Inside the issue ...

Sustainable Agriculture Practices in IHR

Spirulina production and opportunities

Superfood *Spirulina*: *Spirulina* is a type of cyanobacteria, often referred to as blue-green algae. It is rich in nutrients and has been recognized for its nutritional benefits and potential environmental sustainability. Spirulina is often considered a superfood and is used as a dietary supplement. Spirulina is a complete protein source, containing all essential amino acids. It also provides vitamins (B-complex, especially B12), minerals (iron, calcium), antioxidants (beta-carotene, phycocyanin) and essential fatty acids. It is often promoted for its potential health benefits, including boosting the immune system, improving energy levels and acting as an antioxidant. Some studies also suggest potential anti-inflammatory and antihypertensive properties (Gerswin and Belay, 2007).

Spirulina Production: *Spirulina* can be cultivated in various environments, including open ponds, closed-loop photobioreactors and raceway ponds. Each method has its advantages and challenges and the choice may depend on factors like scale, location and available resources. *Spirulina* cultivation is often considered environmentally sustainable (Sow and Ranjan, 2021). It can be grown in non-arable land and its cultivation has the potential to use fewer resources such as water, compared to traditional agriculture.

Spirulina thrives in warm and alkaline conditions. It requires a pH level between 8.0 and 11.0, high temperatures (around 35-38°C or 95-100°F) and a good light source, usually sunlight or artificial light in controlled environments. Harvesting is typically done when the *Spirulina* reaches a specific density. It can be collected using filtration methods, and the harvested biomass can then be further processed. After harvesting, *Spirulina* needs to be dried to reduce its moisture content. Common drying methods include sun drying, spray drying or freeze drying. The dried *Spirulina* can then be processed into various forms such as powders, flakes or tablets. Value-added products also developed such as *Spirulina* powders, capsules or incorporated into functional foods and beverages. Diversification of *Spirulina* products can enhance market competitiveness (Habib *et al.*, 2008).

Post Harvest Considerations: Quality control is crucial in *Spirulina* production to ensure that the final product meets health and safety standards. This includes monitoring for contaminants and ensuring that the product is free from harmful substances. (Belay, 2008) *Spirulina* producers often adhere to regulations related to food safety and quality. Obtaining certifications, such as organic or non-GMO certifications, can enhance the marketability of the product.

The market for *Spirulina* products has been growing, driven by increasing awareness of health and wellness. The growing interest in health and wellness, as well as plant-based diets, can contribute to a strong market demand for Spirulina. Producers are exploring market trends, such as the demand for plant-based protein and functional foods, to tailor their products accordingly.

Editor's Note

As the impacts of climate change are becoming increasingly evident, it is crucial to prioritize climate-smart agricultural practices in the Indian Himalayan region. Farming communities in this area face distinct challenges due to their vulnerability to climatechange. Climate change can significantly affect overall agriculture sector in the Indian Himalayan region. Therefore, adopting climate-smart agricultural practices is essential for sustainable food production, supporting livelihoods and conserving the environment. Climate-smart agriculture offers adaptive measures to mitigate risks associated with climate change, such as irregular rainfall and temperature fluctuations. Crop diversification, efficient water management, and soil conservation is vital to enhance resilience and ensure long-term food security. Precision agriculture through innovative tools and technologies can support farmers in making informed decisions and optimizing resource utilization.In the face of challenges induced by climate change, resilience building in agriculture is paramount. The latest issue of the EIACP Newsletter Vol. 20(4), 2023 addresses these crucial topics, which are pertinent to the Indian Himalayan Region (IHR). This issue contains thirteen high-quality articles focusing on hill agriculture, climate smart agriculture practices, ecological urbanization, green economy and food sustainability. The opinions expressed in the articles are those of the respective authors. We welcome comments and suggestions for further improving the EIACP Newsletter.

Er. Mahendra Singh Lodhi
EIACP, Coordinator

Ongoing research and innovations in Spirulina cultivation and processing methods can contribute to increased efficiency, improved product quality, and cost-effectiveness. Adopting new technologies and methods can improve efficiency and reduce production costs.

Scaling production may involve expanding cultivation areas, optimizing processes and exploring new markets. Efficient scaling requires careful planning and investment.

Understanding the intricacies of *Spirulina* cultivation, coupled with a commitment to quality and sustainability can contribute to successful *Spirulina* production ventures. Exploring partnerships with research institutions, universities and other organizations will enhance knowledge base and potentially access funding or collaborative opportunities. Compliance with local and international regulations shall be ensured regarding food safety, labeling and environmental impact. Compliance is crucial for market access and consumer confidence. To educate consumers about the benefits of *Spirulina* will be considered through marketing and outreach efforts. Building awareness can contribute to increased demand. A robust supply chain can be developed to ensure the efficient production, processing and distribution of Spirulina products.

Conclusively the success in *Spirulina* production involves a combination of factors including basic knowledge for production, quality, sustainability and market understanding. A basic training, thorough market research and feasibility studies can be helpful to assess the potential of Spirulina production in specific region or target market.

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Anuradha Dubey* (*anuradhasharam@vmou.ac.in*),
Department of Botany, School of Science & Tehnology
Vardhman Mahaveer Open University, Kota,
Rajasthan, India

Ecological urbanism: Navigating sustainable development in India's rapidly urbanizing landscape

India, home to a staggering population of 1.4 billion people and boasting an annual growth rate of 0.80%,stands as the world's most populous nation. Since opening its economy in 1992, the country has witnessed a rapid surge in urbanization (Fig.1), giving rise to numerous cities and prompting significant migration of the youth to urban areas. This transformative urban shift underscores the critical need for effective sustainable development, rehabilitation services, and the establishment of sustainable frameworks for planning and action to safeguard the well-being of the burgeoning urban population.

Ecological Urbanism

In response to these pressing challenges, the concept of Ecological Urbanism has gained prominence as a crucial approach. Originating in the late 1990s amidst discussions around sustainable practices, Ecological Urbanism represents a paradigm shift in urban planning and design. The core objective is to strike a harmonious balance between human activities and environmental preservation, envisioning cities that are not only economically vibrant but also environmentally friendly. Several Indian cities have emerged as pioneers in embracing ecological urbanism principles. Cities like Bangalore, Pune, and Chandigarh have become exemplars of eco-friendly practices in urban planning, prioritizing green spaces, efficient waste management, and sustainable transportation. Noteworthy initiatives such as the Smart Cities Mission and AMRUT (Atal Mission for Rejuvenation and Urban Transformation) (Table 1) aim to address these challenges head-on by promoting sustainable and inclusive urban development. To provide a quantitative perspective, as of 2022, India's urban population is estimated to be over 506 million, constituting approximately 35% (Fig.1) of the total population. This rapid urbanization trend is reflected in the emergence of numerous cities across the nation. Bangalore, known as the "Silicon Valley of India," has seen a significant increase in green spaces and sustainable initiatives, with a reported 40% increase in green cover over the last decade. Similarly, Pune has witnessed a surge in sustainable practices, including a notable rise in public transportation usage and the implementation of eco-friendly urban infrastructure.

Table.1 Govt Initiative towards Ecological Urbanism

Govt. Initiative	Goal of the Initiative
Smart Cities Mission	Transforming urban landscapes with tech-driven solutions for sustainable development and improved quality of life in designated smart cities.
Atal Mission for Urban Rejuvenation and Urban Transformation (AMRUT)	Aiming to enhance infrastructure, provide essential services, and ensure a better quality of life in urban areas across India.
Pradhan Mantri Awas Yojna - Housing for All (Urban) Mission (PMAY-HFA)	PMAY-HFA ensures affordable housing for urban residents by 2022. Credit-linked subsidies and diverse schemes cater to various income groups.
Integrated Command and Control Centres (ICCCs)	Centralized hubs leveraging technology to monitor, manage, and improve urban services for enhanced efficiency and citizen welfare.
TULIP-The Urban Learning Internship Program	Offering students, a platform to gain practical insights into urban planning, governance, and development through hands-on internship experiences.
Climate Smart Cities Assessment Framework 2.0	Evaluating cities' climate resilience and sustainability, fostering initiatives to combat climate change and create environmentally conscious urban spaces.
Swachh Bharat Mission	National cleanliness drive promoting sanitation, waste management, and sustainable urban practices for a healthier, cleaner India.
National Urban Livelihoods Mission (DAY-NULM)	Empowering urban poor by promoting sustainable livelihoods, skill development, and access to financial services for inclusive urban growth.
National Clean Air Programme (NCAP)	Focused on reducing air pollution levels in cities, employing strategies for cleaner air and sustainable urban development.
Green Urban Mobility Scheme	Encouraging eco-friendly transportation solutions, promoting cycling, walking, and public transport for sustainable and efficient urban mobility.
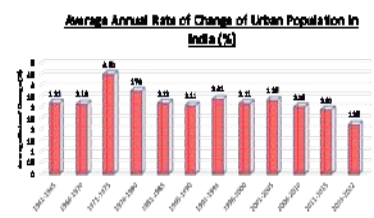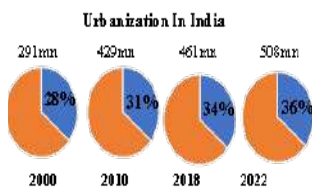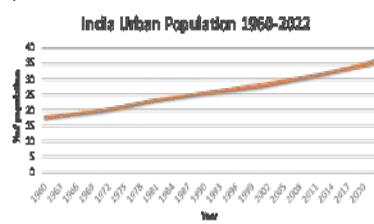
Fig. 1. Urban Population Growth and Average annual Rate of Change of Urban Population (*Source: Ministry of Housing and Urban affairs*)

Challenges on the Road to Sustainability

However, the journey towards sustainable urbanization in India is not without its challenges. Rapid population growth coupled with urban sprawl exerts immense pressure on existing infrastructure, posing a significant threat to the delicate ecological balance. Haphazard urban development, often driven by the imperative for affordable housing, contributes to pollution and the depletion of green spaces. Effectively addressing these challenges demands a comprehensive approach, blending strategic urban planning, community engagement, and policy interventions.

