available to the public. Discussions with both NEPA and the FD indicated that changes within these entities are anticipated, although these are not yet clear – whether in terms of policy and/or operations, staff levels, rationalization of resources, integration with other agencies...etc.

Another concern raised by one of the agencies is the relatively recent move of the Planning Institute of Jamaica (PIOJ) into project implementation. With PIOJ also facing financial constraints, its staff members are now increasingly focused on project planning, proposal writing and implementation. As a result, it was felt that the line Ministries – which each have a narrow focus – would not be able to coordinate and guide an integrated “bigger picture”.

3.3.9. Lack of coordination between agencies’ policies, mandates and field activities

With no overarching framework in place to coordinate and guide the efforts of all the government agencies working within these watersheds, the aforementioned gaps, overlaps and even conflicts manifest also in the field.

At a technical (field) level, officers are definitely aware of one another as they frequently pass each other on the road. However, in-depth knowledge of the other’s activities varies considerably from person to person; and field activities involving more than one agency are not (yet) the norm.

Given the FD's and RADA's respective mandates, both agencies highlighted that their field officers sometimes work at cross-purposes. The FD's officers are concerned with reducing encroachment and illegal activities in the Protected Areas (including the "squatter farmers"⁵⁵); and on the other hand, RADA's officers are mandated to support farmers – and so they may be providing assistance to persons farming within the same protected areas ("nomadic farmers"). Particularly as RADA does not require proof of tenure during the initial steps of farmer registration, some of these farmers may even be registered in its database – and thereby receiving technical assistance.

3.3.10. Lack of mechanism for sharing information between entities

At present, there is no mechanism by which the agencies' routine monitoring/field reports are shared. Apart from circulating the reports by email – usually to a limited group of recipients *within* the agency – some information may be passed on verbally through personal networks (e.g. if an infringement has been noted in the National Park). With all the agencies stressing their lack of officers in the field, they are not yet taking advantage of each another's human resources to contribute to their own mandates. For example, NEPA cannot benefit from RADA's travelling officers making environmental observations when they are visiting their farmers.

The same lack of sharing occurs with project documentation, whether in terms of progress/final reports, evaluations, baseline studies, consultancy reports...etc.; as well as training materials prepared within the projects. Given that the agencies are working in the same geographical areas and undertaking similar activities, funds may inadvertently be wasted through ignorance of what has been done or is being done/planned.

The same applies to the wider stakeholders involved in these areas – there is neither a mechanism for information being shared with each other or with public agencies. As such, the circulation of information tends to occur on the basis of personal connections.

Note: A Land Use database has been used by NEPA, WRA and the FD from the late 90's. If my understanding of this is correct, it presents a good example of how information can be shared between various agencies.

⁵⁵ Given the costs of patrolling and enforcement, the FD does purportedly take a pragmatic approach – and will encourage squatter farmers to re-plant and to consider agro-forestry systems.

3.4. Initiatives Involving SLM Practices, Extension Provision & Capacity Development in Project Area

The parishes of both St. Andrew and St. Thomas have a legacy of large-scale soil conservation works - such as bench terraces that were carried out under the Yallahs Valley Land Authority in the 1950s to 1970s - as well as the use of small-scale soil conservation alternatives such as individual basins, trash and live barriers, mulches, the use of the A-frame for contour planting, and minimum tillage methods" (MoA 2001). Indeed, MYAD's Baseline Study reported that "54% of the farmers already practised some form of soil conservation" (MoA 1997).

Over the decades, farmers in these areas have thus been exposed to the need for and practices of soil conservation and sustainable land management – principally through the numerous agricultural and forestry development projects which included SLM measures, extension activities, community capacity-building, public awareness...etc. The most significant of these projects are described below, highlighting the lessons learned with particular regards to their effectiveness and replicability. Grouped into previous and current initiatives, the projects are listed alphabetically by name. A summary of their objectives and physical targets is given in Annex D. A list of planned initiatives with possible relevance to this Yallahs & Hope Rivers Watersheds Project is given in Annex E.

It is important to note that much of the watersheds management work is conducted through projects; and both public and private entities alike continue to depend on this as a means to derive much-needed resources to implement and/or scale-up their activities.

Previous Initiatives

3.4.1. Eco-Friendly Coffee Production Project

Implemented by the Coffee Industry Board (CIB; 2010-2011) and funded by the Japanese Embassy, this project sought to further educate farmers to produce coffee in an environmentally-friendly manner with particular focus on the Integrated Coffee Berry Borer Management system (CIB 2010). The project had three main components:

- Integrated (non-chemical) approach to the coffee berry borer, including establishing production facility and conducting trials with *Beauveria bassiana* fungus to arrest infestation; and making and installing borer traps on coffee trees.
- Training for farmers and CIB technical staff in improved agronomic & cultural practices, pest and control - through training sessions and best practices information brochures.
- Provision of coffee seedlings and forest trees (Neem and lumber) to farmers to increase plant density and shade intensity on coffee farms, and also improve on-farm ecosystems.

The project worked with small and medium farmers in communities surrounding the Ueshima Coffee Company (UCC) Craighton Estate: Red Light, Irish Town, Sugar Loaf and Middleton. With

the UCC already being Rainforest Alliance-certified, its production practices are already environmentally-friendly. The aim was to extend these to farmers surrounding the UCC.

The Neem and lumber seedlings were purchased from the FD; and its officers also provided technical guidance and training on proper planting and maintenance of the seedlings. The Pesticide Control Authority (PCA), which is responsible for issuing licenses and permits for importation of pesticides, provided guidance in the safe use of these pesticides and certified individuals (applicator) in application techniques.

The *Beauveria bassiana* rearing facility and lab was located on a private farm owned by Jamaica Standard Products Co. Ltd. in Baron Hall, St. Ann, where the CIB already operates a Rural Rearing Facility for parasitic wasps. The farm's Manager and Nursery Supervisor were involved in supporting this project. UCC's Estate was used as base for the planting material prior to distribution to farmers, as well as for the training sessions.

Reflections/Lessons learned

- The next phase of the project requires a private investor to scale up the production of *Beauveria bassiana* to commercial levels as this is out of the CIB's scope. Exploratory discussions were underway in November 2011 with one company.
- The CIB expressed its concerns over who should be purchasing the *Beauveria bassiana* – i.e. whether the farmers or the dealers.

3.4.2. Eastern Jamaica Agricultural Support Project

The Eastern Jamaica Agricultural Project (EJASP, funded by the EU; 2000-06) was intended to build on the success of and lessons learnt from the precursor project, the Morant Yallahs Agricultural Development Project (MYADP, see below). It was designed to continue the work started in the Morant-Yallahs area, and expand this into the non-MYADP areas of St. Thomas and St. Andrew, as well as into the parishes of Portland and St. Mary. Two of EJASP's main objectives were to increase household income levels as well as to promote more environmental awareness and practices.

To increase income of small farmers (holdings <2ha), EJASP implemented 79 group-based and market-led micro-projects⁵⁶. These increased production and reduced wastage through

⁵⁶ These included goat improvement and production (22); small-scale irrigation (5); road rehabilitation (9); environmental and improved land husbandry (4); land titling (1); agro-processing (4); milk production (1); improved bee keeping (2); fruit tree rehabilitation (2); grape revitalisation and expansion (1); coffee rehabilitation and production (5); and production and marketing of ginger (12), mini set yam (5), Scotch Bonnet peppers (4) and plantains (1). (EU 2004).

improved & timely market information flow to farmers; and maintained or improved land resources through better land husbandry methods. In addition to training farmers and extension officers, EJASP provided technical advice, business-related training⁵⁷, conducted on-farm trials and research for the production of permanent & annual crops and livestock for which markets had been identified. Through its public education activities, it also raised environmental awareness in more than 30 communities in eastern Jamaica.

Reflections/Lessons learned

- There was considerable enthusiasm within the project's communities towards agro-processing as this was seen as having tremendous potential to enhance their livelihoods – not only to absorb surplus produce, but also to provide off-farm employment (considered particularly important for the unemployed young people in the rural areas).
- Many farmers with very small acreages, which already had some permanent trees, were not willing to tie up more of their lands in permanent crops as this meant that they would not be able to income for several years from the land on which these were planted (MoA 2003).
- Two of the most significant challenges which faced EJASP's agro-processing initiatives were (i) coordinating between farms and industry so that scale economies can be created and exploited; and (ii) local farmers being unable to offer a constant supply of produce that the agro-processors required to keep their business going (MoA 2000b). "The fruits and vegetables used by agro-industry are generally seasonal in nature; production tends to vary sharply from season to season, and from year to year, owing to the effects of weather, pests and diseases. In addition, fruits grown by small farmers are not planted in orchards but randomly occur on farms, forest and homes." Accurate forecasts by both the processors and the farmers were deemed critical, although this still did not alleviate the variability in production.
- EJASP's Mid-Term Review and ongoing monitoring activities found that the EJASP's truly "bottom-up" approach worked well to ensure ownership of the sub-projects and good participation in the four parishes (EU 2003, 2004). The Mid-Term Review also pointed out that whilst groups had "been exposed to various training, (they) require a lot of "handholding" to become self-sufficient once EU-funding ends". Amongst its recommendations was that the EJASP should "focus on institutional strengthening beyond the project end-date; and that capacity building - specifically in business management, including record keeping – (would be) required to achieve sustainability of the sub-projects". The project's Impact Assessment Survey similarly noted that "many of the groups, even some of the more successful ones, (were) still fragile and

⁵⁷ This included information on potential markets, market prices, by-products and contacts for sale of produce; record keeping; calculating cost of production; and assessing profitability of crops.

need continued fostering and - not necessarily financial and/or material, but management and group dynamics. Continued technical support and training is essential for most of these groups to survive for the long term (MoA 2003).

- By targeting small farmers and their families, EJASP aimed to lessen gender income disparity. According to EJASP's Project Impact Assessment Survey, women comprised 23% of participants - higher than the 16% of female farmers seen in the project's Baseline Study. Women received special attention, particularly through EJASP's marketing focus as there was a tradition of women managing agro-processing, small trading and marketing ventures. With all its sub-projects being market-driven, women played a key role in the selection and implementation of activities (MoA 2003).
- Since the Project Management Unit had been autonomous, the transfer and capacity strengthening of the RADA was somewhat undermined (EU 2003).
- With EJASP providing support to RADA to offer more extension support in the project areas, the question was raised early on as to how this would be supported at the end of the project given that the communities could not pay for such support themselves.
- The high proportion of persons (71%) expressing satisfaction with the level of services provided by RADA was considered due to the project "ensuring that the extension staff had the necessary resources, including adequate travelling, and the relevant training necessary for the effective servicing of the Project beneficiaries". Those who were not satisfied wanted more extension visits and instruction (MoA 2003).

3.4.3. Hope River Watershed Slope Stabilisation Project

The Hope River Watershed Slope Stabilisation Project was implemented between 2007/08 and 2008/09 by NEPA's Environmental Management sub-division and RADA. The main objectives were to establish visible demonstrations of proper land management practices on degraded lands in the watershed to residents that would be replicable in other watersheds, reduce soil erosion, protect water resources and enhance biodiversity habitat values (NEPA 2009a).

The sites selected - in Windsor Castle and Freetown – took into account the following considerations: good integration of farmers within the project; current risks to residents, their livelihoods and the environment; social and ecological benefits (especially protection of rivers, increasing aquifers' capacity to recharge, increasing biodiversity); manageability and replicability; and visibility (i.e. so that sites could be easily seen by passersby).

Having determined that a combination of erosion control measures would be more effective than any single strategy, these farm plots introduced farmers to both structural and non-structural (vegetative) erosion control methods. At Windsor Castle (1.2-1.6ha), bamboo log barriers, check dams, an improved culvert, a retaining wall and Blue Mahoe seedlings to stabilise serve as soil binders were used; and at Freetown (2.4ha), check dams and pineapple barriers as live contour barriers were used. Training days were also held at Freetown to introduce the farmers to these soil conservation measures.

Interagency public education and awareness enhancing workshops were held to sensitise watershed residents more generally on the environmental and planning issues related to landslides. Topics covered included the importance of trees; solid waste and sewage disposal; water resource management; hazard and risk management; best watershed management practices; environmental laws; and process involved in reporting environmental breaches.

Reflections/Lessons learned

- Recognising that specific expertise resides in different organisations, this project – with its more holistic approach – required good interagency cooperation. At different times, the following were involved to provide guidance and other inputs: UWI, NWA, FD, NWC, WRA, and National Solid Waste Management Authority (NSWMA). Throughout, RADA was involved in the delivery of information and best practices to farmers across the island through the project's farmer training exercises.
- If projects require interagency co-funding and human resource input arrangements, the necessary line items must be written into the collaborating agencies' budgets to facilitate a smooth flow of the various elements that culminate in successful and timely project implementation and completion.
- Some of the strategies proposed were well accepted by farmers – particularly those which yielded positive results in the short term (often the physical structures, which were income-generating to farmers as they were paid for their labour). The vegetative measures were less attractive as their benefits were not so readily visible to farmers.
- With the passage of a hurricane shortly after implementation had started, the whole profile of the watersheds changed dramatically. Any project being implemented in these areas must be sufficiently flexible to allow for changes to activities, budgets, resource allocations...etc.
- A project's effectiveness in terms of soil erosion mitigation and heightened environmental awareness requires careful monitoring, using appropriately designed survey instruments.

3.4.4. Integrating Watershed & Coastal Areas Management

This GEF-funded regional project, implemented between 2006-11, had an overall objective “to strengthen the commitment and capacity of the participating countries to implement an integrated approach to the management of watersheds and coastal areas (as part of a) long-term goal to enhance their capacity to plan and manage their aquatic resources and ecosystems on a sustainable basis.” Through a number of demonstration projects which targeted national hotspots where specific environmental threats had been identified, this IWCAM project sought to capture and transfer lessons and best practices both nationally and regionally. These were linked to the project's activities of information transfer, partnership forums for replication, policy and legislative reform as well as institutional capacity-building and training. (NEPA 2006, 2008a-f).

In Jamaica, IWCAM was implemented by NEPA. Its main activities included: (i) Capture of Best Lessons and Practices through other coastal, watershed and community management initiatives within the country for formulation of a model *Watershed Area Management Mechanism* (WAMM); (ii) Development of a model WAMM and its implementation in the Drivers River Watershed (DRW) in the Eastern Portland Area⁵⁸; (iii) Implementation of programmes to remove barriers and resolve threats; and (iv) Identification of transfer and replication mechanisms to allow for these lessons to be applied to other Watershed Management Units within Jamaica.

The GEF-IWCAM demonstration project in DRW comprised the following five elements (NEPA 2011a):

- *Environmental Monitoring*: monitoring of environmental and other indicators (volume of solid waste, siltation, water quality, governance, etc.) to assess project impact and to guide policy reform and legislation;
- *Public Education*: development and implementation of participatory approaches to environmental stewardship and awareness, information dissemination and enforcement of existing regulations and policies among communities in the project area.
- This included ongoing community/town meetings, advocacy training, enforcement workshops, working with schools (e.g. debate, poster and essay competitions; farmers providing training to school children); as well as events like the Enviro-Concert, Environmental Expo with sport component and commemoration of Environmental Days. Several presentations were made: Youths Track Meet, Children's Forum, Youth Service Resident Camp; Jamaica Institute of Environmental Professionals Conference; and local cable network. The 'Watershed Exchanges' allowed the exchange of ideas and best management practices, as well as meetings between watershed groups in and outside the project area.
- *Agriculture and Sustainability Livelihoods*: promotion of economic activities as alternative practices with reduced impact to the WMU, through conservation and environmental management programmes within the project area.
- Livelihood activities supported included: juice puree, wine and liquor production; rearing of broiler chicks (including by schoolchildren and women); fruit and timber tree production (agro-forestry), and recycling of paper for crafts (NEPA 2011a). Farmers Training days were held on land husbandry techniques, basic composting, and proper soil stabilization (e.g. stone barriers, grass barriers, pineapple barriers, contouring, terracing, agro forestry, mulching, and inter-cropping). Additionally, proper tree planting

⁵⁸ Once developed, NEPA's Ecosystems Branch intended to use this WAMM to implement change in the remaining 25 WMUs across the island.

techniques were also demonstrated, and the Pesticide Control Authority made a presentation on environmentally friendly pest control techniques and systems.

- *Governance and Enforcement*: strengthening of the institutional and human resource capacity of the sustainable watershed and environmental management agencies within the project area.
- *Small Grant Programme*: provided funding to initiatives throughout the watershed that supported the principles of integrated watershed management, designed and implemented by community members.
- Grants were awarded for the following: 12 garbage facilities constructed; 8 community clean-up days held to remove garbage; 5 schools' sanitation system improved; 500 coconut seedlings, 400 cassava sticks and 1000 fruit & timber seedlings planted; soil conservation and sedimentation reduction (including stabilisation of a section of the Martha Brae River to contain river bank erosion); approximately four plots of stone and lime grass constructed; and 498 bags of organic fertilizers distributed.

Reflections/Lessons learned

- Considered overall a successful project, in Jamaica this has been attributed to “the combination of an effective community participation strategy, the capacity and institutional linkages of the project management agency (NEPA), a supportive legislative and policy environment, and the strong partnership with other agencies who worked on the project. (NEPA 2011a).
- Given “the integrated and interlinked nature of watersheds and coastal areas”, the project aimed to “develop a more sector-coordinated management approach, both at the national and the regional level, with a strong emphasis on an expanded role for all stakeholders within a participatory management framework”. As noted above, the demonstration project supported a vibrant programme of outreach activities.
- Underpinning the WAMM in DRW was strong community involvement, in the planning as well as implementation phases. The initial consultations with the community – which introduced the project, its goals and objectives; identified capacity gaps; defined priorities and found solutions; and helped to develop a realistic work plan - “not only incorporated the views of stakeholders, but facilitated ownership of the process, outputs and responsibility for outputs” (NEPA 2011a). Under its *Water Quality Monitoring* programme - through which water sampling⁵⁹ was done at 9 marine sites and 20 fresh water sites - community members trained to collect samples. Likewise, the project's *Knowledge, Attitudes and Practices (KAP) surveys* involved 60 community members being trained to administer them.

⁵⁹ Six parameters were tested: pH, nutrients (phosphate and nitrates), biological oxygen demand (BOD), total suspended solids (TSS), and faecal coliform.

- IWCAM recognised that public education and awareness activities were essential for the public to be motivated to participate in the implementation of the project as well as subsequently. A professional ‘animator’ was used for town meetings, and this proved very effective in reaching a wide audience with the IWCAM approach to watershed and coastal management as well as ensuring good communication regarding the project’s activities. The project’s Mid-Term Evaluation concluded that “future projects should consider using innovative / creative means to convey key project messages to a wider public audience” (NEPA 2009b).
- The Mid-Term Evaluation stressed the “need to encourage wider access to environmental information throughout the civil society, and to motivate governments (showing both the mechanisms and benefits) to enable this information to be made available to the public in a timely way.”
- Given IWCAM’s geographic spread and multiplicity of activities, the advantages were apparent of the project having a good monitoring system - adequately resourced, with well-defined performance indicators (not simply expenditure-related) and clear milestones.
- The WAMM model developed for Drivers River, Portland proved very successful - a practical and flexible method for engaging a wider range of stakeholders in watershed management. A similar participatory approach is currently being employed for Black River and Montego Bay. Although a small amount of funding is still coming from IWCAM, the latter are already embedded in NEPA’s routine work plan.
- At the end of the project, outputs from IWCAM were handed over to the local level DAC so that they could continue to disseminate information.
- According to this same Evaluation, “part of the success of the demonstration project in Jamaica (was) attributed to building on a previous ‘Ridge to Reef’ project that encompassed many of the ideals of GEF-IWCAM (...thus) showing the benefits of extending previous project activities to further enhance national capacities and provide long-term commitments to environmental improvements.” The recommendation was for projects, wherever possible, to build on progress made by prior interventions.
- Observed at the regional level but equally applicable to the national situation, “both the donors and the recipient countries (were) concerned about the apparent replication of project objectives and the lack of coordination between related projects, donors and countries over their long-term objectives (...) Specific note (was therefore) made of the need to coordinate, (also) with other GEF-funded regional projects.”

3.4.5. Morant Yallahs Agricultural Development Project

Funded by the EU, the Morant Yallahs Project was implemented in the watersheds of the Morant and Yallahs rivers between 1996-98. It was envisioned as a 3-year pilot project to guide the development of agriculture in an environmentally-secure fashion, through the implementation of programmes to: introduce sustainable and environmentally-friendly farming

systems; raise farm incomes; assist farmers in securing tenure for their holdings; improve the ability of farmers to farm efficiently through rehabilitation of farm infrastructure.

In terms of *sustainable land management practices*, training - which was done through workshops and field days as well as farmer-to-farmer learning – was given in: soil erosion prevention methods such as the lining out and building of contours, individual basins; trenches and pineapple barriers; planting methods for crops such as peanut, pineapples, mini-sett yams and tree crops; land clearing; detection and treatment of pests and diseases; general care of and the application of medication to animals (goats); agro-processing; and mixed cropping. Other direct benefits from the project included seedlings (coffee and fruit trees), planting materials, chemical and organic fertilisers, marketing training and advice, and marketing facilities. In addition, farmers were paid for work done on their own farms in the preparation and maintenance of project demonstration/experimental plots.

An important objective of MYADP was to increase the *planting of trees* throughout the project area and the *rehabilitation of tree crops*⁶⁰. As a result, a significant number of trees were planted on both government owned (mainly forest trees) and privately owned land (mainly fruit trees and coffee). In addition, many of the existing tree crops, especially such crops as mangoes, breadfruit and ackees, were rehabilitated.

The project's *Marketing* component (i) supported the formation of sustainable Producer Marketing Groups (PMGs) to collect, grade, contract and transport produce to market; (ii) promoted local agro-processing activities so as to avoid continued wastage, add value to produce sold, generate income for women and young people, and increase the nutritional level of the communities; (iii) assisted in the development of better communication links between farmers and the market; and (iv) provided post-harvest and marketing advice and training to enable small scale producers to develop more cost effective marketing practices for those crops not already dealt with by commodity boards.

MYADP also included an *Extension & Community Education* component, to strengthen key rural development institutions such RADA, Parish and Area Development Committees (ADCs), NGOs and Farmer Associations. This included a training programme for RADA's Extension Staff as well as farmers on improved technologies and training skills.

⁶⁰ The Project aimed to (i) replant 190 ha of forest plantations in the Yallahs and Morant watershed areas; (ii) encourage private tree planting on 28 ha of private land by supplying seedlings to farmers at subsidised prices; and (iii) improve the existing nursery capacity at Clydesdale to supply planting materials for the project as well as to meet additional farmer demand.

