

REVIEW ARTICLE

INNOVATIVE APPROACHES TO WETLAND CONSERVATION IN NEPAL: A DETAIL REVIEW

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ARTICLE DETAILS

Article History:

Received 10 January 2024
Revised 13 February 2024
Accepted 17 March 2024
Available online 02 April 2024

ABSTRACT

The Nepal Environment Policy and Action Plan (1993) (NEPAP) prioritized the conservation and management of wetlands as one of the most important areas in Nepal. The Nepalese wetlands are referred to as "the kidney of the landscapes." Wetlands are important for ecosystem services, human existence, economic prosperity, and the earth's life support system. However, conservation efforts are hampered by the local community's reliance on wetland resources, poor management participation, and weak, undiversified, and unstable livelihoods centered on the direct exploitation of natural resources. This paper includes some information about community participation and role of local people in wetland conservation and management, also focuses in the concept of the wise use of the wetlands by providing equal opportunities based in local people's participatory management of their wetlands and addresses the innovative approaches of wetland conservation in Nepal.

KEYWORDS

Wetlands (Simsar), wetland conservation, wetland policy, innovative approaches and Current Status.

1. INTRODUCTION

Wetlands are regions in which water either lies on top of the soil or is present at or close to it throughout the year, sometimes even during the growing season. Wetlands, sometimes referred to as "Simsar" in Nepal, are regions that are either seasonal or year-round moist, lying between the land and deepwater (Jha, 2008). Wetland habitats, which include marshes, lakes, rivers, flood basins, estuary deltas, ponds, rice fields, and marine water areas where the depth at low tide does not exceed 6 m, are the most productive and diversified ecosystems on Earth. (Convention on Wetlands 1971; Lamsal et al., 2015). Because of their roles in the hydrologic and chemical cycles as well as their role as downstream recipients of waste from both natural and human causes, wetlands are frequently referred to as "the kidneys of the landscapes." (Poudel, n.d.-a).

Nepal's wetlands are valuable from an economic, ecological, artistic, sociocultural, and religious standpoint. They are located in different high-mountain and lowland plain ecosystems and provide as habitats for a variety of wildlife species (Shrestha, 2013a). Less than 1 µg/l of phosphorus, little chloride, and a predominance of calcium among cations are found in high altitude lakes in Nepal (Löffler, 1969). Lake Tilicho has phosphorus levels of less than 6µg/l, according to who also thought that this level would limit the lake's productivity (Aizaki et al., 1978). High altitude lakes are primarily limited in their productivity by light, temperature, and low nitrogen levels (McEachern, 1994; James and Hubbick, 1969).

Approximately 21 indigenous and ethnic communities in Nepal rely on wetland resources for their subsistence (Bhandari, 1998). For many years, indigenous tribes have relied on wetland resources as a source of income. Nevertheless, these interactions have been negatively impacted in recent years by the disappearance and deterioration of these wetlands (GoN/MoFSC, 2014). Aside from this, the wetlands are increasingly referred to both climate stabilizers and carbon dioxide sinks. Wetlands are also crucial because they prevent soil erosion, mitigate the effects of floods

and droughts, enhance fishing, and control the water cycle (Poudel, n.d.-a).

2. METHODOLOGY

The article's findings and all of its facts were derived from secondary sources. A total of twelve (30) published publications were taken out and examined from websites like Research Gate and Google Scholar. Wetland, innovative approaches, wetland conservation and status were the search terms utilized to find publications.

2.1 Wetlands: A Source of Livelihood

Wetlands are essential to ecosystem services, human existence, economic prosperity, and the earth's life support system. Wetlands are among the planet's most productive life support systems and have enormous economic value since they supply fuel, food, water for irrigation, and industrial uses, as well as fodder and other necessities (Poudel, n.d.-a). Wetlands are known to offer a number of ecosystem services that improve human well-being. Fish, fibre, water supply, water purification, climate regulation, flood control, coastal protection, recreational activities, and tourism are among the main ecosystem services that wetlands offer (Millennium Ecosystem Assessment, 2005; Lamsal et al., 2015). Wetland ecosystems encompass around 6% of the entire geographical surface on Earth (Turner, 1991). Wetland resources have a particularly significant role in the livelihood of the impoverished in emerging nations. For instance, the dependent population's monthly income is generated by wetland activities in the Pece Wetland in Uganda to the tune of more than 50% (Opio et al., 2011).