India's diverse landscape, characterized by varying climates, topographies, and socio-economic conditions, requires adaptable and region-specific solutions. The urban-rural divide further complicates matters, necessitating tailored strategies for metropolitan centres as well as smaller towns. Despite these challenges, the potential for creating sustainable urban environments in India is vast and holds promise for a brighter future.

The Role of Ecological Urbanism in Building Resilient Cities

By incorporating ecological urbanism principles (Fig. 2), cities can transform into resilient, efficient, and liveable spaces. Implementation of green infrastructure, such as parks and urban forests, not only enhances aesthetic appeal but also contributes significantly to environmental health by mitigating pollution and promoting biodiversity.(Li, 2014) Promotion of public transportation, development of cycling infrastructure, and establishment of pedestrian-friendly urban spaces are critical steps to reduce reliance on private vehicles, thereby mitigating air pollution and alleviating congestion.

Moreover, the integration of renewable energy sources, such as solar panels and wind turbines, aligns seamlessly with ecological urbanism principles. This fosters a transition towards cleaner and more sustainable energy practices, aligning with global efforts to combat climate change.

Harmonizing ecosystem services: Blueprinting sustainable development planning in the Indian Himalayan region

Fig. 2. Ecological Urbanism Principles

Government Initiatives

In the Indian context, achieving the Sustainable Development Goals (SDGs) demands a delicate policy balance, given the intricate interconnections among the goals. The continuous stress on urban systems, propelled by rural-to-urban migration and existing urbanization trends, necessitates collaborative efforts and inclusive participation from stakeholders. With general elections occurring every five years, sustaining progress requires a robust, long-term plan that transcends political cycles Despite these strides, challenges persist, and addressing challenge remains crucial. Tailored strategies are needed to ensure that both metropolitan centres and smaller towns benefit from sustainable urban development initiatives.

Conclusion

In navigating the complexities of urbanization, embracing ecological urbanism emerges as a solution. It calls for a reassessment of urban classifications, a proactive approach to tackle challenges, for forming new cities that serve as both economic hubs and environmental stewards. As India continues its journey of urbanization, the integration of ecological urbanism principles stands as a beacon of hope. Through strategic planning, community engagement, and innovative policies, India can pave the way for cities that not only thrive economically but also achieve environmental sustainability. It can only be happened by anunited front involving the government, communities, and the private sector that can chart a course toward a future where urbanization and ecological sustainability seamlessly coexist.The challenges are formidable, but the potential for transformative change is immense. By weaving ecological principles into the urban fabric, India can forge a path towards a sustainable, inclusive, and resilient future for generations to come.

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Abhilash Thakur* (*abhilash.thakur.79@gmail.com*), **Rakesh Kumar Singh and Kesar Chand**
GB Pant National institute of Himalayan Environment Himachal Regional Centre, Mohal Kullu, HP, India

The concept of 'ecosystem services' encompasses the various ways in which humans depend on nature. Strong ecosystems provide numerous advantages to humanity, as nature constitutes the fundamental source of life. Human's well-being is closely connected to the benefits derived from the environment. Crucial ecosystem services, such as clean water, fertile soil, pollination, and environmental protection, play essential roles in ensuring necessities like food, healthcare, energy, shelter and sustainable livelihoods for ongoing development scenarios. Additionally, beyond tangible benefits, humans also appreciate nature for its highly valuable intangible contributions, including artistic inspiration, cultural significance and spiritual enrichment (GIZ 2018) and related intrinsic values. The notion of ecosystem services addresses both human's reliance on nature and the repercussions of their actions on it. It offers a systematic approach to recognizing the significance of nature's values across all sectors of the economy and society. Furthermore, it serves as the fundamental rationale for selecting sustainable development pathways that are environmentally friendly, respecting and preserving these benefits. One significant challenge lies in the historical undervaluation of ecosystem services in decision-making. The benefits and costs associated with their conservation or degradation have often been excluded from policies, markets, and prices that advertently shape production and consumption patterns, investment decisions, land use, and resource management practices.This omission has led to decisions based on incomplete and incoherent information, resulting in decisions leading to ecosystem degradation, missed development opportunities, and significant economic costs and inadvertent losses. For the sustainable development planning across the Pan-Himalayan region, it is very crucial to integrate ecosystem services into development planning schemes and strategies because of their fundamental values and coupled relationship with communities for achieving sustainable growth. Simultaneously, the majority of individuals, enterprises, and governing bodies cannot handle the enduring economic and societal consequences linked with ecosystem degradation and depletion (Qiu *et al.*, 2022), therefore the IES (Integrating Ecosystem services) framework can be adopted for the generalized decision making by the governing organizations

The international framework for integrating ecosystem services into development planning: Integration of Multilateral Environmental Agreements (MEA) alongside the available frameworks of The Economics of Ecosystems and Biodiversity (TEEB), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and the Common International Classification of Ecosystem Services (CICES) into development planning can positively resonate around strategic coordination and collaboration for the policy makers for the Pan Himalayan region. By fostering synergy among these frameworks, governments and stakeholders can leverage their collective strengths to effectively assess, value, and manage ecosystem services within development initiatives. This integration facilitates the incorporation of biodiversity conservation, sustainable resource management, and ecosystem resilience into decision-making processes, promoting holistic and inclusive approaches to development that prioritize long-term environmental sustainability and human well-being. Furthermore, by embracing these frameworks collectively, development planning becomes more sustainably responsive to the complexities of ecosystems, leading to more resilient, equitable, and prosperous societies(Notte *et al.*, 2017).

Conclusion

The IES framework is universally applicable across all sectors and especially pivotal for endeavors closely linked to the natural environment. It underscores various opportunities for integrating ecosystem services into development planning and policy formulation. Services such as carbon sequestration, water purification, ecotourism, recreational benefit and pollination can significantly enhance developmental planning by providing invaluable resources and benefits. Leveraging this framework allows for the implementation of diverse policy alternatives and tools to furnish critical information, establish incentives, and effectively manages ecosystem service's sustainable utilization across Pan-Himalayan region, thereby ensuring sustainable and holistic developmental outcomes for the communities residing in the region.

Table 1. Stepwise Integrating Ecosystem services approach (Modified from: GIZ, 2018)

| Step	Key highlights	Summary	Expected outcomes
Step 1: Defining the scope and setting the stage	• What are the primary concerns in development and management that the IES process must tackle, and for what reason? • Who are the pertinent stakeholders, and what is the ideal manner for their involvement in the IES process? • What are the key stages and anticipated results of the IES process?	Step 1, entails laying the foundation necessary to initiate the (IES) process. Key activities include establishing objectives, delineating the project's scope, and identifying primary stakeholders for engagement. By the conclusion of Step 1, the design and subsequent actions for the IES process should be determined, including task allocation and responsibility assignment.	• Clear identification of the management challenge or issues at hand. • Established and mutually agreed-upon objectives, scope, and anticipated outcomes of the IES process. • Documented and agreed-upon work plan outlining resource needs. • Communication plan
Step 2: Screening and prioritizing the ecosystem services	• How is the development plan, along with its related economic activities and livelihoods, influenced by and affecting ecosystem services? • Which stakeholders are subject to impacts from the development plan and alterations in ecosystem services? • What are the implications regarding costs and benefits linked with these changes, and how will they be distributed among various groups?	Step 2, the focus shifts towards prioritizing the ecosystem services most pertinent to the development plan. The primary objective is to evaluate the development plan to uncover associated risks and opportunities concerning the impacts and reliance of various development activities on ecosystem services, as well as the primary beneficiaries or stakeholders affected	• Matrix illustrating the dependencies and impacts of ecosystem services concerning the development plan. • Mutually approved roster of priority ecosystem services. • Outline of potential zones of conflict or competition that could lead to trade-offs
Step 3: Identifying conditions trends and trade offs	• What are the present circumstances and anticipated future developments concerning the demand for and supply of ecosystem services? • What are the primary factors causing changes? • What potential trade-offs might emerge between development objectives and ecosystem services • How might they impact various stakeholders?	In Step 3, the focus lies on examining the cause-and-effect dynamics between ecosystem services and the development plan. Additionally, this step entails identifying the drivers of ecosystem change and key stakeholders involved. A key objective is to pinpoint areas where synergies and trade-offs may exist among various groups, objectives, or services	• Data regarding the status and trends of ecosystem services. • Examination of ecosystem service synergies and trade-offs within the development plan. • Essential messages tailored for diverse audiences
Step 4: Appraising the institutional and cultural framework	• Which organizations and institutions oversee ecosystems and their services? • What policies, regulations, and incentives shape the utilization and administration of ecosystems? Who or what is their focus, and how are they enforced? • Do conflicts or discrepancies exist among various institutional, policy, legal, and cultural frameworks and the related incentive	Step 4 serves as a supplement to the data collected in Step 3. It evaluates institutional, policy, legal, and cultural attributes while identifying incentive frameworks relevant to ecosystem services and the development plan. These elements shape how individuals manage, utilize, and affect ecosystems and their services, potentially driving either positive or negative changes in ecosystems.	• Compilation of critical institutional, policy, legal, and cultural attributes along with resulting incentive frameworks shaping ecosystem management • Identification of root causes and drivers of ecosystem degradation • Summary of stakeholders' stances, interests, needs, values, and rights
Step 5: Preparing better decision making	• What are the potential risks and opportunities concerning ecosystem services in relation to the development plan? • Is economic valuation a valuable tool? If yes, in what capacity? • What are the most viable policy alternatives and avenues for mitigating risks and harnessing opportunities related to ecosystem services?	Step 5 consolidates and assesses the data collected in earlier steps. It examines risks and opportunities associated with the development plan, drawing from the gathered information. Additionally, it proposes policy alternatives aimed at preserving or enhancing the provision of ecosystem services, while also identifying strategic entry points for guiding or impacting decision-making processes.	• Examination of risks and opportunities linked to the development plan • Crafting of communication messages regarding policy options
Step 6: Implementing stage	• Are the suggested policy alternatives practical, achievable, agreeable, and aligned with the development plan? • Does the implementation of the chosen policy options have the essential financial, technical, human resources, and institutional capabilities? • Which stakeholders will participate in executing the policy measures and in what capacity?	Step 6 entails formulating a plan to put into action the policy suggestions outlined in Step 5. This includes drafting a detailed work plan and devising strategies for engaging stakeholders and communicating effectively to implement specific measures aimed at integrating ecosystem services into the development plan	• Strategy for implementation and operational work plan • Communication strategy detailing target audience, key messages, and potential advocates to facilitate and enact necessary changes

