October 2023

Monthly newsletter on issues of sustainable development

ISSN No. 0974-5483 RNI No. 59360/94 | Vol. 33 | Issue No. 10

DEVELOPMENT ALTERNATIVES

Nature-based Solutions

Contents

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Building Resilience with Nature-based Solutions

Humans connection with nature is multifaceted, encompassing our physical, cultural and spiritual well-being. Recognising and nurturing this connection is essential for the sustainable and harmonious coexistence of humans and the natural world.

The connection between humans and nature is fundamental and intricate, deeply rooted in our evolutionary history and essential for our well-being and survival. Humans are a part of the natural world and depend on it for survival. We rely on ecosystems for essential resources such as clean air, water, food and shelter. Our health and well-being are closely linked to the health of the environment. People have a natural affinity with nature, and many studies have reported that spending time on nature trails, forest bathing, and others improves mental health, promotes physical fitness and helps in the healing process. As a result, healthcare professionals are increasingly recognising the importance of 'nature prescriptions'. The human-nature connection underscores the need for sustainable practices in resource management, land use, water use and development. Sustainable agriculture, responsible fishing and conservation efforts are all informed by our understanding of our dependence on nature. Recognising this connection is important to design pathways and identify approaches like nature-based solutions for recalibrating human responses towards resilience in the wake of unprecedented climatic events such as droughts, floods, intense storms and rising sea levels.

Nature-based solutions have emerged as strategies and approaches that use nature and natural processes to address various environmental and societal challenges. These solutions harness the benefits of ecosystems, biodiversity and natural resources to enhance resilience, mitigate climate change and promote sustainable development. In the context of India, nature-based solutions have a crucial role to play in addressing several pressing issues.

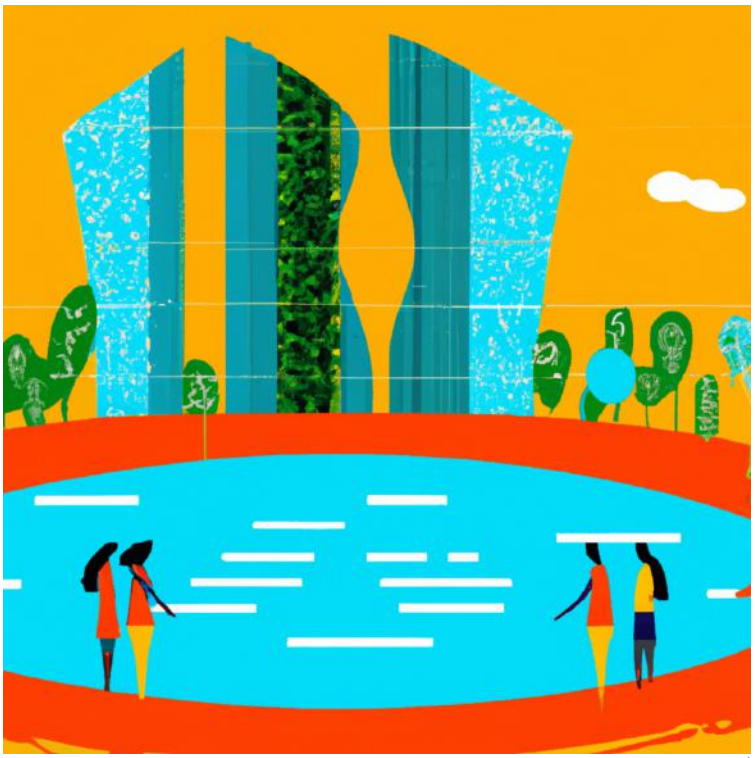

Image source: Canva AI generated

Like the rest of the world, India also faces the challenges of climate change, including extreme weather events, rising temperatures and changing precipitation patterns. Nature-based solutions, like reforestation, afforestation and the restoration of degraded ecosystems, can sequester carbon and help mitigate the impacts of climate change. These efforts also enhance the resilience of communities to climate-related disasters. Many species are at risk due to habitat loss and other factors. Nature-based solutions involve protecting and