Under its *Land Titling* component, the project aimed to facilitate 567 titles being issued to settlers. This was linked to its *Road Construction and Rehabilitation* programme.

Reflections/Lessons learned

- During its Mid-Term Evaluation, respondents were asked to suggest ways in which the project could better serve the farming community. The responses reflected a “long-standing perception that all projects should be hand-outs rather than the MYADP approach of cost-sharing (e.g. farmers were expected to make a small contribution towards the cost of fertiliser and seedlings) and long-term beneficiary investment.” (MoA 1998)
- According to the same evaluation, 41.4% farmers had increased their use of soil conservation methods, 63.9% had increased their environmental awareness and 51.7% had planted permanent crops (trees) after only a couple of years’ implementation.
- Farmers were interested in planting timber trees on their lands and were willing to contribute to the costs, contrary the project personnel’s initial thoughts. Although most were interested in the future yield of lumber, a “significant proportion was concerned with protecting the environment, protecting their own lands, improving soil fertility, and promoting rainfall and soil water retention”.
- Project implementation was adversely affected by the severe drought in late 1996 and late 1997, particularly as this impacted on crop production and therefore income levels. It must be noted that farmers expected the project to increase their income in the short term and result in an improved standard of living for themselves and their families.
- Overall, 25% those involved in the project were women – of which most (43%) were involved in agro-processing under the marketing component. Agro-processing was almost exclusively female, whereas most of the farmers in the producers’ marketing groups were male. The evaluation stressed the need for more women to be encouraged to be involved in farming in order to stem the rural to urban drift of women out of the project area. *Note: The MYADP’s Baseline Study had found that women accounted for more than 60% of the unemployed household members in the project area.*
- Some advances were reported for a number of communities covered by MYADP as the project’s marketing component resulted in links being established with local and export marketing agents. *Producer Marketing Groups* were established for crops like carrots in the Woburn Lawn/Ness Castle area, and mangoes in Llandewey, and worked fairly well. In St. Mary, farmers in areas such as Islington, Frasers’ Wood and Duckgate were affiliated with various local marketing groups which have contractual arrangements to supply hotels and supermarkets. In the case of Sandals, the hotel group provides the farmers with seeds to grow specialty crops such as zucchini, broccoli, cauliflower and red and yellow peppers. On maturity, the hotel buys the crops; and technical assistance is given to the farmers by RADA. This arrangement has proved mutually beneficial to the farmers and the hotel, and is working well. Having “a structured system to assist (farmers) improve sale of their crops, the general marketing arrangements for the PMGs as well as increased sales of products by the agro-processing groups (particularly to use

up surpluses that cannot be sold)” were all considered success stories for the project (MoA 1998).

- Formation of farmers’ groups required considerable time and support from the project. When the project was running behind schedule, attempts were made to fast-track this process – resulting in weak and fragmented groups. It was felt that the groups’ lack of cohesiveness impacted the project’s overall sustainability.
- The project had foreseen that land use plans would be drawn up for each of the areas, and that these would be based on survey reports which would establish the area and boundaries of lands to be planted. In the haste to start land clearing and planting, these were not always done (or done properly) – something which caused multiple problems for the project, including more land being cleared than was planted, waste of project resources, inaccurate implementation results...etc.
- When evaluating the project’s road construction component, several respondents stated that this “would give them improved vehicular access to where they burn charcoal and allow them to expand their charcoal burning enterprises.” The report cautioned that “vigilance be maintained so that uncontrolled charcoal burning does not lead to a deleterious effect on the environment (where) the new roads are opening up.” It went on to recommend that “the charcoal burners be organised so that their activities can be carried out in an environmentally friendly, controlled manner.”
- Some communities appreciated the project for the employment opportunities provided by project e.g. land preparation, tree planting and maintenance for the public reforestation, road construction, supplying lunches to communal projects etc.
- The initial time frame of 3 years was found too short to allow “most of the targets to be achieved (... and) for many project benefits to be realised or sufficiently evaluated”.
- A good monitoring system, with field checks done on a regular basis, was felt to be very important in allowing the project to keep on track and to solve problems as they arose. For this to work, the Monitoring Officer/Management Information Specialist should be independent and also have “full-time exclusive access to a vehicle (to avoid being) dependent for transportation on the very officers whose component s/he is monitoring.”
- Key in the implementation of MYADP, RADA’s input was constrained by: (i) lack of mobility of extension field officers (which was further exacerbated by the remoteness of many communities and the poor condition of access roads to these communities), (ii) inexperience of many of its officers; (iii) cash flow problems within RADA, where extension activities were limited on account of several months backlog of travelling claims reimbursement; and (iv) complaints by RADA officers of taking on “additional” project work without compensation. For the most part, these were addressed following the Mid-Term evaluation.

3.4.6. National Capacity Self-Assessment Project

Whilst this project does not contain activities related to SLM practices, provision of extension or community-capacity building, it nonetheless gives a useful insight into what elements may constrain the Yallahs & Hope Rivers Watersheds Project until adequately factored into its design.

The purpose of the National Capacity Self-Assessment (NCSA) Project was “to provide Jamaica the opportunity to conduct a thorough self-assessment and analysis of national capacity needs, priorities and constraints with respect to its efforts at meeting global environmental management objectives”. It was implemented in two phases between 2004 and 2006.

Executed by NEPA in consultation with the Project Steering Committee (PSC) and UNDP, the project’s objectives were to: (i) Identify, confirm and review priority issues for action within the thematic areas of Biodiversity, Climate Change and Desertification⁶¹; (ii) Explore capacity constraints and needs within and across the areas at various levels (systemic, institutional and individual); (iii) Elaborate a National Action Plan that focuses on capacity building to address the global environmental commitments; (iv) Provide solid basis for the preparation of requests for future external funding/assistance; (v) Link country action to the broader national environmental management and sustainable development framework; and (vi) Monitor and evaluate the implementation of the Action Plan. (NEPA 2003b, 2005b-f)

Reflections/Lessons learned

- A number of constraints were found across all three thematic areas, including: lack of human and financial resources; inefficient dissemination of information at the national level; loss of biodiversity and the corresponding goods and services not properly understood and documented; existing scientific and traditional knowledge not fully utilized; and lack of public education and awareness at all levels.
- Looking particularly at the cross-cutting issue of *Public Awareness Education and Training*, the following constraints were noted (NEPA 2005f):
- Individual: media and communications practitioners need to be engaged in the process and given environmental exposure; environmental experts need communications/media training to help them to make better use of media and communication techniques in getting their message across; ignorance of environmental issues; entrenched cultural practices and behaviour inhibit change; and attitudinal resistance to change.

⁶¹ As per the three Rio Conventions: Convention on Biological Diversity (CBD), UN Convention to Combat Desertification (UNCCD), and UN Framework Convention on Climate Change (UNFCCC).

- Institutional: need for trainers for community learning; teachers in the school system need more environmental training; and projects and incentive schemes are needed for more communities to engage in environmental activities
- Systemic: need for clear policy initiatives for environmental education; more learning Resources are required together with a system for accessing and sharing information; poor coordination and sharing of resources between government agencies with similar objectives in environmental education; need for sustainable long term funding for environmental education (– short programmes do not produce the behaviour change which is necessary to achieve impacts in environmental management at the community level); and local good practice projects are not being given national attention and are therefore not being replicated nationally.

3.4.7. Reducing Climate Change-Driven Erosion & Landslide Risks through Sustainable Agriculture for Safer Slopes

Funded by the GEF/UNDP's Community-Based Adaptation (CBA) Programme, this project was implemented by the JCDT from 2008-10 (JCDT 2008 and 2011a). Working with communities in Woodford (St. Andrew) and Cascade (upper Buff Bay, Portland), the project's objectives and activities were:

- *Increased agro-technical capacity for applying soil conservation techniques for steep slope environs*: Training in cost-effective soil conservation methods for 40 farmers (- this included field trips, and sharing between communities); Demonstration projects of soil conservation practices on farms (including pineapple and fever grass contouring to reduce soil erosion: approximately 2000 pineapple suckers distributed among farmers to form the barriers on their farms, resulting in 40 hectares of land that will be sustainably managed).
- *Promotion of alternative livelihoods*: Demonstration projects of greenhouse farming; Training in organic farming for higher value produce.
- *Promotion of forest and tree cover on slopes that are vulnerable to climate-driven increases in erosion and landslide risks*: Tree planting on degraded land within & outside Park (restoration of approximately 10ha of degraded land in and around the BJCMNP); Farmers practicing agro-forestry (using fruit and native tree species, including citrus, ackee, lychee, blue mahoe and cedar).

Reflections/Lessons learned

- From the *Vulnerability Reduction Assessments* conducted with both communities prior the project's start, residents in Cascade felt at greater risk than those in Woodford of being impacted by hurricanes and related soil erosion (JCDT 2009b). These assessments, which also captured useful baseline data, enabled the communities to better understand their vulnerability and to see how project activities could positively affect their livelihoods.
- Farmers were introduced to varying practices which they readily adapted on their farms as a way of positively impacting the environment and saving their livelihoods.

- Through the training and demonstration plots, farmers realized that there were alternatives to chemicals for treating pests and diseases on their farms.
- As the project fostered good group dynamics and team work, this influenced farmers to take on different leadership roles and positively impacting members of the group as well as the community.
- The farmers had financial benefits, in the short-term through the greenhouses (vegetables) and pineapples as well as subsequently from the sale of fruits from the fruit trees.
- There were inadequate plans incorporated into the project design for problems such as the effect of natural disasters on the activities (e.g. the greenhouse were damaged during heavy rains, which required funds for repairs and set-back the implementation schedule).
- There should have been additional activities and plans beyond the end of the project for participants to increase their confidence in adapting all the practices introduced.

Overall, this project was considered very successful. In part, this was attributed to the fact that JCDT has been working with these communities for a long time and already had a good relationship based on trust. As such, the farmers were open to learn and willing to incorporate new practices.

3.4.8. Ridge to Reef Watershed Project

The Ridge to Reef Watershed Project (funded by USAID; 2000-2005) built upon two earlier projects: the *Environmental Audits for Sustainable Tourism Project* and particularly the *Coastal Water Improvement Project (CWIP)*. R2RW was designed to establish strong community partners to improve environmental management and expand the coastal mandate of CWIP into upland areas. It had three interrelated components:

- Working with local-level organizations to identify and promote *sustainable environmental management practices* for resource users;
- Identifying and supporting solutions that encourage better *compliance and enforcement* of existing environmental regulations and policy; and
- *Institutional strengthening* of Jamaican government agencies, private sector and civil society organizations to implement effective watershed management programs in Jamaica.

The R2RW project implemented more than 100 activities in the two targeted watersheds: the *Great River Watershed*, which faced numerous environmental threats caused by agriculture and urban development; and the *Rio Grande Watershed*, an area of significant biodiversity which was threatened by deforestation, soil erosion, inappropriate land use, and mining. In both watersheds, *Local Water Management Committees (LWMCs)* were formed with representatives from the communities, state agencies, central government and all other stakeholders interested in watershed management to identify and address priority issues. R2RW provided training to these LWMCs, including in book keeping; and one became a legal entity, registered as a Benevolent Society. By the end of the project, the LWMCs were coordinating and

implementing new plans to address additional issues in their watershed – including one which had a 5-year plan developed. The project also developed a *Procedures Manual: Establishing and Operating a Local Watershed Committee*. (NEPA 2005a)

To persuade farmers to invest their time in planting timber and fruit trees (including agroforestry), improving drainage and establishing vegetative and other barriers on hillside contours, R2RW worked with farmers groups and conducted extensive on-farm training. A lead farmer was selected from each group, whose farm would be used as a demonstration farm. Training would take place on these - ‘Promotional Field Days’, and conducted by R2RW technical officers, RADA as well as persons who understood group dynamics from SDC and JAS.

R2RW also included *income generation projects* to expand honey production, produce hot peppers for the fresh export market, produce vegetables targeted at hotel chains, improve the meat production of goats through improved breeds, and to expand the production and productivity of pineapples in the pineapple belt of the upper Great River Watershed.

Having assessed the needs of its partner agencies and stakeholders, R2RW’s *Training* was delivered through conferences, workshops, practical field days and class rooms. It covered a wide array of topics intended to build capacity, provide technical information and raise environmental awareness⁶². Its *Public Awareness Strategy* was designed on the results of the project’s KAP study, and used innovative means to convey its messages often including theatre and music⁶³.

R2RW also supported the development of the programmatic framework for a **National Integrated Watershed Management Council**. Involving various agencies - NRCA (NEPA), PIOJ and RADA – the Council held its first meeting in 2001. It focused on issues such as private sector investment in watershed management, coordination of governance to ensure holistic,

⁶² Leadership Training, Grants Management, Meeting Management, Minutes Taking and Agenda Setting, Effective Report Writing, Fundraising and Proposal Writing; Wetlands Education, Gender and the Environment, Training in Enforcement, and Environmental Advocacy, Advance Participation Methods; Growing Scotch Bonnet Pepper with Organic Inputs, Pineapple Production and Pesticide Management, Perennial Crop Farming, Introduction to Exotic Vegetables, Herbs and Spices; Video Making, Community Photography and Video Techniques.

⁶³ For example, the River Action with the Action Boyz used skits to dramatize environmental themes to more than 3000 people in 20 communities, and before large crowds at the Montpelier and Denbigh shows; 4 “green” competitions were held in the watersheds which drew on communities’ competitive motivations to engender stewardship values; town hall-type meetings used entertainment with environmental messages; special public workshops were held, including three Youth & Environment Conferences as well as a Faith & the Environment Conference. In addition, 14 posters (tested by focus groups) highlighted key aspects of environmental legislation for use in schools, communities and by NEPA; and videos were used to disseminate technologies such as pineapple production, environmental laws, care of tree crops, and constructed wetlands.

integrated approach, crop recommendations, institutional capacity-building etc. It was mainly concerned with two watersheds – Rio Grande and Great River; and continued until 2007.

Reflections/Lessons learned

- The project worked with more than 50 partners, in the GoJ, NGOs and CBOs. In responding to their needs and priorities, there were high levels of stakeholder and community engagement throughout the project.
- R2RW can be described as a “process driven project”: it first assessed the target areas through Rapid Rural Appraisals, then conducted Strategic Action Planning Workshops which led to the formation of the LWMCs and subsequent establishment of their respective Task Forces to address priority areas of concern. Whilst this took 2 years to come to fruition, it is clear that this investment of time and resources in determining and addressing local needs greatly engendered ownership and sustainability (NEPA 2005a).
- During R2RW’s initial community meetings, residents proposed providing people with livelihood opportunities that were environmentally sensitive as the best way to increase the focus on improving the environment. “Persons whose basic needs were met with more secure income are more able to focus on quality of life issues. (...) The early identification of the link between livelihoods and the environment and the flexibility of project management to respond to community demands led to sustainable initiatives that both improved incomes and natural resources management.
- Farmers were found to readily accept the new practices, which also introduced minimum and zero tillage as well as more responsible use of pesticides and inorganic fertilizer. Some aspects of their existing systems were encouraged so as to satisfy their livelihood objectives (e.g. planting of short term crops in between barriers). “The visual impact of new practices adopted by demonstration farms not only prompted other farmers to adopt, but offered them the know-how through the hands-on nature of Promotional Field Days. The results were impressive as land degradation was noticeably lower on farms adopting the new practices, especially after major flood events and a hurricane. Advocating change was a much easier task for R2RW following these disaster events, very much helped by effective demonstrations and visual impact” (NEPA 2005a).
- The project’s KAP study revealed low levels of awareness regarding what was a watershed as well as how people’s actions impacted on natural resources management. On basis of these KAP findings, R2RW’s *Public Awareness Strategy* was developed with “a multi-faceted approach that did not depend on the use of too much written material (given that people did) not get their information by reading.” Public awareness – seen as important to sustainability – required time and resources to be effective. When started ahead of sub-projects/investments, was found to instil a stronger sense of ownership and pride in the communities.
- By addressing community-defined priorities for improved environmental services, R2RW “built confidence, stewardship values and demonstrated that communities can address problems locally” (NEPA 2005a). Examples of this included: providing technical support for the development of a low cost method of disposing of sewage through

environmentally-sensitive constructed wetlands; organising more than 50 community clean-up programs to clean road verges, clear blocked drains, and clear illegal dumps; and linking communities to the National Solid Waste Management Authority (NSWMA) to build holding areas, deploy garbage bins and skips, and to organize the long-term collection of solid waste.

- R2RW's training was tailored to each group to ensure that everyone could understand (including those who were not literate). Whilst a certain amount of theory was covered, these sessions always had more "on the ground", hands-on and practical components.
- With emphasis given to assisting the LWMCs be sustainable beyond the end of the project, it was felt that this model "can be replicated in all watersheds as well as adopted to all natural resources management groups in Jamaica" (NEPA 2005a).

3.4.9. Trees for Tomorrow Project

Funded by the Canadian International Development Agency (CIDA; 1991-2006), the Trees for Tomorrow (TFT) Project sought to increase the capacity of Jamaica's Forestry Department (FD) to plan and manage forests, and develop and implement soil conservation measures appropriate to Jamaica's environment. This was achieved through appropriate watershed interventions, improving present land use practices, and assisting farmers to adopt sustainable rural forestry systems in the selected Watershed Management Units (WMU) – including Rio Minho, Martha Brae, and Buff Bay/Pencar (FD 2002 & 2004).

In these areas, the combination of steep and unstable slopes, highly erodible soils, numerous geological faults, improper land use, deforestation and intensity of rainfall resulted in accelerated soil loss and landslide occurrences. To combat this, a mixture of biological/cultural, engineering and revegetation practices were considered and the most appropriate recommended in each location to contain and reduce erosion and landslide hazards⁶⁴ as well as to minimise flooding, stream erosion and sedimentation. In addition, information on soil and water conservation as well as the impacts of soil erosion on livelihoods was disseminated regularly to farmers and within communities.

Amongst its outputs was the "National Forest Management & Conservation Plan" (FD 2001).

⁶⁴ These included clearing vegetation manually without burning and using this to create mounds aligned to the contours of the slopes; minimising removal of trees and shrubs on steep slopes; adoption of no-tilling practices in the establishment of permanent crops and agroforestry systems wherever possible; using (deep-rooted) vegetation to control rainfall impact on surface soil and areas susceptible to landslides; planting fast-growing tree species within and adjacent to landslides; practice mulching, green manuring and composting; and minor engineering structures such as chute drop spillways, small check dams, grass/concrete waterways; channelling and diverting runoff water away from existing landslides (FD 2004).

Reflections/Lessons learned

- It was felt that “priority should be given to biological measures rather than engineered structures which require considerable resources to construct. Simple and inexpensive agronomic treatments such as grass strips, mulching and strip cropping (were considered) a more appropriate choice of technology” (FD 2002).
- In order to ensure community participation, it was necessary to make people aware of the problems of erosion and how it threatens their livelihoods through showing them the relationship between decrease in crop yield and land degradation (FD 2002).
- The LFMCS required a specific focus to keep them together and active, according to M. Headley, Conservator of Forests, FD (2003). The FD and the LFMCS therefore “looked at ways for local communities to benefit directly from their involvement in forest management.” The Pencar LPMC established a plant nursery on land leased to it by the FD, and the Buff Bay LPMC proposed an ecotourism venture – both economic opportunities based on the forest resource.
- M. Headley concluded that “the establishment of the LFMCS carried a high cost (for the FD): in the four months leading to their official launch, the sensitization and awareness programme included attendance at more than 80 community and group meetings. People’s willingness to listen was a direct result of the groundwork laid during the FD’s (earlier) outreach activities. The heavy investment in personnel time, travel costs and other expenses was supported through the Trees for Tomorrow Project as part of the overall activities being implemented in the Buff Bay/Pencar pilot area. The experience has shown the Forestry Department that trust building and overcoming scepticism of government is essential to developing working partnerships with communities.”
- The strength of LFMCS depends largely on the strength of its executive.

3.4.10. Other Completed Initiatives

The **Forest Conservation Fund**⁶⁵ makes small grants to community groups in high priority watersheds for reforestation and SLM projects. One of one seven priority sites is the Blue and John Crow Mountains National Park (Blue Mountain Forest Reserve), adjacent National Water Commission lands, plus buffer areas of unprotected closed broadleaf forest in the Rio Grande, Swift River, Buff Bay, Morant, Yallahs, Hope and Wag Water watersheds. It has already funded a number of projects in the Project Area, notably:

- ***Reforestation of 25 Hectares of Degraded Forest Reserve at Cinchona in the Yallahs Watershed***⁶⁶, implemented by the Lions Club of Mona (3 years, J\$ 13,465,080): The goal

⁶⁵ <http://jpat-jm.com/netcentr/fcfund/fcfund.html>

⁶⁶ <http://jpat-jm.com/netcentr/fcfund/cinchona.html>

is to contribute to the sustainable management of the country's productive systems by promoting the maintenance of ecosystem integrity. The project addresses the issue of reforestation in order to stem soil erosion, slash and burn cultivation and illegal cultivation, and involves forest restoration (25ha of degraded forest reserve replanted, 650 trees/ha of hard wood species using 6 different species).

- ***Dallas Forest Conservation Project***⁶⁷, implemented by the Dallas Castle Community Development Council (CDC) (3 years, J\$ 2,696,045): The goal of this is to stabilize and restore tree cover to a 3 acre slope in the Dallas Castle Community. The objectives are to: ameliorate the risk of further damage by stabilizing and restoring the land; avert a potential major catastrophe, as the land slide threatens homes, lives and property of residents in the immediate environs of the site; and reduce the potential isolation of the community after heavy rains and road blocks.

⁶⁷ <http://jpat-jm.com/netcentr/fcfund/dallas.html>

Current Initiatives

3.4.11. Capacity Building for Forest Conservation and Sustainable Livelihoods in the Blue Mountains Sustainable Land Management

Recognising the threats to the Blue and John Crow Mountains National Park (BJCMNP/FR) of limited education and sustainable income-generating opportunities in surrounding communities, JCDT is currently implementing a multi-pronged project which includes enforcement, education and capacity-building (JCDT, 2009a). This project aims to abate the problem of deforestation by (a) raising awareness and knowledge about the importance of forest conservation, to be measured by administration of simple questionnaires; and (b) increasing the implementation of sustainable agricultural and tourism practices, to be measured by assessing changes in practices of those involved in the project. It will also establish CBO offices/BJCMNP/FR information centres.