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Honey Bhatt [1] and Neha Tamhankar[2] (*nehatamhankar34@gmail.com*) and Harshit Pant Jugran[1]
[1]CSED, GBPNIHE, Kosi-Katarmal, Almora, Uttarakhand, India
[2]Forest Research Institute, Dehradun, Uttarakhand, India

Ecological urban planning: Concept, challenges and opportunities
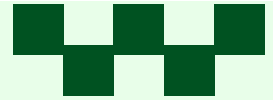
The 'Anthropocene', which is typically referred to as the human-dominated geological epoch, is often defined by urbanization. Urbanization is a worldwide phenomenon in the post-industrial revolution era and is often considered a product of the development of modern industry and technological progress. Concurrently, the emergence and development of cities and urban spaces, being a long-term endeavor, inevitably resulted in the continuous depletion of the Earth's resources and the environment. Therefore, modern urbanism not only serves as a place for gathering elements of population and consumption but also plays a leading role in social production and environmental pollution through agglomeration (Ding and Peng, 2018).

In 2015, over half of the world's populace was residing in urban regions, and by 2050 it is estimated that nearly two-thirds of it shall be dwelling in the urban spaces. Also,urban region apportionment in overall Greenhouse Gases (GHGs) emissions is ~80 %, hence contributing significantly towards global Climate Change (CC). Besides these, under-planned urbanization of natural spaces profoundly alters the indigenous environs leading to loss of habitat, threatening biodiversity, and changing innate hydrological regimes, energy flow & nutrient cycles. The dominant paradigm influencing urban planning and design is modernism, and that in turn is heavily influenced by scientific rationalism which is typically based on mechanistic and reductionist worldviews. As a result,the planning of urban spaces usually occurs in separate parts like the reliance on technology and engineered infrastructure to provide urban functions, compartmentalization of knowledge, and a dualistic perspective of humans and the environment as separate from each other. This approach often disrupts the delicate balance betweenthe ecosystem& associated services that drive & govern the natural landscape prior to urbanizationultimately threatening human well-being (Heymans *et al.*, 2019).

This strongly recommends sustainable urbanism. Following the disbursal of the Brundtland Report (UN) featuring sustainable development, the importance of landscape in urban planning & design for addressing CC impacts was realized.One such conceptthat appeared at the end of the 20this'ecological urbanism'. It derives inspiration from ecology to become more socially inclusive and sensitive towards the environment. With compactness, complexity, efficiency, and stability as the central figures this approach endeavors to intertwine sustainability and urban occupation in tackling the current societal and enrionmental challenges.Similar are the approaches of 'green' and 'sustainable urbanism' that are locus around the development of cities with practices that are viable in the long-term following reduction of consumption, waste generation, and harmful impacts on people & places.These approaches follow the mainstreaming & prioritization of ecosystem services including water management, urban cooling, air quality, food production, disease control, and recreational, aesthetic, spiritual, and psychological benefits within the panorama of urban landscaping & management. The five majorelements which construe 'ecological urbanism' are depicted in Fig. 1(Ghisleni, 2022).

Rainwater Spring Park in China, Green Corridor in Columbia, etc., are some notable examples of the adaption of ecological urbanism around the globe.But despite being a well-established theory, ecological urbanism is often heavily criticized for configuring a vaguely defined idea materialized in a set of flashy projects without representing global applicability. This pushes towards the development of generalized standards that may utilized for diverse landscapes following site-specific inputs. Regardless of being enticing and engaging this concept is relatively not straightforward, especially in the context of mountains where geology, climate, terrain, and slope indices govern the natural and anthropogenic attributes. These not only influences the hydro-sedimentology responses of the area but also shpaesthe soil conditions, vegetation, biodiversity, and determine the distribution of safe zones concerning various calamities in regard to the development of built-up and allied environments. This scenario becomes more convoluted, especially in the case of more geologic active mountains like the Indian Himalayan Region, where most of the nestled urban parcels are spring-fed, have limited urban transport, and where local economies usually thrive on nature and culture-based tourism. As such it becomes more decisive to identify suitable locations followed by their quantitative assessment to develop a more resilient and robust eco-friendly urban infrastructure. Integration of GIS tools like InVEST, etc., that can quantify urban cooling effects, stormwater retention, recreation, tourism, scenic quality, etc., during the planning and in policy development can be of great aid in this regard.

Moreover, incentivization for the land custodians who wish to be stakeholders in ecological urban planning should be there towards promoting the pro-planet style of living. One such recent foot step in this direction is the Green Credit Programme of the MOEFCC, Government of India (GOI). Under the scheme, the GOI is aiming to impel 'Green Credits' in eight major sects with (i) Tree-plantation, (ii) Waste management, and (iii) Sustainable building and infrastructure being part of the same. Additionally, incorporating ecology in urban planning for informed decision-making also contributes to various national and international initiatives. These include India's Nationally Determined Contributions, namely, 1 (Mission LiFE), 2 (Climate friendly and cleaner path), 6 (Better adapt to CC by enhancing investments), and 8 (Build capacities for quick diffusion of cutting-edge climate technology) and UN SDGs, namely, SDG 3 (Good health and well-being), 9 (industry, innovation, and infrastructure), 11 (Sustainable cities and communities), 12 (Responsible consumption & production), and 13 (Climate action).Amid such considerations then only the policy planners can delineate a suitable plan of action for urban consonance that could judiciously trade off the values between development and environmental conservation.

Fig 1. Major Elements in Ecological Urbanism

Himanshu Joshi[1](*himanshujoshiphy@gmail.com*)**, Meenu Rani[1], Ravindra Kumar Joshi[2] and Priyanka Mehta[3]**
[1]ICAR-IIFSR, Modipuram, Meerut, Uttar Pradesh
[2]CBCM, GBP-NIHE, Kosi-Katarmal, Almora, Uttarakhand
[3]Basundhara PSJK Samiti, Almora, Uttarakhand

Nagarvan schemes and its important role for the environmental conservation

Ecological urban planning to mitigate climate change impacts

The innovative and sustainable approach of green environment with reference to conservation of biodiversity and by creation of NagarVan/Nagar Vatika/Ecoparks . It encompasses not only ecosystem population and species but the different sub units of species, each possessing unique characteristic attributes. Protection and conservation of biodiversity is not only a matter of emotion or aesthetic but it is very important for human as well as the entire ecosystem. We have already lost many species that once flourished in this environment, if not properly conserved, the present biodiversity will be drastically reduced in the face of the rapid development that is taking place. The monitoring of bio-diversity is an important aspect to realize the sign of changes. But such a monitoring can not be done with out creating data base of flora and fauna of the area concerned. NagarVan/Nagar Vatika /Ecoparks would serve the objectives of all the above issues in future. The main objective of such kind of park is to conserve the biodiversity of the specific area and to maintain the genetic stock available there in. In NagarVan/Nagar Vatika/Ecoparks, special thrust is also to be given for the conservation of rare, threatened and endangered species.

The Nagar Van scheme is planning to grow about 200 Urban Forests pan India over the next five years. The Warje Urban forest located in Pune at Maharashtra will be considered as a role model for this. The Nagar Van will either be constructed on the current forest land or another vacant land provided by the local bodies in cities across India. Union minister further claimed that this scheme would require the involvement of the people to make it a success. The scheme will also allow states to manage urban ecosystems. Conservation of biodiversity has historically been considered limited to remote forest areas, but there has also been a need to conserve and preserve biodiversity in urban areas with increasing urbanization. The best way to fill the distance is by urban forests. This system, therefore. India has a rich biodiversity with many species of animals and plants and hosts 4 of the 35 hotspots of global biodiversity with many endemic species. Nevertheless, increasing population, deforestation, urbanization and industrialization have put our natural resources under immense pressure that has caused biodiversity losses. Biodiversity is important for the sustainability of all forms of life on this planet and is a gateway to diverse ecological services. India has 8% of the world's biodiversity, but possessing other limitations such as only 2.5% of the world's land area, it has to bear 16% of the human population and just 4% of freshwater sources.

The benefits of Nagarvans are as under
1. Improved air quality , pollution abatement, carbon sequestration, reduction in temperature and urban heat inland effects, water and soil conservation
2. Creation of a green space having aesthetic value with cooling and calming effects on minds of the people
3. Development of green spaces may also take cities climate resilient besides providing ecosystem services.
4. Indirect effects could be promotion of tourism and expansion of business and trade thus improving local economy.
5. Urban forests could offer several positive community physical and mental health benefits.

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Nisar H. Bhat (*Nisar.123@rediffmail.com***), Gowhar Ahmad Parray, Jehangeer Ahmad Baba**
Awantipora Forest Division Jammu and Kashmir Forest Department, KVK/ETC Malangpora Pulwama SKUAST-Kashmir

Climate change poses major threat to the planet, biota, and global economic systems, majorly impacting the urban areas. It has been identified as the major environment problem and the whole world is fighting to overcome it. To overcome these obstacles, we often approach Green urban infrastructure (GUI) which includes infrastructure such as parks, forests, wetlands, and green walls and roofs, is a hybrid system of built systems and green spaces that work together to enhance ecosystem resilience and benefit humans through ecosystem services (Naumann *et al.*, 2010; Pauleit *et al.*, 2011; European Environment Agency, 2012).