restoring ecosystems and habitats to conserve biodiversity. This includes establishing protected areas, wildlife corridors and sustainable land management practices. India is not far behind in experiencing the impacts of groundwater depletion. Integrated water management strategies that consider watershed management, rainwater harvesting and wetland restoration can improve water quality and availability. Along with this, it is important to reduce the pollution load on our rivers and water bodies due to agriculture and land-use practices. Agriculture is vital to the Indian economy, and it is crucial to shift to nature-based solutions to tackle pests and increase the fertility of the soil. Shifting to agroforestry, agroecology, organic farming, sustainable land use practices and promoting local crops like millets can reduce the pressure on our land and provide nutrition to the population with health benefits.

India has an extensive coastline, and coastal areas are vulnerable to erosion and sea-level rise. Mangrove restoration, dune stabilization and the protection of coral reefs are nature-based solutions that can safeguard coastal ecosystems, protect communities from the impacts of climate change and simultaneously provide the benefits of livelihoods from the mangroves and the sea-weeds cultivation.

Urbanisation and development encroaching on or bordering critical habitats have been a concern. Urban planning needs to incorporate the principles of co-habitation and create green spaces, urban forests and green roofs, which improve air quality, reduce heat islands and enhance the overall livability of urban areas.

All of these experiences and practices cannot be woven without the fabric of traditional knowledge and local practices, which have not only been sustainable but also demonstrates the fundamental principles of resource efficiency and circularity. Be it the use of leaf plates or use of pottery for cooking and daily use, water usage in agriculture, managing ponds and water bodies for fishing, or use of locally available materials for housing to suit climate conditions (bamboo, wood, mud) to respond to disasters like high tides and droughts, these practices can be integrated into

modern environmental management strategies and aligned with nature-based solutions. Promoting community-based natural resource management can provide economic opportunities while conserving ecosystems.

In India, several government initiatives and non-governmental organisations and institutions are actively promoting nature-based solutions as part of their sustainability and conservation efforts. Implementing and scaling up these

solutions requires a multi-stakeholder approach involving government agencies, local communities and the private sector. Integrating nature-based solutions into policy frameworks and development plans is essential to address the country's environmental and socio-economic challenges effectively.

The Government of India has initiated several programmes and schemes that address various environmental and sustainability challenges. These

Image source: Canva AI generated

programmes aim to harness the power of nature and ecosystems for conservation, climate change mitigation and adaptation, and sustainable development, and follow the nature-based solutions approach to a great extent. Some of the notable programmes and initiatives that align well with the nature-based solutions approach and applicable to land, mountains, water and oceans are the National Afforestation Programme and the ***Green India Mission,*** focusing on afforestation and reforestation, aimed at increasing forest and tree cover, improving ecosystem services, conserving biodiversity and enhancing carbon sequestration; ***National Mission for Clean Ganga (Namami Gange)*** focuses on restoring the Ganges River ecosystem through various nature-based solutions activities such as afforestation along the riverbanks, promoting sustainable agriculture practices and ensuring the proper treatment of wastewater; and the ***Integrated Coastal Zone Management (ICZM)*** that focuses on coastal and marine nature-based solutions approaches such as mangrove conservation, coral reef restoration and sustainable coastal development. A number of other programmes and schemes on Rural Development and Agriculture also have synergies with practices that can be identified as nature-based solutions, such as integrated farming systems, water use efficiency and green structures in the villages. The ***National Rural Employment Guarantee Act (MGNREGA)***, while not exclusively a nature-based solutions programme, includes provisions for the development of rural green infrastructure, such as water harvesting structures, afforestation and watershed management, which contribute to sustainable natural resource management and can be suitably classified under nature-based solutions.

