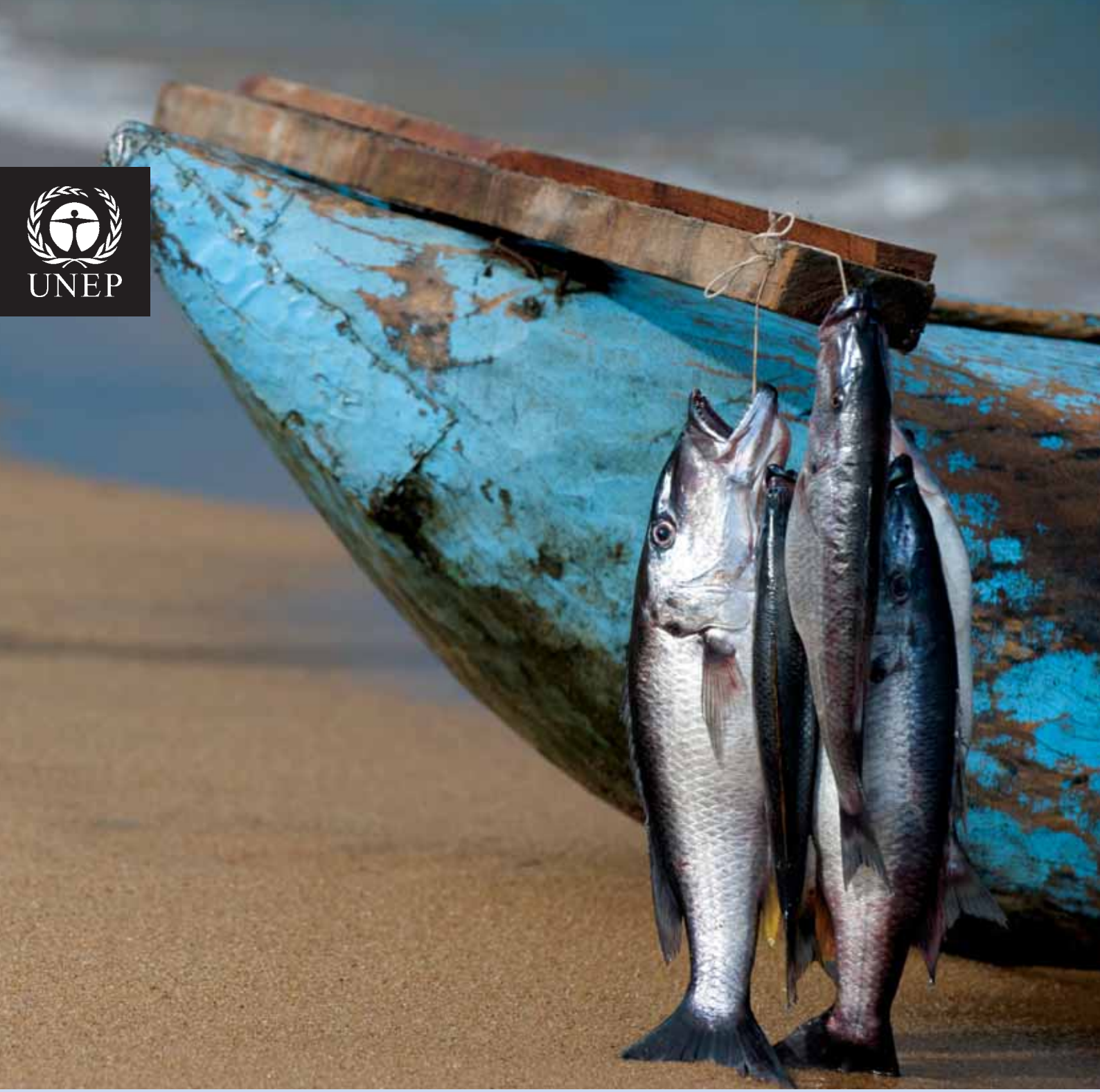


UNEP

Blue Harvest

Inland Fisheries as an Ecosystem Service

UNEP 2010. **Blue Harvest: Inland Fisheries as an Ecosystem Service.** WorldFish Center, Penang, Malaysia

Authors:
Dugan, P.,
Delaporte, A.,
Andrew, N.,
O'Keefe, M.,
Welcomme, R.

