

CHAPTER 13: POLICY ANALYSIS AND OPTIONS FOR ACTION

Our lives on this planet depend on nature's provision of stability and resources. Current rates of human engendered environmental destruction threaten these resources and leave death and misery in their wakes. But we can avoid this. But to do so we must act in concert and with a sense of urgency to make the structural and policy changes needed to maintain ecosystems and their services, control water and air pollution and reverse the trend leading to global warming

United Nations Millennium Project, 2005

Introduction

The message of the UN Millennium Project cited above is relevant to Rwanda's current poverty-environment situation. The analyses in the previous chapters indicate that human engendered environmental changes in Rwanda continue to threaten the livelihoods of the poor and the viability of the ecosystems to provide life-support services. If left unabated, the degradation of the environment and natural resources in Rwanda will undermine the country's ability to sustain economic growth that is vital to the goals of the EDPRS, including improvements in people's livelihoods. In light of the identified challenges and the opportunities, further structural and policy changes are needed in order to enable the country meet its sustainable development goals.

This chapter builds upon the results of the thematic assessments in the previous chapters, highlighting the main issues, the outlooks and the requisite structural and policy changes. It is assumed that the country will stay the course in pursuing the goals of Vision 2020, which to a large extent represents a progression from the current Rwandan situation that approximates the 'policy reform' scenario to that which approximates the 'great transition' scenario. It is further assumed that the structural and policy changes already undertaken and those underway, which benefit both the economy and the environment, will not be diluted.

Despite the documented degradation of Rwanda's environment and ecosystems, it is recognized that judicious and innovative use of the remaining environment asset can enable the country to make substantial contributions to the attainment of the EDPRS goals, the MDGs and the New Partnership for Africa's Development (NEPAD) objectives. The imperative is that immediate actions are needed to curb ongoing degradation and innovative measures undertaken to seize the opportunities offered by the remaining stock of the environment asset. Given Rwanda's strong poverty-environment degradation spiral, the country's planners and policy makers cannot afford to ignore the price of environmental degradation in terms of declines in economic performance and people's standards of living. Postponing policy actions now in the hope of taking them later when Rwanda is wealthier seems not to be a wise option. Given the heavy dependence of the economy on the natural resource base, the continued degradation of the environment and natural resources is most likely to foreclose the prospects of future growth and further reduction in poverty.

In the sections that follow, the issues, outlooks, and possible policy actions for fostering sustainable development are provided for the various thematic areas that are assessed in the preceding chapters. The policy actions consist of both policy and structural changes, which if instituted to complement those in place, would enable Rwanda to stay the course towards its sustainable development objective. It would also enable the country to realize the national aspiration that by 2020 the Rwandan nation will be one in which the pressure on natural

resources, particularly on land, water, biomass and biodiversity are reduced, the process of environmental pollution and degradation are reversed and the management and protection of these resources and the environment is more rational for the country to bequeath to future generations of Rwandese the basic wealth necessary for sustainable development.

Policy options for action

Environment and economic development

Issues

As already highlighted in Chapter 1: Environment and Development, Rwanda's economy is linked to the environment in many ways. All economic activities, including production, consumption and waste disposal, subsist on the environment. The intricate links between the country's natural resources, such as water, land, air, plants and animals requires that Rwanda institutes policy and structural changes for more effective resolution of the challenges to sustainable development.

However, effective resolution of those challenges will depend partly on adequate public investment in the protection of environment and natural resources. To date, the budget allocation to sectors with mandates on the environment is rather miniscule given the magnitude of the challenges in ensuring environmental sustainability. Environmental stakeholders seem not to have sufficiently convinced the treasury that further investments in environment are good for both the economy and environment. From 2003 to 2007, however, the budget allocated to environment increased from 0.06 per cent to 1.15 per cent (MINITERE 2006).

Outlook

Despite the challenges posed by the global depression, Rwanda's economic performance in the medium term exhibits some degree of resilience, as the country maintains its strong record on sound macro-economic management, adequately implements its ICT policy, and effectively implements the EDPRS. These help to attract additional investments, thereby expanding employment, which in turn contributes to reducing the number of people directly dependent on agriculture with positive outcomes on the environment.

Growing civic competence within civil society enables active monitoring of economic and environmental performance. Civil society and other stakeholders make further use of the results of the ecosystem assessments and economic analysis under the Poverty-Environment (PEI) programme to engage in evidence-based advocacy for environment mainstreaming and enhanced investments in the environment and natural resources. The attendant pro-poor and pro-environment stance in policy-making, planning and budgeting yields improvements in the quality of growth and by extension promotes employment and environmental sustainability.

Possible policy actions

Notable progress has already been made in integrating environment into the EDPRS and some of the District Development Plans. Through the cleaner production programme, as already highlighted in the report, a number of industries are appreciating the mutual benefits of cleaner production to both the environment and the business bottom line (profit). There is need to appraise top executives in the ministries and parastatals as well as the country's legislators on the successes already made and what further actions are required in sustaining the integration of environment and development. Towards this end and the overall promotion

of the environment integration agenda, the following actions are proposed to complement those already underway.

