

**[PROTECTION OF THE QUALITY AND SUPPLY OF FRESHWATER RESOURCES:
APPLICATION OF INTEGRATED APPROACHES TO THE DEVELOPMENT,
MANAGEMENT AND USE OF WATER RESOURCES**

Options for Agenda 21

I. INTRODUCTION

1. Effectively integrated management of water resources is important to all socio-economic sectors relying on water. Rational allocation prevents conflict and enhances the social development of local communities as well as economic planning and productivity. Efficient demand management allows water-using sectors to make long-term savings on water costs and stimulates resource-conscious production technologies. Health conditions and environmental quality should also improve either resulting from integrated development planning or as a beneficial consequence of improved environmental or social conditions.

Linkages to other Environmental and Developmental Issues

2. Water is a finite resource, essential for the sustenance of life on earth. Virtually all the environmental issues listed in the United National General Assembly resolution 44/228 are directly or indirectly linked to freshwater issues. With increases in economic activities and the consequent potential for stress on ecosystems and natural resource stocks, the study and recognition of linkages between freshwater issues and other sectoral and cross-sectoral issues is becoming increasingly important. Socio-economic pursuit—including urbanization, industrial production and agricultural activities—has reached a stage where freshwater issues have often become the limiting factor for sustainable development. Freshwaters—rivers, reservoirs, lakes and ground waters[, polar ice mass and glaciers]—are in contact with other ecosystems and are used in a variety of human activities, many of which would not be possible without a freshwater supply of adequate quality and quantity.

3. Poor land-use management, including deforestation, non-sustainable agriculture, mining and urbanization, could lead to a considerable increase in erosion problems and related soil loss in the river basins. The sedimentation in large reservoirs may have serious adverse effects downstream by reducing the quantity of natural nutrients available to agricultural land or to coastal waters. The loss of nutrients can lead to increased fertilizer use and decreases in coastal fishery yields. Acidification of surface and some ground waters due to atmospheric deposition of air pollutants can lead to depletion of freshwater living resources, contributing to the loss of biodiversity. Construction of dams for hydropower and irrigation, water channelization, over-abstraction from aquifers, use of water bodies as open sewers for discharge of both domestic and industrial wastes can lead to salinization of rivers, lakes, and soils, salt intrusions in coastal aquifers, and serious water pollution problems. Should global warming occur as a result of climate change it would affect low-lying island freshwater resources and may affect the world's freshwater resources through [the melting of ice mass in the Arctic and Antarctic regions and] changes in the hydrologic cycle, resulting in changes in precipitation, with possible decreases in many areas of the Northern Hemisphere, accompanying decreases in soil moisture and annual river runoff. Even in the absence of global warming, natural variation in precipitation may be expected as in the past, resulting in periodic drought which can impact water availability, with consequent negative implications for economy and development. Because of these concerns, an integrated approach to freshwater management seems vital along with, for example, an integrated approach to pollution control, the optimal use of water and a holistic approach to the conservation of ecosystems.