ISBN: **978-92-807-3112-5**
Job Number: **DEP/1316/NA**

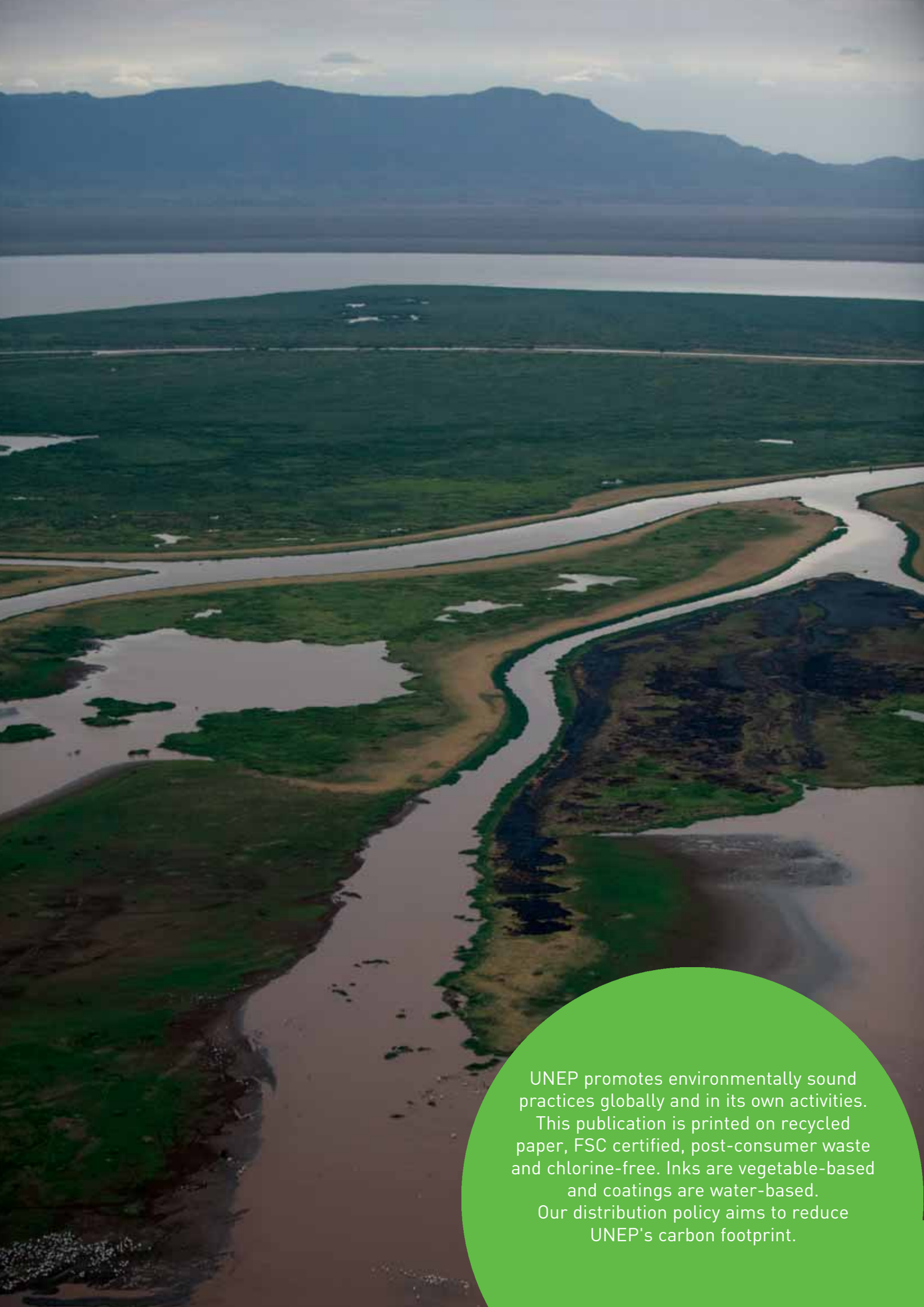
Printed by UNON, Publishing Services Section, Nairobi , ISO 14001:2004-certified

Blue Harvest

Inland Fisheries as an Ecosystem Service

UNEP

WorldFish
CENTER



UNEP promotes environmentally sound practices globally and in its own activities. This publication is printed on recycled paper, FSC certified, post-consumer waste and chlorine-free. Inks are vegetable-based and coatings are water-based.
Our distribution policy aims to reduce UNEP's carbon footprint.