Green infrastructures are "networks of natural and semi-natural areas planned at strategic level with other environmental elements, designed and managed in such a way so as to provide a wide spectrum of ecosystem services" as stated by the European Union (E.U.) There are two major approaches to combat climate change and its effects on the environment and society: Mitigation and Adaptation. Former, to gradually lower the number of gases that alter the climate and trigger global warming and latter to render social, economic, and environmental systems less vulnerable and more capable of withstanding climate change (IPCC 2014). The 2030 Agenda outlines 169 targets and 17 sustainable development goals (SDGs) that must be met in the 15 years that follow. With a focus on urban systems, Goal 11: Sustainable Cities and Communities sets the ambitious objective of "making cities and human settlements inclusive, safe, resilient, and sustainable."

The number of people living in cities has exceeded those living in rural areas or outside of inhabited centres for the first time in recorded history. Thus, overburdening the natural resources such as water, land and limited food sources and contributing to a no. of primary problems and pollution. The priority source of pollution is acknowledged to be the cities. Urban socio-ecological systems are distinguished by a dense population, significant land use change, and the utilisation of natural resources that are not locally available. The sustainable development of urban areas that represent "demand areas for Ecosystem Services," thus depends on the preservation, improvement, and growth of urban and peri-urban forests and street trees through the enhancement of green infrastructures (GIs). SDGs 11 of the UN Agenda 2030 and the IPCC (2014) both recommend maintaining urban green spaces as one of their plans for action.

Lowering the microclimate and mitigating the effects of climate change, particularly the Urban Heat Island (UHI) effect, seem to be best achieved through the use of GIs and their integration with urban planning.

Sustainable urban planning strategies for climate change mitigation

Fig 1. Green Infrastructure (Source:https://www.brec.org/green-infrastructure)

An approach to understand the role that green urban infrastructure plays in mitigating and adapting to climate change is shown in fig 2. Ecosystem services, based on ecological phenomena, are the means by which ecosystems contribute to human well-being. This approach can be used interpret the direct impacts on life as a whole and curate possible opportunities for overall growth and economic planning.

1. Green Buildings: According to UN Habitat (2011), the building sector accounts for approximately one-third of global greenhouse gas emissions and uses about 40% of all energy produced. In order to lessen the impact of buildings on the environment and energy consumption, green buildings that use less energy for air conditioning and have water and energy-efficient

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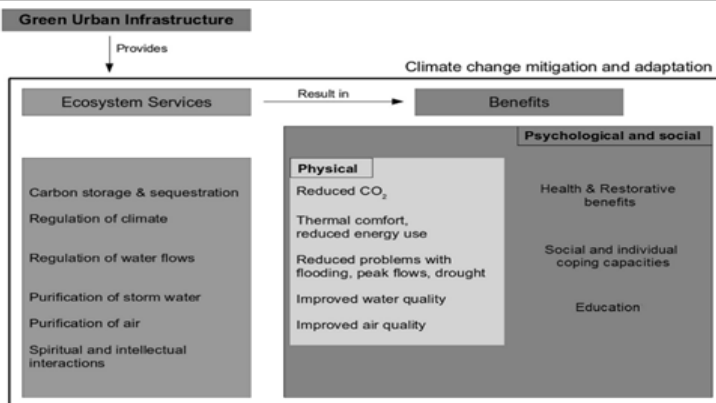
Fig 2. GUI services and benefits (Source:M. Demuzere et al. / Journal of Environmental Management 146

appliances are needed to be constructed. By installing more energy-efficient lighting, HVAC, roofing photovoltaic (PV) and solar water heaters, along with insulated windows, new construction can made up to 70% more energy-efficient than existing structures. Enhanced air quality and better occupant health are two additional benefits of green buildings.

2. Infrastructure: electricity and water supply effciency and conservation Green infrastructure projects include creating low-carbon energy substitutes, conserving and efficiently supplying water, installing sanitary systems, rerouting urban food waste, protecting the shore, and capturing landfill gas to generate energy (UN-Habitat 2011).In order to save costs and enhance the environment, city governments have been using solar energy in street lighting. The government has been encouraging the reuse of treated municipal wastewater for agricultural production, particularly fodder, in order to conserve water and improve water efficiency In addition to preserving groundwater and lowering energy costs associated with pumping water for irrigation, reuse could lessen risks to people and the environment by minimising the amount of wastewater that is released into the environment , thereby contaminating depression areas, aquifers and other water bodies. The consequences of climate change can be worsened by inadequate or lacking infrastructure, as well as by the socioeconomic marginalisation and vulnerability of urban dwellers. The decision to use fossil fuels or renewable energy sources can affect the amount of greenhouse gas emissions and how cities affect the environment globally.

3. Sustainable urban form and carbon sequestration:Cities serve as growth hubs that draw people to them and offer essential opportunities for socioeconomic development due to their agglomeration economies and employment in a variety of economic sectors. Compact, mixed-use, walkable, and dense neighbourhoods are created by sustainable urban design, which also has the added benefit of enhancing urban livability and health. Putting in place a few urban greening and carbon sequestration initiatives, particularly parks, green spaces, and tree planting campaigns will alsoserve to mitigate climate change. Cities should take into consideration rooftop gardening and green roofs as additional strategies for sequestering carbon dioxide, lowering air pollution, and reducing the urban heat island effect, particularly in warm climates. Green roofs and facades can work together to reduce energy consumption in artificial cooling of buildings by lowering indoor temperature. Planting trees, using native plants for landscaping and shadowing, and utilising low-water plants all contribute to preserving biodiversity habitats.The control in deforestation and transplanting of the existing saplings in and around the cities also help in creating urban greening as well as provide for regulating microclimatic conditions.

4. Reduced problems with flooding and improved water quality:With current rates of warming, the GLOF (Glacial Lake Outburst Flood) and flood have increased manifold and it is well known that wetlands, forests, and floodplains can act as peak flow buffers and purify water

by removing pollutants. In order to adapt to changing climates and the dynamics of human needs, these services are significant for urban areas.According to Manning's equation, runoff in urban areas moves more quickly because of smooth impermeable surfaces as opposed to uneven natural surfaces. Thus, while up to 60% of rainwater ends up as runoff in cities devoid of vegetation, only 5 to 15% of rainwater falls on vegetated areas, which lowers peak discharge and encourages groundwater recharge (Spatari et al., 2011). Green urban infrastructure not only affects the amount and timing of runoff but also enhances the physicochemical qualities of the water by eliminating nutrients, suspended solids, hydrocarbons, and heavy metals.

5. Effects on air quality: Green urban infrastructure absorbs pollutants like particulate matter(PM1,PM2.5,PM10) which greatly influence air quality. Some of the particles are also known as short-lived climate pollutants (SLCPs), such as black carbon, the absorption of SLCPs by urban vegetation contributes positively to the mitigation of climate change as the Urban Green Spaces absorbs them around its sources eliminating the threat to deposit in the glacial zones. Huge trees that line both sides of streets help to lessen air pollution and dispersion of air pollutants as well as wind velocity and the particle spread that results from it ultimately lowering the overall urban temperature. Biogenic Volatile Organic Compounds (BVOC) released by trees increase ozone pollution, to overcome such issue, planting low BVOC emitting species may reduce the probability of high-ozone episodes in urban areas.

The overall impacts may be channelised via planning, materialising and implementation at larger scales and thus positively impacting the overall dynamics of climate change from micro to macro levels and ultimately bettering the health & life of planet and provide for sustainable growth. The GUI also provides the possibilities for positive transition into the world with global transformation and parallel economic viability to retain the priority resources.

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Pranjali Bhatt(*pranjali2109@gmail.com***) and Rahul Uniyal**
VCSG UUHF Bharsar Pauri Garhwal, College of Forestry Ranichauri, TehriGarhwal, Uttarakhand

Unveiling landscape of mental health care in India

The majority of the world's mental health systems and services are far from adequate, and India is no different. In India's medical history, mental health has received less attention. A significant treatment gap has resulted from stigma, misunderstandings, and a lack of information, depriving many people of the help they need. Nonetheless, there has been a significant shift in recent years, with mental health being acknowledged as a critical aspect of total wellbeing more and more. As awareness grows, so does the demand for accessible and effective mental health services. The need for comprehensive mental health care is particularly crucial in a nation with a population of over 1.4 billion people, where mental health issues often face stigma and misunderstanding.

Mental health is becoming more and more important in the context of global health, and India, with its diverse population, has difficult problems at the junction of mental health issues and service delivery. Despite the fact that health is defined as "a state of complete physical, social, and mental well-being and not merely the absence of disease or infirmity," our health system places a greater emphasis on disease prevention and curative care than it does on social and mental well-being. ("World Health Organization," 1948). Mental illness is a complex condition affecting thoughts, emotions, behaviour, and overall well-being. It can be classified into various types, including mood disorders, anxiety disorders, psychotic disorders, eating disorders, personality disorders, substance use disorders, and neuro developmental disorders (Table 1). Understanding these disorders is crucial for proper diagnosis, treatment, and support for individuals facing mental health challenges. Understanding these disorders is essential for promoting overall well-being. According to National Mental Health Mission mental diseases affect 6-7% of the population, causing significant Disability Adjusted Life Year (DALY) loss, surpassing individual losses from TB, diarrhoea, malaria, and worm infestations. Mental problems affect over 200 million people in India, making up the second highest illness burden worldwide in 2017 and the sixth largest cause of disability-adjusted life years globally (Kumar *et al.*, 2023).