In terms of building capacity for sustainable livelihoods, the project will target all 40 communities in the BJCMNP/FR Community Buffer Zone (1km around boundary) through awareness-raising and educational activities in schools and communities. In 6 targeted communities – Millbank, Charles Town, Woodford, Cascade, Irish Town and Mavis Bank – business planning, sustainable agriculture and/or sustainable tourism training will be provided. In at least 4 of these communities, sustainable livelihoods projects will be selected⁶⁸ and business plans will be developed in the first year through training with community members. These plans, together with the Forest Conservation Fund's seed funding, will be used to raise additional funded where required.

Recommendations/Possible linkages with Yallahs & Hope Rivers Watersheds Project

With this project's inclusion of capacity-building in the communities with regards to non-agricultural sustainable livelihoods, JCDT is well placed to lead similar activities under the Yallahs & Hope Rivers Watersheds Project – notably the non-agricultural training and Marketing Plans under Component IV.

3.4.12. Climate Change Adaptation & Disaster Risk Reduction Project

Funded by the EU, the *Climate Change Adaptation and Disaster Risk Reduction (CCADRR) Project* seeks to “assist with the adaptation to climate change and to contribute to the sustainable development of Jamaica by increasing the resilience of vulnerable areas and reducing the risks that are associated with natural hazards, particularly in vulnerable

⁶⁸ These may include building a gazebo at Neem Park for education and picnics (Millbank), repairing and improving the Maroon Museum (Charles Town), and developing a waterfall attraction (Cascade).

communities” (PIOJ, 2010c). The partners involved are PIOJ, FD, NEPA, EMD, Meteorological Services Jamaica, and UNEP; the project’s implementation period is 2010-12.

More specifically, the project’s expected results are to:

- Rehabilitate watersheds through slope stabilization measures such as reforestation of denuded hillsides to reduce downstream run-off and associated negative environmental and human impacts;
- Increase resilience of selected coastal areas potential to climate change impacts through restoration and protection of their ecosystems; and
- Enhance institutional and local level capacity from climate change adaptation and disaster risk reduction through increasing capabilities and raising awareness.

The watershed component of the project focuses on the following areas: Yallahs and Hope River WMU⁶⁹; Portland Bight; Palisadoes/Port Royal Protected Areas (Refuge Cay); St. Thomas Morass; Buff Bay/Pencar WMU; and Rio Bueno WMU. These locations were selected on account of their varying levels of degradation as well as their importance in protecting the shoreline, preserving biodiversity and providing other socio-economic and environmental benefits (PIOJ, 2010c).

The project’s expected 1st result is particularly relevant to the planned Yallahs & Hope Rivers Watersheds Project; and is to be achieved through the following activities – mainly through the FD: facilitating the establishment and improvement of community-based management structures or organizations (including two LFMCs in Yallahs – Westphalia and Haws Delight); procuring seeds to restore 300ha of degraded watersheds lands (Crown Lands); promoting agroforestry practices (fruit and timber); comprehensively assessing all forested Crown Lands and developing land use (cover) maps⁷⁰ and a geo-referenced database; declaring an additional 2600 ha of Forest Reserves and Forest Management Areas; developing a comprehensive *Forest Fire Management Programme*; promoting the development of sustainable livelihood/economic activities through conservation and environmental management programmes; and establishing river protection infrastructure/structures in selected areas. The FD will also develop a permanent plot for carbon monitoring and biodiversity.

⁶⁹ In the Yallahs watershed, the proposed locations are Bellevue Heights, Abby Green, Mt. Tiviot, Old England and Clydesdale; and in the Hope watershed, the locations include: Dick’s Pond and Oatley.

⁷⁰ These have already been done for Cockpit Country, Rio Minho, Buff Bay/Penn Carp and Martha Brae; and are currently underway for Yallahs, Hope & Wag Water. In addition to aerial photos (likely 2008 images), these maps will also include photos taken at ground level – indicating, amongst other things, land uses such as abandoned fields, grassland, pasture, total burn, fields (food crops and fruit trees gardens), and type of forest cover (e.g. plantation, bamboo, Caribbean pine, Honduran Mahogany etc). For forested areas, additional data is being collected – including tree height, density and disturbance.

Although the project was approved in October 2010, the FD only came on board in February 2011. Since then, 148 ha have been restored; the assessment of Crown Lands and declaration process are underway; sample and permanent plots have been started; community meetings are being held for the LFMCS, Fire Management Plan as well as for the alternative livelihoods (needs assessments).

The project's Communication Campaign is also about to start: a Communication Specialist, being recruited and who will be based in the Met Office, will have responsibility for a pilot education programme which will target groups island-wide and policy makers through the media, town hall meetings, brochures and audio-visual kits. This activity is expected to be rolled out by March 2012, although the FD will start earlier with their groups.

Under this project, two KAP surveys will be conducted: the first will be completed by January 2012⁷¹; and the second will be conducted at the end of this project (January 2013).

Recommendations/Possible linkages with Yallahs & Hope Rivers Watersheds Project

- As this project includes reforestation activities on crown land, the FD has recommended that this Yallahs & Hope Rivers Watersheds project focus on replanting on private lands.
- Given the long-term value of timber trees, the FD believes that they are less likely to be cut down in future. That said, their long-term nature of their return must be balanced with near-term returns.
- Some of the communities are well aware of environmental issues. In the case of the Maroons, caring for the environment is embedded in their culture; and in another community, a woman's group has established a tree nursery as a result of JCDT's work there (possibly with funding from GEF Small Grants Programme or the EFJ).
- There is also provision for a baseline study to be conducted for the Dallas/Constitution Hill areas in the Hope River watershed.
- The project does not include funds specifically for the alternative livelihoods component, although some funding may be possible under the LFMCS budget headings as well as through other project(s).
- As the project includes a communication campaign, there may be possible synergies with the Yallahs & Hope Rivers Watershed Project's public awareness activities.

⁷¹ This island-wide climate change-related KAP will be funded under PIOJ's *Pilot Project for Climate Resilience* (PPCR): *Phase 1*, funded by the Climate Investment Funds (CIF) Administrative Unit.

3.4.13. Hazard Mapping & Reforestation for Disaster Risk & Reduction in the Blues Mountains Project

Soil erosion (including landslides) and fires (which can increase susceptibility of land to erosion) are two issues of particular concern on the southern slopes of the Blue Mountains (JCDT 2011b). In keeping with the BJCMNP Management Plan, which includes the promotion of research to guide the Park's management, this project is intends to assist the JCDT improve its reforestation and invasive species control for disaster risk reduction through the following research activities: mapping of the hazards in specific areas; identifying, if possible, the role played by deforestation, degraded forest and invasive species in creating these hazards and possible disasters; and determining the role that reforestation can (and does) play in mitigating against such hazards. The project's implementation period is 2010-2012.

Its activities include hazard mapping, research, working with local community members to conduct reforestation (10ha) using a variety of tree species; and help raise awareness and knowledge of local community members regarding reducing the risk of disasters in hazard prone areas.

Possible linkages with Yallahs & Hope Rivers Watersheds Project

JCDT has considerable knowledge of and experience in working closely with communities in the BJCMNP and Community Buffer Zone, which should be harnessed for the Yallahs & Hope Rivers Watersheds Project. Additionally, there may be scope for synergies with this project's public education activities – even if simply to determine appropriateness of materials and to help with organising community meetings.

4. RECOMMENDATIONS FOR PROJECT COMMUNITY AWARENESS & EXTENSION ACTIVITIES

Jamaica's awareness of the need for soil conservation and watershed protection dates back to the late 1930s⁷². Since then, various Acts have been passed; Commissions, Task Forces and Working Groups established; countless studies undertaken; and numerous capacity-building projects executed. Drawing upon the considerable body of knowledge and experience already accumulated, this section seeks to highlight the most salient factors required to fulfil the community awareness and extension objectives of the Yallahs & Hope Rivers Watersheds Project.

4.1. Recommendations specific to Community Awareness & Extension

4.1.1. Holistic approach for Project's recommended interventions

Before any land use changes are recommended to participating communities/farmers, careful consideration must be given to ensure that they are:

- **Technically sound**, based upon a holistic view of the farm system and its environment – including soil (type and health⁷³), climate (including possible impact of climate change), pests and diseases, accessibility and location of participants' plots (e.g. whether grouped/dispersed) as both will impact the ease of carrying in inputs and taking out produce as well as likelihood of post-harvest spoilage.
- **Financially advisable**, particularly in terms of participants' immediate/medium-/long-term cash flow needs; current market status and market trends; realistic determination of alternative livelihoods to replace current (known) ones*; accessibility of markets (e.g. farmers may need to travel further with their produce and therefore incur higher transportation costs).
- **Socially acceptable**, for example, the need for land tenure (particularly where benefits are long-term); presence/absence of praedial larceny (- this may impact what farmers feel comfortable growing); whether activities such as land preparation/crop care/harvest/training fit in with the participants' other activities (in terms of time and finances); whether a new system/approach is perceived as attractive, secure...etc. (- especially to different target groups, e.g. young persons, women); whether participants

⁷² http://www.nrca.org/policies/watershed/policy_information.htm

⁷³ Concern was raised that much land is now displaying reduced fertility, increased soil loss and over-fertilisation. High priority must be given to land preparation (especially to reduce the inputs required to control pests and diseases), soil fertility and soil conservation. In the absence of this, there is real risk that the soil will simply not support the anticipated production levels – and so current market projections cannot be the determining factor.

feel that they will be “losing” or “gaining” control over their production systems (e.g. whether they can harvest small amounts over several months or everything all at once, whether they will need to change from individual to community-based systems).

** It is assumed that many of the small-holding farmers in the Project Area have very little financial cushioning. In fact, most are considered subsistence farmers. **As these individuals will be the ones assuming the risk(s) involved in changing their current systems, it is imperative that the Project’s recommendations are based upon realistic, accurate and up-to-date data.** Against this, it is important to recognise the challenge in obtaining sound market data for a number of alternative livelihoods commonly recommended for such rural areas – e.g. for eco-tourism, community-based ventures, craft production etc. Particular effort must be given to obtaining whatever information is available, and to ensuring that the risks to participants are considered – and mitigated – as far as possible.*

4.1.2. Clearly-defined responsibilities for project partners

The PIF outlines the responsibilities of the various entities which are to implement this Project. In terms of community awareness and extension activities, the “MOAF along with RADA will implement the sustainable agriculture and alternative livelihood components, and will provide technical support, extension services and training to farmers through RADA’s existing agricultural extension network (Component III & IV). NEPA, MOAF, RADA and FD will contribute to the community awareness component (Component III). The National Park will play a key role in liaising with the community and carrying out community education activities through the Local Advisory Committees, using Park Rangers and other staff.”

Although the PIF does not explicitly mention NEPA or FD in relation to community awareness and extension, both agencies will have roles to play – the former in terms of the IWRM and environmental issues (Component I), and the latter through its reforestation, agro-forestry and alternative livelihoods activities (Component IV). There is also clear capacity in a number of other organisations to be involved in these areas: notably, the JCDD (various topics, and particularly with a number of communities); CIB (if the project is to involve coffee farmers).

4.1.3. Early involvement of communities/farmers as project partners

Traditionally, the involvement of communities in development initiatives has been relatively restricted – they often regarded only as “beneficiaries” or “agents of change” within projects

which have been conceptualised and planned without the communities' input⁷⁴. Little attention has typically been given to understanding attitudes and behaviour of communities during the planning of such initiatives, to providing *appropriate* education (both in terms of the message as well as the means of communication), to evaluating the full impact on community members when recommending changes to their existing livelihood strategies, or to offering sufficient incentives to for them to adopt alternative livelihoods which would benefit the environment.

For the Yallahs & Hope Rivers Watersheds Project to meet its objectives, it is strongly recommended that communities are involved from the very inception – preferably, during the planning stage⁷⁵. Given the existence of a number of active CBOs in two watersheds, these should be brought on board as early as possible as project partners, empowered to understand the benefits of the project so that there is real buy-in – i.e. they should not simply be regarded as “beneficiaries” to be targeted by, or paid to take part in, the Project.

4.1.4. Allocation of adequate resources and timeframe for Project activities

All the entities consulted mentioned being expected to implement projects but seldom being given sufficient resources for the task(s) – financial, human resources or time. Instead, their officers are re-allocated to the project which means that they can no longer carry out their core functions. In planning this Yallahs & Hope Rivers Watersheds Project, care must be given to ensure that there are adequate resources to cover all project activities – from the inception to the very end of the initiative.

With regards to the Project's extension and capacity-building activities, this must include sufficient personnel (travelling officers, and also a Rural Sociologist), **vehicles/trail bikes (including fuel & maintenance) and travelling allowances, training** (including staff – discussed below), an in-depth **baseline study** as well as **ongoing monitoring, capacity-building in communities, and shared information management systems** (including mobile technology which can be used in the field).

The Project's timeframe must be sufficiently long for the technical staff's activities to yield “real” results in the field.

⁷⁴ It must however be acknowledged that there have been efforts in recent years to engage with - and build the capacity of – community groups. Examples include the afore-mentioned LFMcs, WUAs, Produce Marketing Organisations (PMOs); as well as various NGOs and CBOs.

⁷⁵ This would also be in keeping with the fifth Expected Output of Component I, namely “Community participatory processes integrated into WMUs land-use planning”.

4.1.5. Professional training for staff

As previously mentioned, all the entities involved in the watersheds indicated less than adequate staff working in the field. As numbers will need to be increased for the Yallahs & Hope Rivers Watersheds Project, they will need to take on new staff – and these may well need **professional training** to become knowledgeable of the integrated approach to watershed management that is to be employed in the Project Area. Such training should also be offered to existing staff so that this approach can become fully integrated through the entities workforce.

There should be **joint training** for staff of the various agencies and other project partners, so that they may not only be better acquainted with each other's expertise but also serve as "ears and eyes" when out in the field. For example, RADA staff could be trained by NEPA to identify the indicator species used for its planning and Development Orders⁷⁶; or could be trained in the same Rural Assessment methodologies.

4.1.6. Provision for baselines study and ongoing monitoring

The aforementioned baseline study and ongoing monitoring activities are essential to better understand the current situation, the findings of which can be used to (a) fine-tune the Project's plans during the early months of implementation, and (b) to measure its progress and ultimately, its impact.

Given that baseline socio-economic data on farmers in these areas have already been collected under the Morant Yallahs Agricultural Development, EJASP and EUBSP projects – and that similar are planned under other projects⁷⁷ - it is recommended that the Yallahs & Hope Rivers Watersheds Project seeks to dovetail any new baseline study into the existing profiles. As it is likely that there are currently held by various entities, a first step would be to bring them into a single database that can be shared – both in terms of accessing the information, as well as having the ability to update.

Another useful instrument to be used at the Project's inception is a 'Knowledge, Attitudes & Practices' (KAP) survey. It is recommended that existing expertise in these be used – for example, NEPA/Social Development Commission have just completed one for Black River.

⁷⁶ The Giant Swallowtail Butterfly (*Pterouus homerus*) is an indicator species used for the Hope and Yallahs watersheds.

⁷⁷ For example, the EU-funded *Climate Change Adaptation & Disaster Risk Reduction* has provision for baseline study to be done for Dallas/Constitution Hill (Hope watershed).

4.1.7. Inclusive approach and sustained engagement with communities/farmers

To yield true, long-lasting change, the Yallahs & Hope Rivers Watersheds Project must be inclusive and its activities sustained as long as possible. In addition to efforts to engage farmers in the Project Area, care must be taken to include youngsters, the squatter/nomadic farmers as well as private companies responsible for large tracts of land. Such engagement may require financial incentives, technical advice, market opportunities, inputs or other contributions – the exact mix must be carefully determined, balancing the project's immediate and short-term objectives with the long-term need for sustained support to these persons.

- As a number of the companies are believed to be responsible for causing environmental problems in these areas, including them in the Project would help to reduce this. Very importantly, it would also ensure that good examples are set for smaller farmers.
- In the case of squatter/nomadic farmers, particular attention must be given to understanding their mindset and livelihood choices otherwise attempts to regularize them may only push them into other, more remote areas and thereby aggravate the existing problem. It is also felt that these farmers must be supported over a sufficiently-long time horizon in order for their mindset is to be changed permanently (i.e. not simply for the period when they receive benefits from the Project).

Through promotion of good land use practices – and perhaps a reward system which operates at both individual and community-levels – there may be scope for **community policing** – particularly as those encroaching on forest lands are known within their communities.

- Specific to the upper watersheds communities, it must be remembered that they may not necessarily experience the (full) benefits of a healthier ecosystem; but rather, these will be gained by those downstream living and depending on the ecosystems' services. One agency indicated that those living in the upper watersheds (may or already do) resent having to conserve water as they don't have the benefits of ample and stable water supplies as those living in the lower watersheds. Given that their activities will be pivotal in halting – and hopefully, reversing – the watersheds' degradation, there is a clear imperative to gain the full support of those in the upper watersheds (- perhaps through inclusion of measures such as rainwater harvesting).

To fully understand and negotiate sensitively the dynamics of these various groups, it is recommended that a Rural Sociologist be included in the Project's team.

Building the social capital in communities requires strong and *sustained* effort. It is recommended that existing CBOs be strengthened and used as the principal channel for group education and public awareness activities. Where these do not exist, there is tried-and-tested

methodology that ought to be followed – for example, the process employed by the FD to form LFMCs⁷⁸, or by the NIC to form WUAs.

It is also considered important that the majority of activities be conducted *in situ*, i.e. on-farm, within the communities (- rather than transporting persons elsewhere). That said, field trips off-site to other demonstration plots and organizations have been very effective in encouraging peer-to-peer learning and networking that may not otherwise take place.

4.1.8. Promotion of peer-to-peer learning within and between communities

With various projects having noted the usefulness of peer-to-peer learning – in encouraging adoption and ongoing maintenance of new methodologies – the Yallahs & Hope Rivers Watersheds Project could adopt a similar approach, i.e. i.e. training key individuals in communities who would be responsible for leading peer-to-peer-learning activities within and between communities. These persons may be the nominated Lead Land Use Managers or others who have an aptitude for communicating and training others in their communities.

If the Project is to monitor participating communities/farmers in their uptake of SLM practices, these individuals could also play a key role. This would follow the concept of NEPA's "first responders", i.e. persons who are trained to collect samples on behalf of its enforcement teams⁷⁹.

4.1.9. Utilisation of mobile technology for staff and communities/farmers

In 2007, the UWI's Telecommunications Policy and Management (TPM) programme in 2007 completed an island-wide household survey of mobile telephone usage patterns, particularly among low income Jamaicans⁸⁰. This found that "over 96% of Jamaicans aged between 30-39 and 50-54 years use mobile phones, with other age groups having a similarly high usage"⁸¹. The study concluded that "mobile phones are a pervasive, constant, and longstanding feature in the lives of the majority of respondents from all age groups and both genders." The Office of

⁷⁸ Under the EU-funded *Climate Change Adaptation and Disaster Risk Reduction Project*, two LFMC are being formed/strengthened by the FD in Yallahs: Westphalia and Haws Delight.

⁷⁹ Already active in NEPA's water quality management programme in the Portland Bight Protected Area, these individuals collect samples which are given to NEPA's enforcement teams to take to the labs for testing.

⁸⁰ <http://e-nnovationjamaica.pbworks.com/w/page/18449443/Study%20on%20Usage%20Patterns%20for%20Mobile%20Phones%20in%20Jamaica>

⁸¹ This contrasts to the usage of the internet in Jamaica, which was found to be much lower – with only 41% individuals in rural areas have computers and use the internet (Dunn, 2011).

Utilities Regulation (OUR) is reported to have estimated mobile subscribers at 2.97 million as of March 2010 – and within this, there is an ever-growing popularity of smart phones (estimated 5-30% monthly subscribers)⁸².

Combined, this represents a clear opportunity for mobile phones to be used within the Yallahs & Hope Rivers Watersheds Project – both as a means to communicate and educate (train), as well as in ongoing monitoring activities, for project personnel and communities/farmers alike. At a basic level, mobile phones could be used to provide reminders regarding timetables for training or SLM measures, to collect and provide crop yields, market prices etc⁸³. Depending on the Project's specific activities, more sophisticated applications (apps) could be used by or developed for both the environmental and agricultural components for beneficiaries with smart phones (e.g. photo monitoring with GIS-placement app, and ⁸⁴).

Note: There is a well-developed tech/software developer community in Jamaica which could be engaged to develop apps to meet the Project's needs ^{81,85}. One - ./roots ("Slash Roots") – held a successful competition in early 2011 for the development of a new open data resource for the MoAF⁸⁶.

4.2. Recommendations for Other Components of Project

4.2.1. Supporting integration at all levels for watershed management

With a holistic approach strongly recommended for the watersheds' management, *integration* is considered critical – not only for the purpose and duration of the Yallahs & Hope Rivers Project, but also for the entities involved in these areas at large. Such integration must occur at *all* levels: from the top management down throughout the organisational structures (- and including technical and field staff); and attention must be given to streamline policies. The process must involve all stakeholders, including PIOJ and Cabinet.

As integration requires a mechanism – and one that can be sustained beyond the end of this Project – resources must be allocated for its development and implementation. As discussed in

⁸² See for example: <http://www.siliconcaribe.com/2011/04/06/jamaicas-mobile-penetration-at-110-why-arent-we-demoing-more-apps/>

⁸³ Within the framework of the parish-level ADRM Sub-Committees, RADA already sends out text messages to its registered farmers to alert them to the approach of storms and guide them on what actions to take and when.

⁸⁴ For example: *IPhone apps for use in agriculture* <http://louisianariceinsects.wordpress.com/2011/01/06/iphone-apps-for-use-in-agriculture/>; US Environmental Protection Agency's *Apps for the Environment Competition* <http://appsfortheenvironment.challenge.gov/submissions/>

⁸⁵ <http://www.slashroots.org/node/5>

⁸⁶ <http://dmitridawkins.com/2011/02/the-slash-roots-developers-conference/>

this report, there are various prior experiences, lessons learned and existing frameworks upon which this can be based – including:

4.2.2. Updating legislative framework governing watersheds

Given the afore-mentioned legislative gaps, parallel jurisdictions and competing powers, attention must be given to clearly and objectively define the requirements for protection of watersheds as well as the roles of all entities involved. The existing Watersheds Protection Act was recently reviewed under another project, and recommendations were made for its revision and Regulations⁸⁷.

With specific regards to illegal activities in the upper watersheds, the following acts are to be updated/amended: Forest Act (this is underway), Strategy Act, Praedial Larceny (Prevention) Act, Agricultural Product Act, Country Fires Act, Squatting Act (to increase penalties), and Malicious Injuries to Property, Larceny, Trespass, Unlawful Possession of Property Acts⁸⁸. Should this be considered under the Yallahs & Hope Watersheds Project, prioritisation will be needed to determine which of these ten acts should be updated/amended.