Foreword

Discussions surrounding the future of fisheries invariably focus on marine catches from the world's seas and oceans.

Here, UNEP and the WorldFish Center are spotlighting the significant contribution of inland fisheries to diet, health and economies. The future of these fisheries is intimately linked with the way humanity manages or mismanages its rivers and lakes and their surrounding basins.

Marine fisheries are being over-fished, mainly as a result of over-exploitation fuelled in large part by global subsidies totalling somewhere under US$30 billion.

Freshwater stocks, especially in developing countries, face a series of additional challenges, from dam construction and low river flows to run-off of chemicals from the land and the impact of alien invasive species. Managing healthy fisheries must focus on managing the health of the ecosystems that create the conditions for fish in the first place.

Loss of species and the rapid erosion of nearly all types of ecosystems worldwide are accelerating: freshwater fisheries are part of this unsustainable trend.

The missing link, in terms of a decisive response, is perhaps the economics: in the past the multi-trillion dollar services provided by nature have been all but invisible in national and global accounts.

The Economics of Ecosystems and Biodiversity (TEEB), a partnership hosted by UNEP, is now bringing the true value of the world's nature-based assets from the invisible into the visible spectrum.

This report, *Blue Harvest: Inland Fisheries as an Ecosystem Service*, contributes to the TEEB process. For example, researchers estimate that around a third of global, small-scale fish catch comes from freshwater, inland fisheries.

The catch from the Mekong River is worth over US$2 billion annually. Globally, over 60 million people are employed, of which over half are women. Meanwhile, these stocks are a key source of the protein and micronutrients essential for a healthy diet.

Thus these fisheries are making an important contribution in developing countries to achieving the poverty-related Millennium Development Goals.

This report, commissioned as a contribution to the 10th Conference of the Parties to the Convention on Biological Diversity taking place in Nagoya, Japan, not only underlines the value of freshwater fisheries but provides guidance on how the ecosystem approach can be applied in order to sustain future harvests.

The world is facing a suite of persistent and emerging challenges, from climate change and food insecurity to loss of biodiversity: these are set against the backdrop of a global population rise to over nine billion by 2050.

These challenges can only be met by a transition to a low-carbon, far more resource-efficient, and employment-generating Green Economy. Investing and reinvesting in the planet's ecological infrastructure, including freshwater ecosystems and the fisheries and other services they provide, will in large part define whether that urgent and fundamental transition can be fully realized.

Achim Steiner
UN Under-Secretary General and
UN Environment Programme Executive Director

Executive Summary

Global food production has increased greatly in recent years and rural livelihoods are much improved in many regions. Yet, despite this clear progress rural poverty and food insecurity remain deeply entrenched in many areas, especially in South Asia and sub-Saharan Africa. In response the international community has renewed calls for increased commitment to meeting the needs of the world's poor.

Simply producing more food however is not enough. Rather this needs to happen in ways that sustain the ecosystem services that support rural livelihoods and provide wider benefits to rural and urban communities. This is a particular challenge for management of the world's freshwaters and for the ecosystems that depend upon these. To help inform future approaches to conservation and management of freshwater ecosystems the present assessment reviews the importance of inland fisheries as an ecosystem service, the pressures upon them, and management approaches to sustain them.

The world's rivers and lakes support globally important inland fisheries. In Europe, North America and Australia these are today mainly used for recreation, but in Africa, Asia and Latin America their primary value is in providing food and employment for tens of millions of people. They provide 33% of the world's small scale fish catch and employ over 60 million people, of whom 33 million are women. China, Bangladesh, India and Myanmar are the four largest producers with a total harvest of 5.1 million tonnes. Another 16 countries (Uganda, Cambodia, Indonesia, Nigeria, Tanzania, Brazil, Egypt, Thailand, Democratic Republic of Congo, Russia, Philippines, Vietnam, Kenya, Mexico, Pakistan and Mali) produce over 100,000 tonnes each. Some river basins are especially important with the lower Mekong producing 2.1 million tonnes of wild fish. This catch is worth over US$2.1 billion at first sale and over US$4.2 billion on retail markets, and supports millions of livelihoods throughout the basin.