Table 1. Types of Mental Illness

Common Mental Health Illness	Severe Mental Health Illness
• Depression • Anxiety/Phobias • Eating Disorders • Stress	• Schizophrenia • Bipolar disorder (Manic depression) • Clinical depression • Suicidal tendency • Personality disorder

Issues and Concerns: In India, an estimated 15 crore (150 million, 12.5%) of people are in need of active interventions for mental illnesses. Of these, nearly 1.2 crore (12 million) are living with serious mental disorders (Lahariya, 2018). India faces several challenges and issues related to mental health services, reflecting a complex interplay of social, cultural, economic, and systemic factors. India's mental health crisis affects 12% of children aged 4-16, with one-third under 14, therefore addressing and promoting mental health services is crucial for public well-being. National Mental Health Survey of 2016 in India found that the overall prevalence of common mental disorders (CMDs), which include anxiety and depressive disorders, was 5.1%, with an 80.4% treatment gap. Around every one in four households is expected to suffer from behavioural or mental health issues ("World Health Organization," 2001). Over 90% lack treatment, various factors attribute to the lack of treatment gap such as: lack of awareness, misconceptions about symptoms, stigma, financial barriers, limited treatment availability etc (Fig. 1).

Fig. 1. Challenges related to Mental Health Services

Preventable mental health conditions can be addressed through various public health interventions, including prenatal care, nutrition assistance, supervised deliveries, vaccinations, newborn nutrition etc. The mental health sector is facing a significant shortage of professionals, including psychiatrists, clinical psychologists, psychiatric social workers, and psychiatric nurses, which hinders effective service delivery. Financial strain on mental health care is also a significant barrier, requiring public-private partnerships and initiative work to ensure affordable treatment for underprivileged and marginalized groups. Mental health emergencies often lack a clear response system, leading to delayed support. Implementing crisis helplines and emergency services is crucial for a comprehensive mental health care system. India needs to prioritize mental health, increase awareness, boost financing, and develop an inclusive policy to create a robust and encouraging mental health ecosystem.

Key Components of Mental Health System: The treatment gap significantly impacts individuals, families, society, and the country. Innovation and capacity building are crucial for developing viable, successful, and relevant community-based mental healthcare models. A mental health system is a comprehensive framework that encompasses organizations and resources aimed at promoting, restoring, or maintaining mental health, ensuring effective interventions and quality care services. To maintain mental health's importance in medical treatment, understanding the current mental health system, including policies, strategies, laws, resources, activities, and processes, is crucial (Fig. 2). Long-term funding and availability of psychotropic drugs are also essential for effective mental health treatment.

Conclusion: India needs significant investments in mental health services to promote prevention, provide accessible treatment, and integrate mental and physical health services. Cultural context should influence the type of mental health treatment provided, but it should always be a top priority of the nation. Since the effects of untreated mental illness are frequently disregarded or undervalued, mental health has not received much attention from the public. It is completely unjustified to undervalue mental health because it is a crucial component of total health. Better treatment for those with mental problems will become available when mental health care becomes more important in the context of overall healthcare.

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India can lead the way towards a future where mental health is prioritized, de-stigmatized, and accessible to all by creating a supportive atmosphere, allocating resources, and putting culturally relevant techniques into practice.

Fig. 2. Steps to improve mental health services in India

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Sakshi Thakur, Renu Lata (*renu15_negi@yahoo.co.in***),**
Dharam Chand, R.K. Singh and Kishor Kumar
G.B. Pant National Institute of Himalayan Environment, Himachal Regional Centre, Mohal- Kullu, Himachal Pradesh, India

Empowering rural youth in Himachal Pradesh through vocational training

Himachal Pradesh, a state known for its picturesque landscapes and rich cultural heritage, faces unique challenges in terms of youth employment and skill development. The majority of its population resides in rural areas, primarily engaged in agriculture and allied activities. Vocational education is a process of preparing individuals for employment as technicians, trades people, or artisans using their specialized skills. This article aims to investigate how vocational training can serve as a pivotal tool for empowering the youth in these regions, enabling them to contribute more effectively to the state's economy.

Demographics of Himachal Pradesh: Himachal Pradesh, located in the northern part of India, is characterized by its hilly terrain and rich cultural heritage. The population is predominantly Hindu, and the region is known for its diverse ethnic groups and languages, including Hindi, Pahari, Kangari, Bhoti and Kinnauri etc. The demographic composition is largely agrarian, with a significant portion of the population engaged in agriculture and allied sectors. The state also has a young demographic profile, which underlines the importance of addressing employment and education needs for its youth.

Current status of vocational training in Himachal Pradesh: It reflects a dynamic and evolving landscape, influenced by both governmental initiatives and the demands of the modern job market. Some the key aspects are as:

Government Initiatives: The Himachal Pradesh government, in collaboration with the Indian central government, has launched several initiatives to promote vocational training. Programs such as the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and initiatives under the National Skill Development Corporation (NSDC) are significant contributors to skill development in the state.

Educational Integration: Vocational training has been increasingly integrated into the formal education system. Many secondary and higher secondary schools have started offering vocational subjects as part of their curriculum, aiming to equip students with job-ready skills from an early age.

Role of ITIs and Polytechnics: Industrial Training Institutes (ITIs) and Polytechnics are at the forefront of vocational education in Himachal Pradesh. They offer a variety of courses in fields like electronics, mechanics, hospitality, and more, catering to the diverse skill requirements of different industries.

Sector-Specific Training: Given the state's economic structure, vocational training in Himachal Pradesh is geared towards sectors such as tourism, hospitality, horticulture, information technology, digital skills and electronics, reflecting the local job market and industry needs.

Public-Private Partnerships (PPP): The state has seen collaborations between government and private entities to enhance the quality and infrastructure of vocational training. These partnerships aim to bring industry-relevant skills and updated technology to the training programs. Challenges: Despite these developments, the vocational training sector in the state faces challenges such as aligning training with current industry needs, improving the quality of training, and enhancing the employability of graduates.

Focus on Women and Rural Areas: There is a growing emphasis on encouraging women's participation in vocational training, especially in rural areas. This approach aims to empower women with skills that can help them secure employment or start their own ventures.

Alignment with Local Economic Needs: Recognizing the unique economic landscape, vocational training programs have been tailored to meet these specific local needs:

Tourism and Hospitality Training: Given that tourism is a major economic driver in Himachal Pradesh, there is a significant focus on vocational training in hospitality and tourism management. This includes courses in hotel management, travel and tourism, culinary arts, and event management, aimed at preparing individuals for various roles in this sector.

Rehabilitation services in India: Addressing diverse needs

Agriculture and Horticulture Skills: Agriculture, including horticulture, is another key sector in the state. Vocational training in agricultural practices, organic farming, horticulture techniques, and related technologies is provided to enhance the skills of farmers and others involved in this sector. This training is crucial for improving crop yields, adopting sustainable practices, and enhancing the overall productivity of the sector.

Information Technology and Electronics: With the growing importance of IT and electronics at a global level, vocational training in these fields is being promoted to prepare the youth for emerging job opportunities, both within the state and in the broader national and international job markets.

Traditional Arts and Crafts: The state is also focusing on vocational training in traditional arts and crafts unique to Himachal Pradesh. This includes training in weaving, embroidery, wood carving, and other handicrafts, which not only helps in preserving the cultural heritage but also provides livelihood opportunities to the local population. Understanding the diverse geographic and cultural landscape of the state, vocational training programs are often customized to meet the specific needs of different regions within the state.

Skill Development for Entrepreneurship: Entrepreneurship development programs are part of vocational training, encouraging locals to start their own businesses, particularly in areas like tourism, handicrafts, and agro-processing. This approach helps in job creation and economic diversification.

Healthcare and Allied Services: With a focus on improving health services in the state, there is a growing emphasis on vocational training in healthcare, nursing, and allied services. This is especially important in rural and remote areas where there is a need for skilled healthcare professionals.

Conclusion: Vocational training in the state is evolving, with an emphasis on meeting the demands of the modern job market and equipping the state's youth with relevant skills. However, continuous efforts are required to address challenges and adapt to the rapidly changing global and national economic landscape. It is essential for the holistic development of Himachal Pradesh, providing a pathway for sustainable economic growth, self-employment, and overall social and economic empowerment of its youth. In recent years, there has been a growth in the tourism and hospitality sectors, owing to the state's natural beauty and cultural attractions. The industrial sector is also growing, albeit at a slower pace, with pharmaceuticals, textiles, and food processing being the key industries.

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Sumati Rathore (*s002rathore@gmail.com***) and Rakesh Kumar Singh**
G.B. Pant National Institute of Himalayan Environment, Himachal Regional Centre, Mohal- Kullu, Himachal Pradesh, India

Rehabilitation services in India stand as a testament to the nation's commitment to addressing the multifaceted challenges faced by individuals dealing with physical, mental, or social adversities. In a country characterized by its rich cultural diversity and a population exceeding a billion, the need for comprehensive rehabilitation services has never been more paramount. These services encompass a broad spectrum, ranging from physical rehabilitation that aids in restoring mobility, to mental health rehabilitation aiming to break down societal stigmas surrounding mental well-being. Substance abuse rehabilitation, vocational training, social reintegration, and community-based initiatives further underline the holistic approach adopted by India's rehabilitation sector.

In the intricate tapestry of India's social landscape, rehabilitation services play a pivotal role in mending the fabric of lives affected by disabilities, illnesses, or societal prejudices. This article delves into the expansive realm of rehabilitation services in India, examining their diverse dimensions and the pivotal role they play in fostering inclusivity, independence, and overall well-being. From state-of-the-art facilities utilizing cutting-edge technology to grassroots community-driven initiatives, these services collectively contribute to a narrative of empowerment, resilience, and the unwavering spirit of individuals overcoming adversities. As India strides into the future, its commitment to robust rehabilitation services mirrors a society's dedication to leaving no one behind, ensuring that every individual has the opportunity to lead a fulfilling and dignified life.

Rehabilitation services in India play a crucial role in enhancing the quality of life for individuals facing physical, mental, or social challenges. From healthcare to social integration, these services aim to empower individuals and enable them to lead fulfilling lives. This article provides a concise overview of rehabilitation services in India, highlighting their importance and the diverse range of needs they address.

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Exploring the landscape of health services in India

Physical Rehabilitation: Physical rehabilitation services cater to individuals with physical disabilities or injuries. Specialized centers offer physiotherapy, occupational therapy, and speech therapy to help patients regain mobility, functionality, and independence. These services are vital for those recovering from accidents, surgeries, or chronic conditions.