- Institutionalize the integration of environment into policies, plans and programmes as provided for in the Environment Management Policy. Towards this end, appraise top executives of the various ministries and parastatals on the merits and challenges of environment mainstreaming; strengthen the capacity of sector and district planners and environmentalists for environmental assessment, poverty-environment mapping, policy analysis, economic analysis of various aspects of environmental degradation and environmental public expenditure review; and ensure the adequacy of environmental data, including its capture in future household surveys
- Apart from providing the skills mentioned above, draw upon the good practices and lessons learned from the Decentralized Environment Management Project (DEMP) and similar initiatives in the East African region to develop a strategy for effective mainstreaming of environment at the decentralized level. Supplement this with well-packaged education and information material on why environment matters and what actions the various stakeholders at the district and lower levels could take to promote environmental sustainability.
- Market failures and market distortions partly account for the ineffectiveness of environmental policies and laws despite increased efforts in applying the command and control approach in enforcement. Invest, therefore, in strengthening the capacity to assess the costs of environmental degradation (preferably via satellite account, for instance tourism) and how the various taxes and subsidies affect the achievement of environmental sustainability, with the view to developing suitable economic instruments to complement the command-and-control management regime.

Land use and agriculture

Issues

Agriculture will continue to be the mainstay of the Rwandan economy for the foreseeable future despite the documented progressive decline in its contribution to the GDP. Despite this, Rwanda's land resources are utilized in an inefficient and unsustainable manner (ROR 2000). A number of land use practices hurt both agricultural performance and environmental sustainability. These include conversion of wetlands into farms and pastures, cultivation of river banks and conversion of forest land into farms. Some husbandry practices may also harm the environment. Excessive application of both fertilizers and pesticide is a case in point. Unless the extension service is effective, the target of increased use of fertilizers from 0.5 per cent in 2000 to 8 per cent in 2010 and 15 per cent by 2020 (ROR 2000) could adversely affect the environment, especially soil and water quality. Inappropriate management of irrigated agriculture can also have deleterious effects on soil productivity.

As revealed in Chapter 3: Land Use and Agriculture, the negative effects of changing land use and agriculture on environmental sustainability are partly linked to the piecemeal implementation of both the land policy and the land law. The limited coverage of formal land registration and its focus on urban areas and rural commercial farms and church land is affecting sustainable land management. It has been estimated that between 1.5 and 2 million land holdings would need to be registered over the next few decades, if all land in Rwanda is to be registered (DFID and MINITERE 2003). The very limited coverage of formal land registration in the rural areas is partly attributable to inability of land owners to meet the costs of land registration.

Overall, two basic constraints undermine enhanced agricultural performance: a) demographic pressures, which complicate the improvement of soil and water management, often leading to rapid decline in farm size and the disappearance of fallow period from the farming systems, over cultivation, lack of replenishment of organic matter, and cultivation of excessively steep slopes that have no erosion control measures; and b) very poor soils with low organic matter, except in lowlands and volcanic soils (ROR 2004a).

Gully erosion in Gishwati



Photo credit: REMA

Outlook

Unabated population growth continues to pose a formidable challenge to the loss in land productivity: as population pressure on land intensifies. The incidence of HIV and AIDS does not drastically affect population growth rate in the medium term. But the attendant morbidity adversely affects agricultural productivity, with implications for household incomes and food security.

Annual losses of 1.4 million tonnes of soil translate into a rather persistent decline in the country's capacity to feed 40,000 (Musahara 2006). Such losses adversely affect both the economy and the environment. The non-agricultural jobs in industry and services increase, thereby becoming a fetter to continued land fragmentation. In the spirit of the movement towards the great transition to sustainable development, the government aggressively pursues the following Vision 2020 targets: a) reducing agricultural population from 90 per cent in 2000 to 75 per cent in 2010 and 50 per cent by 2020; and b) increasing non-agricultural jobs from 200,000 in 2000 to 500,000 in 2010 to 1,400,000 by 2020. An increase in the number of jobs in the industrial and services sector helps to reduce the number of people dependent on agriculture for their livelihoods. A positive environment gain is made.

In the short to medium term, the internal migration of the population from land scarce areas to those that seem to have land does not effectively solve the problem of land scarcity in Rwanda. Land scarcity, therefore, drives the needy population to encroach on the wetlands and forests. Government's capacity to enforce environment policies and laws on forests and wetlands does not improve sufficiently, resulting in unabated degradation of the wetlands and forests. Government institutes ways and means of ensuring that the land rights of people in the rural areas are secure; and this helps to avert land use conflicts. Those farmers with land

titles use them as collateral to seek commercial loans for farm improvements. Sustainable land management is therefore enhanced.

The conflicts in jurisdiction and interest between the ministry responsible for agriculture and that for environment regarding the utilization of the land resource are adequately resolved in the medium term. In the short term, REMA takes statutory actions to ensure that there is sufficient compliance with the EIA requirements by those developing the wetlands.

The vulnerability of Rwanda's agriculture to climate change and the interest of government in ensuring food security compel government to pursue adaptive measures in mitigating the impacts of climate variability and climate change. In the same vein, government enhances the capacity of its delegations to the international negotiations on a new global regime for managing climate change. It also seeks to access available trust and non-trust funds for mitigation and adaptation to climate change.

Population pressure is leading to encroachment on the Gishwati Natural Forest



Photo credit: REMA

Possible policy action

The Strategic Plan for Agricultural Transformation in Rwanda (ROR 2004a), if properly implemented, is likely to contribute to economic growth, poverty reduction and the protection of the environment and natural resources. The principle that the protection of the land heritage is the responsibility of those using it is endeared by a growing segment of the population. The communities should therefore be sufficiently sensitized in order to understand the need for and apply erosion control measures. Among the programme's 10 strategic axes, the one on sustainable management of natural resources, particularly water and soils, aims at stopping the destruction of soil and water resources. It provides for specific actions for the development of marshlands and irrigated agriculture.