4.2.3. Policy intervention to support project activities

Quoting again from NEPA's website, "the lack of a sound and steady policy to guide the design of watershed interventions resulted in the implementation of activities which, in some cases, have been inconsistent with watershed management principles. Moreover, a project-based rather than programme-based approach has meant that the gains from previous interventions have been short lived and have seldom been sustained by investments in long-term programmes."⁸⁹

4.2.4. Management of squatters in National Park & Forest Reserves

Acknowledging the multi-faceted nature of this problem, there is already a collaborative approach underway – involving the Squatter Management Unit (Ministry of Transport, Works & Housing), FD, RADA, Praedial Larceny Prevention Unit (MOAF), JCDT, NLA and the Island Special Constabulary Force (ISCF)⁹⁰. Their joint recommendations include⁹⁰:

⁸⁷ Feedback received on Final Report v1 through N. Douglas, Manager of Special Projects, CEO's Office in NEPA (27.3.12); and A. Donaldson, Manager (Acting), NEPA's Ecosystems Management Branch (5.4.12).

⁸⁸ http://www.nrca.org/policies/watershed/policy_information.htm

⁸⁹ The ISCF is first reserve to Jamaica's Police Force, supplementing the regular force in all facets of policing.

⁹⁰ From "Squatting in the Blue Mountains: Squatter Management Unit – Recommendations on the way forward based on joint-agency field visit on January 29, 2010" and "Minutes of Forestry Reserve Steering Committee Meeting held March 18, 2010 at 2pm in RADA's Conference Room" (both courtesy of RADA).

- **Conducting a comprehensive inventory of all illegal occupants as well as government leases of forest reserves** – including (if available) approximately acreage occupied, crops planted (cash/coffee), approximately period of occupancy. *Status: Such a list is being prepared of farmers who are legally and illegally occupying the area, focused initially in the Strawberry Hill area. The CIB was to provide a list of occupants on their property.*
- **Relocation of squatter farmers from areas posing the greatest threat:** this may require incentives, improved infrastructure and accessibility (- discussed below). *Status: Alternate areas for relocation were being considered, including lands adjoining Cinchona.*
- **Marking boundaries of Blue Mountain Forest Reserve**, i.e. land managed by the FD: this was considered particularly important as the lack of knowledge regarding the Reserve's boundaries was considered to significantly hamper the effectiveness of the FD's enforcement activities. Additionally, it was recommended that the skills of the FD's Field and Enforcement be increased in e.g. map reading, GPS mapping etc. so that they could clearly identify private from public holdings.
- **Review and marking boundaries of lands leased by Commissioner of Lands (COL):** As of early 2010, lands leased by the CIB which were not under coffee production were to be returned to the COL. A map was needed showing the boundaries of the returned lands and those holdings which were to remain under coffee, for monitoring and enforcement purposes.
- **Enforcement:**
 - o **Notices of illegal occupancy** should be served on all persons, as a matter of principle. That said, they could also be served preferentially – i.e. persons should be asked to leave if on lands urgently needed for reforestation programmes which do not include their involvement, and others can given short-term leases (and therefore controlled) if the FD wants to incorporate them.
 - o **Ranger presence:** Forest and Park Rangers (- all whom should be equipped with trail bikes) should focus on squatting “hotspots”⁹¹, and their numbers increased so as to permit more frequent regular patrols – particularly as a uniformed presence is known to act as a deterrent to some illegal activities, and fewer incidents have been noted in areas with a higher level of Range presence⁹².
 - JCDT's Rangers should be trained by the Police Force and appointed Special District Constables so that they can have the necessary powers to

⁹¹ From the FD's perspective, these include Cinchona, Belview Heights, Old England, Westphalia, St. Helen's Gap to Morces Gap Trail, St. Helens Gap to Clydesdale Road and Round Hill.

⁹² As per “The Praedial Larceny Unit” section in aforementioned “Squatting in the Blue Mountains” document, reported by Lt. Col. Paul C. Dunn (Paedial Larceny Prevention Coordinator).

deal with environmental and other breaches of law within the Reserves/Park.

- The Ranger Stations in Mill Bank and Portland Gap should be re-opened and, along with Holywel, manned full time.

- **Punishment for offences:**

- Under the NRCA Act, offences currently can attract a fine of J\$ 50,000 or imprisonment to a term not exceeding 2 years. It was recommended that these be increased sufficiently to make them true deterrents.
- Under Section 30 of the Forest Act, cutting a tree in a forest reserve can incur a fine of J\$ 500,000 or imprisonment to a term not exceeding 2 years; and Section 31, the fine is J\$ 200,000 and in default of payment, imprisonment to a term not exceeding 2 years. Given the value of trees in the Forest Reserve, it is recommended that the fines and terms be increased.

- **Increased signage**, as “No Trespassing” signs have proven to work to some degree.

- **Monitoring:** a joint monitoring regime was recommended to prevent new illegal entry into the forest reserves as well as containment of existing illegal occupants – involving FD, RADA, NLA, JCDT and National Security (ISCF, Jamaica Constabulary Force (JCF) and Jamaica Defence Force (JDF)⁹³).

N.B. Additional resources are desperately needed for the additional manpower etc needed. JCDT would be in the best position to handle the monitoring of these areas.

- **Training of farmers in alternative practices**, including: reforestation; alley cropping using forest and/or fruit (guava, nutmeg, cherimoya, peach) trees; soil conservation and good land husbandry measures such as contour barriers, gully plugs, cover cropping; intensive, lower-cost protected agriculture systems (vegetables, herbs, condiments, ornamental horticulture) in selected locations of low environmental risk; apiculture; production of value-added products (teas, seasoning, crafts); provision of recreational facilities (e.g. hiking, donkey/bike, cable car) and study tours.
- **Public Education** for specific communities as well as the general public, to aid enforcement and promote specific programmes (esp. forest fires, impact of slash-and-burn farming).
- **Zoning:** Particularly in higher altitudes, areas should be designated as “no cash crops”; other areas should be restricted to reforestation with pine trees, and no other use or divestment of the lands allowed. This would be particularly useful in guiding the NLA.

⁹³ The JDF has its Training Depot in Newcastle, in the Blue Mountains.

Note: It was recommended that farmers and community groups be involved in all these activities, particularly remedial actions. Dialogue with the squatting farmers – i.e. using a participatory approach – was considered “extremely necessary as the breach has existing for too long, resulting in investments at various levels and the institutionalisation by at least two generations”.

4.2.5. Consideration of land tenure

With insecure or completely lacking land tenure reported throughout the watersheds, this is an issue which must be acknowledged during the Project’s design.

4.2.6. Geographical boundaries of Project Area

Whilst the project is to focus strongly on the two nominated WMU’s – and particularly for forestry/agro-forestry activities – there must be sufficient flexibility to include communities just outside their boundaries. Clearly, persons do not live or work according to the FMUs or WMUs – and so there may be destructive activities or leadership found just outside the Project Area which impacts the watersheds. An example of this is the Moy Hall Coffee Plantation, which lies just outside the Yallahs WMU.

4.2.7. Strengthening existing infrastructure to improve accessibility

With produce currently being taken out on foot or donkey, accessibility within the Project Area is an important factor – particularly if farmers are to be encouraged into different production systems or alternative livelihoods (e.g. eco-tourism). Maintenance of access roads as well as transportation facilities are considered a major pre-requisite for the success of the Project.

As such, it was recommended that the Project consider re-building or strengthening existing infrastructure as well as constructing new access roads, bridges, pipes, entombing water sources...etc.

4.2.8. Support to non-agricultural livelihood activities

Given the array and complex nature of challenges facing many of these rural communities, the case must be made to support livelihood activities which increase rural income through non-agricultural means. As noted during EJASP’s design, it is recommended to “keep value-added within communities, diversify the use of natural resource, and promote community culture and heritage. Agri-tourism (could be used) to build a bridge between rural tourism and agriculture”, particularly as many of these communities also boast attractions such as waterfalls, walking trails, and fresh produce. In addition, some are located sufficiently close to Kingston that they could draw day visitors.

4.2.9. Communication of Project’s wider message

Whilst it may be considered that the extension services should focus on those farmers being targeted to change their current land use practices, it is recommended that the Project’s

extension activities seeks to raise awareness in communities throughout the Project Area regarding the entire watershed. For example, those living in the upper reaches should be made to realise the impact of their activities on those living lower down; those in the middle/lower areas should be aware of need to conserve forests for biodiversity hotspots as well to ensure their own water supply (quality and quantity, the latter particularly in the low volume seasons). Another example of this would be to communicate the need for sufficient water flowing into the sea to prevent saline intrusion.

Suggestions for **free publicity** include⁹⁴: radio programmes, Hill & Gully Ride, Raggashanti's Programme; Get the Facts (TVJ). The Jamaica Information Service will work for free if equipment is available.

4.2.10. Type of benefits to be provided by Project

On the basis of their experience, one agency voiced their opinion that the Project should not give financial rewards to participants. To achieve sustainable results, it should instead focus on providing material inputs and building social capital – at individual as well as community-level.

⁹⁴ From "Minutes of Forestry Reserve Steering Committee Meeting held March 18, 2010 at 2pm in RADA's Conference Room".

5. PROPOSED EXTENSION PROGRAMME FOR PROJECT

5.1. Objectives for Project's Extension Programme

As described in the PIF, Component III speaks to “Improving community awareness, sensitivity and understanding of SLM techniques”. The Expected Outcome is “Increased public awareness of the importance and benefits of sustainably managing the biodiversity, and the watershed and of good land management”; and the Expected Outputs are:

- Inventory of good practices developed and disseminated to 75% of community groups & local government staff⁹⁵; and
- 40% of watershed community groups trained in soil conservation, IWRM & watershed management.

Strong extension support will be required too for the achievement of Component IV “Implementing Sustainable Livelihoods, Agriculture, Forestry & Land Management practices in watershed communities” – in particular, the second Expected Outcome “Good land, agro-forestry and forestry management practices among watershed residents are widely used”.

5.2. Recommended SLM practices and extension methodologies

As lead implementer for the Project's SLM and AF-related extension, training and demonstration plots, RADA has identified a number of practices that are best suited to the project's aims and locations. These include minimum tillage, bamboo barriers, live barriers, alley cropping, pineapple rows and contour barriers, agro-forestry, green manure, use of A-frames, diversion ditches, individual basins, waterways, continuous mounds, check dams/drop structures as well as appropriate on-farm water management measures.

On the basis of RADA's experience – and taking into account recommendations made by the other stakeholders consulted – these SLM and on-farm water management practices will be demonstrated and diffused throughout the project locations through a suite of complementary extension methodologies:

- Extension materials for farmers: Flip charts, videos, information booklets and mobile phone messages (voice and text) will be developed for the afore-listed practices as well as the preparation of farm plans.
- Training for government staff⁹⁶ and farmers/LFMC members: Under the umbrella term of “Good Land Husbandry”, a series of targeted training sessions will be organised to increase knowledge and implementation capacity for the recommended SLM practices.

⁹⁵ This refers to government officers working at the local level (as per feedback received from NEPA, 27.3.12).

- Additionally, field trips will allow staff and farmers/LFMC members alike to see the same. For both target groups, these demonstration visits will play an important role in enabling persons to share experiences and learn from one another – increasing inter-agency collaboration at officer level, and farmer-to-farmer learning respectively.
- Sustainable agriculture and agro-forestry demonstration plots will be established in all project locations, as per Table 5. These will be on farmers' own lands, and easily visible to everyone in their communities. The plots will include diversion ditches, individual basins, waterways (with *Vetivera* grass), continuous mounds, pineapple rows, alley cropping using sweet potato plants and other vegetables, N fixation & green manure (using red peas), live barriers, and check dams/drop structures.

Table 5: Land Husbandry activities to be done in each project location

| Land Husbandry activities | Quantity |
|--|------------|
| Diversion Ditch | 600 m |
| Individual Basin | 1000 units |
| Waterways (with <i>Vetivera</i> grass) | 100 m |
| Continuous Mounds | 400 m |
| Ginger/Tumeric | 1 ha |
| Pineapple Rows (alley cropping) | 600 m |
| Plantain (crop, to maintain banks & waterways) | 2 ha |
| Sweet Potato Plants (alley cropping) | 0.5 ha |
| Red Peas (N fixation & green manure) | 5 ha |
| Vegetable Seeds (alley cropping) | 5 ha |
| Check Dam/Drop Structure | 10 units |

RADA has confirmed that it will be contributing a total of JMD 3,000,000 (equivalent to USD 35,294) from its own budget for the establishment of **Agro-forestry demonstration plots**, as follows: JMD 2,250,000 for planting materials, and JMD 750,000 for transportation⁹⁷.

Irrigation systems: The water harvest reservoirs will be charged by direct rainfall, surface runoff and/or streams. These will cover as large an area as possible within the project locations (40-50%, "designated area"). The on-farm drip irrigation systems proposed as demonstration plots has been selected on account of this technology having minimal water runoff.⁹⁸

⁹⁶ This staff training will include officers from RADA, FD, NEPA, JCDT, NIC's On-Farm Water Mngt Unit as well as CIB.

⁹⁷ P. Chung, Senior Director of RADA's Division of Technology, Training & Technical Info (by telephone, on 24.4.12).

⁹⁸ W. Shaw, Manager of NIC's On-farm Water Management Unit (meeting, on 20.4.12).

5.3. Principles guiding Project's Extension Programme

- Acknowledging the complementary strengths of the various extension providers, the Project's extension programme will be implemented by a "core" team⁹⁹ comprising RADA (plus the NIC's On-Farm Water Management Unit), FD, NEPA and JCDT. During implementation, these entities will interface with wider stakeholders in the Project Area – including public and private sector entities, other NGOs and CBOs.
- One of the first activities which will be carried out is the first of three KAP studies, which will explore *inter alia* persons' knowledge of the watersheds (including the environmental services and how to protect these), good land husbandry practices, and biodiversity management. This KAP study will cover all the communities in the Project area; and its findings will be used to develop the rest of the extension activities – especially the precise selection criteria of beneficiaries, progress indicators, extension materials and training.
- The extension messages and training methods used will vary according to the target groups (see below), and will cover general issues involved in integrated watershed management as well as specifics of SLM measures. The project will also include capacity-building activities involving farmers' groups as well as LFMCs.
- Giving the importance of women in these communities, all extension activities will encourage their strong involvement and active participation e.g. as respondents in the KAP studies, in the testing of extension materials, in training sessions as well as in capacity-building efforts of the community-based organisations.
- Farmer-to-farmer learning will be encouraged wherever possible as this has been found by previous projects to be both: an efficient means of communication, and (ii) most effective in encouraging persons to change their behaviour.

5.4. Selection of Beneficiaries for Extension Activities

Under Component III, the Project's extension activities will target the following groups of beneficiaries:

- a. *Farmers and community members* – using, where possible, (i) existing groups such as the farmers' groups, LFMCs, WUAs and other CBOs; and (ii) the community groups to be formed under this Project;

⁹⁹ During the Project's design phase, the CIB was similarly invited to participate as the Consultant felt that it would also form part of this "core" team. In spite of continued efforts to involve the CIB, the lack of their response meant that they would not be part of the "core" team but would certainly be involved as "wider stakeholders" during project implementation.

- b. *Larger land owners* - individuals and private companies responsible for larger tracts of land, especially in the coffee-growing areas; and
- c. *Staff of the government and other entities* currently working in the watersheds – including RADA, FD, NEPA, JCDT, NIC and CIB.

The Project's extension materials will be disseminated to larger numbers of beneficiaries, whereas its training activities will be more focused in terms of participant numbers and locations. Guided by the findings of the first KAP study, detailed selection criteria for the latter will be determined collectively by RADA, FD, NEPA and JCDT on the basis of their knowledge of these areas together with the Project Staff.

5.5. Proposed Activities, Expected Results, Timeframes and Budget

Table 6 presents a summary of the proposed activities, specific outputs, timeframes for implementation, budget requirements, lead entity/entities and other(s) involved as well as an identification of the project location(s). Full details of these activities are given in Table 7, as well as the Excel file which accompanies this Final Report.

Note: these figures were correct as of 24/4/12, and are expected to be revised as the project design is finalised.

The activities covered by this report are as follows:

- Output III.1: Knowledge, Attitude & Practice (KAP) studies.
- Output III.2: Joint inventory of SLM practices.
- Output III.3: Training in Better Land Husbandry practices, irrigation & on-farm water management for government staff and farmers/LFMC members.
 - o Details of Graphics - for preparation of extension and training materials.
 - o Details of Training - including training materials, items for demonstrations, presenter/trainers etc.
- Output III.4: Strengthening of Community Social Capital – community group formation and strengthening.
- Output III.5: Development and dissemination of extension materials on SLM practices.
- Output III.6: Demonstration plots for SLM practices, agro-forestry, irrigation and on-farm water management.
- Details of demonstration plots – including materials and labour requirements.
- Output III.9: Community training in alternative non-agricultural livelihoods (including market studies).
- Output III.10: Monitoring & evaluation of extension and training activities.

Further explanation of these activities is given below the corresponding sections in Table 7.

Table 6: Summary of Project's Activities, Entities Involved, Project Locations, Specific Outputs, Timeframes and Budget Requirements (in USD)

| | Lead Entity /Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|-----------------------|---------------------------------------|--|---|----------------|--------------|---------------|--------------|---------------|----------------|
| III.1 Knowledge, Attitudes & Practices (KAP) studies | | | | | | | | | | |
| Design and implementation of KAP studies, data analysis & validation of findings within communities | NEPA | SDC (with input from RADA, FD & JCDT) | All | 3 x KAP studies/Focus Group discussions will be conducted to gain an understanding of the training gaps through needs assessment in the communities (at start, middle and end of the project). The findings will be used to inform the project's Extension, Training & Communication activities | 25,882 | 0 | 25,882 | 0 | 25,882 | 77,647 |
| Total for III.1. KAP studies | | | | | 25,882 | 0 | 25,882 | 0 | 25,882 | 77,647 |
| III.2 Inventory of Sustainable Land Management (SLM) practices, to be accessed by the public and with administrative rights granted to selected entities | | | | | | | | | | |
| III.2.1: Creation of the database, training of users & development of user manual | NEPA | RADA, FD & JCDT | n/a | Fully-searchable joint database of all the SLM practices, which is fully compatible with stakeholders' systems; and stakeholders trained in how to use and update database | 49,800 | 0 | 0 | 0 | 0 | 49,800 |
| III.1.2: Collection & digitisation of (project & other) documents, population of and oversight for database | NEPA | RADA, FD & JCDT | n/a | Database populated with SLM technical information; associated training & communication materials; and project documentation | 53,400 | 4,800 | 2,400 | 2,400 | 2,400 | 65,400 |
| Total for III.2: Inventory of SLM practices | | | | | 103,200 | 4,800 | 2,400 | 2,400 | 2,400 | 115,200 |

| | Lead Entity /Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|--|-----------------------|---|--|--|---------------|---------------|---------------|---------------|---------------|----------------|
| III.3 Training in Better Land Husbandry practices, Irrigation & On-Farm Water Management for government staff & communities | | | | | | | | | | |
| III.3.1: Staff training workshops & field trip in Better Land Husbandry practices | RADA | NIC's On-Farm Water Mngt Unit, FD, JCDDT & NEPA | Farm sites (to be selected in Project Locations) | 3 x 1-day training workshops plus 1 field trip to equip 37 staff officers with the relevant knowledge & skills in sustainable land management practices | 5,012 | 1,481 | 0 | 0 | 0 | 6,492 |
| III.3.2: Farmer & LFMC training programme in Better Land Husbandry practices | RADA | NIC's On-Farm Water Mngt Unit, FD, JCDDT & NEPA | Farm sites (to be selected in Project Locations) | 3 training sessions plus 3 field trips per year, to equip 750 farmers/LFMC members in total with the relevant knowledge, skills and attitudes in sustainable land management practices | 47,034 | 47,034 | 47,034 | 47,034 | 47,034 | 235,169 |
| Total for III.3: Training in Better Land Husbandry practices, Irrigation & On-Farm Water Management | | | | | 52,045 | 48,514 | 47,034 | 47,034 | 47,034 | 241,661 |
| III.4 Strengthening of Community Social Capital | | | | | | | | | | |
| III.4.1: Community Sensitisation & Group formation | FD & RADA | JCDDT, with support from SDC | (1) St. Peters/Content Gap/Mount Lebanon; (2) Hagley Gap/Minto/ Penlyne Castle; (3) Woodford/Maryland; (4) Ness Castle/Woburn Lawn; (5) Guava Ridge/ Mavis Bank/Mount Charles; (6) Richmond Vale/Windsor Forest/ Bethel Gap/Wilson Gap | Community members organised into 6 groups (each approx. 50 members), made aware of project activities, their & other stakeholders' roles & responsibilities, and taken through a group formation process which will culminate in the groups' formalisation and registration (x 12 monthly meetings, rotated around the communities involved) | 56,354 | 0 | 0 | 0 | 0 | 56,354 |
| III.4.2: Ongoing Strengthening of Groups | FD & RADA | JCDDT, with support from SDC | As for Activity III.4.1 | Community Groups strengthened through bi-monthly meetings to enable their continued existence post-project (x 6 bi-monthly meetings/year, rotated around communities involved) | 0 | 18,610 | 11,993 | 11,993 | 11,993 | 54,589 |
| Total for III.4: Strengthening of Community Social Capital | | | | | 56,354 | 18,610 | 11,993 | 11,993 | 11,993 | 110,943 |

| | Lead Entity /Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|--|-----------------------|----------------------|--|--|---------------|---------------|---------------|---------------|--------------|----------------|
| III.5 Development & Dissemination of extension materials on SLM practices (taking into account findings from the initial KAP Study) | | | | | | | | | | |
| III.5.1: Development of flip-charts for use by extension staff | RADA | FD, JCDT, NEPA & WRA | All | 50 x 25-page full colour, ring-bound flip charts (24x36 inch) with appropriate key messages for land husbandry interventions designed and produced | 94,704 | 33,147 | 14,229 | 4,235 | 0 | 146,315 |
| III.5.2: Development of information booklet for farmers | RADA | FD, JCDT, NEPA & WRA | All | 2,200 x 25-page full colour booklet of appropriate SLM technical information designed and produced | | | | | | |
| III.5.3: Development of videos for farmers | RADA | FD, JCDT, NEPA & WRA | All | 10 x 5-minute videos on SLM practices developed for 3000 farmers | | | | | | |
| III.5.4: Development of mobile phone messages for farmers | RADA | FD, JCDT, NEPA & WRA | All | 16 x voice messages and 16 x text messages developed, with 3 of each tested on 200 farmers | | | | | | |
| III.5.5: Delivery of mobile phone voice & text messages on appropriate SLM practices to farmers | RADA | - | All | Voice and text messages delivered to 500 farmers on A-frames, check dams, Agro-forestry, bamboo barriers, live barriers and diversion ditches | 2,353 | 11,765 | 14,118 | 11,765 | 7,059 | 47,059 |
| Total for III.5: Development & Dissemination of extension material on SLM practices | | | | | 97,057 | 44,912 | 28,347 | 16,000 | 7,059 | 193,374 |