Mental Health Rehabilitation: India has witnessed an increased focus on mental health rehabilitation in recent years. Facilities provide counseling, psychotherapy, and psychiatric support to individuals dealing with mental health challenges. Addressing the stigma associated with mental health is a key aspect of these services.

Substance Abuse Rehabilitation: Rehabilitation centers across the country offer programs for individuals struggling with substance abuse. These services include detoxification, counseling, and support groups to help individuals overcome addiction and reintegrate into society.

Vocational Rehabilitation: Vocational rehabilitation programs aim to empower individuals with disabilities by providing them with skills and training to enhance their employability. These services focus on fostering independence and self-sufficiency, enabling individuals to contribute meaningfully to the workforce.

Social Rehabilitation: Social rehabilitation services focus on reintegrating individuals into society, particularly those facing social exclusion. This includes support for marginalized communities, such as people with disabilities, the elderly, and those affected by discrimination, aiming to create an inclusive and supportive environment.

Community-Based Rehabilitation: Community-based rehabilitation emphasizes local initiatives to address the diverse needs of individuals. It involves collaboration between communities, healthcare providers, and social organizations to create a supportive network for rehabilitation services, especially in rural areas.

Technological Advancements: The integration of technology in rehabilitation services is gaining prominence. Virtual rehabilitation, telemedicine, and assistive devices contribute to more accessible and innovative approaches, expanding the reach of rehabilitation services to remote areas.

Conclusion: Rehabilitation services in India are evolving to meet the diverse needs of individuals facing physical, mental, and social challenges. The focus on inclusivity, technological advancements, and community-based approaches reflects a commitment to enhancing the well-being and independence of all members of society. As these services continue to evolve, the goal remains clear: to create a more inclusive and supportive environment for individuals on the path to recovery and empowerment.

Hem Ch. Joshi (*hembiophysics12@gmail.com*)
Department of Botany, D.S.B. Campus,
Kumaun University, Nainital, Uttarakhand

The year 2023 rank of India in UNDP's Human development Index (HDI) is 132 among 191 countries which reflect the depressing state of India's Health Services. Compared to western countries India has the life expectancy of 70.8 years (WHO, 2019). Poor health services during birth lead to death or any kind of physical deformity in infants in the country. A long queue in the government hospitals shows the stressing picture of India's health related fundamental infrastructure. Even today hundreds of children and adult suffer from diseases like Malaria, TB, and Dengue for which treatment is available and are manageable to cure. It is worth noting that these diseases not only affect the physical condition but also mental, economic, social and spiritual wellbeing of the individual.

What is Health? We misunderstood health by only looking at physical wellbeing of the individual. However, Health is the holistic development of an individual which includes balanced state of physical, mental, social, economic, psychic and spiritual approach. In India assessment of Health services can be done on these parameters. India has three tier health services system at rural level: Primary Health Centre, Sub-Health Centre and Community Health Centre. The primary health centers are first point of access to meet individual's primary healthcare requirements. Secondary care emphasizes acute and specialized services offered by district hospitals, while tertiary care encompasses advanced medical services, including specialty and super-specialty services provided by medical colleges. Besides these rural India has dire situation of Health Services. Prime reason behind the low quality of health services despite healthy infrastructure at rural level is administrative disability in its implementation. Moreover, week financial situation, social and gender disparity, lack of cleanliness, open defecation and lack of balance diet are causes of poor health in India.

Evolution of healthcare services in India: The ancient people rely on the four Veda's; Rig Veda, Sam Veda, Yajur Veda and Atharva Veda, for their medical knowledge. The Atharva Veda is replete with hymns and prayers, offering guidance on methods to safeguard individuals from various diseases and natural disasters. Charak, Dhanvantri, Sushrut were some renowned court physicians of Ancient period who further developed the traditional healthcare system in India. Lord Buddha was himself keen supporter of medical science. With the advent of Europeans and missionaries, hospitals became an integrated part of all churches and monasteries. Post-independence India set up The Planning commission for the effective utilization of its resources. States formed their own health policy as Health being a state subject. From the union policy implementation side Community DevelopmentProgram and National extension movement were the main thrust. Several committees such as Bhore committee, Mudaliar committee were made to improve the health services delivery in India. India came up with The National health policy 1983 with the ambitious objectives of robust healthcare system in India. The National Health Policy asserts that the efficient provision of healthcare services primarily relies on the quality of education, training, and the proper orientation of health professionals towards community health.

Yoga and Ayurveda: Yoga and Ayurveda often called sister science, promoting natural healing for both the body and mind. These are key components of traditional Indian healthcare system called AYUSH (Ayurveda, Yoga, Unani, Siddha and Homeopathy) which has become a global trend in 21st century. With its gaining popularity, UN has recognized 21st June as International Yoga day. Yoga, acknowledged as an intangible cultural heritage of humanity by UNESCO, has evolved into a global symbol of unity, peace, and overall well-being.As per a government report, the Indian Ayurveda products market achieved a size of USD 18 billion in 2022. Additionally, the global Yoga Market, valued at USD 110.2 billion in 2022, is projected to grow at a Compound Annual Growth Rate (CAGR) of 10.9% from 2023 to 2033.In addition to contributing holistic health and wellness, Yoga and Ayurveda has immense potential to boost Indian economy as well.

Healthcare Infrastructure in India: Government has set population norms for establishing public health facilities in India. Sub Centre: Typically, one is established for every 5,000 people in general regions and for every 3,000 individuals in challenging, tribal, and mountainous areas.Primary Health Centre: Generally, one is set up for every 30,000 people in standard regions and for every 20,000 individuals in challenging, tribal, and hilly areas.Community Health Centre: Normally, one is established for every 1, 20,000 people in general areas and for every 80,000 individuals in challenging, tribal, and hilly areas (PIB, 2023). However, According to the Rural Health Statistics (RHS) 2020, there is a deficit of 46,140 Sub Centres (SCs), accounting for 24% of the required number, 9,231 Primary Health Centres (PHCs), representing 29% of the needed facilities, and 3,002 Community Health Centres (CHCs), constituting a shortfall of 38% nationwide.As of 2022, thereare 22 All India Institutes of Medical Sciences (AIIMS) in various states across India for providing high-quality healthcare, medical education, and research. According to the data provided by National Medical Commission (NMC) of India, The doctor-population ratio in the country stands at 1:834, which surpasses the WHO standard of 1:1000. Additionally, there are 34.33 lakh registered nursing personnel and 13 lakh allied and Healthcare Professionals across the nation. The government is also actively enhancing the availability of manpower to provide mental healthcare services in underserved areas.

Challenges in Indian Health services: India houses 1.4 billion population which requires cost-effective, accessible and efficient health services. Despite experiencing substantial transformations throughout the years, the system still encounters numerous challenges. The challenges encompass insufficient infrastructure, a scarcity of healthcare professionals, urban-rural discrepancies, restricted health insurance coverage, inadequate public healthcare funding, and a fragmented healthcare system. Such inefficiencies in health service delivery counteract the government's endeavors to alleviate poverty. The recent global health crisis like COVID 19 has posed a serious challenge to health facilities and development around the world. Such a pandemic has warned the country of a sudden health crisis.

Disease burden on India: The estimation of Indian Council of Medical Research (ICMR)indicates that the percentage of deaths attributed to Non-Communicable Diseases (NCDs) in India has risen from 37.9% in 1990 to 61.8% in 2016.India bears the highest burden of tuberculosis (TB), experiencing two deaths every three minutes attributable to this disease (WHO, 2022). However, with the increasing TB surveillance efforts India has accelerated its pace towards ending TB by 2025. In India, approximately 77 million individuals aged 18 and above are estimated to be grappling with type 2 diabetes, and nearly 25 million are classified as prediabetic, putting them at a heightened risk of developing diabetes in the near future. Alarmingly, over 50% of people are unaware of their diabetic status, leading to potential health complications if the condition is not detected and treated early (WHO, 2022). To lower the disease burden in country robust awareness campaign, increased diagnosis rate and routine primary check-ups are imperative.

Govt. Initiative:

i) Ayushman Bharat: Ayushman Bharat, under National Health Protection Mission, is a comprehensive health protection scheme. It aims to cover more than 10 crore economically disadvantaged and vulnerable families, which translates to approximately 50 crore beneficiaries. Under this initiative, each family is provided coverage of up to 5 lakh rupees per year for secondary and tertiary care hospitalization.

ii) Mission Indradhnush: India is running world's largest child immunization program, providing vaccination against eight life threatening diseases (diphtheria, whooping cough, Haemophilus influenza type B (Hib) causing pneumonia and meningitis, tetanus, polio, tuberculosis, measles and hepatitis B)

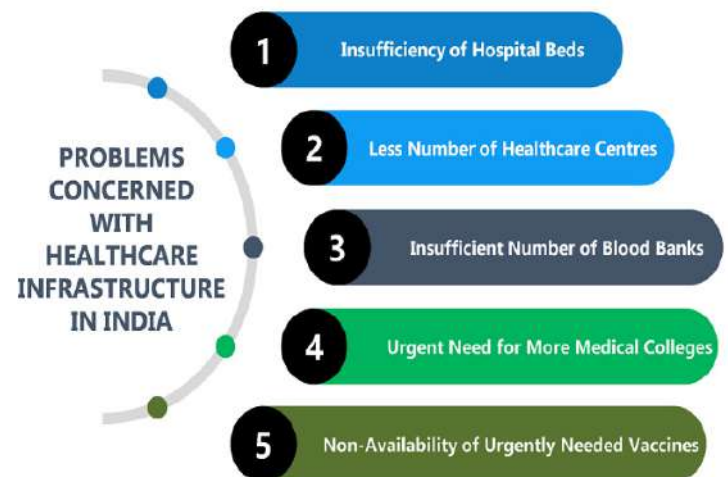**iii)** POSHAN Abhiyaan; to improve the nutritional outcomes of mother and their infants.

iv) The Pradhan Mantri Matra Vandana Yojana (PMMVY) is a direct benefit transfer (DBT) scheme designed to provide financial assistance directly to the bank accounts of pregnant women.

v) Surakshit Matritva Anushasan (SUMAN), and Labour Room & Quality Improvement Initiative (LaQshya) to providepositive birthing experience.

vi) In 2018, the Union Ministry of Health and Family Welfare initiated the Anemia Mukt Bharat strategy with the goal of reducing the prevalence of anaemia caused by both nutritional and non-nutritional factors, adopting a lifecycle approach. The strategy is anticipated to benefit approximately 450 million individuals, including 30 million pregnant women.

vii) "Pradhan Mantri TB Mukt Bharat Abhiyaan (PMTBMBA)" to provide persons affected with TB and their families additional nutritional, diagnostic, and vocational support, delivered by the community.

viii) National Tele Mental Health Programme: Govt launchedtele-Manas to further enhance access to high-quality mental health counseling and care services in the country.