Modern wetlands play a vital role in global ecology by supporting a variety of species by offering them food and habitat, as well as by helping to recharge groundwater and retain and detain water, which keeps wetlands' high-water tables stable and lessens flooding in nearby ecosystems. Additionally, they improve water quality by filtering metals and sediment

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DOI:
10.26480/ees.01.2024.22.25

from groundwater, regulate erosion and sedimentation between neighboring habitats, and cycle nutrients to terrestrial and aquatic environments within wetland and between ecotones (National Research Council, 1995). Wetlands contain a wide variety of plant and animal species, including endemics, and are essential for the preservation of both migratory species and some globally vulnerable biodiversity in Nepal. Of the estimated 7000 vascular plant species in the country, 25% are thought to be entirely or partially dependent on wetlands (Joshi and Joshi 1991).

2.2 Types of Wetlands

Nepal ratified the Ramsar Convention on Wetlands on April 17, 1988. There are already ten locations in Nepal that are recognised as Wetlands of International Importance. Over the past few decades, workers on different continents and in different hemispheres have classified Holocene wetlands in a variety of ways based on a variety of characteristics, including hydrology, geography, and flora (Keddy, 2000). Four major river systems that originate in the higher Himalayan Zone drain around 70% of the country: the eastern Sapta Koshi, the central Sapta Gandaki (Narayani),

the western Karnali, and the far-western Mahakali. While tiny rivers, generally of seasonal character, arise from the Siwalik (Churia) hills and sever the Terai plain, other medium-sized rivers (such as the Rapti, Bagmati, Kamala, Kankai, Tinau, etc.) originate in the midland zone or in the Mahabharat range (Jha, 2008).

2.3 Wetland related policies in Nepal

A comprehensive set of laws and regulations designed to protect these important ecosystems serves as the foundation for Nepal's wetlands conservation efforts. A few such policies are the Nepal Policy and Action Plan of 1993 and 1998, the National Wetland Policy of 2003, and the Soil and Watershed Conservation Act of 1982. Wetland conservation initiatives are further supported by the Ramsar Convention of 1997, the Environmental Protection Act and Rules of 1997, and the Nepal Biodiversity Strategy of 2002. In order to preserve Nepal's wetlands and ensure their biological integrity and biodiversity for future generations, the National Parks and Wildlife Conservation Act of 1973 and the more recent National Wetland Policy of 2069 work together (K.C et al., 2012).

Table 1: Wetlands of international importance in Nepal

S.N.	Sites	Zone	Province	Altitude (m)	Area (ha)	Date	
						Designation	Ratification
1	Koshi Tappu	Terai, lowland	2	90	17,500	1987/12/17	2003/08/13
2	Ghodaghodi Lake Area	Terai, lowland	7	205	2,563	2003/08/13	2003/08/13
3	Jagadishpur Reservoir	Terai, lowland	4	195	225	2003/08/13	2003/08/13
4	Beeshazari and Associated Lakes	Terai, lowland	3	285	3,200	2003/08/13	2003/08/13
5	Rara Lake	Himalayas	6	2990	1,583	2007/09/23	2007/09/23
6	Phoksundo Lake	Himalayas	6	3610	494	2007/09/23	2007/09/23
7	Gosaikunda and Associated Lakes	Himalayas	3	4700	1,030	2007/09/23	2007/09/23
8	Gokyo and Associated Lakes	Himalayas	3	5000	7,770	2007/09/23	2007/09/23
9	Mai Pokhari	Midhills	1	2100	90	2008/10/20	2008/10/20
10	Lake Cluster of Pokhara Valley	Midhills	4	827	26,106	2016/02/02	2016/02/02

Nepal's numerous conservation regulations are reflected in the preservation and management of wetlands. The National Conservation Strategy placed a strong emphasis on the necessity of using natural resources and land sustainably (The National Conservation Strategy, 1988). The need of including people in the management of natural resources is emphasized in the 1989 Government of Nepal's Master Plan for the Forestry Sector. The Plan placed a strong emphasis on the long-term management and use of land and forest resources in order to preserve the forests, soil, water, flora, fauna, and scenic beauty. The necessity to identify and conserve biologically significant marshes, wetlands, and water bodies has been duly prioritized by the Nepal Environmental Policy and Action Plan (1993) (NEPAP). This plan has a solid policy framework and is a successful approach for wetlands protection (Poudel, n.d.-b).