Critical to the sustainable use of the land resource for improved agricultural performance and environmental sustainability are the needs to strengthen the land resource rights of the poor and to enhance the ability of the poor to manage the environment. It is in this context that the following policy actions are recommended to complement those that MINAGRI, MINERA and REMA are already implementing.

- Given the issues of affordability of land registration and titling in rural areas, effectively implement the suggestion by DFID and MINITERE (2003) that a programme be instituted in the short-to-medium term to develop appropriate procedures for extending land registration to villagers and small land owners in rural areas. This will ensure that these categories of people have legally enforceable land rights
- Strengthen the capacity of community-based organizations in providing legal literacy to the poor regarding land rights in accordance with the current land policy and law. That capacity enhancement should also enable the organizations to monitor the implementation of both the land policy and land law
- In deepening decentralization, provide sufficient capacity development support and funds to the environment and other relevant committees at district and lower levels so that they can effectively execute their mandates on land and agriculture and also meet the environmental sustainability objective

Climate change and natural disasters

Issues

Having an economy that is heavily dependent on rain-fed agriculture, Rwanda's economy and people's livelihoods are vulnerable to climate variability and climate change. Agriculture, biodiversity, water resources are more likely to be affected by climate variability and climate change. Floods, droughts, landslides and increased incidences of malaria and cholera have been the main outcomes so far. Droughts, especially in the Bugesera region, have often translated into food insecurity in an area that previously was food secure. Besides the disasters associated with floods and droughts, Rwanda also is periodically affected by volcanic eruptions especially north-western part of the country.

Outlook

In the short to medium term, the reality of climate change in Rwanda evokes strategic actions in dealing with it. The dominant position of indifference to climate change alters considerably as the country experiences persistent ravages of floods, droughts and land slides. Many are now convinced by President Paul Kagame's affirmation that 'it does not help us a great deal to keep citing the fact that climate change is expected to worsen our continental and national situation'. They, therefore, overwhelmingly endorse his advice that 'our preoccupation should be about implementing corrective measures' (ROR 2008).

Crucially, government encourages investments in the careful understanding of the nature and impacts of climate variability and climate change on the economy and people's livelihoods. In trying to move from the policy reform to a great transitions agenda, government and its development partners deliberately use the locally generated knowledge to support the mainstreaming of climate change into national and sector policies, plans and programmes. Similarly, government and other funding agencies require climate proofing of investments in climate-sensitive sectors such as agriculture, water, infrastructure and health.

In the spirit of regional and global cooperation on the problem posed by climate change, Rwanda strengthens the capacity of its functionaries with mandates on this subject in order to ensure adequate information sharing with regional and global partners, effective participation

in regional and global climate change fora, and collective action in terms of regional and global actions on mitigation of and adaptation to climate change. Its environment agencies, especially REMA aggressively seeks to access the available trust and non-trust funds to support Rwanda's activities in response to climate change.

Property destroyed by floods in Gishwati



Photo credit: REMA

Possible policy actions

As a party to the United Nations Framework Convention on Climate Change and the Kyoto Protocol, Rwanda has taken actions in responding to the effects of climate change. These are already highlighted in the chapter on climate change and natural disasters. For purposes of reinforcing actions already underway, it is hereby proposed that the following actions that are also relevant for the Eastern Africa region (Orindi and Murray 2005) be considered.

- Document the nature and impacts of climate change, especially in the very sensitive sectors such as agriculture, infrastructure, water and health.
- Understand, document and strengthen existing livelihood coping strategies rather than imposing new, high-tech solutions.
- Coordinate efforts within and between governments, private sector and civil society in promoting adaptation to climate change and sustainable development through sharing ideas. This will encourage innovation and maximize the efficiency with which limited resources are used.
- Integrate climate change adaptation into the development agenda across all sectors and levels of government.
- Strengthen national capacity for effective engagement in the regional and global negotiations and collective actions to mitigate and adapt to climate change.

Biodiversity and genetic resources

Issues

Rwanda is a small country but with a wealth of biodiversity as is documented in Chapter 5: Biodiversity and Genetic Resources. However, having the highest population density in Africa and being heavily dependent on agriculture and natural resources, biodiversity, including genetic resources, face major threats from population pressure. Additional threats come from the conversion of natural habitats by human activities (mining and changes in land use) and the introduction of alien species. Some biodiversity and genetic resources are trans-boundary in nature and are therefore liable to population pressure and other threats from neighbouring countries. The insecurity in the Great Lakes region and the reported plunder of natural resources has also degraded the biodiversity and genetic resources to some extent. Rwanda-specific insecurity that culminated in the genocide also contributed to the erosion of the country's biodiversity and genetic resources.

However, there are a number of opportunities that Rwanda could seize in promoting conservation and sustainable use of its biodiversity and genetic resources. These include the promotion of nature-based tourism, using the genetic resources in developing pharmaceutical and cosmetic industries, and using relevant components of the biodiversity to participate in global trade in carbon. Of concern are the lack of a biodiversity policy and law; weak enforcement of existing policies and laws and the lack of protection of biodiversity outside the protected areas as well as the endangered species and important bird species.

