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PHILIPPINE FRESHWATER RESOURCES: STRATEGIES FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

Water is essential for life and sustainable human development. Despite its vast freshwater resources consisting of lakes, swamps, rivers, reservoirs and groundwater, the Philippines has an impending "water crisis" because of rapid depletion and deterioration of such resources brought about by increasing demand for human, agricultural and industrial.

Policies and laws for national conservation and management of the country's freshwater resources seem adequate. There is an urgent need, however, to restructure and strengthen the national coordinating and regulating agency for water, promote public and private participation for rehabilitation of watersheds and the efficient delivery of water services as well as the exercise of political will for water policy/law enforcement to ensure sustainable development of such vital resources.

INTRODUCTION

Water is essential for life and sustainable human development. Freshwater constitutes only 2.7% of the earth's water resources. Two-thirds of the water from rainfall goes back to the atmosphere through evaporation. Of the remaining water, more than one-half flows out into the sea. Only 8% of the world's freshwater is used for human and sanitation needs, while 60-70% is used for agriculture and 20% for industry (Singh, 1996).

The Philippines has a rainfall of 2500 mm and freshwater resources consisting of surface inland waters (lakes, rivers, reservoirs and swamps) and groundwater. There are about 70 lakes in the country with an aggregate area of 200,000 hectares and 106,328 hectares of freshwater swamps. There are also 424 principal rivers and 30,000 hectares of dams and reservoirs in the country. The groundwater in the aquifers of the Philippines has been estimated to be under a 100,000 square kilometer area (Guerrero, 1995).

There is an impending freshwater crisis in the world because of the increasing demand for human, agricultural and industrial needs, and the depletion as well as contamination of freshwater resources. The water availability per person in Asia that was 10,000 m³ in 1950 is expected to be only 3,000 m³ per person by the year 2000 (Singh, 1996). In the Philippines, only 76% of the population had access to potable water in 1992.

This paper will assess the current status of freshwater resources in the Philippines, review water conservation and management policies and discuss strategies for the sustainable development of such resources.

STATUS OF FRESHWATER

In 1950, per capita water availability in the Philippines was 9,600 m³. It is now down to about 3,300 cubic meters. Destruction of forest watersheds and drainage of wetlands have reduced the capacity of such resources to hold and release water. The country's present forest cover is much lower than the optimal 54% (Liew, 1996). There has been a drop of 30-50% in the country's water resources in the past 20 years (Alejandrino, 1996).

As of 1994, there were 1.532 million hectares of agricultural land in the country which were provided with irrigation facilities. The effectively irrigated area only represents 49% of the total irrigable area of 3.126 million hectares. With lahar flows in Central Luzon and decreasing water supply due to watershed denudation, irrigation efficiencies in the country have decreased (NIA, 1991). Water use efficiency for rice irrigation in the Philippines is only 30-40% in the wet season and 40-60% in the dry season (Spurgeon, 1995).

Major lakes and reservoirs in the country are adversely affected by sedimentation due to watershed denudation and soil erosion. The fisheries productivity of such waters has declined because of water quality deterioration and habitat destruction. The hydroelectric power generating capacity of heavily silted dams has been much reduced.

The future of Laguna de Bay, the country's largest lake, is threatened with man-induced stresses as sedimentation, over-exploitation of its fisheries and pollution. Forest cover of the lake's watershed has been reduced from 93,000 hectares in 1963 to less than 18,000 hectares in 1988 because of human activities. Soil erosion from deforested areas is the main contributor of sediment to the lake. The sediment loading has been estimated at 1.5 million cubic meter per year (Guerrero, 1996).

Of the 74 designed water quality monitoring stations surveyed in various parts of the country, 65% showed water quality already deteriorated beyond the beneficial use of the stations. Forty-seven percent of the river stations surveyed had water quality lower than the worst classification. Some 40 rivers which are major sources of water for industry and major population centers were found to be polluted to a degree of critical concern (NWRB, 1995).

Groundwater nitrate levels in some agricultural areas in Ilocos Norte have been found to be almost double the safe limits. Endosulfan, a commonly used pesticide, was found in 79% of well water samples in rice growing areas of the country. The levels of toxic metals such as mercury, lead, cadmium and zinc have been found to be increasing in Laguna de Bay (Tuong, 1955).

Saltwater intrusion of aquifers in heavily urbanized areas as Metro Manila as a result of overpumping of groundwater has been reported (Haman, 1996).

WATER CONSERVATION AND MANAGEMENT POLICIES

There appears to be adequate laws and regulations for the protection, conservation and management of the country's freshwater resources. Among others, such laws include the creation of a National Water Resources Council, a Water Code, the establishment of the Presidential Committee on Water Conservation and Demand Management and the National Water Crisis Act.

Presidential Decree No. 424 (1974) created the National Water Resources Council (NWRC) to coordinate and integrate water resources development in the country for social and economic progress and to meet present and future needs for water. The NWRC which was later restructured into the national Water Resources Board is tasked to "coordinate and integrate on a sound and logical basis the national plans and policies for the appropriation and utilization of surface and groundwater; undertake river basin surveys and establish, operate and maintain observation networks and a centralized water resources data center for the scientific surface and appraisal of surface and groundwater potentials of the country; and to conduct or promote special studies and researches with other government or private agencies on related aspects of water resources development."

Presidential Decree No. 1067 (1976) instituted a Water Code which consolidated laws governing the ownership, appropriation, utilization, exploitation, development, conservation and protection of the country's water resources subject to the control and regulation of the government through the National Water Resources Council.

