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Mapping stakeholders in the development of eco-cities: Insights from Nepal and Indonesia

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Abstract

Urban areas are dynamic and intricate, encompassing various social, economic, ecological, and cultural aspects. It's crucial to employ effective approaches and management methods to achieve sustainable urban development. Stakeholder analysis is pivotal in understanding their roles and responsibilities in this process. By analyzing potential stakeholders and their responsibilities, enhances achieving development goals. This paper uses 'solid waste bank' and 'socio-cultural water management approach' case of Surabaya, Indonesia and Lalitpur, Nepal respectively. The challenges stakeholders face when implementing have been studied and mapped. Additionally, the significance of stakeholders in implementing development plans and policies has been reviewed through relevant journals and reports, considering the current cases of solid waste management and water management only. The mapping of stakeholders' problems and prospects revealed that none of the stakeholders had low influence and low importance in both Nepal and Indonesia. This finding suggests that further studies could explore other relevant aspects of the stakeholder dynamics that could contribute to developing eco-city in both the countries. Also mapping, synthesizing both situation and stakeholder of other practices, and upgrading the practices as well may help achieve eco-city, which is unique, inclusive and has the contextual flavors.

Keywords: Eco-city; Development; Stakeholders; Surabaya; Lalitpur

1. Introduction

With the growing population and increasing concerns about the environment, there is a challenge in making settlements more sustainable [1,2]. Resilient and sustainable cities offer a comprehensive approach to planning for the future, bringing together academic knowledge and practical innovations to address the city as a holistic system [3,4] which is at the forefront of the minds of many urban planners, designers, academics, and government officials [1]. Eco-city incorporate sustainable urban structures and transportation systems, are vital in achieving this [5, 1] but not limited as seen in the figure 1 below. On the other hand, the success of eco-city development depends on the involvement of stakeholders and their perceptions (ibid). Understanding stakeholders' responsibilities is crucial to ensure an eco-city's development process, as their interests may sometimes lead to conflicts [6,7,8]. Conflicts such as between developers and environmental activists regarding the use of land or the preservation of natural resources [9,10] and conflicts between residents and city planners regarding the allocation of public spaces or the impact of new infrastructure projects [11] are some of the common. In both Surabaya and Lalitpur, there are different groups of people having important roles in making the eco-city a reality. Surabaya focuses on demonstrating how to manage solid waste effectively, while Lalitpur emphasizes the importance of traditional water management. The stakeholders include government agencies, local communities, and environmental organizations. So, the paper studies the efforts of these stakeholders in both places, to learn valuable lessons and adopt steps from each other. This exchange of knowledge can greatly contribute to the individual goals of both countries in building eco-friendly cities. In this study Surabaya and Lalitpur shows the best practices and innovative approaches in managing solid waste and water respectively.

2. Towards building an eco-city

When it comes to the development of an eco-city, the role of both water management and solid waste management is crucial [1]. Proper management of water resources, including conservation, efficient distribution, and sustainable use, are essential for creating a sustainable and resilient urban environment. Additionally, effective water management systems, such as maintaining, repairing, and recycling, play a significant role in minimizing pollution and preserving water quality. That again focuses on ensuring the eco-city development priortizing sustainable water and solid waste management practices and contributes to the overall well-being of the community.

In the late 19th century, developing green cities was seen as a simple solution to simple problems. Simple technology and decentralized policies were considered the most applicable approaches to building eco-cities. This perception was more prevalent in the earlier stages of sustainable urban planning, particularly in the late 20th century. During that time, there was a focus on basic technologies and decentralized policies as the most applicable approaches to building eco-cities [13].

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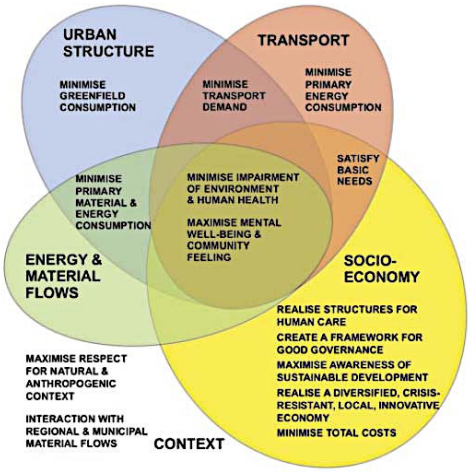

Figure 1: Four elements that form the city system: a general framework to understanding the city's internal function (adopted).