A waterfall in Nyungwe national park

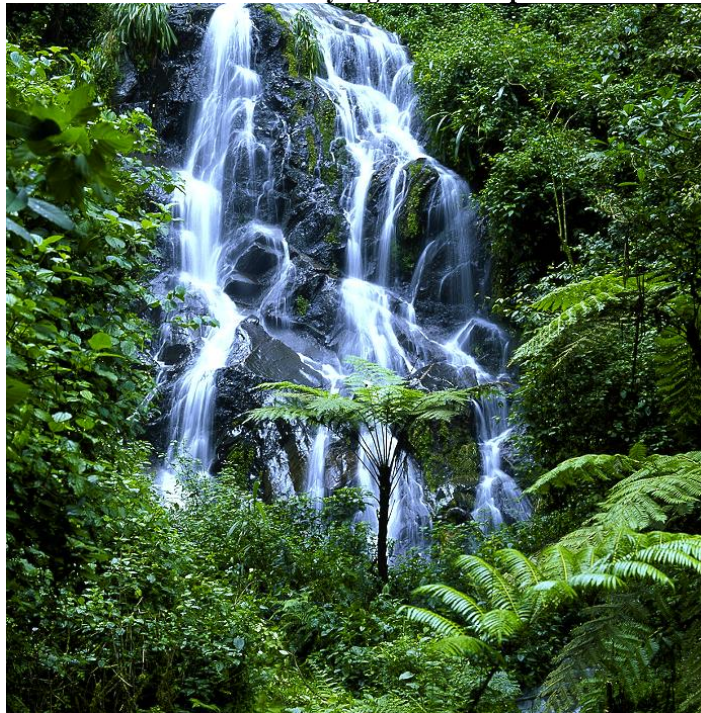


Photo credit: REMA

Outlook

Rwanda's biodiversity, especially its mountain gorillas continues to attract tourists, thereby enhancing revenue generation from the tourism sector. The efforts of governments in the Great Lakes region to restore stability should ease the threats posed to Rwanda's biodiversity, especially the mountain gorillas. The weak slowdown in population growth and the

continuing scarcity of land sustains the pressure that communities, especially those neighbouring the protected areas, exert on the biodiversity in protected areas. In aiming to transit from the policy reform to the great transitions agenda, government provides sufficient incentives through co-management schemes to enable communities living around protected areas to commit to compliance with policies and laws governing protected areas.

Biodiversity outside protected areas continues to be vulnerable to erosion. Although actions by REMA succeed in reducing water pollution by industrialists and developers of wetlands, the recovery of aquatic biodiversity is negligible. And as the country's becomes more open to biotechnology and opens up to regional and international cooperation on developing biotechnology, there is initial vulnerability to the erosion of genetic resources due to the clandestine actions of gene hunters who pose as tourists in Rwanda. However, in the interest of reaping the financial benefits associated with the Convention on Biological Diversity, Rwanda builds national capacity to develop and implement national and regional projects supported by the Global Environment Facility (GEF).

Possible policy actions

Given the benefits that accrue from the biodiversity resources to the country, especially through tourism, Rwanda will continue to invest in better management of protected areas. The biodiversity and genetic resources outside protected areas are however equally important to Rwanda's development. Use of biotechnology by pharmaceutical and cosmetic industries accords growing importance to soil, aquatic and other forms of biodiversity that are currently unprotected. There is also local indigenous knowledge and technology that Rwandese use in reaping benefits from these biodiversity and genetic resources. This also deserves some protection.

Those who are the repository of such knowledge but are poor can very easily be lured into providing the information to gene hunters at negligible fees. For purposes of complementing existing policy and legal regimes that relate to the use and management of biodiversity and genetic resources, the following additional policy actions are proposed.

- Develop and promulgate biodiversity policy and law taking account of the existing biodiversity strategy and action plan developed under GEF. The biodiversity policy and law should adequately cover wildlife and other important genetic resources outside protected areas. They should also regulate research on biological resources, bio-prospecting and the patent rights of those who are repository of indigenous knowledge and technology.
- Once the new policy and law on biodiversity is in force, harmonize other existing policies and laws that relate to the protection of biodiversity and genetic resources with the new policy and law. Build capacity for effective enforcement of these policies and laws, including the development and application of appropriate economic instruments.
- For adequate biodiversity profiling that is central to effective management, strengthen national capacity for taxonomy, ethno-biology and ecology.

Forests and protected areas

Issues

The role of forests in preserving ecological balance is particularly important. Forests contribute greatly to watershed protection against erosion, thus making agriculture viable and also covering the daily basic wood needs for most of the country's population. Additionally, forests generate direct monetary incomes, thereby contributing to poverty reduction (ROR 2004b). In 1993 forests covered 26 per cent of the land area but by 2004 it covered only 19

per cent (ROR 2004b). Due to the genocide experienced by the country and inadequate investment in the training of foresters, currently there are few forest technicians.

The main threat to forests is the rapid increase in population, which is leading to forest encroachment and deforestation. Thus there is increasing wood shortage in the country. Factors accounting for this include: a) heavy (96 per cent) dependence of the population on wood as a source of domestic energy (ROR 2004b); b) weak afforestation efforts, especially between 1994 and 2001; c) dwindling population enthusiasm in afforestation; and d) weak institutional capacity that has rendered forest management ineffective.

Government efforts in increasing the forest coverage have been up against the following threats. Because of the increasing population pressure on land, the available land for reforestation is very limited. Only marginal land is usually available for reforestation. There is also shortage of forestry extension staff, which has weakened the support provided by the extension service. The population is no longer enthusiastic in tree planting. The profitability of reforestation remains uncertain and farfetched.