Source: https://hindrise.org/resources/health-infrastructure-in-india/

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Dimple Kumari, R.K. Singh and Renu Lata (*renu15_negi@yahoo.co.in*)
G.B. Pant National Institute of Himalayan Environment, Himachal Regional Centre, Mohal- Kullu, Himachal Pradesh

Potential of minor millets to ensure nutrition security and livelihood enhancement opportunities in rural areas of

Millets, with a cultivation history spanning approximately 3,000 years, hold a significant place in the cultural and historical fabric of Uttarakhand. They are found in places with warm, seaside soils and also in high altitude, at over 2,000 m in the Himalayas (Seetharam, 1998). The central Himalayas region displays diverse crops and cropping systems, minor millets including Barnyard millet (Echinochloa frumentacea), Finger millet (Eleusinecoracana), Foxtail millet (Setaria italica), and Kodo millet (Paspalum scrobiculatum) have been widely grown in Uttarakhand contributing to a total production of 89 thousand tonnes contributing to the agricultural landscape of the region. Small and marginal farmers in the hills of Uttarakhand cultivate these crops using the organic farming framework, depending on marginal and degraded soils with little cash inputs and avoiding the use of pesticides and chemical fertilizers. Millets generally called 'nutricereals' are known for their good profile of amino acids and are considered as a good source of immunity boosting foods. These grains, exceeding major cereals in nutritional value, provide carbohydrates and energy with good source of protein, high dietary fibre, steady number of vitamins and minerals, antioxidants and micronutrients which maintains our immune system, safeguarding against diseases. Although minor millet grains as a food resource have been quite overlooked, but they play an important role in the hilly areas of Uttarakhand, providing food, fodder and nutritional security to the local people. Consumers are showing more interest in millet-based food products like noodles, pasta, momos, providing opportunities for entrepreneurs and due to the increased awareness, the prices of these millets have been significantly increased in market as shown in figure 1. In recent years, this crop has become globally popular due to its health benefits and is gaining more recognition from farmers as their grains have long storage viability and can be preserved well without requiring any specific conditions.

Barnyard millet (*Echinochloa frumentacea*) commonly known as Jangora or Madira in Himalayan region, is one of the oldest crops cultivated in the hilly areas of Uttarakhand and has high amount of nutrition covering 46,408 ha area with 64,093 tonne production and 13.81 q/ha productivity. The grains of Barnyard millets are consumed in different forms such as in puddings, rice dishes, and in time of fasting. It is considered as an essential ingredient in preparing baby and infant food formulations. Different traditional cuisines like Jhangore Kheer are prepared in Uttarakhand.

Finger millet (*Eleusine coracana*) commonly known as Ragi or Mandua, is majorly grown in hilly areas of Uttarakhand covering 86 ha area with 127.11 tonne production and 1478 kg/h productivity. In India, it holds the sixth rank in production after wheat, rice, maize, sorghum, and bajra (Devi *et al.*, 2014). Among all the millets it has the highest yielding potential and is the richest source of methionine, Ca, Fe and Mn. The grains of finger millet are used in making 'roti' which are extremely easy to digest and are gluten free. Also, many other traditional dishes are made from popped flour when mixed with Jaggery/ ghee/butter milk and salt. Malting of finger millet for food uses has been subjected since ages. The grains have several medicinal benefits and also used as a folk remedy for various diseases such as liver disease, measles, pneumonia and small pox.

Foxtail millet (Setariaitalica) commonly known as Kauni, is a drought resistant, short duration cereal, frequently sown as an alternate crop with sorghum when rainfall is low, and when it's too late to plant other crops. It can be cooked like a rice or made into meal, sometimes eaten as a thick porridge called 'sargati'. Although the grains possess medicinal properties, particularly for stomach problems or chicken pox, and have low glycaemic index due to which it is recommended to diabetic patients.

Kodo millet (Paspalum scrobiculatum) commonly known as Kodra or Varagu, is an ancient, long-duration, rainfed crop. Among all the millets it has the highest productivity. Along with other cereal flour it is used to prepare bakery items like biscuits, cakes, pasta and fermented foods. 'Kodo Roti' serves as a staple food in the hilly area of Uttarakhand. Nutritionally, it has many health benefits and is a good source of polyphenols, flavonoids, and antioxidant compounds which makes it anti-cancerous. Also, it is rich in vitamins mostly niacin, pyridoxine, folic acid and minerals namely Zn, Ca, K, Fe and Mg which helps in lowering the cholesterol level and strengthening the immune system.

Farming as a vital source for livelihood: The primary livelihood source relies majorly on agriculture, where traditional cereal crops play an important role in the food supply. Most of the economy depends on the small amount of farmable land, and around 59 % of the workforce is involved in farming. Millets are a versatile crop used in various traditional dishes and tasty recipes like porridge, salads, stews, and desserts, increasing the economical benefits as consumers are preferring it more as a healthy option also, is cheaper than commonly consumed whole grains. Millets are majorly preferred because of its medical benefits as well, these are recommended to patients suffering from diabetes, or high blood pressure. Encouraging farmers to increase their productivity and to fight the malnutrition affecting people in rural areas. Millets are common referred as 'women's crop', as they play an important role in cultivation and processing of millets in traditional agricultural societies. Women are more involved in sowing, harvesting and preparing millets-based meals creating economic opportunities, putting brake on youth migration to urban areas. The availability of millet-based products contributes to an increase in consumption, and prevented the farm families from having to look for earning a desirable amount in order to maintain their standard of living. By increasing the yields to 50 per cent of the potential yield in all low performing areas could increase annual production by 8.46×10^{14} Kcal (West *et al.*, 2014). Given these considerations, it was acknowledged that millets represented an efficient opportunity for holistic efforts to reverse the situation, profiting farmers in terms of status and income. Thus, Increasing the usage of millets in Himalayan states and other rural areas of India, along with improving the value chain and demand can also improve farmers daily income and may help them in getting even better prices and market for their yield and ultimately ensuring nutritional security all over the world.

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Fig. 1. Representation of minor millets a) Foxtail millet; b) Kodo millet; c) Barnyard millet; d) Finger millet

Srijana Bisht[1], Pooja Oli[2] and Shailaja Punetha[2] (*shailupunetha@gmail.com*)
[1]Banasthali Vidyapith, Jaipur, Rajasthan
[2]G.B. Pant National Institute of Himalayan Environment, Kosi-Katarmal, Uttarakhand

Green spaces: Enhancing liveability and sustainability in Indian cities

The urban landscape of India has undergone rapid transformation in the past few decades due to increasing demands and developmental activities. This change has just not transformed Indian towns and cities into concrete jungles but also created immense pressure on natural resources. In search of better opportunities, a massive number of people from rural regions of the nation have shifted to urban settings. This rural-to-urban influx of population resulted in a rapid multiplication of population in cities, loss of green cover, and declined environmental quality. Under the scenario where available natural resource deposits are under stress, the sustaining capacity of urban spaces is in doubt. Therefore under these circumstances, the need for a long- term viable plan for securing the future of urban areas is paramount. In this context, the installation of green spaces in urban areas plays a vital role in maintaining environmental security and mitigating socio-economic issues caused by excessive urbanization.

According to the report of CSCAF, it is noted that one-third of India's population currently lives in cities. It is anticipated that by 2030, there will be 590 million more people living in cities, and their economic share of GDP will rise from the current 65% to 75%. Indian cities, being hubs of economic expansion and population increase, are confronted with intricate infrastructure problems and environmental deterioration as a result of swift urbanisation and climate change. As such, cities need to make consistent efforts to prepare for and enhance their capacity to prosper in the evolving environment.

In the present era, where climate change is recognised as a global threat and urban India finds itself under the trap of concrete jungle, green spaces emerge as lungs. These spaces are not just relaxing points but are the elements that thrive for a sustainable future of India cities. Integration of green spaces in urban settings has multiple benefits, like these spaces secure floral and faunal diversity of cities and maintain the temperature and air quality of the region. These spaces also contribute to the emotional and physical well-being. These natural havens also contribute greatly to city people's emotional and physical well-being of individuals residing in cities by providing various recreational opportunities. It is to be noted that the creation of these kinds of spaces also faces certain challenges like limited available land, maintenance, competition with developmental needs and many more. However, despite these challenges, the promotion of green spaces is an evident necessity. The present work is an attempt to look into various aspects of green spaces and their integration in urban India. The work examines the advantages of these spaces in urban settings and, the difficulties faced in installation and promotion strategies. Through this comprehensive analysis, the potential of these spaces in the sustainable development of the nation is highlighted.

Methodology: This study is exploratory in nature which aims to find varied green space initiatives in diverse Indian cities. Case studies have been used as they provide real-world examples of successful green space initiatives. Furthermore, the qualitative methodology was deployed. Data was collected from various secondary sources ranging from news articles, journals and other web sources.