| | Lead Entity /Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|-----------------------|-------------------------------------|--|---|----------------|----------------|---------------|---------------|---------------|----------------|
| III.6 Demonstration plots for SLM & Agro-Forestry practices, irrigation & on-farm water management | | | | | | | | | | |
| III.6.1: Establishment of SLM & AF demonstration plots | RADA | With input from FD | All | Demonstration plots will be established on farmers' land in the 10 project locations, to include diversion ditches, individual basins, waterways, continuous mounds, check dam/drop structure, pineapple rows and contour barriers (estim. 20 ha/project location, i.e. total 200 ha) | 204,235 | 150,471 | 89,029 | 13,824 | 13,824 | 471,382 |
| III.6.2: Establishment of water harvest reservoirs, main lines & filtration systems | RADA | NIC's On-Farm Irrigation Unit & WRA | All | Water harvest reservoirs will be established (to be charged by direct rainfall, surface runoff and/or streams) & systems to deliver irrigation water to 40-50% of the area in the project locations in order to support agricultural production | 89,744 | 58,653 | 0 | 0 | 0 | 148,397 |
| III.6.3: Establishment of low-flow drip irrigation systems as demonstration plots | RADA | NIC's On-Farm Irrigation Unit & WRA | All | Low flow irrigation systems will be established as demonstration plots for water to be applied in the most cost effective, labour efficient and environmentally friendly manner | 14,118 | 9,412 | 0 | 0 | 0 | 23,529 |
| Total for III.6: SLM & AF demonstration plots, irrigation & on-farm water management | | | | | 308,097 | 218,535 | 89,029 | 13,824 | 13,824 | 643,309 |
| III.9 Community Training in Alternative (Non-Agricultural) Livelihoods | | | | | | | | | | |
| III.9.1: Community training programme in non-agricultural livelihoods | JCDT | FD, RADA, NEPA, TPDCo | Penlyne Castle, Mavis Bank, Woodford & Redlight | 150 community members trained for Guest Houses/Ecolodges (Penlyne Castle), Visitor Centre (Mavis Bank) & ICT Centres (Woodford & Redlight Districts) | 12,417 | 7,431 | 5,177 | 5,177 | 10,577 | 40,779 |
| III.9.2: Market Studies for non-agricultural livelihoods | JCDT | With input from RADA, FD & NEPA | Exact locations to be decided on the basis of the initial KAP findings | 6 x market studies will be conducted/updated to assess viability of non-agricultural livelihoods | 16,280 | 16,280 | 8,140 | 8,140 | 0 | 48,840 |
| Total for III.9: Training in alternative (non-agricultural) livelihoods | | | | | 28,697 | 23,711 | 13,317 | 13,317 | 10,577 | 89,619 |

| | Lead Entity /Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|-----------------------|-------------------|--|--|----------------|----------------|----------------|----------------|----------------|------------------|
| III.10 Monitoring & evaluation of extension & training activities | | | | | | | | | | |
| III.10.1: Monitoring effectiveness of training activities | RADA | MOAF - Databank | All | To assess whether farmers have adopted SLM practices transferred & to provide further technical advice where necessary | 3,388 | 3,388 | 3,388 | 3,388 | 3,388 | 16,941 |
| III.10.2: Monitoring effectiveness of extension materials | RADA | - | All | 80 sites visits to assess effectiveness of communication of voice & text messages, booklets/brochures & DVDs | 593 | 593 | 791 | 0 | 0 | 1,976 |
| Total for III.10: Monitoring & evaluation of extension & training activities | | | | | 3,981 | 3,981 | 4,179 | 3,388 | 3,388 | 18,918 |
| TOTAL | | | | | 675,313 | 363,064 | 222,181 | 107,955 | 122,157 | 1,490,671 |

Table 7: Details of Project's Activities, Entities Involved, Project Locations, Specific Outputs, Timeframes and Budget Requirements (in USD)

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|--------------------------|---------------------------------------|--|---|--------------------|--------------|--------|--------|--------|--------|--------|--------|
| | | | | | Unit | Unit cost | | | | | | |
| III.1 Knowledge, Attitudes & Practices (KAP) studies | | | | | | | | | | | | |
| Design and implementation of KAP studies, data analysis & validation of findings within communities | NEPA | SDC (with input from RADA, FD & JCDT) | All | Output: 3 x KAP studies/Focus Group discussions will be conducted to gain an understanding of the training gaps through needs assessment in the communities (at start, middle and end of the project). The findings will be used to inform the project's Extension, Training & Communication activities | | | | | | | | |
| - Consulting Services: Social Development Commission (SDC) for the design of and training in data collection instruments/ tools; execution of data collection in communities, data analysis and validation of findings within communities | | | | Data collection (to involve focus group discussion questions, interview questions, questionnaires and direct observation) and validation will be conducted in all 10 project locations | consultancy | 25,882 | 25,882 | | 25,882 | | 25,882 | 77,647 |
| Total for III.I. KAP studies | | | | | | | 25,882 | 0 | 25,882 | 0 | 25,882 | 77,647 |

Additional notes for Output III.1

- During project implementation, it may be decided that Focus Group discussions would be better than a mid-point KAP Study to gather information in Year 3 *(to be decided once the project has commenced)*
- SDC will be contracted by NEPA to undertake these KAP studies on the basis of their previous experience with NEPA under the GEF-funded Integrating Watershed & Coastal Areas Management Project.

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|--|--------------------------|----------------------|--|--|--------------------|--------------|---------|--------|--------|--------|--------|---------|
| | | | | | Unit | Unit cost | | | | | | |
| III.2 Inventory of Sustainable Land Management (SLM) practices, to be accessed by the public and with administrative rights granted to selected entities | | | | | | | | | | | | |
| III.2.1: Creation of the database, training of users & development of user manual | NEPA | RADA, FD & JCDT | n/a | Output: Fully-searchable joint database of all the SLM practices, which is fully compatible with stakeholders' systems; and stakeholders trained in how to use and update database | | | | | | | | |
| - Inputs/Goods: SQL Server | | | | | server | 12,000 | 12,000 | | | | | 12,000 |
| - Consulting Services: IT Consultant | | | | | mandays | 300 | 37,800 | | | | | 37,800 |
| Sub-total for Activity III.2.1 | | | | | | | 49,800 | 0 | 0 | 0 | 0 | 49,800 |
| III.1.2: Collection & digitisation of (project & other) documents, population of and oversight for database | NEPA | RADA, FD & JCDT | n/a | Output: Database populated with SLM technical information; associated training & communication materials; and project documentation | | | | | | | | |
| - Inputs/Goods: Flatbed scanner (x2) | | | | | scanner | 2,400 | 4,800 | | | | | 4,800 |
| - Inputs/Goods: Laptops (x2) | | | | | laptop | 1,500 | 3,000 | | | | | 3,000 |
| - Consulting Services: Inventory Officers (x2) | | | | | mandays | 100 | 36,000 | | | | | 36,000 |
| - Consulting Services: Database Coordinator | | | | | mandays | 200 | 9,600 | 4,800 | 2,400 | 2,400 | 2,400 | 21,600 |
| Sub-total for Activity III.1.2 | | | | | | | 53,400 | 4,800 | 2,400 | 2,400 | 2,400 | 65,400 |
| Total for III.2: Inventory of SLM practices | | | | | | | 103,200 | 4,800 | 2,400 | 2,400 | 2,400 | 115,200 |

Additional notes for Output III.2

- In the case of digitising large-scale documents, the scanner that is to be procured for RADA under Output III.5 will be used.

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|--------------------------|--|--|---|--------------------|--------------|--------|--------|--------|--------|--------|-------|
| | | | | | Unit | Unit cost | | | | | | |
| III.3 Training in Better Land Husbandry practices, Irrigation & On-Farm Water Management for government staff & communities | | | | | | | | | | | | |
| III.3.1: Staff training workshops & field trip in Better Land Husbandry practices | RADA | NIC's On-Farm Water Management Unit, FD, JCDT & NEPA | Farm sites (to be selected in Project Locations) | Output: 3 x 1-day training workshops plus 1 field trip to equip 37 staff officers with the relevant knowledge & skills in sustainable land management practices (20 from RADA, 6 from FD, 3 from NEPA, 3 from JCDT & 4 from NIC's On-Farm Water Mngt Unit/CIB/Other | | | | | | | | |
| (a) Sub-Activity: Staff training workshops for RADA, FD, NEPA, JCDT & CIB/NIC's On-Farm Water Management Unit | | | | | | | | | | | | |
| - Inputs/Goods: Training materials for 37 staff | | | | See III.3 Training (details) table - below | various | 216 | 433 | 216 | | | | 649 |
| - Inputs/Goods: Items for demonstrations | | | | | various | 961 | 961 | | | | | 961 |
| - Inputs/Goods: Refreshments for staff (x 37 persons) | | | | | training session | 218 | 435 | 218 | | | | 653 |
| - Consulting Services: Guest Presenter | | | | | fees | 235 | 471 | 235 | | | | 706 |
| - Other: Travel costs for RADA officers to conduct & attend staff trainings (21 persons) | | | | | travel | 423 | 846 | 423 | | | | 1,269 |
| - Other: Travel costs for FD officers to attend staff trainings (6 persons) | | | | | travel | 141 | 282 | 141 | | | | 424 |
| - Other: Travel costs for NEPA officers to attend staff trainings (3 persons) | | | | | travel | 74 | 148 | 74 | | | | 222 |
| - Other: Travel costs for JCDT officers to attend staff trainings (3 persons) | | | | | travel | 74 | 148 | 74 | | | | 222 |
| - Other: Travel costs for NIC's On-Farm Water Mngt Unit/CIB/Other officers to attend staff trainings (4 persons in total) | | | | | travel | 99 | 198 | 99 | | | | 296 |

| | | | | | | | | | | | | |
|---|------|--|--|--|------------------|--------|--------|--------|--------|--------|--------|--------|
| (b) Sub-Activity: Staff Field Trip | | | | | | | | | | | | |
| - Inputs/Goods: Refreshments for staff (x 37 persons) | | | | See III.3 Training (details) table - below | field trip | 218 | 218 | | | | | 218 |
| - Other: Travel costs for RADA trainer to conduct field trip for staff (1 person/field trip) | | | | | travel | 25 | 25 | | | | | 25 |
| - Other: Field trip for demonstrations | | | | | bus rental | 847 | 847 | | | | | 847 |
| Sub-total for Activity III.3.1 | | | | | | | 5,012 | 1,481 | 0 | 0 | 0 | 6,492 |
| III.3.2: Farmer & LFMC training programme in Better Land Husbandry practices | RADA | NIC's On-Farm Water Management Unit, FD, JCDT & NEPA | Farm sites (to be selected in Project Locations) | Output: 3 training sessions plus 3 field trips per year, to equip 750 farmers/LFMC members in total with the relevant knowledge, skills and attitudes in sustainable land management practices | | | | | | | | |
| (a) Sub-Activity: Farmer & LFMC training workshops | | | | | | | | | | | | |
| - Inputs/Goods: Training materials for farmer/LFMC training (x 250 persons) | | | | See III.3 Training (details) table - below | various | 977 | 2,931 | 2,931 | 2,931 | 2,931 | 2,931 | 14,657 |
| - Inputs/Goods: Items for demonstrations | | | | | various | 18,849 | 18,849 | 18,849 | 18,849 | 18,849 | 18,849 | 94,247 |
| - Inputs/Goods: Refreshments for farmer/LFMC training (x 260 persons) | | | | | training session | 1,529 | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | 22,941 |
| - Other: Travel costs for RADA officers to conduct farmer/LFMC training (x2) | | | | | travel | 353 | 1,059 | 1,059 | 1,059 | 1,059 | 1,059 | 5,294 |
| - Other: Travel costs for NIC's On-Farm Water Mngt Unit officers to conduct farmer/LFMC training (x2) | | | | | travel | 353 | 1,059 | 1,059 | 1,059 | 1,059 | 1,059 | 5,294 |
| - Other: Travel costs for LFMC members (x25) | | | | | travel | 294 | 882 | 882 | 882 | 882 | 882 | 4,412 |
| (b) Sub-Activity: Farmer & LFMC Field Trips | | | | | | | | | | | | |
| - Inputs/Goods: Refreshments for farmer/LFMC Field Trips (x 260 persons) | | | | See III.3 Training (details) table - below | field trip | 1,529 | 4,588 | 4,588 | 4,588 | 4,588 | 4,588 | 22,941 |

| | | | | | | | | | | | | |
|--|--|--|--|--|------------|-------|---------------|---------------|---------------|---------------|---------------|----------------|
| - Other: Travel costs for RADA trainer to conduct Field Trip for farmers/LFMC members | | | | | travel | 124 | 371 | 371 | 371 | 371 | 371 | 1,853 |
| - Other: Field trips for observations & sharing experiences (3/year) | | | | | bus rental | 4,235 | 12,706 | 12,706 | 12,706 | 12,706 | 12,706 | 63,529 |
| Sub-total for Activity III.3.2 | | | | | | | 47,034 | 47,034 | 47,034 | 47,034 | 47,034 | 235,169 |
| Total for III.3: Training in Better Land Husbandry practices, Irrigation & On-Farm Water Management | | | | | | | 52,045 | 48,514 | 47,034 | 47,034 | 47,034 | 241,661 |

Additional notes for Output III.3

- Staff training and field trips: 2 x 1-day training sessions will be held in Year 1, and the 3rd session will be held in Year 2; and 1 field trip will be held in Year 1.
- Farmer/LFMC members training and field trips: 3 x 1-day training sessions will be held per year (Years 1-5); and 3 field trips will be held per year (Years 1-5). Given the numbers involved, the 250 farmers/LFMC members will be divided into 5 groups (with 2 buses/field trip).
- Given the project's budgetary constraints, the Irrigation & On-Farm Water Management training for farmers/LFMC members (x2 sessions/year) will be covered by RADA's Parish farmer training allocations.
- Travel budget is required only for LFMC members (i.e. not also farmers) given the distances they must travel to reach the training sessions.

Details of Training in Better Land Husbandry practices, Irrigation & On-Farm Water Management for government staff & communities

| ITEMS | | | | UNIT | | | UNIT COST | | |
|---|--------|------------|---------|------|--|--|-----------|--|--|
| Training Materials | | | | | | | | | |
| Paper | packs | JMD 1,000 | USD 12 | | | | | | |
| Masking tape | roll | JMD 100 | USD 1 | | | | | | |
| Pens | packs | JMD 200 | USD 2 | | | | | | |
| Post its (assorted colours) | packs | JMD 500 | USD 6 | | | | | | |
| Flipchart | pads | JMD 300 | USD 4 | | | | | | |
| Notepads | pads | JMD 100 | USD 1 | | | | | | |
| Markers | packs | JMD 100 | USD 1 | | | | | | |
| Sub-Total for Training Materials (per session) | | | | | | | | | |
| Items for demonstrations(for use in training sessions) | | | | | | | | | |
| A-frame | each | JMD 4,000 | USD 47 | | | | | | |
| Sieve | each | JMD 1,250 | USD 15 | | | | | | |
| Pineapple suckers | each | JMD 50 | USD 1 | | | | | | |
| Fruit trees | each | JMD 400 | USD 5 | | | | | | |
| Check dam materials | unit | JMD 14,700 | USD 173 | | | | | | |
| Sub-Total for Items for Demonstrations | | | | | | | | | |
| Refreshments | | | | | | | | | |
| Refreshments - training sessions | person | JMD 500 | USD 6 | | | | | | |
| Refreshments - field trip(s) | person | JMD 500 | USD 6 | | | | | | |
| Sub-Total for Refreshments (per session/field trip) | | | | | | | | | |

| III.3.1 Staff Training | | |
|---|------------|----------------|
| 3 x 1-day training sessions (two in Year 1, one in Year 2) plus 1 field trip (Year 1) => for 37 staff members, who will be divided into 3 groups) | | |
| Quantity | Cost | |
| 3 | JMD 3,000 | USD 35 |
| 10 | JMD 1,000 | USD 12 |
| 37 | JMD 7,400 | USD 87 |
| 4 | JMD 2,000 | USD 24 |
| 1 | JMD 300 | USD 4 |
| 37 | JMD 3,700 | USD 44 |
| 10 | JMD 1,000 | USD 12 |
| | | USD 216 |
| 8 | JMD 32,000 | USD 376 |
| 4 | JMD 5,000 | USD 59 |
| 200 | JMD 10,000 | USD 118 |
| 50 | JMD 20,000 | USD 235 |
| 1 | JMD 14,700 | USD 173 |
| | | USD 961 |
| 37 | JMD 18,500 | USD 218 |
| 37 | JMD 18,500 | USD 218 |
| | | USD 435 |

| III.3.2 Farmer & LFMC Training | | |
|---|---------------|-------------------|
| 5 x 1-day training sessions/year plus 3 field trips/year (Years 1-5) => for 250 farmers/LFMC members, who will be divided into 10 groups (as per project locations) | | |
| Quantity | Cost | |
| 5 | JMD 5,000 | USD 59 |
| 250 | JMD 50,000 | USD 588 |
| 10 | JMD 3,000 | USD 35 |
| 250 | JMD 25,000 | USD 294 |
| 48 | JMD 56 | USD 0.7 |
| | | USD 977 |
| 250 | JMD 1,000,000 | USD 11,765 |
| 250 | JMD 312,500 | USD 3,676 |
| 1500 | JMD 75,000 | USD 882 |
| 500 | JMD 200,000 | USD 2,353 |
| 1 | JMD 14,700 | USD 173 |
| | | USD 18,849 |
| 260 | JMD 130,000 | USD 1,529 |
| 260 | JMD 130,000 | USD 1,529 |
| | | USD 3,059 |

| Guest Presenter/Trainer | | | |
|--|--------------|------------|---------|
| Guest Presenter/Consultant | fees | JMD 20,000 | USD 235 |
| Sub-Total for Presenter/Trainer (per session) | | | |
| Travel costs | | | |
| Travel for RADA Officers to conduct & attend staff training (21 persons x 3 sessions) | officer trip | JMD 2,100 | USD 25 |
| | officer trip | JMD 741 | USD 9 |
| Travel for FD Officers to attend staff training (6 persons) | travel | JMD 2,000 | USD 24 |
| Travel for NEPA Officers to attend staff training (3 persons) | travel | JMD 2,100 | USD 25 |
| Travel for JCDT Officers to attend staff training (3 persons) | travel | JMD 2,100 | USD 25 |
| Travel for NIC's On-Farm Water Mngt Unit/CIB/Other Officers to attend staff training (4 persons) | travel | JMD 2,100 | USD 25 |
| Travel for RADA Officers to conduct farmer/LFMC training | officer trip | JMD 15,000 | USD 176 |
| Travel for NIC's On-Farm Water Mngt Unit Officers to conduct farmer/LFMC training | officer trip | JMD 15,000 | USD 176 |
| Travel for LFMC members to attend training | person | JMD 1,000 | USD 12 |
| Travel for RADA Trainer to conduct Field Trips | officer trip | JMD 2,100 | USD 25 |
| Field Trips for demonstrations | bus rental | JMD 36,000 | USD 424 |
| Sub-Total for Travel costs | | | |

| | | |
|----|------------|------------------|
| 1 | JMD 20,000 | USD 235 |
| | | USD 235 |
| 15 | JMD 31,500 | USD 371 |
| 6 | JMD 4,444 | USD 52 |
| 6 | JMD 12,000 | USD 141 |
| 3 | JMD 6,300 | USD 74 |
| 3 | JMD 6,300 | USD 74 |
| 4 | JMD 8,400 | USD 99 |
| | | |
| | | |
| | | |
| 1 | JMD 2,100 | USD 25 |
| 2 | JMD 72,000 | USD 847 |
| | | USD 1,683 |

| | | |
|----|-------------|------------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 2 | JMD 30,000 | USD 353 |
| 2 | JMD 30,000 | USD 353 |
| 25 | JMD 25,000 | USD 294 |
| 5 | JMD 10,500 | USD 124 |
| 10 | JMD 360,000 | USD 4,235 |
| | | USD 5,359 |