This issue of the Newsletter explores the various connections and different approaches to applying nature-based solutions to various projects and programmes. ❐

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Reshaping the Development Paradigm with Nature-based Solutions

The Earth is out of bounds, with six of the nine planetary boundaries of a 'just and safe operating space' crossed and pressure building upon the remaining three [1]. There is, at the same time, a socio-economic turmoil arising from limited jobs, unequal access, representation and benefit sharing from the commercial use of natural resources, which is leading to increased inequalities and income disparities. Relooking at the ways in which we work with nature while pushing for social empowerment and economic well-being in the development agenda may solve most of the problems we face today. Nature-based Solutions can act as powerful tools towards that end.

Nature-based Solutions, as 'actions that protect, sustainably manage and restore natural and modified ecosystems', offer more than a 66% chance of holding global warming to below 2°C while delivering one-third of mitigation reduction targets through 2030 [2]. With the right

Main definitions of NBS in use

IUCN defines NBS as "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (Cohen-Shacham and others, 2016).

The European Commission defines them as solutions"inspired and supported by nature [that are] cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience" (European Commission, 2015).

The Organisation for Economic Co-operation and Development (OECD) proposes a definition whereby NBS are "measures that protect, sustainably manage or restore nature, with the goal of maintaining or enhancing ecosystem services to address a variety of social, environmental and economic challenges" (OECD, 2020a).

Nature's contributions to people are "all the contributions, both positive and negative, of living nature (i.e. diversity of organisms, ecosystems, and their associated ecological and evolutionary processes) to the quality of life for people. Beneficial contributions from nature include such things as food provision, water purification, flood control, and artistic inspiration, whereas detrimental contributions include disease transmission and predation that damages people or their assets. Many NCP may be perceived as benefits or detriments depending on the cultural, temporal or spatial context" (IPBES, 2022).

Source: E. Cohen-Shacham and others (eds.), *Nature-based solutions to address global societal challenges,* Gland, International Union for Conservation of Nature (IUCN), 2016; European Commission, *Towards an EU research and innovation policy agendafor nature-based solutions & re-naturing cities:final report of the Horizon 2020 expert group on 'Nature based solutions and re naturing cities:* Brussels, 2015; Organisation for Economic Co-operation and Development (OECD), "Nature-based solutions for adapting to water-related climate risks", *OECD Environment Policy Paper*, No. 21, Paris, 2020; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services {IPBES), "Report of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on the work of its sixth session", Bonn, 2018 [online] https://ipbes.net/sites/default/files/ ipbes_6_15_add.2_spm_americas_english.pdf.

WADI farm in Bundelkhand region

policies and investment, these solutions can generate 20 million new jobs and provide decent work, especially in rural areas [3]. In India, the importance of Nature-based Solutions has been recognised under different government programmes and policies geared towards afforestation and reforestation, sustainable agriculture, renewable energy, disaster risk reduction and sustainable habitat, among others.

Development Alternatives' Approach to Nature-based Solutions

At the heart of the work at Development Alternatives is promoting a just transition towards a green economy. A green economy is understood to be a 'low-carbon, resource-efficient and socially inclusive economy that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities' [4]. To that extent, it encompasses bioeconomy, bio-based economy and circular economy within its ambit. Adopting Nature-based Solutions operationalise these approaches in policy and praxis.

From integrated watershed management programmes in rural areas of Bundelkhand to green buildings/infrastructure towards resilient cities, Development Alternatives employs a wide range of nature-based solutions in the space of the following:

1. **Water Conservation:** Development Alternatives has been working on ecosystem restoration and nature-based solutions in water space, promoting models such as pond rejuvenation that impact groundwater availability and contribute towards biodiversity conservation. To date, DA has rejuvenated more than 60 ponds in both peri-urban and rural geographies.

NbS and Its relation to Green Economy, Bioeconomy, Bio-based Economy and Circular Economy

The green economy is an umbrella concept that underpins the triple bottom line, i.e. socio-economic-ecological processes. Nested within the green economy, both bioeconomy and circular economy are resource focused, with the social aspects yet in the process of developing.

