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Environmental Challenges and Global Markets for Environmental Businesses in Areas with Vulnerable Ecosystems

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Abstract

This paper presents the state of needs and new markets for trained professionals and businesses to respond to the environmental challenges in Latin America and Caribbean. Innovative programs centered on development of ideas to bring solutions to environmental degradation concerns and starting up new environmental business enterprises are addressed in response to increasing needs for:

- Protection, restoration, and managing coastal and ocean resources through ecosystem management;
- Products and services that would enable local communities to plan and respond to climate variability and change;
- Improving weather and water information, products and services to advance the capabilities for understanding, observation, forecasting and warning of environmental events; and,
- Support for the existing infrastructure with information, products and services for safe, efficient, and environmentally sound products and management tools.

Introduction

The Latin America and the Caribbean Region is home to one of the richest natural resource bases of the world. However, environmental degradation in the region has been increasing consistently over the last several decades. The vulnerability of rural and urban areas to natural disasters is increasingly growing, due to population increase, inadequately planned urbanization, and the increasing stress on the existing fragile ecosystems. The social and cultural link between environmental quality and economic vitality has created major markets for qualified environmental professionals. The needs for trained professional to resolve the existing and emerging environmental challenges cover a wide variety of practices (such as design of water supply and wastewater treatment facilities, solid waste recovery and disposal, hazardous waste management, site remediation, pollution prevention, waste minimization, modeling of surface and groundwater water resources, wetlands mitigation, and air pollution control and air quality modeling, among others). The needs of the Caribbean and Latin American environmental businesses typically focus on water supply and wastewater, solid waste, and water resources and quality management issues.

Natural disasters (i.e., earthquakes, volcanic eruptions, fires, floods, hurricanes, land slides) that result into significant and instant loss of life and long term disturbances in world's ecosystems. The impacts to infrastructure in urban areas as well as damage to the natural ecosystems have long terms effects. The number and density of people within tropical zones have increased significantly in the recent decades. As a result, in many tropical regions, population increase and poverty have forced and continue to force the people to clear and cultivate the land in vulnerable areas such as flood plains or on hill slopes. Hence, the

significant rate of deforestation has lead to a significant increase in run-off and soil erosion, mudslides and flash flooding (UNEP, 2000).

Vulnerable Ecosystems

Environment in tropical and subtropical regions of the world is the most vulnerable to natural disasters especially when the disaster occurs at or near highly populated regions. Vulnerability of the tropical coast lines, fragile dynamics of the ecosystems, presence of unique marine life and wildlife populations are significantly impacted by natural disasters due to soil erosion, water pollution, disaster debris generation, waste runoff, and instant displacement and disappearance of natural species.

Natural hazards are part of the global dynamics and the tropical regions are vulnerable as in these areas living systems (including humans) are very dependent on nature and the environmental quality. Droughts, hurricanes, cyclones, tropical storms, floods, tidal waves, avalanches, landslides and mudslides, earthquakes and volcanoes constitute the most common causes of natural disasters and subsequent environmental stresses in Latin America and Caribbean. The stresses caused by mining activities and oil spill accidents are also significant. While hazards are inevitable, there are many technical measures, practices, and experiences that can reduce the extent or severity of primary and secondary effects after natural disasters. With climate change, it is anticipated that increasing vulnerability of environment and humans, changing life styles and land use practices will require mechanisms for disaster risk reduction to build up capacity to cope (Jarraud, 2005). Reducing impacts of natural hazards means developing capacity to reduce the magnitude impacts, reducing recovery periods, and reducing our vulnerability of the society.

Coastal and marine areas suffer from the stresses created by habitat conversion and destruction, pollution due to human activities, and overexploitation of marine resources. These problems are closely linked to the businesses such as development of coastal areas for tourism, infrastructure and urbanization, and to the conversion of coastal habitats for uses such as agriculture and aquaculture. In addition to diminished natural productivity of coastal areas, most coastal and offshore fisheries are being severely overexploited. Hurricanes and tsunamis cause unpredictable changes on the environment. The recent hurricane activity has brought public attention for recognizing the needs for research in water and power systems for disaster management. There is a well recognized need to develop a research agenda at the global scale focusing on the environmental impacts of natural disasters in tropical regions.

Environment and Global Markets for Environmental Businesses

Technological advances come about in response to changing paradigms in society and to breakthroughs in scientific knowledge creating new windows of opportunity. There is an increasing need for programs focusing developing skills for capturing market forces while cultivating ideas for innovative solutions to local and global environmental problems. There is a major market need for innovative contracting approaches that address the local concerns as well as entrepreneurial visions for bringing solutions to environmental problems. The existing and emerging needs and new markets for trained professionals and businesses to respond to the environmental challenges include the following:

- Environmental engineering and ecosystems management
- Post disaster management of environmental stresses (i.e., infrastructure needs, remediation of ecosystem disturbances, temporary and permanent measures)
- Environmental quality compliance
- Environmental data and knowledge management
- Energy efficiency and new energy sources

- Climate change and global scale environmental issues
- Expanded scales of understanding of environmental engineering principles (both in the nano and mega directions) relative to biological processes; and water, air, solid/hazardous waste processes
- Environmental sampling, instrumentation, sensors, analytical methods
- Integrated applications of environmental chemistry, microbiology, geology, and ecology
- Dynamics and integration global- and regional-scale environmental impacts
- Innovative recycling and reuse of materials
- Infrastructure needs for water distribution and wastewater collection
- Solid and hazardous waste management
- Integrated marine and terrestrial resources management
- Controlled harvesting of marine resources
- Slope and forest covers
- Reversing the effects of deforestation

Conclusions

Population increase, disparity in income distribution, unplanned urban development, and high dependence on natural resources are among the causes of rapidly increasing environmental stress factors in the Latin America and the Caribbean Region (UNEP, 2000). Urban environmental problems, such as air pollution, water contamination, improper waste management and disposal, and subsequent environmental stresses are causing significant health impacts in densely populated urban areas. In addition, the increasing frequency and intensity of natural disasters in the recent years have resulted in high social and financial costs with long lasting effects. The growing environmental problems have expanded the job opportunities for environmental engineers both locally and globally. The global dynamics have created a significant increase in the needs for engineers who are trained in environmental engineering discipline.

References

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