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|--|--------------------------|-----------------------------|---|--|----------------------|-----------|--------|--------|--------|--------|--------|--------|
| | | | | | Unit | Unit cost | | | | | | |
| III.4 Strengthening of Community Social Capital | | | | | | | | | | | | |
| III.4.1: Community Sensitisation & Group formation | FD & RADA | JCDT, with support from SDC | (1) St. Peters/Content Gap/ Mount Lebanon; (2) Hagley Gap/ Minto/Penlyne Castle; (3) Woodford/ Maryland; (4) Ness Castle/Woburn Lawn; (5) Guava Ridge/Mavis Bank/Mount Charles; (6) Richmond Vale/ Windsor Forest/Bethel Gap/Wilson Gap | Output: Community members organised into 6 groups (each approx. 50 members), made aware of project activities, their & other stakeholders' roles & responsibilities, and taken through a group formation process which will culminate in the groups' formalisation and registration (x 12 monthly meetings, rotated around the communities involved) | | | | | | | | |
| - Consulting Services: Community Development/Rural Development Extension Officer (full-time) | | | | | fees/ month | 1,500 | 18,000 | | | | | 18,000 |
| - Inputs/Goods: Brochure/flyers (5 brochures/flyers x 50 persons/group) | FD & RADA | | | | brochures/ flyers | 794 | 794 | | | | | 794 |
| - Inputs/Goods: Light refreshments (J\$ 250/person x 50 persons/group; x 12 monthly meetings) | | | | | meeting | 882 | 10,588 | | | | | 10,588 |
| Other: Training by & registration with Dept. Cooperatives & Friendly Societies (incl. organisational development, finance, governance, accountability etc) | | | | | group | 706 | 4,235 | | | | | 4,235 |
| - Other: Publicity for LFMCS' launch | | | | | various | 1,176 | 7,059 | | | | | 7,059 |
| - Other: Travel costs for FD officers (x2 persons, travelling together in 1 vehicle; x12 monthly meetings/group) | | | | | travel/ meeting | 33 | 2,372 | | | | | 2,372 |

| | | | | | | | | | | | | |
|---|----------------------|--|--------------------------------|---|----------------------|-------|---------------|----------|----------|----------|----------|---------------|
| - Other: Travel costs for RADA (x2 persons, travelling together in 1 vehicle; x12 monthly meetings/group) | | | | | travel/ meeting | 33 | 2,372 | | | | | 2,372 |
| - Other: Travel costs for NIC's On-Farm Water Mngt officers (x3 persons, travelling together in 1 vehicle; x6 monthly meetings/group) | | | | | travel/ meeting | 33 | 1,186 | | | | | 1,186 |
| - Other: Travel costs for SDC officers to present KAP findings (x 2 persons, travelling together in 1 vehicle; x6 monthly meetings/group) | | | | | travel/ meeting | 33 | 1,186 | | | | | 1,186 |
| - Other: Travel costs for LFMC members | | | | | travel | 706 | 8,471 | | | | | 8,471 |
| - Other: Phone credit for LFMC members to organise meetings | | | | | phone credit | 1.3 | 91 | | | | | 91 |
| Sub-total for Activity III.4.1 | | | | | | | 56,354 | 0 | 0 | 0 | 0 | 56,354 |
| III.4.2: Ongoing Strengthening of Groups | FD & RADA | JCDT, with support from SDC | As for Activity III.4.1 | Output: Community Groups strengthened through bi-monthly meetings to enable their continued existence post-project (x 6 bi-monthly meetings/year, rotated around communities involved) | | | | | | | | |
| - Consulting Services: Community Development/Rural Development Extension Officer (part-time) | | | | | fees/ month | 1,500 | | 9,000 | 4,500 | 4,500 | 4,500 | 22,500 |
| - Inputs/Goods: Brochure/flyers (6 brochures x 50 persons/group) | FD | | | | brochures/ flyers | 953 | | 953 | 953 | 953 | 953 | 3,812 |
| - Inputs/Goods: Brochures (6 brochures x 50 persons/group) | RADA | Input from NIC's On-Farm Water Mngt Unit | | | brochures | 953 | | 953 | 953 | 953 | 953 | 3,812 |
| - Inputs/Goods: Light refreshments (J\$ 150/person x 50 persons/group; x 6 bi-monthly meetings) | | | | | meeting | 529 | | 1,588 | 1,588 | 1,588 | 1,588 | 6,353 |

| | | | | | | | | | | | | |
|--|--|--|--|---|--------------------|-----|---------------|---------------|---------------|---------------|---------------|----------------|
| - Other: Travel costs for FD officers (x2 persons, travelling together in 1 vehicle; x6 bi-monthly meetings/group) | | | | | travel/ meeting | 33 | | 1,186 | 1,186 | 1,186 | 1,186 | 4,744 |
| - Other: Travel costs for RADA officers (x2 persons, travelling together in 1 vehicle; x6 bi-monthly meetings/group) - alternative agricultural and value-added activities | | | | May include e.g. bee keeping, food processing, green houses | travel/ meeting | 33 | | 1,186 | 1,186 | 1,186 | 1,186 | 4,744 |
| - Other: Travel costs for NIC's On-Farm Water Mngt officers (x3 persons, travelling together in 1 vehicle; x4 meetings/group) | | | | | travel | 33 | | 791 | 791 | 791 | 791 | 3,162 |
| - Other: Travel costs for JBDC officers (x2 persons, travelling together in 1 vehicle; x4 meetings/group) - training in business development, crafts etc | | | | | travel | 33 | | 791 | 791 | 791 | 791 | 3,162 |
| - Other: Travel costs for LFMC members | | | | | travel | 706 | | 2,118 | | | | 2,118 |
| - Other: Phone credit for LFMC members to organise meetings | | | | | phone credit | 1.3 | | 46 | 46 | 46 | 46 | 183 |
| Sub-total for Activity III.4.2 | | | | | | | 0 | 18,610 | 11,993 | 11,993 | 11,993 | 54,589 |
| Total for III.4: Strengthening of Community Social Capital | | | | | | | 56,354 | 18,610 | 11,993 | 11,993 | 11,993 | 110,943 |

Additional notes for Output III.4

- Training in non-agricultural livelihoods (III.9) will be organised to coincide with these Group monthly meetings in Year 1; the bi-monthly meetings in Years 2-5.
- The Community Development/Rural Development Extension Officer will support the (FD) Rural Sociologist to sensitise and mobilise community members; as well as be responsible for non-agricultural livelihood training activities (Output III.9)
- Travel for LFMC members will be only for a subset of the groups, i.e. those who have to travel furthest (approx. 20 persons/group/meeting @ J\$ 500/person). These will be paid for all the meetings in Year 1, and only the first 3 meetings in Year 2. Beyond this, everyone will need to cover their own travel to meetings.
- Refreshment costs: From Year 2 onwards, the project will cover only ½ of the meetings' refreshment costs.

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|--------------------------|----------------------|--|--|--|-----------|--------|--------|--------|--------|--------|--------|
| | | | | | Unit | Unit cost | | | | | | |
| III.5 Development & Dissemination of extension materials on SLM practices (taking into account findings from the initial KAP Study) | | | | | | | | | | | | |
| III.5.1: Development of flip-charts for use by extension staff | RADA | FD, JCDT, NEPA & WRA | All | Output: 50 x 25-page full colour, ring-bound flip charts (24x36 inch) with appropriate key messages for land husbandry interventions designed and produced | | | | | | | | |
| III.5.2: Development of information booklet for farmers | | | | Output: 2,200 x 25-page full colour booklet of appropriate SLM technical information designed and produced | | | | | | | | |
| III.5.3: Development of videos for farmers | | | | Output: 10 x 5-minute videos on SLM practices developed for 3000 farmers | | | | | | | | |
| III.5.4: Development of mobile phone messages for farmers | | | | Output: 16 x voice messages and 16 x text messages developed, with 3 of each tested on 200 farmers | | | | | | | | |
| (a) Sub-Activity: Content development => in-kind, provided by RADA, with input from FD, NEPA, WRA & JCDT | | | | | | | | | | | | |
| (b) Sub-Activity: Design of artwork (incl. photographs), lay-out of information, printing and binding of flip charts and information booklets => RADA staff plus contracted specialists (Graphics Designer & Graphics Assist) | | | | | | | | | | | | |
| - Inputs/Goods: Graphics Hardware (laptop & hard drive, large format printers, paper cutter, laminator, scanner, score/perforating machine, CD/DVD publishing machine) | | | | | See III.5 - Extension (graphics details) table - below | | 81,550 | | | | | 81,550 |
| - Inputs/Goods: Graphics Software | | | | | | | 4,995 | | | | | 4,995 |
| - Consulting Services: Graphics Designer | | | | | days | 150 | 1,200 | 3,000 | 1,800 | | | 6,000 |
| - Consulting Services: Graphics Assistant | | | | | days | 50 | 600 | 1,500 | 900 | | | 3,000 |
| - Consulting Services: Video producer | | | | 10 x 5-minute videos on SLM practices developed | consultancy | 10,588 | 1,059 | 3,176 | 4,235 | 2,118 | | 10,588 |
| - Consulting Services: Replicating & labelling of DVDs (x 3000) | | | | 3,000 DVDs burned with video clips & labelled for dissemination to farmers | consultancy | 10,588 | 3,176 | 3,176 | 2,118 | 2,118 | | 10,588 |
| - Other Services: Printing of flipcharts | RADA | | | 50 flip charts | flip chart | 441 | | 22,059 | | | | 22,059 |

| | | | | | | | | | | | | | |
|--|-------------|-----------|-----------------------------|--|----------------|-------|---------------|---------------|---------------|---------------|--------------|----------|----------------|
| - Other Services: Printing of draft booklets (x 100) | RADA | | | 100 draft info booklets printed | booklets | 0.4 | | 235 | | | | | 235 |
| - Other Services: Printing of information booklets (x 2200) | RADA | | | 2,200 full-colour info booklets printed | booklets | 2 | | | 5,176 | | | | 5,176 |
| - Other Services: Delivery of test voice messages to farmers | RADA | | | 3 test voice messages delivered to 200 farmers | Voice messages | 0.2 | 113 | | | | | | 113 |
| - Other Services: Delivery of test text messages to farmers | RADA | | | 3 test text messages delivered to 200 farmers | Text messages | 0.1 | 56 | | | | | | 56 |
| - Other Services: Phone calls to test farmers' understanding of test messages | RADA | | | Phone calls to assess 200 farmers' understanding of test messages | Phone calls | 1 | 918 | | | | | | 918 |
| - Other: Travel costs for field testing of info booklets | RADA | FD & JCDT | Various project communities | | travel | 1,036 | 1,036 | | | | | | 1,036 |
| Sub-total for Activities III.5.1-III.5.4 | | | | | | | | 94,704 | 33,147 | 14,229 | 4,235 | 0 | 146,315 |
| III.5.5: Delivery of mobile phone voice and text messages on appropriate SLM practices to farmers | RADA | - | All | Output: Voice and text messages delivered to 500 farmers on A-frames, check dams, Agro-forestry, bamboo barriers, live barriers and diversion ditches | | | | | | | | | |
| - Other Services: Delivery of voice messages | | | | 200,000 voice messages delivered to 500 farmers | Voice messages | 0.2 | 1,882 | 9,412 | 11,294 | 9,412 | 5,647 | | 37,647 |
| - Other Services: Delivery of text messages | | | | 100,000 text messages delivered to 500 farmers | Text messages | 0.1 | 471 | 2,353 | 2,824 | 2,353 | 1,412 | | 9,412 |
| Sub-total for Activity III.5.5 | | | | | | | 2,353 | 11,765 | 14,118 | 11,765 | 7,059 | | 47,059 |
| Total for III.5: Development & Dissemination of extension material on SLM practices | | | | | | | 97,057 | 44,912 | 28,347 | 16,000 | 7,059 | | 193,374 |

Additional notes for Output III.5

- RADA's staff will coordinate the other entities, prepare the SLM content, assist with & approve designs, field test info booklets & voice/text messages with farmers, produce materials in-house, work with video producer, develop & deliver voice & text messages etc.
- Graphic Designer & Graphics Assistant: These will work on all the extension material, esp. the flip charts & info booklets.
- Videos developed for A-frame construction & use, check dam, Agro-forestry, minimum tillage, individual basins, fire prevention, bamboo barrier, live barrier, diversion ditch, preparing a farm plan. This assumes unit cost = J\$ 90,000/video.

Details of Graphics for Extension Materials

| | Unit Cost | Units | No. Units | Total cost |
|--|------------|-------|-----------|-------------------|
| Graphics - Hardware | | | | |
| iMac 27 inch 3.4GHz Quad-Core Intel Core i7 | USD 2,900 | | 1 | USD 2,900 |
| WD My Book Essential External 3 TB 3.5" Hard Drive | USD 250 | | 1 | USD 250 |
| bizhub PRO C6501/C6501P/C5501 series - Color Production Printer | USD 40,000 | | 1 | USD 40,000 |
| Xerox 8264E Colour Wide Format Printer | USD 12,000 | | 1 | USD 12,000 |
| Epson Expression 10000XL — Graphic Arts (Scanner) | USD 2,800 | | 1 | USD 2,800 |
| MBM Triumph 6550-EP 25 1/2 inch Digital Fully Automatic Paper Cutter | USD 13,000 | | 1 | USD 13,000 |
| HS-100 Handi-Score Scoring and Perforating Machine | USD 500 | | 1 | USD 500 |
| D&K 42" EXP 42 Plus Wide Format Laminator | USD 6,800 | | 1 | USD 6,800 |
| Spyder4Express - for colour calibration of equipment | USD 300 | | 1 | USD 300 |
| Professional CD/DVD Publishing/Duplicating machine | USD 3,000 | | 1 | USD 3,000 |
| Sub-Total for Graphics Hardware | | | | USD 81,550 |
| Graphics - Software | | | | |
| Adobe Creative Suite 5.5 Master Collection (universal) | USD 2,500 | | 1 | USD 2,500 |
| QuarkEpress 9 Americas Edition (universal) | USD 900 | | 1 | USD 900 |
| Office for Mac 2011 Home & Business 2 licenses | USD 300 | | 1 | USD 300 |
| Extensis Suitcase Fusion 3 Mac (universal) | USD 200 | | 1 | USD 200 |
| Macbarcode 4 (universal) | USD 795 | | 1 | USD 795 |
| Roxio Toast 11Titanium | USD 150 | | 1 | USD 150 |
| TypeStyler 11 for Max OS X | USD 150 | | 1 | USD 150 |
| Sub-Total for Graphics Hardware | | | | USD 4,995 |
| Sub-Total for Graphics Hardware & Software | | | | USD 86,545 |
| Personnel | | | | |
| Graphics designer | USD 150 | days | 40 | USD 6,000 |
| Graphics assistant | USD 50 | days | 60 | USD 3,000 |
| Sub-Total for Graphics Personnel | | | | USD 9,000 |
| Total for Graphics (III.3.1) | | | | USD 95,545 |

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|--|--------------------------|----------------------|--|--|--------------------|-----------|---------|---------|--------|--------|--------|---------|
| | | | | | Unit | Unit cost | | | | | | |
| III.6 Demonstration plots for SLM & Agro-Forestry practices, irrigation & on-farm water management | | | | | | | | | | | | |
| III.6.1: Establishment of SLM & AF demonstration plots | RADA | With input from FD | All | Output: Demonstration plots will be established on farmers' land in the 10 project locations, to include diversion ditches, individual basins, waterways, continuous mounds, check dams/drop structures, pineapple rows and contour barriers (estimated 20 ha/project location, i.e. total 200 ha) | | | | | | | | |
| - Consulting Services: Land Husbandry Specialist (part-time) | | | | | fees | 27,529 | 27,529 | 13,765 | 13,765 | | | 55,059 |
| - Inputs/Goods: Toyota Hilux 4x4 (4-door turbo-diesel pickup with duraliner and bed liner) | | | | | vehicle | 41,176 | 41,176 | | | | | 41,176 |
| - Inputs/Goods: Licensing & fitness for vehicle | | | | | per year | 176 | 176 | 176 | 176 | 176 | 176 | 882 |
| - Inputs/Goods: Fuel for vehicle | | | | | per month | 941 | 11,294 | 11,294 | 11,294 | 11,294 | 11,294 | 56,471 |
| - Inputs/Goods: Maintenance for vehicle | | | | | per service | 1,176 | 1,176 | 2,353 | 2,353 | 2,353 | 2,353 | 10,588 |
| - Inputs/Goods - Land Husbandry & AF plots (incl. fertilizer, pesticide, planting materials & A-Frames) | | | | See "III.6 Plots & Irrig (details)" table - below | various | 21,859 | 87,437 | 87,437 | 43,719 | | | 218,593 |
| - Inputs/Goods - Check dams/drop structures: stones, used tyres, sand, gabion baskets, wire, cement, steel rods, storage containers & transportation | | | | | various | 3,471 | 13,882 | 13,882 | 6,941 | | | 34,706 |
| - Other: Labour for Land Husbandry & AF plots and Check dams/drop structures (@ 40% actual cost) | | | | | labour | 5,391 | 21,563 | 21,563 | 10,781 | | | 53,907 |
| Sub-total for Activity III.6.1 | | | | | | | 204,235 | 150,471 | 89,029 | 13,824 | 13,824 | 471,382 |

| | | | | | | | | | | | | |
|---|-------------|--|------------|--|---------|--------|----------------|----------------|---------------|---------------|---------------|----------------|
| III.6.2: Establishment of water harvest reservoirs, main lines & filtration systems | RADA | NIC's On-Farm Irrigation Unit & WRA | All | Output: Water harvest reservoirs will be established (to be charged by direct rainfall, surface runoff and/or streams) & systems to deliver irrigation water to 40-50% of the area in the project locations in order to support agricultural production | | | | | | | | |
| - Inputs/Goods: Application for Abstraction Licence (from WRA) | | | | See III.6 Plots & Irrig (details) table - below | each | 176 | 1,765 | | | | | 1,765 |
| - Inputs/Goods: Reservoirs - excavation & geomembranes (x5) | | | | | various | 11,765 | 35,294 | 23,529 | | | | 58,824 |
| - Inputs/Goods: Entombment of springs (x5) | | | | | various | 6,503 | 19,509 | 13,006 | | | | 32,515 |
| - Inputs/Goods: Main line, valves & accessories (incl. installation) | | | | | various | 4,941 | 29,647 | 19,765 | | | | 49,412 |
| - Inputs/Goods: Filtration systems (incl. installation) | | | | | various | 588 | 3,529 | 2,353 | | | | 5,882 |
| Sub-total for Activity III.6.2 | | | | | | | 89,744 | 58,653 | 0 | 0 | 0 | 148,397 |
| III.6.3: Establishment of low-flow drip irrigation systems as demonstration plots | RADA | NIC's On-Farm Irrigation Unit & WRA | All | Output: Low flow irrigation systems will be established as demonstration plots for water etc to be applied in the most cost effective, labour efficient and environmentally friendly manner | | | | | | | | |
| - Inputs/Goods: Drip irrigation systems (incl. trucking & labour for installation) | | | | See III.6 Plots & Irrig (details) table - below | various | 2,353 | 14,118 | 9,412 | | | | 23,529 |
| Sub-total for Activity III.6.3 | | | | | | | 14,118 | 9,412 | 0 | 0 | 0 | 23,529 |
| Total for III.6: SLM & AF demonstration plots, irrigation & on-farm water management | | | | | | | 308,097 | 218,535 | 89,029 | 13,824 | 13,824 | 643,309 |

Additional notes for Output III.6

- The Land Husbandry Specialist will (i) prepare comprehensive work and farm plans; (ii) ensure that plots receive the appropriate best practice interventions in a timely manner; (iii) Serve as resource person for training and monitoring services; and (iv) Prepare monthly reports on all relevant activities.
- RADA's contribution from its own budget of JMD 3,000,000 to the Agro-forestry demonstration plots is detailed in Section 5.2 (pg 94).

Details of SLM & AF demonstration plots

| ITEMS | UNIT | UNIT COST | QUANTITY | Cost per Project Location | | Total Cost for 10 Project Locations | |
|---|-------------|-------------|----------|---------------------------|-------------------|-------------------------------------|--------------------|
| Inputs/Goods for Land Husbandry & AF activities | | | | | | | |
| Fertilizer (organic) | bags | JMD 4,349 | 150 | JMD 652,313 | USD 7,674 | JMD 6,523,125 | USD 76,743 |
| Pesticide | kg or l | | | JMD 31,978 | USD 376 | JMD 319,780 | USD 3,762 |
| Ginger/Tumeric Sets | lbs | JMD 105 | 3750 | JMD 393,750 | USD 4,632 | JMD 3,937,500 | USD 46,324 |
| Pineapple Suckers | units | JMD 50 | 2000 | JMD 100,000 | USD 1,176 | JMD 1,000,000 | USD 11,765 |
| Plantain Suckers | each | JMD 65 | 5000 | JMD 325,000 | USD 3,824 | JMD 3,250,000 | USD 38,235 |
| Sweet Potato Plants | each | JMD 5 | 5000 | JMD 25,000 | USD 294 | JMD 250,000 | USD 2,941 |
| Vegetable Seeds | kg | | | JMD 80,000 | USD 941 | JMD 800,000 | USD 9,412 |
| Red Peas | lbs | JMD 100 | 500 | JMD 50,000 | USD 588 | JMD 500,000 | USD 5,882 |
| A Frames | each | JMD 4,000 | 50 | JMD 200,000 | USD 2,353 | JMD 2,000,000 | USD 23,529 |
| Sub-Total for Inputs/Goods - Sust. Agric & AF Demonstration Plots | | | | JMD 1,858,041 | USD 21,859 | JMD 18,580,405 | USD 218,593 |
| Inputs/Goods for Check Dams/Drop Structures (- emphasis will be on using on-farm indigenous materials including stones, logs etc.) | | | | | | | |
| Stones (incl. transportation) | truck loads | JMD 50,000 | 2 | JMD 100,000 | USD 1,176 | JMD 1,000,000 | USD 11,765 |
| Used tyres (incl. transportation) | truck loads | JMD 10,000 | 3 | JMD 30,000 | USD 353 | JMD 300,000 | USD 3,529 |
| Sand (incl. transportation) | truck loads | JMD 40,000 | 1 | JMD 40,000 | USD 471 | JMD 400,000 | USD 4,706 |
| Gabion baskets (incl. transportation) | each | JMD 10,000 | 6 | JMD 60,000 | USD 706 | JMD 600,000 | USD 7,059 |
| Wire | rolls | JMD 10,000 | 1 | JMD 10,000 | USD 118 | JMD 100,000 | USD 1,176 |
| Cement | bags | JMD 800 | 40 | JMD 32,000 | USD 376 | JMD 320,000 | USD 3,765 |
| Steel rods | ton | JMD 115,000 | 0.2 | JMD 23,000 | USD 271 | JMD 230,000 | USD 2,706 |
| Storage containers (for RADA Parish Offices - St. Andrew & St. Thomas) | containers | JMD 400,000 | 2 | JMD 800,000 | USD 9,412 | | |
| Transportation for Wire, Cement & Steel Rods | trip | JMD 30,000 | 2 | JMD 60,000 | USD 706 | | |
| Sub-Total for Inputs/Goods - Check Dams/Drop Structures | | | | JMD 295,000 | USD 3,471 | JMD 2,950,000 | USD 34,706 |
| Labour for Agric Demonstration Plots => Note: Project will cover 40% of these costs | | | | | | | |
| Diversion Ditch | m | JMD 400 | 600 | JMD 240,000 | USD 2,824 | JMD 2,400,000 | USD 28,235 |
| Individual Basin | units | JMD 25 | 1000 | JMD 25,000 | USD 294 | JMD 250,000 | USD 2,941 |
| Waterways (with Vetivera grass) | m | JMD 100 | 100 | JMD 10,000 | USD 118 | JMD 100,000 | USD 1,176 |
| Continuous Mounds | m | JMD 100 | 400 | JMD 40,000 | USD 471 | JMD 400,000 | USD 4,706 |
| Ginger/Tumeric | ha | JMD 50,000 | 1 | JMD 50,000 | USD 588 | JMD 500,000 | USD 5,882 |
| Pineapple Rows (alley cropping) | m | JMD 113 | 600 | JMD 68,022 | USD 800 | JMD 680,220 | USD 8,003 |

| | | | | | | | |
|---|-------|------------|-----|----------------------|-------------------|-----------------------|--------------------|
| Plantain (crop, to maintain banks & waterways) | ha | JMD 25,000 | 2 | JMD 50,000 | USD 588 | JMD 500,000 | USD 5,882 |
| Sweet Potato Plants (alley cropping) | ha | JMD 25,000 | 0.5 | JMD 12,500 | USD 147 | JMD 125,000 | USD 1,471 |
| Red Peas (N fixation & green manure) | ha | JMD 25,000 | 5 | JMD 125,000 | USD 1,471 | JMD 1,250,000 | USD 14,706 |
| Vegetable Seeds (alley cropping) | ha | JMD 25,000 | 5 | JMD 125,000 | USD 1,471 | JMD 1,250,000 | USD 14,706 |
| Check Dam/Drop Structure | units | JMD 40,000 | 10 | JMD 400,000 | USD 4,706 | JMD 4,000,000 | USD 47,059 |
| Sub-Total for Labour - Sust. Agric Demonstration Plots | | | | JMD 1,145,522 | USD 13,477 | JMD 11,455,220 | USD 134,767 |