Outlook

In the medium term, the Rwandan population continues to depend on wood as a major source of its energy. However, given the problem of land scarcity that is yet to be resolved, the demand for wood outstrips supply. Resort to crop residues and animal wastes (dung) as sources of biomass energy becomes deleterious to soil structure and soil fertility. Extensive efforts by the NGOs and CBOs to promote energy-saving cook stoves help to avert the domestic energy crisis and the adverse nutritional outcomes that are usually associated with preferences for foods that do not require too much energy for cooking.

The revitalization of the forestry extension service, however, enables the promotion of agro-forestry and the propagation and diffusion of locally adapted fast growing tree species. Government and the NGOs support communities and local governments into using woodlots and forests outside the protected areas to earn carbon funds. Similar efforts are made in using payment for environmental services to protect watersheds, thereby yielding benefits for the watershed forests as well as upstream and downstream communities.

As government makes a strategic shift from a policy reform agenda to that of promoting sustainable development, it effectively uses the policy inter-linkages approach inherent in the forest policy, and performance contracts associated with results-based management, to achieve the Vision 2020 target of increasing access to electric energy from 2 per cent in 2000 to 35 per cent in 2020; and reduce the contribution of wood energy in the national energy consumption from 94 per cent in 2000 to 50 per cent in 2020. The decentralization policy is applied fully to devolve authority and resource control to local governments. The capacity of local governments is sufficiently strengthened to avoid a negative backlash of devolution on environmental sustainability. The country's anticorruption measures are taken to eliminate practices in the forest sector that work against the interest of the poor. Government makes efforts to ensure that continued access to forests by nearby communities in order to harvest non-timber forest products to meet their livelihoods needs does not compromise the ecological integrity of the forest ecosystem.

A sample of energy saving cook stoves ready for sale



Photo credit: REMA

Possible policy actions

Although the contributions of forests to the economy and people's livelihood appear to be substantial, an empirical documentation of those contributions is yet to be done. That empirical document should, for instance, reveal the extent to which timber and non-timber products, carbon trade, and so on, contribute to Rwanda's economic growth. In addition to the ongoing efforts to improve the governance of the forest sector and to ensure effective compliance with the forest policy and law, the following additional actions are proposed:

- Strengthen further the National Forest Authority to ensure improved governance and stewardship of the forest resources.
- Strengthen the human resource capacity of the forest sector to ensure effective provision of technical and extension services.
- Promote agro-forestry that is well adapted to the land availability situation in Rwanda, taking special account of the needs of the land holders.
- Invest in the quantification of the contribution of forests to economic growth and poverty reduction.
- Sensitize the local communities and local governments on the opportunities for earning incomes through payment for environmental services and the earning of carbon funds. Build the capacities of relevant government agencies and local NGOs to support the communities and local governments in seizing these opportunities.

Water resources and wetlands

Issues

Although Rwanda possesses abundant water resources, the distribution of drinkable water is still inadequate and the rate of access in the country is estimated at 54 per cent, and does not exceed 44 per cent in rural areas (ROR 2004c). Some of the water sources have been subjected to heavy and unchecked pollution as a result of untreated wastes (both domestic and industrial) being dumped into water courses. In urban areas, non-treated effluents are also dumped in rivers and marshlands. In urban and peri-urban areas, where sewerage pits are constructed in areas with high water table, like those close to marshlands or streams, water contamination is usually high. Also most of the industries in the country lack waste treatment

facilities and discharge their effluents directly into water courses near them. Inappropriate application of fertilizers and pesticides also is also contributing to the contamination of water sources. When tests were conducted to establish water quality, the results revealed that some rivers contained high levels of the elements under investigation, well beyond those recommendation by WHO for drinking water (NUR 2002).

Sediment loads from erosion water from deforested areas tends to contaminate lakes and rivers and interfere with the smooth flow of water that feeds into hydro-electric power stations. The degradation of wetlands by human activities is disrupting the provision of ecosystem services and impacting on the livelihoods of people who depend on wetland resources. In situations where industries located in the wetlands fail to institute and implement adequate environment management plans, such wetlands are degraded. Where wetlands are drained for agricultural production, there tends to be a reduction in the water recharge capacity of and the overall water availability from such wetlands.

Building and cultivation close to river banks such as along the Nyabugogo river is a threat to the wetlands and water quality



Photo credit: REMA

Outlook

Despite the apparent abundant availability of the water resources, unabated population growth rates in the medium term and the slow progress made by industries and developers of wetlands to ensure that their activities do not unduly contaminate the water courses; the per capita availability of clean and safe drinking water is reduced. Despite the tradition of a strong policy reform agenda in the last decade, there is considerable resistance to the introduction of demand management in the water sector. Political pressure has been exerted on the water utility to defer the revision of the water tariffs to reflect the economic value of water.

In the short to medium term, the competition for water for the various end uses intensifies. In response, the government together with the civil society and the private sector invoke the

country's decentralization, democratization and anticorruption principles to demand and institute a drastic reform of the water, agricultural and the industrial sectors. The upshot of this is an Integrated Water Resources Management regime, which becomes the norm for Rwanda. The anxiety to avoid the water and water-related energy crises compels government to intensify inter-ministerial collaboration in the critical sectors such as water, energy, agriculture and industry.

At the same time, the economic pressures from the global recession impacts on the local economy, compelling industrialists to aggressively search for technologies that are more energy efficient. In the short run, the industrialists also join environmentalists and civil society in demanding that actions be taken to prevent a repeat of the recent energy crisis that resulted from reduced water flow from degraded wetlands into the hydro-electric power stations. REMA takes advantage of this movement and mobilizes sufficient resources to strengthen the capacity to guide on sustainable use and management of the wetland. It also strengthens the capacity for EIA, SEA, environmental audits and the monitoring of water quality.