Case studies: To conduct this study in accordance with the methodology, various sources were searched for relevant case studies on the topic. Three significant studies were chosen to be mentioned in this work to provide a comprehensive understanding of green spaces and their utilisation in Indian cities. The three case studies are as follows.

1. Beach restoration in Mumbai: Based on the article in Hindustan Times "How Mumbai save its beach mangrove and green spaces" by Badri Chatterjee on April 18, 2018, it is noted that the people of Mumbai have come together for the revival of natural sites by their united efforts which is evidential in case of Varsova beach where over 13 million Kg of plastic is removed for developing healthy surrounding. This brilliant effort is an example of collective unity for restoring green spaces amongst beaches and mangroves. This case is a lesson from the busiest city of Mumbai is a lesson for other urban bodies in India to develop community-based effort to enhance the liveability of their surroundings.

2. Expanding greenery in Delhi: In an India Today article "Delhi's green area expanded to 23.6% in 2021 from 20% in 2013" of 11 February 2023 by Pankaj Jain, It is shown that Delhi's green cover increased from 20 % in 2013 to 23.6% in 2021 due to the contribution of many governmental bodies who have contributed remarkably. This case highlights systematic plantation that leads in the enhancement of green regions for the well-being of the urban environment. This case marks the point that how with the help of coordinated efforts of government and associated bodies urban centres across the nation can achieve a significant rise in green spaces that support sustainable environmental stability.

3. Success of green living in multifamily buildings: An article of ADDA "Small Changes, Big Impact: Green Living Success Stories in Multifamily Buildings" 28 March 2023 by Raj mentions that there are many examples globally that light the success of green living practices in multifamily buildings of megacities. This article gives examples of energy-efficient structures of New York, Copenhagen's sustainable complexes and eco-friendly residential communities residing in Chennai and Bengaluru. These mentioned cases show that there are multiple ways through which sustainable and green urban living can be achieved like the integration of solar panels, Green roofs; rain water harvesting and community- based environmental approaches. These kinds of examples are a way forward for city planners to implement ideal deals for developing green and durable urban spaces.

Discussion: The case studies mentioned above describe aspects and influence of adding green spaces in urban localities of India. Where, Mumbai's citizens show the importance of collaboration in their efforts in the green revival of Varsova beach while Delhi's enhancement of green cover denotes coordinated and systematic government efforts for sustainable development of the environment in urban centre. Additionally, green living measures of multifamily buildings especially in cities like Bengaluru and Chennai turn out to be solutions to challenges possessed by metropolitan cities in India. However, there are several challenges in the installation of these kinds of spaces such as regulations and security etc. The above-mentioned cases advocate for varied comprehensive approaches like communal actions, environment-centric urban development and government support that can lead towards green and resilient city development In India.

Conclusion and Way Forward: "Being green and clean is not just an aspiration but an action."
- Christine Pelosi

Based on the above discussions it is clear that the installation of these green spaces is essential for the longevity of urbanised locality in India. The assessment highlights the major role played by these kinds of spaces in developing a resilient ecosystem across Indian cities. These green areas contribute to better air quality and enhanced biodiversity, leading to the development of a better lifestyle for the population living in urbanised settings. Therefore it is clear that the incorporation of these spaces is essential for the future security of Indian cities. This work acknowledged the significance of these green spaces as respiratory machinery of urban areas, leading towards secure and comfortable living for the population in cities ensuring urban sustainability.

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Rishav Rawal[1] (*rawalrishav1@gmail.com*) **and Neha Bisht[2]**
DSB Campus, Kumaun University Nainital, Uttarakhand

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भारत विविधताओं का देश है जो अपनी संस्कृति, पहनावा और खानपान की बदौलत दुनिया भर में मशहूर हैं जिसके एक कोने से दूसरे कोने तक जाने में संस्कृति से लेकर भाषा और खानपान तक सब बदल जाता है। जहां एक ओर यह अपनी विविधता के लिए प्रसिद्ध है वही दूसरी ओर यह "अतिथि देवो भवः" अर्थात मेहमान भगवान का रूप है, को आत्मसात कर मेहमानों को घर पर बुलाना और उनकी सेवा करने में बड़ा सम्मान महसूस करता है। बदलते दौर और समय के चकाचौंध की सभ्यता में होटलों में ठहरने में यह सम्मान महसूस नहीं होता है। इसी को ध्यान में रखकर उत्तराखंड सरकार ने उत्तराखण्ड पर्यटन विकास परिषद् अधिनियम की धारा 8 की उपधारा 2 के खण्ड (क) के अधीन राज्य में पर्यटन को बढ़ावा देने एवं स्वरोजगारोन्मुखी योजना को कार्यान्वियत करने के लिए दीनदयाल उपाध्याय गृह आवास होम स्टे विकास योजना नियमावली को स्वीकृति प्रदान कर राज्य में होम स्टे योजना की शुरुआत की है। होमस्टे में बंगले से लेकर एक झोपड़ीनुमा मकान तक उपलब्ध है जिसका चयन अपनी आवश्यकता और सुविधा के अनुसार किया जा सकता है।

gkseLVs;kstuk dk dkmís; &
स्थानीय लोगों को स्वरोजगार से जोड़ना और उनके जीवन स्तर को सुधारना
राज्य में पर्यटन को बढ़ावा देना
स्थानीय रोजगार सृजन कर पलायन रोकना
राज्य में 10000 होम स्टे विकसित करना
राज्य की संस्कृति और शैली को बनाए रखना
पर्यटको को राज्य की धरोहरों और पारंपरिक पहाड़ी शैली, खानपान से परिचित कराना।

gkseLVs;kstuk dh ग्रhdrk&
उत्तराखण्ड का निवासी होना अनिवार्य
होम स्टे योजना नगर निगम क्षेत्र को छोड़कर संपूर्ण प्रदेश में लागू
होम स्टे योजना के तहत भवन का पंजीकरण कराना
होम स्टे भवन में मकान मालिक का अपने परिवार के साथ स्वयं रहना अनिवार्य
पर्यटकों के लिए 1-6 कमरों की व्यवस्था
पारंपरिक पहाड़ी शैली में निर्मित भवनों को प्राथमिकता

होम स्टे योजना के फायदे
होम स्टे योजना में घर का नवीनीकरण करने के लिए पात्र आवेदकों को बैंक लोन हेतु सरकार से मदद
होम स्टे से आमदनी पर शुरुआती तीन साल तक राज्य कर की धनराशि की भरपाई विभाग द्वारा
होम स्टे योजना के प्रचार प्रसार के लिए अलग वेबसाइट और मोबाइल एप विकसित
होम स्टे संचालकों को आतिथ्य सत्कार का प्रशिक्षण
पुराने भवनों के आधुनिकीकरण, साजसज्जा, अनुरक्षण एवं नए शौचालयों के निर्माण उपयोग परिवर्तन की आवश्यकता नहीं
पर्यटक स्थलों को विकसित करने के लिए ईको टूरिज्म विंग का गठन

gVy cuke gkseLVs&
होम स्टे में पर्यटकों को कम कीमत पर ठहरने की सुविधा मिल जाती है
घर परिवार की तरह प्यार और वातावरण
अपनी इच्छानुसार सात्विक भोजन की सुविधा
पर्यावरण अनुकूल शान्त वातावरण

स्थानीय पर्वों और संस्कृति से जुड़ने में महत्वपूर्ण सुरक्षा की दृष्टि से भी इन्हे सहज माना जा सकता है उत्तराखंड में होम स्टे योजना तेजी से भी विकसित हो रही है। उत्तराखण्ड पर्यटन विभाग के अनुसार उत्तराखण्ड में अभी 5316 होम स्टे रजिस्टर्ड हैं। इनके माध्यम से जहां पर्यटक स्थानीय संस्कृति व खानपान से रूबरू होते हैं वहीं स्थानीय युवाओं को रोजगार भी मिलता है और पलायन व बेरोजगारी दूर होती है। पर्यटन सीजन में पर्यटकों की भारी आवाजाही के कारण जब होटल फुल हो जाते हैं और पर्यटकों को असुविधा होती है ऐसे में होम स्टे ही पर्यटकों का सहारा और इस कड़ी में मील का पत्थर साबित होते हैं। सरकार भी विभिन्न योजनाओं के माध्यम से पलायन रोकने के लिए व क्षेत्र में ही रोजगार मुहैया कराने के उद्देश्य से होम स्टे को और सुदृढ़ बनाने के लिए प्रयासरत है। यही नहीं पर्यावरणीय दृष्टि से पर्यटक स्थलों को विकसित करने के लिए ईको टूरिज्म विंग का गठन किया गया है। गौरतलब है कि प्रधानमंत्री नरेन्द्र मोदी भी उत्तराखंड में चल रही होम स्टे योजना की सराहना कर चुके हैं। सरकार की इस पहल से जहां स्थानीय और दुर्गम क्षेत्रों के लोगों को रोजगार मिल रहा है और पर्यटकों को रहने के लिए कम कीमत में एक बेहतर ठिकाना मिल रहा है। उत्तराखंड के पर्वतीय जिलों में होम स्टे से जुड़कर यहां के स्थानीय युवा स्वरोजगार को अपनाने के साथ ही पर्यटकों को उचित सेवा भी दे रहे हैं जिससे उत्तराखंड के दुर्गम इलाकों के लोगों की आजीविका पर सुधार आया है और सीजन में स्थानीय लोग अच्छा रोजगार और आय अर्जित कर रहे हैं और इस व्यवसाय की मांग मार्केट में बहुत अधिक होती जा रही हैं।

उत्तराखण्ड टूरिज्म वेबसाइट
नवभारत टाइम्स समाचार पत्र
अमर उजाला समाचार पत्र
दैनिक जागरण समाचार पत्र
हिन्दुस्तान समाचार पत्र

egskpUæ lrh (mahesh.sati@gmail.com)
गो.ब.प. राष्ट्रीय हिमालयी पर्यावरण संस्थान, कोसी कटारमल, अल्मोड़ा, उत्तराखण्ड