According to Mersal [12], in an eco-city the four elements that form the city system provide a framework for understanding how the city functions internally while focusing on sustainability. The physical infrastructure element involves designing eco-friendly buildings, efficient transportation systems, and green spaces. The social fabric element emphasizes community engagement and creating a sense of belonging. The economic activities and systems element focuses on promoting green businesses and sustainable industries. Lastly, the governance and administration element involve effective urban planning and implementing policies to encourage sustainable practices. By considering these elements, an eco-city can achieve a balance between environmental, social, and economic aspects, creating a sustainable and thriving urban environment.

However, the understanding of sustainability has deepened, and urban challenges have become more complex, the approach to eco-city development has become more sophisticated and comprehensive. In 1975, experts and environmentalists came together to discuss concepts related to eco-cities in urban areas [13]. The successful implementation of eco-cities in urban areas depends on three main aspects: policy, environment, and stakeholder involvement where these aspects also support environmentally friendly economic development in cities [14,15]. The environmental aspect, which is the most important, includes indicators such as water quality, green building and energy, solid waste management, transportation, air quality, land use, parks and open spaces, and environmental health [13,14,15]. So, developing an eco-city concept can encounter challenges like navigating the political landscape in policymaking, managing overlapping responsibilities among stakeholders, adapting to dynamic changes in the natural environment, and addressing the diverse preferences of local communities in constructing an environmentally friendly city, commonly referred to as an 'eco-city'.

Study Area

In today's rapidly evolving world, developing nations such as Indonesia and Nepal face the challenge of achieving sustainable development while avoiding the pitfalls of haphazard growth. This research study delves into the unique case of these two nations, examining stakeholders' crucial role in contributing, guiding, and shaping the eco-city development process. Urbanization in Nepal has been on a constant rise, with a continuous increase in recent years [17] leading to the continuous conversion of agricultural land for non-agricultural or off-farm activities [18,19]. However, the growth has mainly been unplanned, resulting in a lack of basic infrastructure and services for the population. Lalitpur is situated in the Lalitpur district, which is one of the 77 districts in Nepal. It falls within the Bagmati Province (see figure 3) and shares borders with Makwanpur, Bhaktapur, Kathmandu, and Kavre. Lalitpur is renowned for its exquisite handicrafts, particularly its metalwork and woodcarving. The district also celebrates various traditional festivals. Its surrounding areas are experiencing rapid expansion, with numerous settlements sprouting up on the outskirts. In Lalitpur, the engagement of various stakeholders in the traditional management of water supply infrastructure is studied. The stakeholders involved include the local government, private entities, experts, individuals, and community in the improvement of Lalitpur. The celebration of Sithi, involves cultural practices related to water conservation and cleaning water reserves, exemplifies this sustainable and eco-friendly approach.

Surabaya, the second largest city in Indonesia, is a vibrant and dynamic center for business, commerce, and industry. It occupies a strategic location on the northern coast of Java Island, which has played a crucial role in its development as a major trade hub. Surabaya's geographical position has enabled it to become a bustling center for trade traffic between the islands in eastern Indonesia (see figure 2). This has not only facilitated economic growth but also fostered cultural exchange and diversity in the region. While in Surabaya, Indonesia, the development of an eco-city is centered around going green [20]. The study focuses on the steps taken by various stakeholders to conserve green open spaces and implement Surabaya's Green City Master Plan (GCMP). The case of Surabaya Indonesia shows the overlapping responsibilities among stakeholders, adapting to dynamic changes in the natural environment, and addressing the diverse preferences of local communities. By including a diverse range of stakeholders, the study aims to gather insights and perspectives from both the countries in addressing the city's urban development challenges as well as marching towards being an eco- city.

3. Method

This paper is to understand and analyze the efforts and roles of different stakeholders in Surabaya and Lalitpur in building eco-friendly cities through cases of traditional water management and solid waste management. By studying these stakeholders, the paper aimed to uncover valuable lessons and steps that can be adopted from each other. The exchange of knowledge and best practices between Surabaya and Lalitpur can contribute to the individual goals of both countries in achieving sustainable urban development. Additionally, the study explores the importance of involving various stakeholders in the eco-city development process and examines the challenges that may arise between policymakers, community preferences, NGOs, and local governments. Given that background the methodological tools used is mapping stakeholders and analyzing them based on the roles and responsibilities of the respective stakeholders. In both the case of Surabaya and Lalitpur the stakeholders considered are local government, NGOs, private sector, academician, expert and individual as community. Surabaya's focus is on the implementation approaches and stakeholders in the solid waste bank, while Lalitpur's emphasis is on the same set of stakeholders but for wastewater management and traditional water conservation methods that are currently overlooked and declining. The study used mapping stakeholders as a cognitive process and explored it in this context the structural similarities between stakeholders despite the work arena being different. The studies for the case of solid waste bank in Surabaya and water management in Lalitpur gathers data from various sources such as journals, project reports, and research reports. After map-

Figure 2: Surabaya City Area, East Java, Indonesia.