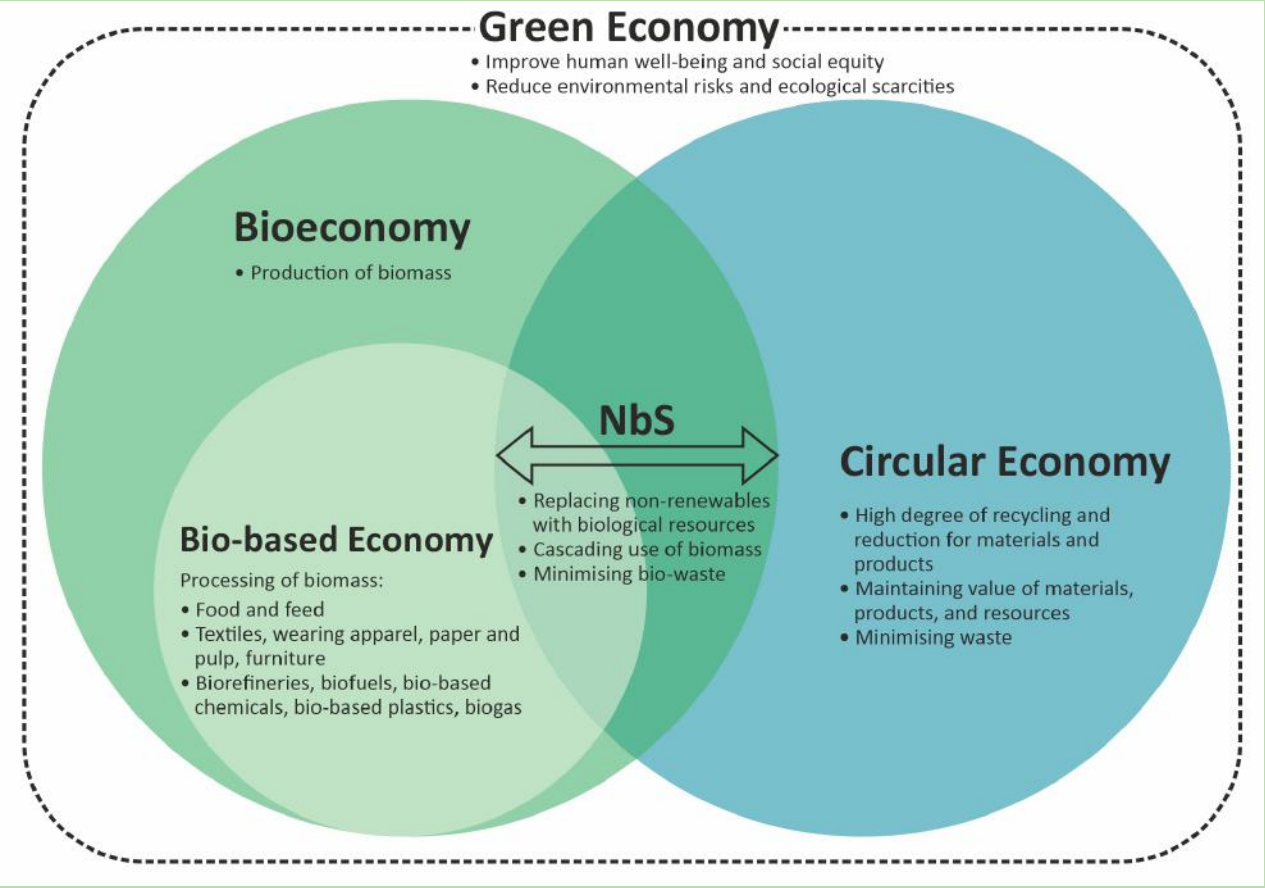
The bioeconomy encompasses the production of biomass through either primary production from agriculture, forestry, aquaculture and industry or the collection of waste streams as well as the use of biomass for food, energy and material usage. The bio-based economy is a part of the overall bioeconomy and addresses only the use of biomass for material, energy, chemicals and other bio-based processes, excluding food [5].