Possible policy actions

In addition to the actions that are underway such as the establishment of the water resources management units in various ministries and piloting cleaner production approaches, additional actions are needed to ensure improved per capita availability of clean and safe water. Protection of the wetlands is also required to ensure that the ecosystem services they provide are not disrupted. The following are some of the proposed actions.

- Ensure that the integrated water resources management regime is in force and scaled up.
- Expand the cleaner production programme to cover more industries, while producing an empirical documentation of the benefits of the programme to the environment, industry and the economy.
- Intensify water quality monitoring and where practical train and engage the environment committees at the district level to support this effort.
- Encourage the water utilities and other relevant government agencies to explore the feasibility and viability of water demand management, taking sufficient account of the rights of both the environment and the poor to water for sustaining ecological functions and human livelihoods, respectively.
- Finalize the classification and inventorying of wetlands in order to institute adequate wetlands management regimes.
- Harmonise and rationalize the function and mandates of the ministries responsible for both agriculture and the environment so as not to compromise the availability of wetland ecosystem services.

Energy resources

Issues

In Rwanda biomass based fuels dominate the energy scenario, with an estimated 96 per cent of the total energy supply made up of firewood, charcoal and agricultural residues (ROR 2004d). Energy consumption is intricately linked to environment and natural resources. Increased firewood and charcoal usage in the country contributes to deforestation. The use of agricultural residues as fuel in rural areas results in the loss of soil nutrients, thereby undermining agricultural productivity.

Energy use in most manufacturing industries in Rwanda is inefficient, largely because the equipment is old and the technologies in use are outdated. In the transport sector the energy

challenge is to ensure efficient and safe use of petroleum products. The standard of vehicles is a problem, given that many of them are reconditioned.

The increasing demand for energy in the modern sector has necessitated searching for alternative sources of energy. While expanding hydro-electricity remains an option, the government is also keenly prospecting on the methane gas in Lake Kivu. Micro-hydro, geothermal, wind solar and peat are the renewable energy options under consideration.

Outlook

In an attempt to increase non-agricultural jobs from the base level of 200,000 in 2000 up to 1,400,000 by 2020, Rwanda pursues a vigorous programme of restructuring the economy so that the manufacturing and service sectors can contribute to growth in employment. The economic pressures arising from the ripple effects of the economic depression in the industrialized countries, however, makes energy efficiency in the transport and manufacturing sectors a critical issue in the medium term. Manufacturers voluntarily seek to replace some of their rather archaic equipment and technologies with minimal need for staff layoff.

In the short to medium term, there is more focus on the energy supply side. Prospecting for methane in Lake Kivu is accelerated and the piloting of production is fast-tracked in order to provide an alternative source of energy. Similar efforts are made in the renewable energy sub-sector. Scientific data collection on different sources of renewable energy becomes a priority. Furthermore, civil society organizations join other lobbyists in naming and shaming industries that are bent on frustrating the up scaling of the cleaner production programme. This is in addition to aggressive efforts to expand the use of energy efficient cook stoves and energy-efficient kilns for brick making, especially in areas already experiencing deficits in the availability of woody biomass.

In the medium term, rather than just sticking to the command and control approach to ensure that there is a positive link between energy consumption and environment sustainability; REMA partners with the private sector and the Ministry of Finance to develop and apply economic instruments to motivate the manufacturers to comply with environmental policy and law. It also strengthens its EIA unit in order to ensure timely community-level hearings on the EIA reports and rapid turn around in vetting the EIA reports.

Possible policy actions

While the current efforts by government to develop an appropriate biomass strategy are commendable, a number of actions are needed to ensure improved energy supply, energy use efficiency and a positive energy-environmental sustainability nexus. In that regard, the following actions are proposed.

- Expeditiously develop the Lake Kivu methane and bring on-line additional hydro-power stations.
- Foster collaboration between the ministries responsible for agriculture, environment and energy to ensure that the development of wetlands does not interrupt the availability of water from the wetlands that feed hydro-power stations.
- Implement a wood and charcoal efficiency and a substitution strategy that can help curb deforestation.
- Make rural energy and electrification an integral part of the country's rural transformation and poverty reduction strategy with the view to achieving the Vision 2020 targets on percentage of the population with access to electricity.

- Enforce the SEA and EIA requirement in the development of new energy supply systems

Industry and mining

Issues

The majority of the industrial processing operations in Rwanda use fuel wood as a source of energy, thereby accelerating deforestation. This poses a threat of land degradation through accelerated soil erosion with adverse consequences for the environment and agriculture. In the Kigali city area, a significant number of factories are located in a low lying area – the Gikondo wetland. These factories have no proper liquid-waste disposal systems, and consequently pollute soils, ground and surface water. Generally, it is rare to find industrial enterprises that have efficient systems of liquid or effluent water processing and elimination. The waste water is discharged to environment without any preliminary treatment (ROR 2006).

The unplanned location of industries, petroleum depots and garages contribute to the environmental pollution problems. Almost all industries, garages and workshops are located in valleys or marshes and are bordered by heavily populated areas. The chemical discharges from the industries pollute water and in some instances the soils. These pollutants are for the most part toxic to humans and animals. The industrial effluents and other pollutants created in the Gikondo-Nyabugogo wetland system pose trans-boundary environmental challenges. The polluted waters from the industrial park in the Gikondo-Nyabugogo wetland system are discharged into the Nyabarongo River and its tributaries. The Nyabarongo, in turn, feeds the polluted waters into the Akagera River that flows into Lake Victoria.