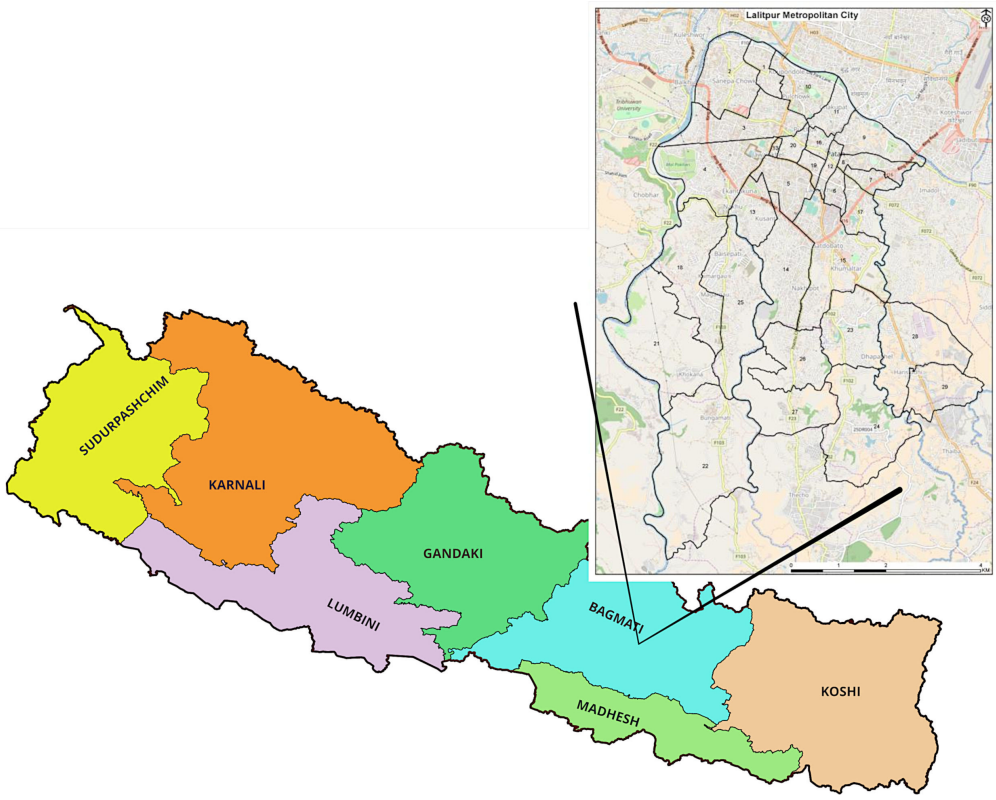

Figure 3: Lalitpur Metropolitan City, Bagmati Province, Nepal.

ping the stakeholder analysis was employed to map stakeholder involvement and contribution levels in the implementation process. Stakeholder analysis has involved understanding their perspectives, interests, influence, and importance on the initiatives of both Surabaya and Lalitpur [21].