The National Parks and Wildlife Conservation Act of 1973, as well as other resource laws and regulations such as the Aquatic Animal Protection Act of 1961, the Soil and Watershed Conservation Act of 1982, the Water Resources Act of 1992, the Electricity Act of 1992, the Forest Act of 1993, the Environmental Protection Act of 1996, the Local Self Governance Act of 1999, and others, do not define wetlands as a distinct category of ecologically significant areas. (Poudel, n.d.-b). The Local Self Governance Act of 1999 grants District Development Committees (DDCs), municipalities, and Village Development Committees (VDCs) a great deal of authority. They are mandated to plan and take action to safeguard forests, the environment, biodiversity, and wetland areas. (Poudel, n.d.-a).

The following is the Wetlands Management Policy (HMG/MoFSC, 2003) that takes local involvement into account:

- In accordance with the letter and spirit of the Ramsar Treaty, conserve and manage wetlands with the involvement of the local population for their benefit.
- Make the idea of prudent wetland resource use a reality by granting fair possibilities based on community members' collaborative management of wetlands.
- Involve locals, communities, and community-based organisations in wetlands conservation and management initiatives to increase their effectiveness.

- Carry out community-beneficial social and economic development initiatives and protect the environment for the benefit of current and future generations.
- Conserve endangered and common wildlife species, aquatic fauna and other genetic sources dependent on wetlands.

2.4 Role of Community in Wetland Conservation

One of the main initiatives that is still in place is the army's routine patrolling of the wetlands, which is followed by regular monitoring and awareness efforts for the management and conservation of wetlands. (Bhattarai, n.d.). Local communities can take the lead in many tasks that are essential to sustainability and equity; local communities should only be represented by conservation programs during the consultation stage of plan development. People who depend on wetlands can make significant contributions to conservation efforts. The following people are primarily involved in wetland activities: Bantar (Sunsari and Saptari), Mukhia (Rautahat), Majhis, Tharus, and Kushar (Terai), Sunuha (Karnali),

Mallah (Gandak), Kewat (Nawalparasi), Bote and Mushahar (Nawalparasi, Chitwan), Poda (Phewa lake), Gongi (Koshi), Dasuhad (Parsa), Sahani (Parsa and Bara), Bantar (Sunsari and Saptari), Barhamus (Gorkha), Majhis, Tharus, and Kushar (Terai) (Shrestha, 2013b). If implemented effectively, decentralised participatory conservation programmes could reduce barriers between conservation and sustainable development in underdeveloped nations that rely on natural resources (Baral and Heinen, 2007; Diouf, 2002). The Penang Statement of AWS highlights the value of cultural history, indigenous knowledge, and local customs in the prudent use of wetland resources and the responsibility of the local populace in the stewardship of wetland areas (AWS, 2001). However, conservation efforts are hampered by the local community's reliance on wetland resources, poor management participation, and weak, undiversified, and unstable livelihoods centered on the direct exploitation of natural resources. (Shrestha, 2013).

The major roles that local communities have played in wetland conservation are:

- They had prohibited the dumping of chemical pollutants, domestic garbage, industrial waste, toxic substances, and the use of electric current and explosives in the wetland sites.

- They have not allowed any project to take over community land or any unwanted service they are not willing to do or any illegal use of resources such as wetland drainage.
- They had not overexploited the wetlands and work under safe standards set for regeneration capacity of wetland resources.
- They had cooperated in environment management program that secures their right and gains.
- Rural communities had cooperated with project to prioritize the problem that seeks the immediate solution.

2.5 Declaring RAMSAR Sites

Although numerous ways have been developed for wetland conservation, one of the most important ones is the "Declaration of RAMSAR site," which aims to conserve wetlands and their resources. By encouraging ecotourism, this strategy boosts the national economy while aiding in the more sustainable management of the natural resources found in the wetlands and helps to preserve them. At the moment, Nepal is home to ten internationally significant RAMSAR sites. A few uncommon, rare, and endangered species have been supported by each location.