The circular economy as a model of production and consumption runs on the 9R strategy of Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle and Recover.

At the intersection of bioeconomy and circular economy, it is replacing non-renewables with biological resources, which is reducing the use of biomass and minimising bio-waste.

A wide range of Nature-based Solutions, including pond and soil infiltrations, living walls, constructed rooftop wetlands, green roofs, green facades and green infrastructure, are available to convert these approaches to praxis and distil recommendations for improving the policy landscape in India.

Source: L.E. Meza and A. G. Rodríguez, "Nature-based solutions and the bioeconomy: contributing to a sustainable and inclusive transformation of agriculture and to the post-COVID-19 recovery", Natural Resources and Development series, No. 210 (LC/TS.2022/43), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2022, https://repositorio.cepal.org/server/api/core/bitstreams/f5ce6145-4529-4e61-881d-2e5c07ec298f/content



2. **Sustainable Agriculture and Livelihoods:** WADI is the flagship model developed by Development Alternatives, where the multi-tiered cropping pattern ensures the households' nutritional security by providing cereals, pulses, vegetables and fruits. The Agri-Horti model reduces climate risks, regenerates the land's production potential and ensures that farmers enjoy a regular flow of income due to diversification of production. To date, Development Alternatives has planted more than 3 lakh plants through its WADI program.

3. **Green Buildings:** Development Alternatives has actively promoted the use of low-carbon materials such as bamboo, timber and fly ash to construct buildings in States like Uttarakhand and Bihar, among others. In the eco-tourism model, this has meant the construction of homestays using green materials.

Homestay built in Uttarakhand using low-carbon materials

Praxis to Policy

Assessments of these interventions have, from time to time, led to advocacy for improving the policy framework in India. As common learnings, adopting a gender-inclusive lens, strengthening the Panchayati Raj Institutions, empowering local communities, and incorporating traditional knowledge in design and implementation come across as 'critical to have' for any policy or programme driving a just transition towards a green economy in the country. ❐

End Notes

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Unlocking a Brighter Future: The Remarkable Transformation of Mahawad Village Through Pond Rejuvenation

In the heart of the Gautam Buddha Nagar District in Uttar Pradesh lies the village of Mahawad. It has been on the cusp of a profound transformation—a transformation that brought new life into the village and its cherished community. This tale of rejuvenation centres around a once-neglected pond, which had sadly become a dumping ground for the villagers who, overwhelmed by its deteriorating state, had no inkling of how to transform it.

HCL Foundation joined hands with Development Alternatives, and the journey of rejuvenating the Mahawad village pond started. A meticulous plan was made, beginning with a comprehensive baseline survey to understand the pond's current state and to strategise its revival.

Our first pivotal step involved dewatering the pond to assess the extent of sediment accumulation, which had drastically reduced its capacity. It was evident that years of neglect had taken their toll. Following dewatering, the next step was de-weeding and further excavating the pond to remove the amassed silt, thus significantly enhancing its capacity. The numbers spoke for themselves: the pond's volume surged from a mere 4618 m^3 to an impressive 9466 m^3 after the intervention.

Beyond the pond's physical revival, the focus was also on enriching its surroundings. Along the pond's

Before shot of the Mahawad pond rejuvenation initiative

periphery, 50 trees were planted, which created a serene scene and a place for the community to gather and relish their evenings by the pond's edge.

Recognising the pivotal role of the community in sustaining this rejuvenated ecosystem, great emphasis was placed on fostering awareness. Vibrant wall paintings in the village were made to convey the message of pond rejuvenation. Community gatherings in common areas and school campaigns were pivotal in bringing everyone together, equipping them with knowledge on sustaining the pond and efficient waste management practices.