4. Findings and discussion

4.1. Addressing environmental issues

Surabaya is striving to become an eco-city; important management aspects, especially in infrastructure, are directly linked to environmental challenges [22,23]. It is known with the increasing population in Surabaya, the city is experiencing a rise in waste generation as well [24]. The demographic being directly correlated to the amount of waste produced in the city. The government has implemented solid waste banks in various locations throughout the city since 2009 [23]. Surabaya's 'waste bank initiative' [24] can be taken as a significant step towards achieving the objectives of becoming an eco-city. The city is walking on the pathways of sustainability, promoting a cleaner environment, and contributing to the overall vision of an eco-friendly urban landscape. This very initiative of waste bank was first supported by the "low-carbon management" approach under the Surabaya Green and Clean City program [22,23]. This initiative focuses on improving waste management, creating green open spaces, promoting renewable energy, and implementing sustainable transportation practices. Meanwhile in Nepal, Lalitpur City is one of the oldest planned settlements of its time, with a close-knit community and compact housing. The surrounding land was designated for agriculture, [26] as it was low-lying, fertile, and suitable for irrigation which is now at a faster rate of conversion [18,19]. Despite the rapid urbanization, migration, and modernization happening in Lalitpur, it's truly remarkable to witness the continuation of age-old practices among the local people. One such practice that holds great significance in the context of building an eco-city is the festival called Sithi [26]. This vibrant celebration takes place around the month of May and is widely practiced by the Newar communities who are deeply involved in agriculture. During the festivities, there is a strong emphasis on preserving the urban water facilities as a way of honoring their ancestors, known as Dewali (ibid). This tradition spans the entire month, allowing the community to come together and engage in the meticulous process of cleaning and maintaining crucial water sources such as wells, waterholes (kuwa), ponds, and drainage ditches (ibid). The collective effort put forth by the community to conserve these traditional water supply and outlet systems serves as a commendable step towards achieving the parameters of an eco-city. It showcases the harmonious integration of cultural practices with modern environmental goals, fostering a sustainable and an eco-friendly future for Lalitpur.

4.2. Mapping stakeholders' engagement

4.2.1. Surabaya Indonesia

In the context of the solid waste bank initiative for waste management in Surabaya, the responsibility for solving environmental problems primarily lies with the local government [24]. However, the active involvement of local communities and private sectors play a crucial role. The solid waste bank initiative in Surabaya focuses on managing waste by encouraging residents to deposit their recyclable materials in designated collection points. These collection points, often operated by local communities or private sectors, serve as "banks" where the recyclables are collected, sorted, and processed for recycling purposes [22,25]. By actively involving local communities and private sectors in this initiative, the burden of waste management is shared, and it becomes a collective effort to create a cleaner and more sustainable environment. The local communities play a vital role in promoting awareness, encouraging participation, and ensuring proper waste segregation, while the private sectors contribute their expertise and resources to efficiently process and recycle the collected materials [23]. Together, the local government, local communities, and private sectors form a collaborative approach to address waste management in Surabaya, fostering a sense of ownership and responsibility among all stakeholders involved. This multi-stakeholder approach can be taken as an essential step for the success and sustainability of the solid waste bank initiative in Surabaya City. From the context of implementing the solid waste bank initiative, the successful execution relied on effectively mobilizing the stakeholders [22,24]. So, it's essential to recognize and appreciate the importance and influence in the process as shown in Table 1. A comprehensive situation analysis of the stakeholders has been done based on the literatures (see Table 1) where the respective strengths, as well as the challenges are put together in understanding the dynamics of their relationships. The insights of how they interact and collaborate has shown the stakeholder's engagement may be scaled or develop strategies that leverage the strengths of each stakeholder while addressing any potential issues and finally achieving the eco-city development or any environmental development goals. The analysis enabled to foster a cooperative and coordinated approach, leading to the successful implementation of the solid waste bank initiative not such in Surabaya but can be replicated in other places with similar context (see Table 1).

4.2.2. Lalitpur, Nepal

The cultural practices as 'sithi' aim to meet goals and objectives, from the more excellent vision to the fundamental implementation of projects and eco-friendly practices. The plans, in documents, maps, figures, and texts, reflect the current situation and guide future development. Local government as 'municipality' plays a significant role in planning, and implementing the most minor unit level along with the informed and inclusive participation from the people. Similarly, the possible responsibilities of the National Planning Commission and the provincial government may seem similar when it comes to supporting cultural practices like 'Sithi.' However, there are some differences in their roles and areas of focus such as the National Planning Commission may play a role in formulating national policies and guidelines to ensure the preservation and promotion of cultural practices related to urban water management and cleaning water reserves whereas the provincial government may have a more hands-on role in coordinating and implementing initiatives, projects, and programs related to cleaning water reserves within their specific province along with the local level and not limiting to the Newar communities.