Although mining occupies a small area of the land, it can have significant and often irreversible environmental impacts. Sand harvesting and quarrying, if done inappropriately, can result in some significant environmental impacts. The dangers that are associated with mining include the displacement of people, land use changes, dust and noise pollution. The preparation of ores which use a lot of water constitutes a major pollutant of streams. A specific case in point is the water draining the mining sectors of Rutongo and Gatumba, which pollute the rivers of Nyabarongo and Nyabugogo with clay and sand sediment. The significant environmental challenges resulting from mining operations calls for a supportive institutional coordination framework that will see successful operationalisation of existing national policies in general and environmental and mining policies in particular.

Outlook

In pursuing the transformation of the economy to achieve both a reduction in the agricultural population and an increase in the non-agricultural jobs, Rwanda, in the medium term, boosts its industrial and mining sectors. In spite of its stand on economic liberalization, the government intervenes by insisting that industrialists and miners must respect the country's environmental policy and law. This is a clear demonstration of the country's commitment to sustainable development.

Spurred by government's desired shift from the policy reform agenda to one of a great transition to sustainable development, REMA negotiates effectively with the development partners and obtains adequate support to strengthen its institutional capacity to ensure environmentally friendly mining and industrial production in the country. In the interest of stimulating grassroots support for effective enforcement of the laws governing mining and industry, REMA works very closely with the ministries responsible for industry, mining and local government and civil society organizations to legally empower the local communities in

areas with industrial and mining operations in using existing laws to protect their constitutional rights to a clean and productive environment.

Efforts by miners and industrialists to corrupt the poor population into turning a blind eye to pollution hit a snag as the anti-corruption agency helps the poor communities to resist corruption. The few advocates who had benefited from the training provided under REMA's auspices on environmental law volunteer to provide legal service to communities interested in instituting litigation against miners and industrialists who pollute the environment on a *pro bono* basis. Even baits through community social responsibility projects fail to slow down the pro-environment movement at the grassroots. Fortunately communities had been assisted by development partners in ensuring that corporate social responsibility projects had clear contracts and clearly spelt out roles and responsibilities of contracting parties, and a mutually acceptable third party to mediate corporate social responsibility conflicts.

Possible policy action

Already REMA is instituting environmental regulatory instruments such as guidelines and standards intended to ensure that the desirable speedy transformation of the economy does not undermine environmental sustainability. The piloting of the cleaner production programme has provided a basis for ensuring that industrial expansion is done in ways that are consistent with the environmental sustainability objective of the country. The following additional actions are proposed as a means of reinforcing the aforementioned ones.

- REMA should undertake its statutory obligation under the Mines and Geology Policy to study the impacts of mining and quarries on the environment so as to ensure better compliance with the existing laws and regulations on mining.
- The Cleaner Production programme should be expanded in order to ensure that expanded industrial production brings benefits to both the economy and the environment.
- In deepening decentralization, REMA should work closely with the ministries responsible for industry, mining, environment and local government to develop the capacity of district environment committees to enable them contribute to the monitoring and enforcement of the laws and regulations governing industrial and mining operations.

Population, health and human settlement

Issues

Rwanda has a young but fast growing population. The population was 9.2 million in 2006 and is expected to reach 16 million by 2020 unless family planning education and outreach strategies are intensified. With a population density of 397 inhabitants per square kilometer, Rwanda is the most densely populated country in Africa (ROR 2000).

Like other developing countries, Rwanda is experiencing increasing rural-urban migration. Perceived availability of and convenient access to service, infrastructure, amenities and employment encourages this form of migration.

Although government has been trying to address population access to basic services in the urban areas, there is still a significant lack of adequate water, electricity supply, sanitation systems, and garbage collection systems. Housing is in short supply and the public transport network is inadequate. Human settlements are not adequately planned and this complicates the delivery of basic social services, including education, water and sanitation. The inability of fixed-income urban employees to use modern energy services compels them to rely heavily on biomass fuels with negative environmental and health implications.

Waste management remains poor. Drainage in the cities is generally inappropriate and is contaminated with refuse. The situation isn't any better in the rural areas. Although it is estimated that 86 per cent of the Rwandan rural population have latrines, few of the latrines meet the conditions for safe hygiene and sanitation. Urban air pollution, resulting from dust particles and vehicular emissions, is growing. So are air borne diseases caused by dust particles and vehicular emission, particularly during the dry season?

Outlook

In spite of the family planning campaigns, there is no substantial slow down in population growth in the medium term; and despite effective HIV and AIDS campaigns the incidence of the epidemic does not subside in the short and medium term. However, this does not help to reduce population growth rate substantially. Although productivity gains are made in agriculture through the implementation of the Strategic Plan for Agricultural Transformation, it does not impact substantially on the pace of rural-urban migration. Scarcity of land becomes a push factor in rural-urban migration. So does the perceived increase in urban employment, as new industries open up and the service sector expands.

In the medium term, however, water demand management becomes a reality. The difficulties that fixed-income dwellers experience in adapting to new water tariffs force them to resort to unclean sources of water. The upshot of this is increased morbidity of this category of urban workers. Those of them with insecure contracts are laid off for frequent absenteeism from work. Consequently, their remittances to family members in rural homes are interrupted, exposing them to income and food insecurity. To make ends meet those family members are extensively engaged in making bricks, mining sand and selling fire wood for which there is growing demand. These activities, however, do contribute to localized but serious degradation of the community woodlots and the wetlands.

