

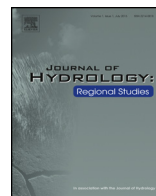


ELSEVIER

Contents lists available at ScienceDirect

Journal of Hydrology: Regional Studies

journal homepage: www.elsevier.com/locate/ejrh



Review

Status of wetlands in India: A review of extent, ecosystem benefits, threats and management strategies



Nitin Bassi^{a,*}, M. Dinesh Kumar^b, Anuradha Sharma^c,
P. Pardha-Saradhi^a

^a Department of Environmental Studies, University of Delhi, Delhi 110007, India

^b Institute for Resource Analysis and Policy (IRAP), Hyderabad, India

^c Department of Botany, Hindu College, University of Delhi, Delhi, India

ARTICLE INFO

Article history:

Received 29 April 2014

Received in revised form 7 July 2014

Accepted 12 July 2014

Available online 13 August 2014

Keywords:

India

Wetlands

Ecosystem benefits

Anthropogenic threats

Institutional strategies

ABSTRACT

Study region: India.

Study focus: India has a wealth of wetland ecosystems that support diverse and unique habitats. These wetlands provide numerous ecological goods and services but are under tremendous stress due to rapid urbanization, industrialization and agricultural intensification, manifested by the shrinkage in their areal extent, and decline in the hydrological, economic and ecological functions they perform. This paper reviews the wetland wealth of India in terms of their geographic distribution and extent, ecosystem benefits they provide, and the various stresses they are exposed to. The paper also discusses the efforts at management of these fragile ecosystems, identifies the institutional vacuum and suggests priority area where immediate attention is required in order to formulate better conservation strategies for these productive systems.

New hydrological insights for the region: It has been found that management of wetlands has received inadequate attention in the national water sector agenda. As a result, many of the wetlands are subject to anthropogenic pressures, including land use changes in the catchment; pollution from industry and households; encroachments; tourism; and over exploitation of their natural resources. Further, majority of research on wetland management in India relates to the limnological aspects and ecological/environmental economics of wetland management. But, the physical (such as hydrological and land use changes in the catchment) and socio-economic processes leading to limnological changes have not been explored substantially.

© 2014 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

* Corresponding author. Tel.: +91 9999629934.

E-mail addresses: bassi43@gmail.com, nitinbassi@irapindia.org, bassi.43@yahoo.com (N. Bassi), dinesh@irapindia.org (M.D. Kumar), anuradhacdu@gmail.com (A. Sharma), ppsaradhi@gmail.com (P. Pardha-Saradhi).

Contents

1. Introduction	2
2. Distribution and extent of wetlands in India	3
2.1. India's wetland extent as per the latest wetland inventory	4
2.2. Regional extent of wetlands in India as per the National Wetland Atlas 2011	5
3. Importance of wetlands	7
3.1. Multiple-use water services	7
3.2. Carbon sequestration	8
3.3. Pollution abatement	8
3.4. Flood control	9
3.5. Biodiversity hotspots	10
4. Growing threat to wetland ecosystem	11
4.1. Urbanization and land use changes	11
4.2. Agricultural, municipal and industrial pollution	12
4.3. Other threats	13
5. Institutional strategies adopted for wetland management in India	13
5.1. Legal framework	14
5.2. Policy support	14
6. Conclusion	16
Conflict of interest	16
References	16

1. Introduction

Wetlands are amongst the most productive ecosystems on the Earth (Ghermandi et al., 2008), and provide many important services to human society (ten Brink et al., 2012). However, they are also ecologically sensitive and adaptive systems (Turner et al., 2000). Wetlands exhibit enormous diversity according to their genesis, geographical location, water regime and chemistry, dominant species, and soil and sediment characteristics (Space Applications Centre, 2011). Globally, the areal extent of wetland ecosystems ranges from 917 million hectares (m ha) (Lehner and Döll, 2004) to more than 1275 m ha (Finlayson and Spiers, 1999) with an estimated economic value of about US\$15 trillion a year (MEA, 2005).

One of the first widely used wetland classifications systems (devised by Cowardin et al., 1979) categorized wetlands into marine (coastal wetlands), estuarine (including deltas, tidal marshes, and mangrove swamps), lacustrine (lakes), riverine (along rivers and streams), and palustrine ('marshy' – marshes, swamps and bogs) based on their hydrological, ecological and geological characteristics. However, Ramsar Convention on Wetlands, which is an international treaty signed in 1971 for national action and international cooperation for the conservation and wise use of wetlands and their resources, defines wetlands (Article 1.1) as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". Overall, 1052 sites in Europe; 289 sites in Asia; 359 sites in Africa; 175 sites in South America; 211 sites in North America; and 79 sites in Oceania region have been identified as Ramsar sites or wetlands of International importance (Ramsar Secretariat, 2013).

As per the Ramsar Convention definition most of the natural water bodies (such as rivers, lakes, coastal lagoons, mangroves, peat land, coral reefs) and man made wetlands (such as ponds, farm ponds, irrigated fields, sacred groves, salt pans, reservoirs, gravel pits, sewage farms and canals) in India constitute the wetland ecosystem. Only 26 of these numerous wetlands have been designated as Ramsar Sites (Ramsar, 2013). However, many other wetlands which perform potentially valuable functions are continued to be ignored in the policy process. As a result many freshwater wetlands ecosystems are threatened and many are already degraded and lost due to urbanization, population growth, and increased economic activities (Central Pollution Control Board, 2008).

Download English Version:

<https://daneshyari.com/en/article/4435280>

Download Persian Version:

<https://daneshyari.com/article/4435280>

[Daneshyari.com](https://daneshyari.com)