Table 2 provides an overview of the existing planning institutions of Nepal and their respective responsibilities. Additionally, it also provides what kind of role could they have keeping in mind the cultural practice led initiatives in the urban water management. This table simplifies the hierarchy of government and their roles in implementing environmental initiatives and achieving the goals of an eco-city from the case of Lalitpur revolving around the cultural practice of celebrating Sithi. The situation analysis (Table 3) of the cultural practices of Sithi in Lalitpur indicates within the context of achieving eco-city goals, there exists an opportunity to integrate and enhance these practices as part of an eco-city development and environmental conservation efforts. By incorporating the cultural practices of Sithi into the eco-city framework/ strategy, not only Lalitpur can march towards being an eco-city but others similar cities in Nepal, Indonesia and outside can implement. On the other

Table 1: *Matrix for accessing the current scenarios of development in Surabaya.*

Stakeholders	Problems	Prospects	Importance level	Influence level
1. Local Government	Local government possesses significant authority but not effectively utilizing their power according to their capabilities. The development of eco-cities still focuses on specific sectors rather than being holistic.	Setting policies and guidelines. Effectively managing and coordinating all stakeholders involved in eco-city development. Monitor and evaluate the progress of development initiatives, such as waste management, to ensure their effectiveness and success. Facilitating collaboration with other institutions or companies for seamless cooperation.	High	High
2. Community	Sociocultural and lifestyle variations i.e. areas of high population density and limited space, there may be a greater emphasis on efficient waste collection and disposal systems (implementation of recycling programs, waste segregation at the source, and the establishment of waste-to-energy facilities) whereas in the rural communities the focus might be on promoting awareness and education about the proper disposal of non-biodegradable waste, encouraging reuse, and reducing the use of single-use plastics. Limited awareness regarding eco-city and its parameters.	Communities with higher levels of education are only more receptive to learning about eco-city development, tailored to the specific needs and interests of different communities.	High	High
3. NGOs	The members of NGOs often consist of political actors who have a dominant role in decision-making for eco-city development rather than local or scholarly individuals. Above could have an influence of political agendas rather than the environmental ones.	Involving the local communities in the process. Making the implementation of the eco-city concept ideal. Educating the local people to protect the environment.	Low	High
4. Private Sectors	Variances in private sector policies adopted by companies in eco-city implementation. Lack of government coordination in leveraging the strengths of private sectors for an eco-city.	Funding assistance. Training and development of local people through CSR (Corporate Social Responsibility) management.	Low	High
5. Academic research and universities	Sometimes, it lacks the authority to make decisions at the governmental level. Additionally, there is often a lack of integration in approaches and ideas for implementing eco-city development.	Finding innovative ideas or approaches for eco-city development can involve collaborating with academic consortium. Additionally, becoming an academic consultant for the local government can help ensure effective and efficient decision-making processes.	Low	High

Table 2: *Existing planning institutions with their existing and possible responsibilities.*

Different planning domain	Existing responsibilities	Possible responsibilities in reference to the cultural practices 'Sithi'
1. National planning commission/ ministries	• National/ strategic/ economic plan	• Recognize the cultural practices of Sithi as valuable assets and document them to preserve their knowledge and significance for future generations. • Incorporate the cultural practices of Sithi into national policies and plans, specifically those related to eco-city development and environmental conservation.
2. Provincial government	• Regional/ structural plan/ Land use and zoning	• Resource allocation • Collaboration and coordination • Prioritize education and awareness initiatives to ensure that residents within the province have a good understanding of Sithi's cultural practices
3. Local Government	• Implementation of all the planning norms, standards/ byelaws • Neighborhood planning and master plan of development projects/ integrated action plan	• Incorporate cultural education into school curricula, offering workshops and training programs, and encouraging cultural exchanges and interactions. • Support and promote it can collaborate with local artists and cultural organizations to showcase and preserve this unique cultural practice. • Establish partnerships with environmental non-governmental organizations (NGOs) that specialize in water conservation and sustainable practices.

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hand, this integration also preserves the cultural and practices of the people of the people and the place while contributing to the overall environmental well-being of the city.