Details of Irrigation & on-farm water management systems

| | | | | | | | |
|--|---------|-------------|------|----------------------|-------------------|-----------------------|--------------------|
| Inputs/Goods for Water Source & Head Main | | | | | | | |
| Application for Abstraction Licence (from WRA) | each | JMD 15,000 | 1 | JMD 15,000 | USD 176 | JMD 150,000 | USD 1,765 |
| Excavation of reservoirs (x5 project locations) | each | JMD 350,000 | 1 | JMD 350,000 | USD 4,118 | JMD 1,750,000 | USD 20,588 |
| Geomembrane for reservoir (supply, transportation & installation) | each | JMD 650,000 | 1 | JMD 650,000 | USD 7,647 | JMD 3,250,000 | USD 38,235 |
| Entombment of springs (x5 project locations) | | | | | | | |
| Cement | bags | JMD 800 | 45 | JMD 36,000 | USD 424 | JMD 180,000 | USD 2,118 |
| Sand | cubic m | JMD 3,000 | 20 | JMD 60,000 | USD 706 | JMD 300,000 | USD 3,529 |
| Gravel | cubic m | JMD 3,000 | 10 | JMD 30,000 | USD 353 | JMD 150,000 | USD 1,765 |
| Steel | ton | JMD 115,000 | 0.25 | JMD 28,750 | USD 338 | JMD 143,750 | USD 1,691 |
| Lumber | RTF | JMD 32 | 1500 | JMD 48,000 | USD 565 | JMD 240,000 | USD 2,824 |
| Trucking | trip | JMD 25,000 | 4 | JMD 100,000 | USD 1,176 | JMD 500,000 | USD 5,882 |
| Labour (incl. site preparation) | each | JMD 250,000 | 1 | JMD 250,000 | USD 2,941 | JMD 1,250,000 | USD 14,706 |
| Main line, valves & accessories | various | JMD 400,000 | 1 | JMD 400,000 | USD 4,706 | JMD 4,000,000 | USD 47,059 |
| Installation of main line | each | JMD 20,000 | 1 | JMD 20,000 | USD 235 | JMD 200,000 | USD 2,353 |
| Filtration system | each | JMD 40,000 | 1 | JMD 40,000 | USD 471 | JMD 400,000 | USD 4,706 |
| Installation of filtration system | each | JMD 10,000 | 1 | JMD 10,000 | USD 118 | JMD 100,000 | USD 1,176 |
| Sub-Total for Inputs/Goods - Water Source & Head Main | | | | JMD 2,037,750 | USD 23,974 | JMD 12,613,750 | USD 148,397 |
| Inputs/Goods for On-Farm Irrigation Systems for demonstration plots | | | | | | | |
| Drip irrigation system (hose, fittings & other accessories) | each | JMD 160,000 | 1 | JMD 160,000 | USD 1,882 | JMD 1,600,000 | USD 18,824 |
| Trucking costs for irrigation systems & pipes | trip | JMD 25,000 | 1 | JMD 25,000 | USD 294 | JMD 250,000 | USD 2,941 |
| Labour for installation | each | JMD 15,000 | 1 | JMD 15,000 | USD 176 | JMD 150,000 | USD 1,765 |
| Sub-Total for Inputs/Goods - On-Farm Irrigation Systems for demonstration plots | | | | JMD 200,000 | USD 2,353 | JMD 2,000,000 | USD 23,529 |
| Total for Water Source, Head Mains & On-Farm Irrigation Systems | | | | JMD 2,237,750 | USD 26,326 | JMD 14,613,750 | USD 171,926 |

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|--------------------------|------------------------------|--|--|-----------------------------|--------------|--------|--------|--------|--------|--------|--------|
| | | | | | Unit | Unit cost | | | | | | |
| III.9 Community Training in Alternative (Non-Agricultural) Livelihoods | | | | | | | | | | | | |
| III.9.1: Community training programme in non-agricultural livelihoods | JCDT | FD, RADA, NEPA & TPDCo | Penlyne Castle, Mavis Bank, Woodford & Redlight | Output: 150 community members trained for Guest Houses/Eco-lodges (Penlyne Castle), Visitor Centre (Mavis Bank) & ICT Centres (Woodford & Redlight Districts) | | | | | | | | |
| (a) Sub-Activity: Site visits to engage community persons, coordinate & monitor their non-agricultural training | | | | | | | | | | | | |
| - Other: Travel costs for JCDT officer to attend community training sessions | JCDT staff | | | | travel | 25 | 1,186 | 1,186 | 1,186 | 1,186 | 1,186 | 5,929 |
| (b) Sub-Activity: TEAM Jamaica Training for Guest Houses/Eco-lodges & Visitor Centre (Penlyne Castle and Mavis Bank) | | | | | | | | | | | | |
| - Consulting Services: TEAM Jamaica training | TPDCo | | | 2 days/year, in Years 1&2 | training | 1,725 | 1,725 | 1,725 | | | | 3,450 |
| - Inputs/Goods: Light refreshments for TEAM Jamaica Training (J\$ 150/person x 25 persons/group x 6 groups) | | | | | training session | 265 | 529 | 529 | | | | 1,059 |
| (c) Sub-Activity: CPR Renewal training for Guest Houses/Eco-lodges & Visitor Centre (Penlyne Castle and Mavis Bank) | | | | | | | | | | | | |
| - Consulting Services: CPR Renewal training | Heart Foundation | | | 1 day/year, from Years 2-5 | renewal of certification | 150 | | 150 | 150 | 150 | 150 | 600 |
| - Inputs/Goods: Light refreshments for CPR Renewal training (J\$ 150/person x av. 25 persons/group x 6 groups) | | | | | training session | 265 | | 265 | 265 | 265 | 265 | 1,059 |
| (d) Sub-Activity: Training to run Community ICT Centres (Woodford & Redlight Districts) | | | | | | | | | | | | |
| - Inputs/Goods: 6 computer units for ICT Centres | HEART/NTA & ICT4D | | | Bi-monthly meetings | computers | 900 | 5,400 | | | | 5,400 | 10,800 |
| - Consulting Services: HEART/NTA & ICT4D training to run the ICT Centres | | | | | training | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 5,000 |
| - Inputs/Goods: Light refreshments for HEART/NTA & ICT4D training (J\$ 150/person x | | | | | training session | 265 | 1,588 | 1,588 | 1,588 | 1,588 | 1,588 | 7,941 |

| | | | | | | | | | | | | |
|--|------|---------------------------------|--|---|----------|-------|---------------|---------------|---------------|---------------|---------------|---------------|
| av. 25 persons/group x 6 groups) | | | | | | | | | | | | |
| - Other: Cost for provision of internet to ICT Centres | | | | | lump sum | 988 | 988 | 988 | 988 | 988 | 988 | 4,941 |
| Sub-total for Activity III.9.1 | | | | | | | 12,417 | 7,431 | 5,177 | 5,177 | 10,577 | 40,779 |
| III.9.2: Market Studies for non-agricultural livelihoods | JCDT | With input from RADA, FD & NEPA | Exact locations to be decided on the basis of the initial KAP findings | Output: 6 x market studies will be conducted/updated to assess viability of non-agricultural livelihoods | | | | | | | | |
| - Consulting Services: Market/Marketing Specialist | | | | | fees | 8,000 | 16,000 | 16,000 | 8,000 | 8,000 | | 48,000 |
| - Other: Travel & subsistence for JCDT officers to support field work | JCDT | | | | travel | 140 | 280 | 280 | 140 | 140 | | 840 |
| Sub-total for Activity III.9.2 | | | | | | | 16,280 | 16,280 | 8,140 | 8,140 | 0 | 48,840 |
| Total for III.9: Alternative non-agricultural livelihood projects | | | | | | | 28,697 | 23,711 | 13,317 | 13,317 | 10,577 | 89,619 |

Additional notes for Output III.9

- These training sessions will be organised to coincide with the Community Group Formation & Strengthening meetings (monthly in Year 1, and bi-monthly in Years 2-5).
- The Community Devt/Rural Devt. Extension Officer who will be employed for the Grp Formation & Strengthening (Output III.4) will also be responsible for organising, supporting & monitoring the non-agricultural livelihood training activities in these communities.
- JCDT field officers will be present at the training sessions given by external agents.
- The TEAM Jamaica training covers initial CPR, but this must be renewed annually (as per TPDCO's requirement for recognition of Eco-lodges & Visitor Centres)
- The ICT Centres to be used by community members for their own access to internet as well as to offer to visitors (internet café).
- The market studies will be based on the demand in communities as well as the knowledge of implementing organisations. They will also take into account the results from the first two KAP studies (start & middle of project).

| | Lead Entity/ Entities | Other(s) involved | Project Location(s) or Communities, where applicable | Specific Output(s) | Resources Required | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|--|----------------------|--|--|--------------------|-----------|--------|--------|--------|--------|--------|--------|
| | | | | | Unit | Unit cost | | | | | | |
| III.10 Monitoring & evaluation of extension & training activities | | | | | | | | | | | | |
| III.10.1: Monitoring effectiveness of training activities | MOAF – Data Bank & Evaluation Division | RADA | All | Output: To assess whether farmers have adopted SLM practices transferred & to provide further technical advice where necessary | | | | | | | | |
| - Other: Travel & subsistence for field assessments | Data Bank & Evaluation | | | | travel | 3,388 | 3,388 | 3,388 | 3,388 | 3,388 | 3,388 | 16,941 |
| III.10.2: Monitoring effectiveness of extension materials | RADA | - | All | Output: 80 sites visits to assess effectiveness of communication of voice & text messages, booklets/brochures & DVDs | | | | | | | | |
| - Other: Travel costs for RADA field officers & specialists to assess voice & text messages | | | | | travel | 1,976 | 593 | 593 | 791 | | | 1,976 |
| Total for III.10: Monitoring & evaluation of extension & training activities | | | | | | | 3,981 | 3,981 | 4,179 | 3,388 | 3,388 | 18,918 |

Additional notes for Output III.10

- MoAF's Databank & Evaluation Division (DBED) will assist with the design of the monitoring instruments free of charge.
- In keeping with the DBED's monitoring and evaluation of previous projects (including EJASP), the following methodology will be used: (i) Beneficiaries will be carefully selected to achieve a wide and representative distribution across the project area as well as to capture nuances of the specific project locations; (2) Monitoring instruments (including questionnaires and explanatory notes) will be developed in consultation with RADA and the Project Staff, and these will be field tested and modified; (3) Field data collection will be carried out by the DBED's team of experienced data collection officers, under the overall direction of the Division's Director; and (4) Questionnaire editing, coding and data processing will be done in-house by the Data Processing Section of the DBED.
- RADA will follow similar questionnaire for its monitoring of extension materials. *Note: The assessment of information booklets/brochures & DVDs will be assessed by RADA officers during their routine duties, and so have not been included here.*

5.6. Monitoring of Extension Programme

As indicated in Tables 5 and 6, the Project's Extension Programme will be monitored as follows:

- *Monitoring effectiveness of training activities* will assess whether farmers have adopted SLM practices transferred and to provide further technical advice where necessary. This will be conducted by RADA in conjunction with MoAF's Data Bank & Evaluation Division (DBED).
- *Monitoring effectiveness of extension materials* will assess the effectiveness of communication of voice & text messages, booklets/brochures & DVDs. This will be conducted by RADA.

The methodology that will be used has been described in the Additional Notes at the end of its corresponding section of Table 7 (III.10). For both, a precise definition of the performance indicators will be determined collectively by agencies involved and the Project Staff at the inception of the Project.

Final Report: Annexes

ANNEX A: PERSONS INTERVIEWED/CONSULTED DURING RESEARCH

| Organisation/Company | Name | Title | Contact information | |
|---|-----------------------|---|---|--|
| Rural Agricultural Development Authority (RADA) | Harold Spaulding | Principal Director – Technical Services (and Acting Deputy Chief Executive Director) | spauldingh@rada.gov.jm | (1876) 977 1158-62 |
| | Janette Lawrence | Principal Director - Field Services, & Deputy Chief Executive Director (soon to start pre-retirement leave) | lawrencej@rada.gov.jm | (1876) 927-2280 m. (1876) 564-3542 |
| | Cavell Francis-Rhiney | Senior Director - Production, Marketing & Special Projects | rhineyc@rada.gov.jm | (1876) 977 1158-62 m. (1876) 577-9159 |
| | Phillip Chung | Senior Director, Div. of Technology, Training & Technical Info (TTTI) | chung_p2@yahoo.com and training@abisjamaica.com.jm | (1876) 927-1780 m. (1876) 577-9774 |
| | Winston Simpson | Agricultural Engineer – TTTI Division | simo2wd@yahoo.com | (1876) 970-3461 m. (1876) 577-9484 |
| | Bevine Martin | Acting Parish Agricultural Manager, St. Andrew | bvinmar@yahoo.com | (1876) 927-1570-1 m. (1876) 878-1418 |
| | Eistein McLean | Acting Deputy Parish Agricultural Manager, St. Andrew | mcleane@rada.gov.jm | m. (1876) 564-3581 |
| | Wayne Reid | Land Husbandry Specialist, St. Andrew | bushj2k@hotmail.com | m. (1876) 560-5795 |
| | Lennox Hemans | Deputy Parish Agricultural Manager, St. Thomas | lenhemans@yahoo.com | m. (1876) 577-9557 |

| | | | | |
|--|-----------------------------|---|---|---------------------------------------|
| | Collan Parke | Land Husbandry Specialist, St. Thomas (now on pre-retirement leave) | parke@rada.gov.jm | m. (1876) 870-3271 |
| | Dwight Forrester | Agricultural Extension Officer, St. Thomas (seconded to USAID/EHF Project as Coordinator) | forresterd@rada.gov.jm and forro_d@yahoo.com | m. (1876) 564-2956 |
| Ministry of Agriculture & Fisheries (MoAF) | Michael Pryce | Director, Agricultural Marketing Info Division (AMID) | mapryce@moa.gov.jm | (1876) 927-1206 |
| | Paulette Lyons-Dodd | Director, Project Coordinating Unit | pmylons-dodd@moa.gov.jm | (1876) 927-1731 to 50 |
| Forestry Department (FD) | Marilyn Headley | CEO & Forestry Conservator | mheadley@forestry.gov.jm | (1876) 924 2667 - 8 or 931 4148 |
| | Keith Porter | Principal Director, Forestry Operations | kporter@forestry.gov.jm | (1876) 925-7469 m. (1876) 564-6672 |
| | Owen Evelyn | Senior Director, Forest Science & Technology | oevelyn@forestry.gov.jm | (1876) 931-8630 m. (1876) 564-7473 |
| | Donna Lowe | Field Operations, AF & Zonal Director, E. Region | dlowe@forestry.gov.jm | m. (1876) 564-7530 |
| | Siran Bent | Manager, Strategic Corporate Planning | sbent@forestry.gov.jm | m. (1876) 578-7139 |
| | Noel Bennett | Rural Sociologist | nbennett@forestry.gov.jm | |
| | Stephanie Donaldson-Francis | Senior Manager, Public Relations & Corporate Communications | sdonaldson@forestry.gov.jm | |
| | Alli Morgan | Manager, Forest Resource Info Mngt | amorgan@forestry.gov.jm | (1876) 905-1270 m. (1876) 564-7504 |

| | | | | |
|---|------------------|---|--|---|
| | Damart Williams | Compliance and Enforcement Manager | dwilliams@forestry.gov.jm | |
| | Rainee Oliphant | Senior Legal Officer & Enforcement | roliphant@forestry.gov.jm | |
| National Environment & Planning Agency (NEPA) | Novlette Douglas | Manager, Special Projects, CEO's Office | NDouglas@nepa.gov.jm | (1876) 754-7540 extn. 2470 |
| | Sheries Simpson | Manager, Projects Planning & Monitoring Branch | sasimpson@nepa.gov.jm | (1876) 754-7540 extn. 2336 m.(1876) 851-5496 |
| | Andrea Donaldson | Manager (Acting), Ecosystems Management Branch | ADonaldson@nepa.gov.jm | (1876) 754-7540 extn. 2213 m. (1876) 478-8081 |
| | Vivian Blake | Coordinator, Environmental Mngt Sub-Division | VBlake@nepa.gov.jm | m. (1876) 351-1812 |
| | David Reid | Environmental Officer, Ecosystems Management Branch | dreid@nepa.gov.jm | (1876) 754-7540, ext. 2218 |
| Jamaica Conservation & Development Trust (JCDT) | Marlon Beale | Executive Director | jamaicaconservation@gmail.com | (1876) 960-2848/9; 920-8278/9 m. (1876) 385-4696 |
| National Irrigation Commission Ltd. | Winston Shaw | Manager, On-Farm Water Management Unit | winstons@nicjamaica.com | m. (1876) 405-2258 |
| Coffee Industry Board (CIB) | Louis Campbell | Advisory Services Manager | lcampbell@ciboj.org | (1876) 758-1259 or 758-3903 |
| | Noel Richards | Advisory Officer, St. Andrew | Nrichards@ciboj.org | m. (1876) 846-5410 |
| Planning Institute of Jamaica (PIOJ) | Hopeton Peterson | Manager, Environment - Sustainable Devt. & Reg. Planning Div. | Hopeton_Peterson@pioj.gov.jm | (1876) 906-4463 |

| | | | | |
|---|-----------------|---|--|--|
| | Mary Ann Gooden | Project Manager, Climate Change Adapt & Disaster Risk Reduction Project | MGooden@pioj.gov.jm | (1876) 935-5060 or 960-9339 extn. 5060 |
| Ministry of Transport, Works & Housing - Squatter Management Unit | Basil Forsythe | Director | basil.forsythe@mwh.gov.jm | (1876) 906-8265 or 926-1590 |

ANNEX B: BIBLIOGRAPHY

Project documents have been listed under the name of the main Implementing/Executing entity in Jamaica.

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ANNEX C: WEBSITES CONSULTED

| Organisation / Company | |
|---|---|
| ABIS Farmer Registration | https://www.abisjamaica.com.jm/ABIS2009/registration_info.asp |
| Agricultural Business Information System | http://www.abisjamaica.com.jm/ |
| Agro-Investment Corporation | http://www.assp.gov.jm/about.php |
| Canadian International Development Agency | http://www.acdi-cida.gc.ca/home |
| Clearing-House Mechanism of the U.N. Convention on Biological Diversity – Jamaica | http://jamaicachm.org.jm/ioj_wp/ |
| Climate Investment Funds | http://www.climateinvestmentfunds.org/cif/ |
| Coffee Industry Board | http://www.ciboj.org/cib/ and http://www.moa.gov.jm/about/agencies/coffee.php |
| Environmental Foundation of Jamaica | http://www.efj.org.jm/ |
| Forestry Department | http://www.forestry.gov.jm/ and http://www.moa.gov.jm/forestry/index.php |
| Global Environment Facility | http://www.thegef.org/gef/ |
| Inter-American Development Bank | http://www.iadb.org/en/inter-american-development-bank,2837.html |
| <i>Integrating Watershed and Coastal Area Management</i> | http://iwcam.org/ |
| <i>Jamaica 4H Clubs</i> | http://www.moa.gov.jm/about/agencies/4hclub.php and www.Jamaica4h.com (most of this was not functioning) |
| Jamaica Agriculture Market Information System | http://www.ja-mis.com/CompanionSite/home.aspx |
| Jamaica Agricultural Society | www.jas.org and http://www.moa.gov.jm/about/agencies/jas.php |
| Jamaica Conservation Development Trust | http://jcdt.org.jm/html/ |
| Jamaica Defence Force - Newcastle camp | http://www.jdfmil.org/campsAndBases/campAndBasesHome2.php |
| Jamaican Protected Areas Trust – Forest Conservation Fund | http://jpat-jm.com/netcentr/fcfund/fcfund.html |
| Ministry of Housing, Environment & Water | http://www.mwh.gov.jm/ and http://www.facebook.com/MHEWJamaica |
| Ministry of Food & Agriculture | http://www.moa.gov.jm/ |
| Ministry of National Security | http://www.mns.gov.jm/content/departments-and-agencies |
| National Biodiversity Strategies and Action Plans | http://www.cbd.int/nbsap/ |
| National Environment & Planning Agency | http://www.nepa.gov.jm/index.asp |

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| National Irrigation Commission | http://www.nicjamaica.com/ |
| National Land Agency | http://www.nla.gov.jm/ |
| PANOS Caribbean | http://panoscaribbean.org/home |
| Rural Agricultural Development Authority | http://www.rada.gov.jm/ and http://www.moa.gov.jm/about/agencies/rada.php |
| Rural Physical Planning Division | http://www.rppdjm.com/ |
| UCC Ueshima Coffee Co. Ltd. | http://www.ucc.co.jp/eng/ |
| UN Convention on Biological Diversity | http://www.cbd.int/nbsap/ |
| UNDP - Jamaica | http://www.jm.undp.org/content/environment-and-energy |
| United States Agency for International Development | http://www.usaid.gov/ |

ANNEX D: SUMMARY OF PAST & CURRENT INITIATIVES WITH RELEVANCE TO PROJECT

Projects are listed alphabetically by their titles; and those which have been completed, are shaded in green. Activities specifically relevant to this Yallahs & Hope Rivers Watersheds Project are highlighted in blue. Projects in italics have not been discussed in more detail in Section 3.4, but are included here for completeness of information.

| Project | Donor(s) | Implementing Entity | Duration | Total Cost | Objectives | Targets Initially Envisaged |
|--|--------------------------|---------------------|--|----------------------------|---|---|
| <i>Agricultural Support Services Project</i> | <i>IDB</i> | <i>MoA</i> | <i>2001-2005; 2005-2008</i> | <i>J\$ 1,417.5 million</i> | <i>To enhance the quality & delivery of agricultural support services mainly through improving extension, marketing and research services, upgrading existing systems for safeguarding animal & plant health, as well as food safety, and supporting implementation of selected productive projects in order to stimulate agri-business development in rural areas.</i> | <i>Component 1:</i> Strengthening delivery of agric support services to producers (Establish an improved system of delivering agric support services to producers & exporters; Develop & execute MOU with support service providers; Acquire & disseminate agric technology, info & market intelligence; Acquire equipment, upgrade facilities & train technical personnel & producers); <i>Component 2:</i> Strengthening & consolidating agricultural health & food safety services (Develop policy & strengthen coordination mechanism between Agencies & Ministries; Strengthen & upgrade infrastructure at Agencies & Ministries; Implement public awareness campaign; Develop a database & strengthen record systems); <i>Component 3:</i> Financing selected activities in high payoff productive projects for agric producers & exporters (Increase competitiveness & profitability of Ja agricultural producers & exporters thro specific productive projects in non-traditional sectors. Grants will be allocated to formal associations & purchasers who will share the cost of selected projects). |
| Capacity Building for Forest Conservation and Sustainable Livelihoods in the Blue Mountains Sustainable Land Management | Forest Conservation Fund | JCDT | 2009- | J\$ 21,591,148 | Improved conservation of forests inside and outside the BJCMNP/FR | 1. To increase the level of awareness and knowledge regarding forest conservation and sustainable livelihoods, in 40 communities within the Buffer Zone of the BJCMNP/FR 2. To facilitate implementation of sustainable livelihood activities and projects in at least 4 communities within the project area. 3. To strengthen JCDT's ability to sustain its management of the BJCMNP by generating income and increasing the number of supportive community members. |

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|---|--|---|------------------|--------------------|---|---|
| Capacity Building for Sustainable Land Management to Address Land Degradation in Jamaica | GEF/UNDP/ Jamaica Conservation Development Trust/GoJ (in kind) | PIOJ (Exec. Agency) & Forestry Dept. (Implement. Agency) | 2010-2013 | J\$ 86.44 million | To enhance effective sustainable land management (SLM) by building capacities for SLM in appropriate government & civil society institutions & user groups. The overarching goal is to mainstream SLM into government planning & strategy development. | To mainstream SLM into national institutions, policies, strategies & plans; To enhance capacity for management, application & adaptation of SLM ; To achieve effective management & adaptive learning. |
| Capacity Building in Primary Schools Project | <i>JEF</i> | <i>JCDT</i> | | | <i>To build the capacity of primary schools through agricultural interventions, principally targeting 8-12 year-old boys and girls.</i> | <i>JCDT's Education Officer and the schools' principals decide what activity would be most suited to the school (e.g. greenhouse, vegetable garden for the canteen); and JCDT provides financial assistance for this purpose. Projects have been implemented to date in the communities of Woodford¹⁰⁰, Cascade and Red Light District.</i> |
| Centre of Excellence for Advanced Technology in Agriculture (CEATA) | <i>AECID</i> | <i>RADA</i> | 2010-2012 | J\$ 393.40 million | To increase competitiveness of agric production to meet local demand for high quality fruit & vegetables, and to enable private initiatives for export of these food items in future. Goal is to implement appropriate technology adapted to specific agro-climatic & social factors, to develop education, training & R&D programmes so as to increase productivity in fruits & vegetable-growing sectors. | Develop training programmes, train & provide training & technical assistance to farmers and other agric stakeholders in appropriate use of technology adapted to local agro-climatic & social conditions; Demonstrate & allow for wide-spread transfer of advanced crop technology; Develop greenhouse facilities; Serve as meeting point to agricultural sector where research, development & innovation may be applied to business development & promotion. |

¹⁰⁰ Having participated in the GEF/UNDP *Reducing Climate Change-Driven Erosion & Landslide Risks through Sustainable Agriculture for Safer Slopes Project* which was implemented by JCDT, community members contributed pineapple suckers to the school in their community.