Possible policy actions

The implementation of the human settlement policy is commendable action by government, which is enabling some of the communities to have better access to basic services. With adequate funding of the National Water and Sanitation Authority, access to water and sanitation is likely to improve. Sanitation, too, should improve with the scaling up of the Ecosan programme by the Ministry of Natural Resources. The following actions are proposed to complement the ongoing ones for purposes of improving human welfare, human settlements and the provision of water and sanitation services.

- Evolve a rural growth centre strategy for purposes of increasing the opportunities for self employment and the employment in services, both of which can contribute to reducing rural-urban migration.
- Intensify the family planning programme and ensure that the family development message is powerful enough to counter the traditional, cultural and religious messages that tend to run counter to objectives of family planning.
- Make sufficient investment in the *imidugudu* programme to improve on human settlement, use the same opportunity to promote the uptake of energy-saving cook stoves, replanting of degraded hill tops in the neighbourhood and better provision of education, water, sanitation and health services.
- Encourage the districts that will be developing new DDPs to include targets on promoting environmental health in addition to the targets on environment protection.
- Seek to build and strengthen synergy between the programmes of the Ministry of Natural Resources on water and sanitation and those of the National Water and Sanitation

Authority for purposes of enabling the country to meet its EDPRS and MDG targets on water and sanitation.

Environmental policies, legislation and institutional arrangements

Issues

Rwanda has made a remarkable progress in the development and implementation of environmental policies and legislation. A number of new policies and laws were promulgated in 2004. Many of these policies in sectors such as energy and industry make provision for issues of environmental sustainability. The country's institutional architecture for promoting environmental sustainability has also improved. The establishment of REMA in 2006 provided the country with the institutional machinery for supporting the implementation of the environmental policies and laws. The post genocide political dispensation, especially the principles associated with decentralization and democratization, has helped to ensure the engagement of the population in development of Rwanda's environmental policies and laws. Globally, poor people who are largely dependent on natural resources continue to have precarious livelihoods. Thus the question of their participation in policies that determine the security of their livelihood and the state of livelihood resources is important (IIED and IDS 2004).

There is growing consciousness in the country on the need to always examine the inter-linkages of policies and laws, especially when developing new and reviewing old policies and laws. The development of the Forest Policy attests to this. However, the capacity for policy implementation is weak at both the central and local government levels. There is also heavy reliance on the command and control regime in the enforcement of environmental policies and laws. Efforts at domesticating the international environmental policies and laws that Rwanda has ratified remain weak. Although action plans for the implementation of these policies and laws have been developed, the tendency of not mainstreaming their key interventions into national and sector plans and programmes has tended to leave the plans with insufficient or no funding.

Outlook

In the short to medium term, environmental stakeholders, through REMA, succeed in sustaining the momentum on environment mainstreaming that began with the integration of environment in the EDPRS. With continued funding from the development partners, REMA uses the second phase of the PEI and DEMP to rally more environment champions at both the national and district level. New and credible evidence continues to emerge from national and district levels on the costs the country is incurring by not investing sufficiently in environment management. On the plus side, there are some success stories on the benefits of additional investments in environment protection. The industrialists also are happy with the well-targeted second phase of the cleaner production programme. They now talk openly of how the programme has clearly demonstrated to them the benefits of environment protection to both industry and the economy. 'Win-win' is now a common slogan among industrialists.

Also in the short to medium term, a movement within civil society for the harmonization and rationalization of environmental and other related policies and laws gains momentum. The first annual review of the EDPRS sparked this movement and there is now growing demand for careful examination of the inter-linkages among policies and laws with the view to strengthening synergies, minimizing overlaps and eliminating policy conflicts. At that EDPRS review, a serious concern was also raised on the growing incapacity to implement environmental policies and laws. It was also observed at the EDPRS review that while the

civil service reform helped to streamline the roles and responsibilities of the sector ministries and districts on this matter, it left the ministry too lean to provide adequate capacity development support to the districts. There was also anxiety on the capacity of REMA. Concerns were raised by the developers in the agricultural and industrial sectors that the vetting of their EIA reports by REMA has been unduly delayed. REMA's capacity in social marketing was also questioned.

Stunned by the increasing levels of water pollution in areas where mining and manufacturing occur, the coalition of advocates for environment protection, through the Parliamentary Committee on Environment and Natural Resources, convinces Cabinet to sanction annual budget allocation for the training of advocates on the country's environment law as a means of enhancing enforcement capacity. They also renew, to Cabinet, their commitment to provide *pro bono* legal services in helping community litigations against polluters so that the polluter pays principle is adequately applied.

Proposed policy actions

In addition to the ongoing implementation of environmental laws and policies and the strengthening of institutional capacity, the following actions are proposed.

- Increase the knowledge and awareness of the general public on environment laws and policies in order to facilitate public participation in the EIA public hearings in particular and in public decision making in general.
- Strengthen the human resource capacity of environmental and related institutions at national and district levels for environment assessment, policy analysis, monitoring and enforcement.
- Invest adequately in the training of advocates in environment law.
- Fill the critical gaps in environment policies and laws, ensuring that the inter-linkages approach is adhered to in the development of new policies and laws.
- Determine the actual institutional deficits and areas of overlap and conflict in order to strengthen the implementation capacities of the various agencies with mandates on natural resources and environment. Correct the deficits through a combination of staff training, adequate funding and governmental reform.

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