The Philippine Constitution of 1987 provides that the exploration, development and utilization of natural resources (including water) to be under the full control and supervision of the State (Article XII).

Executive Order No. 222 (1995) established the Presidential Committee on Water Conservation and Demand Management to prepare a nationwide Water Conservation Plan to cover conservation measures focusing on both the quality and quantity of water and undertake a nationwide information campaign. The Committee came about because of the "water crisis" that impelled the need for a national water program to be implemented through coordinative, consultative and mutually supportive mechanisms where the private sector plays an active role."

The National Water Crisis Act of 1995 (Republic Act No. 8041) addresses the country's water problem through an integrated water management program and the development of new water resources and the conservation of identified watershed, among other provisions.

STRATEGIES FOR SUSTAINABLE DEVELOPMENT OF FRESHWATER RESOURCES

Sustainable development implies the utilization of the earth's natural resources (including water) "in a regenerative manner so as to preserve them not only for the present generation but for all generations to come" (La Vina, 1991).

Despite the existing constitutional and legal framework governing the utilization of the country's freshwater resources on a supposedly rational and sustainable basis, the depletion and contamination of such resources due to the factors earlier mentioned go on unabated at an alarming rate. Why is this so?

According to B. Gujja of the World Wildlife Fund International's Freshwater Programme, ensuring the availability of freshwater on a sustainable basis requires an ecosystems and cross-sectoral approach. There is need to manage water resources considering "social equity and ecological sustainability" (Singh, 1996).

Various strategies and action programs have been proposed for the sustainable development of freshwater resources in the Philippines.

The National Irrigation Administration (1991) proposed the following measures for maximizing use of available water:

1. Construction of reservoir-type projects
2. Redesign of irrigation facilities to reuse return flows
3. Engineering measures to minimize water conveyance losses
4. Involvement of farmers for better planning of cropping calendars and irrigation delivery schedules.

Cruz (1995) endorsed the holistic, integrated and systematic approach for effective planning and management of the country's watersheds as a multi-resource with social equity and multi-sectoral participation.

Liew (1996) recommended the following action plans for addressing the country's "water crisis":

1. Formulation of policies that stress integrated water resource management;
2. Mapping out of a water resource management system which should include the inventory of available land and water resources, projection of development potential of water resources, demand-management action plans projection of community water demand and environmental impacts assessment for future development projects.

3. Decentralizing water projects such as irrigation, sewerage and flood control to local government units (LGUs);
4. Rehabilitation of deforested watersheds for minimizing floods and soil erosion; and
5. Promoting reforms in the water service sector such as mobilizing private sector participation and strengthening the ability of water supply institutions to serve their clientele.

There is also an urgent need for legislative action to restructure and structure and strengthen to national coordinating and regulating agency for water resources, the National Water Resources Board. While the NWRB has the legal mandate to carry out the herculean tasks of conserving and managing the country's freshwater resources, it does not have the control and financial capability to carry them out.

Water conservation and management should be every citizen's concern. Thus, there is need for public information dissemination to instill awareness and discipline for water saving practices and consciousness.

Lastly, the strategy for exercising political will at all levels of society for the implementation of water development based on ecological sustainability and the unrelenting enforcement of water laws and policies is strongly urged.

REFERENCES

- Alejandro, A. 1996. Institutional aspect of water resources development and management in the Philippines. pp. 43-52. Phil. Water International '96 Technical Papers. Mandaluyong City, Philippines.
- Cruz, R.V. 1995. Watershed management: basic concepts, principles and needs. pp. 33-40. Proceedings of the Symposium on Managing Our Water Resources for Sustainable Development, Los Banos Science Community, Los Banos, Laguna.
- Guerrero, R.D. 1995. An overview of Philippine aquatic resources research and development. pp. 57-59. Proceedings of the Symposium on Management of Water Resources for Sustainable Development, Los Banos Science Community, Los Banos, Laguna.
- Guerrero, R.D. 1996. Human impacts on Laguna de Bay, Philippines and management strategies of their mitigation. *Geo Journal* (July, 1996): i-4 Kluwer Academic Publishers, Netherlands.
- Homan, B.Z. 1996. On sustainability of withdrawal from Metro Manila Groundwater system and availability of additional groundwater resources. pp. 148-184. PhilWater International '96 Technical Papers. Mandaluyong City, Philippines.
- La Vina, A. G.M. (ed) 1991. Law and ecology – a compilation of Philippine laws and international documents pertaining to ecology. The Legal Rights and Natural Resources Center, Mandaluyong, Metro Manila, Philippines.
- National Irrigation Administration. 1995. Irrigation development and management: status and performance, issues and concerns. Workshop on Water Supply and Conservation, Malacanang, Manila.
- National Water Resources Board. 1995. Outlook of water supply in the Philippines. Workshop on Water Supply and Conservation, Malacanang, Manila.
- Singh, S. 1996. Freshwater becomes scarce in a thirsty world. D+C/96:27-28.

- Singh, S. 1996. Freshwater becomes scarce in a thirsty world. D+C2/96:27-28.
- Tuong, P. 1995. Water resources management in Asia: present and future scenarios. pp. 16-32. Proceedings of the symposium on Managing our Water Resources for Sustainable Development, Los Banos, Laguna.
- Spurgeon, D. 1995. Water – a looming crisis. International Rice Research Institute, Manila, Philippines. 90.