The supply of fish from inland waters is critically important for human nutrition, especially in Africa and parts of Asia. Over 200 million of Africa's 1 billion people regularly consume fish and nearly half of this comes from inland fisheries. In the countries of the Lower Mekong Basin freshwater fish provide the main source of protein and micro-nutrients for 60 million people.

The continued supply of benefits from inland fisheries is dependent on the health of the ecosystems upon which they depend. As rivers have been dammed and lakes and waterways polluted, inland fisheries have declined, yet growing demand for the world's freshwater resources will increase these pressures further in coming years. There is therefore an urgent need for major investment in policy and management approaches that address the direct and indirect drivers of aquatic ecosystem degradation and loss of inland fisheries taking into account their role in sustainable development and human well being.

The UNEP Ecosystem Management Programme (UNEP-EMP) provides an effective framework for pursuing this challenge. It does so by incorporating the principles of the ecosystem approach presented in the Convention on Biological Diversity and providing a framework for the holistic management of ecosystems. It gives particular attention to the links between ecosystems and human well being and the need for proper ecosystem functioning to allow for the delivery of ecosystem services. The UNEP-EMP uses a participatory diagnosis as the entry point followed by adaptive management as the focus for investment, and provides a path to sustained delivery of provisioning services such as fisheries. More specifically the FAO Code of Conduct for Responsible Fisheries also promotes an ecosystems approach that complements the UNEP-EMP. The policy implications of this integrative ecosystem approach to inland fisheries include the need to:

- **Ensure participation.** Effective engagement of key stakeholders is essential for success. All constituencies that impact on fisheries need to be engaged, especially those concerned with land and water management, and economic development such as energy, trade and agriculture. Similarly coalitions of interest should be developed with stakeholders in other sectors that draw upon other services provided by aquatic ecosys-

tems, including water supply, conservation and tourism.

- **Agree future scenarios.** Stakeholders need to agree upon future scenarios and management objectives for each fishery and the ecosystems that sustain them. Unless this happens it is unlikely that there will be any real progress towards sustaining these resources, regardless of how well the drivers of change are understood. This stage of the diagnosis needs to embrace the social and political dimensions of fishery and ecosystem management, and bring together different social, economic, and institutional perspectives. In doing so it needs to confront the power relations between and within stakeholder groups and work to develop scenarios that recognise the costs and benefits to different stakeholders of different management options.

- **Manage for resilience.** The ecosystem approach recognises the limits to proactive management. Because multiple drivers impact inland fisheries and there are complex interactions between these, it is rarely possible to identify all drivers and tease out multiple impact pathways for each fishery. As a result managing these systems can be a very uncertain 'science', and one that requires investment to maintain resilience and multiple options for future use of these ecosystems. Underlying this approach is explicit recognition that resilience is fostered by investments that maintain ecosystem functioning, reduce vulnerability, and build adaptive capacity in the face of unforeseen and unforeseeable threats.

- **Pursue adaptive learning.** The complexity and variability of ecosystem processes is added to by the often complex social and institutional environments within which management processes take place. Successful management of inland fisheries needs to embrace this complexity and adopt an effective process of adaptive learning that adjusts management practices and policies in response to the results achieved.

- **Plan and manage catchments for inland fisheries.** The ecosystem approach highlights the importance of sustaining ecological processes that sustain fisheries productivity. This means investing in maintaining healthy catchments with appropriate land use and coverage of natural forest and wetland ecosystems, and sustaining the quality and quantity of water flow into lakes and rivers. Doing so requires engaging with land and water management processes at multiple scales within these lake and river basins. A number of approaches are available to assist with this engagement, but three of the most valuable are strategic environmental assessment; integrated planning at the basin scale; and design of environmental flow regimes for fisheries.

In support of this approach, five investments are recommended:

- Improve understanding of inland fisheries' vulnerability to environmental change
- Develop viable options for addressing the threats posed to inland fisheries by environmental change
- Build adaptive capacity among key stakeholder groups to increase resilience of inland fisheries at local, national and regional scales
- Improve governance of inland fisheries and their ecosystems
- Develop capacity to sustain and enhance social benefits from these resources.