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|--|--|--|------------------|--------------------|---|---|
| Climate Change Adaptation & Disaster Risk Reduction | EU | PIOJ NEPA EMD-OPM Forestry Dept. MET Service UNEP | 2010-2012 | J\$ 182.5 million | To increase resilience & reduce risks associated with natural hazards in vulnerable areas as an adaptive measure to climate change, thereby contributing to sustainable development of Jamaica. Project aims to: rehabilitate & improve management of selected watersheds to reduce down-stream run-off and associated pollution & health risks; restore & protect coastal ecosystems to enhance natural buffers & increase resilience; Integrate climate change mitigation and adaptation into national policies, enhance institutional capacity & facilitate awareness-building amongst Ja's population . | Facilitate establishment of Local Forest Mngt Committees (LFMC) to promote sustainable environmental practices, increase awareness & assist with enforcement of relevant legislation in communities in selected watershed - Hope & Yallahs Rivers & White River - Rio Bueno; Procure seeds, producing approximately 300,000 seedlings & planting/establishing suitable tree species and other vegetative cover on 300ha of degraded watershed lands; Promote agro-forestry practices in selected watersheds to reduce destruction of trees to improve crop production & livelihoods of associated communities; Assess all forest crown lands to determine status, and develop geo-reference database to assist in prioritisation of planning; Declare additional forest reserves to halt & reverse loss of biodiversity; Develop comprehensive forest fire management programme for targeted areas with relevant stakeholders; Promote development of sustainable livelihood/economic activities through conservation & environmental management programmes; Establish river protection infrastructure to minimise erosion & flooding |
| Competitive Coffee Enterprises Programme | <i>Coffee Industry Board & Common Fund for Commodities</i> | GoJ | 2010-2013 | J\$ 106.88 million | <i>To provide capacity building of coffee cooperatives in central & northern regions of Jamaica; To improve competitiveness of small coffee producers in the selected areas; To promote consumption of good quality coffee</i> | <i>Improve productivity of small producers (0.1-1.5 ha) from 50 to 100 boxes per ha; Reduce cost of Arabica seedlings; Coffee producers acquire appropriate tools and technologies, and become business oriented; Adequate investment and technology transfer to result in better income and overall quality of life.</i> |
| Eco-Friendly Coffee Production | Japanese Embassy | Coffee Industry Board | 2010-2011 | U\$ 50,030 | To assist farmers produce coffee in an environmentally-friendly manner with particular focus on the Integrated Coffee Berry Borer Management system so as to reduce the amount of chemicals being used. | Beauveris bassiana spores used for control of Coffee Berry Borer; 4 technicians (including 2 university students) trained to mass rear the entomopathogen; 10,000 rustic/homemade borer traps with diffusers & attractant to reduce incidence level of Coffee Berry Borer; 3,000 permanent trees planted to increase plant density and shade intensity on coffee farms, and also improve on-farm ecosystem; 150 farmers trained in improved agronomic & cultural practices, pest and control; 4000 best practices brochures produced and distributed. |

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|--|--------------------------|--------------------------|---|--|--|---|
| Eastern Jamaica Agricultural Support Project | EU | RADA | 2000-2002; 2002-2004; 2004-2005; 2005-2006 | J\$ 358.89 million | To devise, test & replicate sustainable group-based & market-led methods for increasing income of small farmers with holdings <2ha in selected rural communities in Eastern Jamaica. The project will promote interventions that will maintain or improve land resources through better land husbandry methods . | Establish 79 micro-projects for the development of income-generation, market-led activities by farmer groups ; Form & develop 100 farmer groups; Train 84 extension officers & 5,250 farmers; Educate 30 communities in environmental awareness; Increase production & reduce wastage through improved & timely market information flow to farmers; Provide technical advice, on-farm trials & research for the production of permanent & annual crops and livestock for which markets have been identified. |
| Forest Conservation in the Blue Mountains Project | Forest Conservation Fund | JCDT | 2007-2011; extension to May12) | J\$ 12.496 million | To contribute to the rehabilitation of degraded and deforested areas within the BJCMNP and John Crow Mountains Forest Reserve | Activities include: 28ha of Park/Forest Reserve land and lands in the surrounding 1 km buffer zone rehabilitated using a combination of controlling invasive alien plant species and replanting with native forest trees; Propagation and establishment of at least 10 native forest species including at least 3 species of the approximately 100 threatened endemic plants which the Park contains; To obtain in field/on the job training in conservation management from scientists conducting research in the park. |
| Hazard Mapping and Reforestation for Disaster Risk & Reduction in the Blue Mountains Project | EFJ | JCDT | 2011-2012 | J\$ 10,363,200 (with J\$ 8,267,200 from EFJ) | Within the Blue and John Crow Mountains National Park (BJCMNP) and its Community Buffer Zone, to assist the JCDT improve its reforestation for disaster risk reduction through hazard mapping and related research into sites, previous projects, the impact of invasive species and deforestation on disaster risk and, reforestation for risk reduction. | <ol style="list-style-type: none"> 1. Conduct hazard mapping for selected sites. 2. Conduct research regarding the relationship between climate change-related hazards, forest degradation and deforestation, and reforestation for disaster risk reduction. 3. Work with local community members to conduct reforestation (10ha) for disaster risk reduction, using a variety of tree species and related to the research. 4. Prepare public education materials and disseminate in communities (brochures, DVDs, community meetings...etc.) |
| Hope River Watershed Slope Stabilisation Project | NEPA | NEPA, with MOU with RADA | 2007/08-2008/09 | \$774,800 | To establish visible demonstrations of proper land management practices on degraded lands in the watershed that would reduce soil erosion, protect water resources, enhance biodiversity habitat values, and be replicable in other watersheds. | <p><i>Windsor Castle</i> (1.2-1.6ha site): bamboo log barriers to contain sediment; two check dams to reduce the velocity of runoff; a retaining wall and culvert improvement to transport excess storm water into an existing gully. Also 100 Blue Mahoe seedlings planted to serve as soil binders.</p> <p><i>Freetown</i> (2.4 ha site): three check dams; and 1,500 pineapple suckers as live contour barriers.</p> <p>Also farmer training days, and public education meetings.</p> |

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|--|----------|------|------------|---|---|--|
| Integrating Watershed And Coastal Areas Management (IWCAM) | GEF/UNEP | NEPA | 2006- 2011 | U\$112.052 million (with U\$ 5.742 million & U\$ 7.67 million from GES) | <p>Overall objective is to strengthen the commitment and capacity of the participating countries to implement an integrated approach to the management of watersheds and coastal areas, with a long-term goal of enhancement of the capacity of the countries to plan and manage their aquatic resources and ecosystems on a sustainable basis.</p> | <p>- <i>Demonstration, Capture and Transfer of Best Practices</i>: On-the-ground Demonstrations targeted at national hotspots where specific threats to national, regional and global environmental amenities have been identified. Emphasis will be on cross-sectoral management approaches, institutional/infrastructure realignment and policy reform; sectoral and stakeholder participation and coordination, related capacity building, and the replication and transfer of best lessons and practices from these demonstrations.</p> <p>- <i>Development of IWCAM Process, Stress Reduction and Environmental Status Indicators Framework</i>: Identification of impact indicators for IWCAM efficacy (including improvements in process, stress reduction, overall status of the coastal and watershed environment), and monitoring programme which can drive policy reforms.</p> <p>- <i>Policy, Legislative and Institutional Reform for IWCAM</i>: National and regional policy & legislative reforms, plus institutional improvements. High priority will be given to helping countries meet commitments required in the ratification process for regional legal agreements such as the Cartagena Convention and its protocols. Also the development of national Integrated Water Resources Management and Water Use Efficiency Plans.</p> <p>- <i>Regional & National Capacity-building & Sustainability for IWCA</i>: Establishing mechanisms for regional integration and networking to develop active partnerships for IWCAM (e.g. in public awareness, stakeholders participation, policy-level sensitisation, educational materials and curricula, training, secondment) to ensure direct involvement of donors and potential co-funders in the coordination process for the development of long-term strategy for sustainable IWCAM at the regional level.</p> <p>- <i>Project Management & Coordination</i>: Developing long-term, sustainable management & coordination through a process of stakeholder participation and integration.</p> |
|--|----------|------|------------|---|---|--|

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| Marketing & Agriculture for Jamaican Improved Competitiveness (MAJIC) | USAID | MoAF | 2010-2014 | J\$ 1,201.88 million | To increase volume & value of Jamaican agricultural commodities marketed profitably and competitively, leading to improved farm income, strengthened food security & expanded small-scale rural enterprise | <p>Component 1: Effective & Efficient Marketing Info System (Build capacity of MoAF & RADA to collect, analyse & disseminate production & marketing info; <i>Develop marketing information system (MIS) & platform for information dissemination</i>);</p> <p>Component 2: Strengthening of Production, Processing & Marketing Linkages throughout value chain (create legislative environment supportive of competitive agriculture; <i>strengthening capacity of farm groups</i>; strengthening linkages to buyers & providers; training of farmers on business of training);</p> <p>Component 3: Strengthening of Financial Services for Production, Productivity & Marketing (train farmers & rural agribusiness personnel; train operators of financial institutions);</p> <p>Component 4: Improvement of Production & Marketing of Selected Speciality Crops (farm-level training; cocoa tree rehabilitation & renewal; <i>Strengthening of farmers' organisations</i>; Improvement in post-harvest practices).</p> |
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| Morant Yallahs Agricultural Development Project | EU | MOA | 1996-98 | | To guide the development of agriculture in an environmentally-secure fashion, through the implementation of programmes to: introduce sustainable and environmentally-friendly farming systems ; raise farm incomes; assist farmers in securing tenure for their holdings; improve the ability of farmers to farm efficiently through rehabilitation of farm infrastructure. | <p>Component 1: Technology Generation and Validation (subcontracted to IICA & CARDI) - to establish a technology generation, validation and transfer programme based on <i>On- Farm Adaptive Research</i> in order to improve farm productivity and incomes of the small farmers through improved production systems emphasising soil conservation measures.</p> <p>Component 2: Forestry - Replanting and enhancing existing forest plantations and encouraging private tree planting in order to arrest the watersheds' degradation caused by deforestation.</p> <p>Component 3: Small Livestock Development – to raise goat meat production in areas suitable for livestock rearing through improving herd quality; to establish sustainable breeding associations; and to encourage better husbandry practices through more efficient fodder production systems that also serve to improve soil conservation.</p> <p>Component 4: Marketing – to establish Producer Marketing Groups so as to improve marketing on a group basis; and to assist a small number of existing agro-processing ventures through the provision of equipment and training.</p> <p>Component 5: Land Titling and Roads – to facilitate titles being issued to settlers; and to construct/rehabilitate 20 km of access roads to settlement areas.</p> <p>Component 6: Extension and Community Education – to increase crop production and farm incomes, and prevent further on-farm land degradation through the provision of technical assistance, training, equipment and farm inputs. Also to strengthen key rural development institutions, NGOs and other groups.</p> |
| National Capacity Self-Assessment Project | UNDP/GEF | NEPA | 2004- 2005 (Phase I) 2005-2006 (Phase II) | US\$230,000 (UNDP/GEF) plus GoJ in-kind) | To conduct a thorough self-assessment and analysis of national capacity needs, priorities and constraints with respect to its efforts at meeting global environmental management objectives. | <p>Phase I: To identify, confirm and review priority issues for action within the thematic areas of Biodiversity, Climate Change and Desertification; To explore related capacity needs within and across the three thematic areas; To elaborate a national action plan that focuses on capacity building to address the global environmental commitments; To provide a solid basis for the preparation of requests for future external funding and assistance.</p> <p>Phase II: Monitoring the implementation of the activities of the NCSA Action Plan.</p> |

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| National Irrigation Development Project (II) | IDB | National Irrigation Commission | 2005-2010; 2010-2011 | J\$ 1,295.49 million | To increase agricultural production and farmer incomes through improved irrigation management | (1) Institutional & Strengthening of National Irrigation Commission (improve institutional framework & capacity for irrigation management in Ja; develop new business strategy & strengthen management, accounting, billing & operation system); (2) <i>Promotion & formation of Water User's Associations</i> (establish 5 <i>autonomous, viable self-sustaining WUA's</i> in Colbeck, New Forest, <i>Yallahs</i> , Essex Valley & St. Dorothy to serve approximately 1,000 farmers on 1,700ha); (3) <i>Technical Assistance & Training</i> (train 30 trainers & technical assistants; train 1,000 farmers on topics related to farming with irrigation & use of sound environmental practices); (4) Irrigation System Infrastructure (construction & other/or rehabilitation and installation of irrigation systems infrastructure on 1,700ha land in Colbeck, Yallahs, New Forest, Essex Valley & St. Dorothy. |
| Pilot Project for Climate Resilience (Phase 1) | Climate Investment Funds | PIOJ | 2011-2012 | US\$ 507,000 | To develop Jamaica's Strategic Programme for Climate Resilience (SPCR) for the period to 2030. | (i) Developing a PPCR financing proposal; (ii) Conducting studies and analyses to secure the type of data/ information required to inform the development of the SPCR (including review of all development policies, plans and regulations to ascertain the extent to which climate change concerns are incorporated; conducting a climate change knowledge, attitude and practice survey, and an assessment of the gap in the capacity and the needs of key institutions to implement climate change programs; (iii) Strengthening the climate change data management system; (iv) <i>Development of a climate change communication strategy and action plan, then commence implementation of a climate resilience awareness and practice program, targeting the most vulnerable communities and groups</i> ; (v) Developing Jamaica's SPCR through a participatory and consensus building process, and also develop related investment proposals as the basis for accessing/leveraging financing. The SPCR will include a monitoring and results management framework; (vi) Capturing data, and collaborating with activities to be carried out under the regional track; (vii) Strengthening the program coordination capacity of the Sustainable Development & Regional Planning Division of the PIOJ, to facilitate implementation of the PPCR. |

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| Reducing Climate Change-Driven Erosion and Landslide Risks Through Sustainable Agriculture for Safer Slopes | UNDP/GEF SGP Community-Based Adaptation (CBA) Programme | JCDT | 2008-2010 | U\$126,817 (including U\$48,526 from UNDP plus U\$ 12,318 from other sources) | To increase the capacity of two farming communities on the slopes of the Blue Mountains (Woodford & Cascade) to adapt to climate change, through: (1) Increased agro-technical capacity for applying soil conservation techniques on steep slope environs; (2) Promoting alternative livelihoods promoted; and (3) Promoting forest and tree cover on slopes that are vulnerable to climate-driven increases in erosion and landslide risks. | <ul style="list-style-type: none"> - Training workshops in cost-effective soil conservation methods - Demonstration projects of soil conservation practices on farms - Greenhouse technology fieldtrips, workshops and demonstration projects - Training workshops in organic farming for high value produce - Organic farm fieldtrips - Tree planting in and outside the BCJMNP, as well as on individual farms |
| Ridge to Reef Watershed Project | USAID /GoJ | NEPA | 2000-2005 | U\$6 million (USAID) plus approximately J\$ 5 million annually (GoJ) | To promote sustainable environmental practices in the Great River Watershed; compliance and enforcement; and support to sustainable livelihood projects | <p>Institutional Strengthening & Policy: Green Paper on Watershed Policy; Watershed Management Plan and Strategy; Enhancing Coordination for Watershed Management; Tools for Sustainable Watershed Management; Compliance and Enforcement issues being addressed by Task Forces in both Watersheds.</p> <p>Training: Training of SWB and other key WM Staff; Training of Trainers; and watershed-level training.</p> <p>Public Awareness including pocket-size field-guide and popular materials to inform the public on environmental policies, rules and regulations; and hosting of “Gender and Environment” symposium.</p> <p>Projects: 3 water harvesting and sanitation projects completed; Planted 6,000 trees in 8 communities of Portland, Westmoreland and St. James; Established 200 chains of vegetative barriers on slopes in GRW and RGW.</p> <p>Monitoring: Watershed monitoring protocols established and implemented; Water quality monitoring program.</p> |

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| Strengthening the Operational and Financial aspects of the Protected Areas System | UNDP/ GEF/ TNC/ KfW & GoJ | NEPA (Executive), with Forestry Dept., Fisheries Division, JNHT, The Nature Conservancy | 2010-2016 | US\$7.8M | To consolidate the operational and financial sustainability of Jamaica's national system of protected areas through: (1) Strengthening of planning and revenue generation; (2) Rationalizing and integrating the national system of protected areas; and, (3) Increasing the effectiveness of protected area management. | Outputs for (1): Protected Area Trust Fund (PATF) and Revolving Fund; Model site-level business plans; Revenue generation mechanisms in five key protected areas; Operational plan for PA system financial strategy. Outputs for (2): National protected areas legislation and supporting legal framework; New and expanded PA network. Outputs for (3): New and updated protected area management plans; Monitoring and evaluation system for protected area management; Conservation-based economic development established in or near five protected areas; <i>Communication strategy to raise key stakeholder awareness and build national constituency.</i> |
| Trees for Tomorrow | CIDA | MoA | 1991-1996; 1996-1997; 1997-1998; 1998-2003; 2003-2004; 2005-2006 | J\$ 338.57 million | To strengthen institutional capabilities of the Jamaican forest sector, and <i>plan & implement sustainable forest management.</i> | Preparation & implementation of national biophysical inventory & management plan; Identification & re-opening of reserve boundaries & mapping; Development of forest land use data bank; <i>Development of national forestry awareness programme; Preparation of detailed forest management & land use plans for selected watershed(s); Development of extension programme; Training of 17 staff members in forestry management & environmental protection.</i> |

ANNEX E: PLANNED INITIATIVES WITH RELEVANCE TO PROJECT

Pilot Project for Climate Resilience (Phase II)

Following on the 1st phase of this project which is currently underway, PIOJ is putting together a number of investment projects for consideration by the Climate Investment Funds under Phase II. Three investment projects will cover the following:

- Development and use of high-resolution models for different climate scenarios;
- Conducting vulnerability assessments for the key sectors: Water Resources; Agriculture and Food Security; Tourism; Human Health; and Human Settlements and Coastal Resources
- Development of climate-sensitive adaptation strategies for the River Minho river basin – including: rainwater harvesting, management & storage; drip irrigation; improved land management (husbandry).
- Development and use of climate information platform for public awareness, particularly to share innovations with most vulnerable target groups (farmers, fishermen...etc.).

Phase I covers the climate models, KAP survey and initial communication activities; the other activities are anticipated to start in 2012, under Phase II, together with a more significant public awareness campaign on climate change. The latter may possibly be modelled on PANOS Caribbean's "*Voices for Climate Change*" programme¹⁰¹, which uses popular artists to take the climate change message into communities; uses cookouts, plants trees...etc.

Water Programme for Environmental Sustainability: Adaptation Measures to Human & Climate Change Impacts

Implemented by the Water Resources Authority (WRA), along with UNESCO and IMET, this project will be implemented in the Yallahs WMU. It will seek to improve the management of groundwater resources as a tool to overcome climate variability, increase water storage facilities and water supply capacity.

Other Planned Initiatives

The JCDT is currently formulating a proposal for consideration by the Forest Conservation Fund which will include some reforestation as well as small-scale sustainable livelihood activities. It aims to commence with Westphalia and Cedar Valley.

¹⁰¹ <http://panoscaribbeanblog.wordpress.com/2010/10/24/voices-for-climate-change-video-produced-by-panos-caribbean-neec/> and <http://panoscaribbeanblog.wordpress.com/>.