No longer was the revived pond a mere water body; it became a lifeline for agriculture, significantly reducing groundwater dependency. It flourished as a diverse habitat for various flora and fauna, while the heightened green cover around the pond helped preserve fertile soil and shield against soil erosion.

Residents now enjoy improved access to clean water for their daily needs and agricultural activities, leading to enhanced hygiene and increased crop yields. This resurgence also created employment opportunities, improving the local economy and curbing migration trends.

Regular community meetings and awareness initiatives instilled a sense of ownership and responsibility, ensuring the pond's long-term sustainability.

The remarkable collaboration between HCL Foundation and Development Alternatives in rejuvenating Mahawad Village's pond is a testament to the potent synergy between conservation and community engagement. This project stands as a beacon of sustainable development, illuminating the path towards a brighter future. ❐

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After shot of the Mahawad Pond rejuvenation

Mission Amrit Sarovar and Ecosystem-based Pond Rejuvenation: An Analysis

Context

Ponds have long played a pivotal role in India's agrarian economy, serving as essential reservoirs for rainwater to address the community's vital needs. They serve not only as crucial water storage units but also offer immense biodiversity, regulate micro-climate, facilitate groundwater recharge and even help in drought-proofing. In India, the significance of ponds stretches beyond their mere functionality. They liberate women from the often arduous task of fetching water from distant sources, thereby improving their quality of life. Moreover, ponds amplify livelihood avenues for local residents through pisciculture, duck farming, chestnut cultivation and other related activities. But these vital water bodies are under threat. As of 2023, India hosts approximately 1,442,993 ponds, with a staggering 96% situated in rural locales. Alarmingly, only 82% of these ponds remain functional [1]. The rest face deterioration due to various detrimental factors, including siltation, salinity and industrial pollution.

Amrit Sarovar, Hariahera pond in Gurugram district of Haryana

To address these issues, the Mission Amrit Sarovar was launched in 2022 as part of the *Azadi ka Amrit Mahotsav*. The mission's core objective centers around rejuvenating 75 Amrit Sarovars (ponds) across every Indian district. This initiative hopes to create 50,000 revitalized water bodies, each with a minimum pondage area of 1 acre and holding over 10,000 m^3 of water.

This renewed focus on ponds, however, goes beyond mere rejuvenation. It highlights the necessity of a holistic ecosystem-based approach. Such an approach would encompass the myriad benefits ponds offer, from ecological to socio-economic, steering away from the traditional methods of merely desilting or refilling them.

In a recent study conducted by Development Alternatives, 12 pond rejuvenation models spanning India's diverse climatic zones were critically assessed, covering both Amrit Sarovars and non-Amrit Sarovars. Through this assessment, we aim to amalgamate our understanding of the pond's utilities, the need for rejuvenation and its triple bottom-line influence, encompassing economic, social and environmental dimensions. The insights are drawn from this research endeavour to augment and strengthen the implementation of Mission Amrit Sarovar.

About Mission Amrit Sarovar

Inaugurated as a component of the Azadi ka Amrit Mahotsav, Mission Amrit Sarovar 2022 has been established with the ambition to construct and rejuvenate 75 Amrit Sarovars (ponds) in every district nationwide, ensuring water conservation for forthcoming generations. This initiative is set to manifest 50,000 water bodies, each occupying a minimum pondage expanse of 1 acre (0.4 hectares) and retaining a water volume exceeding 10,000 m^3. Economically, the mission acknowledges the worth of these ponds through activities rooted in pond-based livelihoods. Biodiversity emphasis, however, is primarily directed towards symbolic tree plantations. At its institutional level, the mission emphasises 'Jan Bhagidari', fostering community engagement through the inception of user collectives [2].