2.6 Wise Use

The concept of wise use of wetlands has been found to be more significant in wetland conservation. The wise use is defined, implemented and evaluated by government experts and international consultants. The PRA exercises indicate that if local communities are given the opportunity, they

can define, design, implement and evaluate the wise use of their wetlands. Wise use policy should be based on peoples' priorities, knowledge and management systems. (Pimbert et al., 1988)

2.7 Indigenous Knowledge for Wetland Conservation

The methods of Wetland Indigenous Knowledge (WIK) Documentation Methodology and Application Guidelines is used (CSUWN 2011). The documentation was based on two approaches: i) resources utilization – knowledge associated with utilizing different wetland products as medicine, food, fibre, fodder, fuelwood, equipment, housing materials, etc.; and ii) wetland management –knowledge that contributes towards species conservation, reducing wetland degradation management of catchment areas, sustainable harvesting, etc. (Bhatta et al., n.d.).

Wetland documentation is done in a methodical manner as follows: Wetland sites are first selected according to their importance and the community's dependence on them. Second, factors including reliance on wetland resources and cultural preservation are used to identify Wetland Dependent Communities (WDCs). Native Americans in the community are asked for their Prior Informed Consent (PIC). Selected are knowledgeable people, particularly elders or healers in the area. Because they are familiar with the values of the community, local resource persons (LRPs) assist with documentation. Transect walks are used to gather seasonal information on animals and vegetation. Products that are culturally distinctive, commercially valuable, and vulnerable are highlighted in an inventory. Samples are preserved in a herbarium. Forms including information about communities, wetlands, and product details are part of detailed knowledge documentation. In conclusion, accuracy is ensured via data triangulation and reporting, which involves community validation and consultation with numerous competent individuals (Bhatta et al., n.d.).

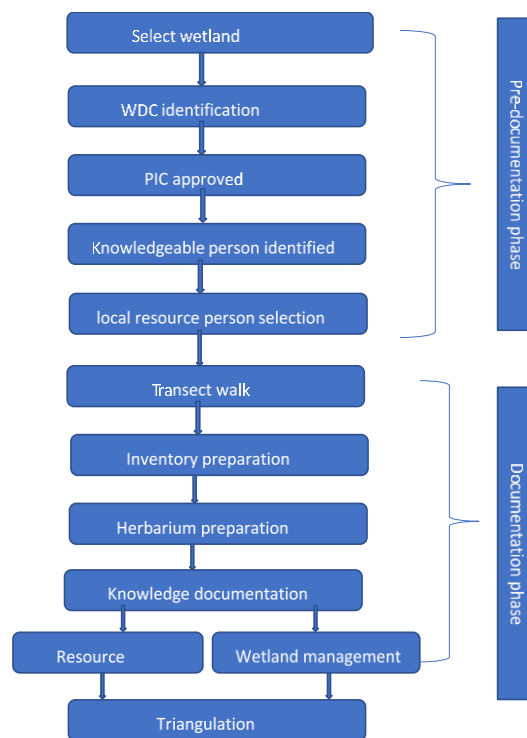


Figure 1: Schematic presentation of the steps followed for WIK documentation

3. CONCLUSION

Wetlands are important ecosystem that offers several advantages, such as providing resources for human livelihoods, regulating the climate, and acting as habitats for wildlife. The preservation and sustainable management of wetlands depend heavily on conservation initiatives, which engage local populations. They are the most productive and diversified ecosystems on Earth, providing habitats for various wildlife species and playing a crucial role in the hydrologic and chemical cycles. Wetlands are essential for ecosystem services, human existence, economic prosperity, and the earth's life support system. Wetlands cover around 6% of the Earth's surface and have a significant role in the livelihood of the impoverished in emerging nations. Modern wetlands play a vital role in global ecology by supporting various species, recharging groundwater, regulating erosion and sedimentation, and cycling nutrients between

terrestrial and aquatic environments. Wetlands of international importance in Nepal include four major river systems that drain around 70% of the country. The National Conservation Strategy (1988) and the 1989 Government's Master Plan for the Forestry Sector emphasize long-term management of wetland and use of its resources. However, conservation efforts are hindered by reliance on wetland resources, poor management participation, and weak livelihoods based on direct exploitation of natural resources.

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