Based on the individual mapping matrix of Surabaya and Lalitpur, it hints that every stakeholder holds importance and influence in the development of eco-cities. This means that no stakeholder is considered to have low significance or lacks the ability to make an impact in the development process. The mapping matrix likely highlights the recognition of the diverse roles and contributions that each stakeholder can bring to the table. It emphasizes the collaborative nature of an eco-city development, where all stakeholders are valued and have the potential to shape positive change. In the process of implementing government policies for the eco-city development, conflicts of responsibilities and interest between stakeholders can indeed arise. These problems may occur when different stakeholders have varying priorities, interests, or perspectives. For example, let's say there is a situation where a government is formulating policies related to waste management in an eco-city. Environmental NGOs may advocate for stricter regulations and more sustainable waste management practices, while businesses may be concerned about the potential costs and impact on their operations. In such cases, there can be a tendency to overlook accommodating all stakeholders' perspectives in the agreement letter, even if they have participated in the meetings. This can happen due to various reasons, such as time constraints, differing priorities, or challenges in finding common ground. From the mapping matrix of both the countries, it's important for stakeholders to engage in open and constructive dialogue to implement, address problems (if any) and find mutually beneficial solutions. By actively involving all stakeholders in the decision-making process and considering their perspectives, it becomes more likely to achieve a balanced and inclusive approach to the eco-city development. Based on the stakeholder mapping matrix above in Lalitpur the private sector plays a significant role in the effectiveness of eco-city outcomes. This also suggests that the need of community's awareness and engagement are a central focus in both the design and implementation strategies. On the other hand, in Surabaya Indonesia, community and private sector groups have a strong presence and contribute to the effectiveness of development projects, particularly in terms of corporate social sustainability. The mapping aligns with the general understanding that different countries may prioritize different stakeholders based on their unique contexts and goals. However, it's important to consider the local dynamics and engage various stakeholders to ensure the overall success and sustainability of the eco-city development projects.

4.2.3. Initiatives and management

Implementing new management methods and solutions is crucial for developing successful eco-cities. While achieving an eco-city may not meet all parameters or indicators, it can still be accomplished by focusing on specific aspects. For example, in Curitiba, Brazil, they implemented efficient public transportation systems and prioritized the creation of green spaces. And in Freiburg, Germany, they have been known for their sustainable building practices and renewable energy sources. They reflect of how different cities have targeted specific areas for the eco-city development. In the case of Lalitpur, it's important to consider factors like water management, water conservation, and promoting sustainable practices in urban planning. By addressing these areas, Lalitpur can make significant progress towards becoming an eco-city. Collaborating with private sectors and seeking expert guidance can greatly enhance the cultural practice of reviving the water infrastructure in Lalitpur and contribute to the sustainability of eco-city initiatives. Another effective strategy is fostering public-private partnerships, where the government works closely with private sectors in urban areas. This integrative approach can have a positive impact on the eco-city development by leveraging the community and increasing their sense of ownership. It is important to involve the private sector and seek expert guidance as they bring valuable resources, knowledge, and innovation to the table. Lalitpur and Surabaya have great potential to become eco-cities, with Indonesia and Nepal already showcasing some eco-city characteristics based on the experiences of the solid waste management through 'waste bank' and 'cultural water management'. However, there is room for improvement to ensure that Lalitpur and Surabaya become environmentally responsible livable cities. Implementing effective policies and governance is crucial in creating these eco-cities and achieving sustainable development. By prioritizing environmental sustainability and considering the needs of the community, Lalitpur and Surabaya can pave the way for a more sustainable and eco-friendly future. The strategies mentioned above are not exclusive to NGOs but involve all relevant stakeholders. It's important for various entities, including NGOs, government agencies, private sectors, and community representatives, to work together in identifying stakeholders, conducting workshops, updating development goals, mapping existing developments, preparing response plans, and organizing educational workshops. By involving all stakeholders, we can foster understanding, raise awareness, and ensure effective collaboration for the successful development of an eco-city. It's not just about having good initiatives, but also about effectively managing them. When it comes to developing eco-cities, conflicts among stakeholders are common, especially in urban areas. Each stakeholder has their own unique vision and ideas for how the eco-city should be built. It's important to consider stakeholders' perspectives based on their responsibilities and find ways to collaborate and address these conflicts. Fostering understanding and promoting effective communication, can work together to find common ground and create a sustainable future for our cities towards the development of eco-cities. Further research could be done in analyzing the conflicts among stakeholders using one theory or a combination of them because considering the different perspectives and finding ways to collaborate and address these conflicts is essential.

5. Conclusion

Based on the research and analysis conducted in this paper, the conclusion is that stakeholder engagement and collaboration are crucial for achieving sustainable urban development and eco-city initiatives. By mapping and understanding the roles, responsibilities, and challenges of stakeholders, further studies can be done in the areas of improvement and develop strategies to address them. The cases of Surabaya and Lalitpur provide valuable insights while linking cultural practices of water management in Nepal which when realized and upgraded can help achieve ecocity parameters. Likewise, in Surabaya the operation of the waste bank respectively. Moving forward, it is essential to continue exploring and upgrading stakeholder practices while considering the unique characteristics and needs of each city. This will contribute to the development of eco-cities that are not only environmentally sustainable but also socially inclusive and culturally relevant.

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