Adopting a comprehensive 'Whole of Government' methodology, Mission Amrit Sarovar operates without any exclusive financial outlay. Instead, it harnesses resources from pre-existing schemes, such as the Mahatma Gandhi National Rural Employment

Guarantee Scheme, 15th Finance Commission Grants and sub-schemes under Pradhan Mantri Krishi Sichayi Yojna. Furthermore, the mission taps into similar programmes both from the state and the central government, either individually or in combination. Avenues for financial support also include public contribution via crowdfunding through corporate social responsibility. In its essence, Mission Amrit Sarovar offers a prime platform to transition from a traditional approach, acknowledging the multifaceted advantages of the pond ecosystem and integrating them across the design, implementation and monitoring phases. For detailed findings of the study, a policy brief on *Harnessing the Potential of Ponds with an Ecosystem-Based Rejuvenation Approach in India* will soon be published by Development Alternatives with support from the Nature Conservancy.

Recommendations

Based on the assessment of Mission Amrit Sarovar Scheme along with a comprehensive assessment of 12 model ponds, the following recommendations have been proposed:

1. **Coherence in pond classification:** While water remains a state prerogative with diverse classification parameters, a standardised system, primarily based on 'climatic zones', is recommended. This will facilitate streamlined administration, monitoring and knowledge exchange among similar climatic regions.
2. **Adopting a long-term vision:** The mission's potential can be maximised by drawing lessons from initial implementations, allowing time to identify effective rejuvenation methods from ground-level experiences. Continuous and punctual financial support is crucial for effective groundwork and livelihood sustenance.
3. **Empowerment of Panchayati Raj Institutions (PRIs):** Intensifying capacity-building efforts in PRIs, both in technical rejuvenation models and in non-technical community engagement aspects, can boost the mission's impact. Sharing experiences among similar terrains is vital.
4. **Innovation and knowledge dissemination:** Incorporating traditional water conservation practices and ensuring systematic documentation of learning through the mission's digital platforms is crucial.
5. **Robust community engagement:** Effective management of Amrit Sarovar requires extensive community involvement, particularly among women, youth and marginalised groups. Initiatives include revitalising local committees for pond governance, raising awareness via public forums, integrating 'Citizen Science' for data-driven monitoring and devising business models that both monetise the ponds and ensure community-led maintenance. ❐

End Notes

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WADI a Nature-based Income Generation Solution

A farmer looking at the successful implementation of the WADI model on his land

Small and marginal farmers with land holdings of less than 2 hectares comprise nearly 85% of all farming households in India. These farms have low productivity that barely provides for the subsistence of the poor farmers. Many farmers abandon their farms and migrate to cities in search of work, ultimately getting trapped in a vicious cycle of poverty and debt. The Wadi model, developed by Development Alternatives, presents a sustainable solution that makes farming profitable even on small plots. The multi-tiered cropping pattern ensures the nutritional security of the households by the provisioning of cereals, pulses, vegetables and fruits. The agri-horti model reduces climate risks, regenerates the production potential of the land and ensures that farmers enjoy a regular flow of income due to diversification of production. Development Alternatives has implemented this model in 75 villages across 3 districts, including Jhansi, Sonbhadra and Shivpuri districts in Uttar Pradesh and Madhya Pradesh, covering an area of 3800 hectares of land. ❐

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Development Alternatives

अपना रेडियो अपनी बातें

Radio Bundelkhand

Apna radio Apni baatein

Radio Bundelkhand plays a crucial role in promoting citizen science in the region. Through its broadcasts, it engages local communities in scientific endeavours, encouraging them to participate in data collection and research projects. The radio station serves as a platform for disseminating scientific knowledge, fostering public awareness, and connecting experts with citizens. By sharing information on various scientific topics and facilitating discussions, Radio Bundelkhand empowers residents to actively contribute to research initiatives, promoting a sense of ownership and collaboration in understanding and addressing local environmental and social challenges. This synergy between the radio station and citizen science exemplifies a powerful model for grassroots engagement and community-driven research.

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