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Nexus approach in urban planning

Case study: Mauritius

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ABSTRACT

With growing urbanization trends, cities are facing numerous challenges and are the most vulnerable to climate change. In order to promote sustainable cities and communities, it is important to adopt a holistic and integrated approach. The Urban Nexus, which is a relatively recent concept, is an approach to sustainability that seeks to integrate sectors and silos in the design and development process. This paper will look at cities, through a literature review, which have already adopted this approach and show the benefits of implementing an Urban Nexus. The weaknesses of the planning framework in Mauritius will then be assessed through a qualitative survey carried out among the major stakeholders in the sector. Recommendations will then be proposed on how to overcome the weaknesses identified by implementing an Urban Nexus in the local context. It was observed that the adoption of an Urban Nexus approach, where all stakeholders, including the citizens, would work in collaboration would be very beneficial in the building of more resilient and sustainable cities in Mauritius.

Keywords:

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1. INTRODUCTION

The term "Nexus" in latin describes the act of tying together or something which binds. The concept was first mentioned in the context of resource management in 1980s, especially in connection with the UN University Food-Energy Nexus programme. The concept of nexus in urban planning is relatively recent. The Urban Nexus is an approach to sustainability that seeks to integrate sectors and silos in the design and development process. It is a means of integrating '*management and governance across sectors and scales*' (Hoff, 2011). This is in line with the SDG 11 – 'Sustainable cities and communities' and its goal 11: 'Make cities and human settlements inclusive, safe, resilient and sustainable'. This approach is very important in the Mauritian context to build sustainable and resilient cities. The objective of this paper is to understand the concept of Urban Nexus and to find means to implement the Urban Nexus in the Mauritian context. This paper will look at cities, through a literature review, which have already adopted this approach and show the benefits of adopting such a method. The weaknesses of the planning framework in Mauritius will then be assessed through a qualitative survey carried out among the major stakeholders in the planning framework. Recommendations will then be proposed on how to overcome the weaknesses identified by implementing an Urban Nexus in the Mauritian context. This will help in building more resilient and sustainable cities in Mauritius.

2. LITERATURE REVIEW

2.1 Role of urban areas and their hinterland

Cities and urban areas are vital in achieving the sustainable development goals as these are the economic centres in today's world. They account for 75% of global GDP. According to a report by the United Nations (2010), the ratio of urban populations rose from 13% in 1900, to 29% in 1950, to 50% in 2009, and it is projected to be 69% in 2050. The world's population is urbanising more rapidly than any time in human history [Sperling, 2014]. This trend will continue as urbanisation brings many benefits, such as diversity, market efficiency, jobs, education, and health improvement (Christopher, 2008; Glaeser, 1998). Urban areas depend a lot on their rural hinterland for the resources needed for the inhabitants –water, food and even for their energy supply. However, these sectors are more often than not viewed separately, in silos. If providing for these new demands is managed in an unsustainable manner and without considering interconnections, outcomes may be increased instability, conflict, resource scarcity, environmental damage, and climatic change (Bizikova et al (2013) & World Economic Forum (2011)). In response to these challenges (Brugmann et al, 2014), a more collaborative and holistic approach is required to meet the requirements of cities in order to develop better integrated approach to city management. The interconnections between rural and urban areas need to be addressed through a nexus approach. Building partnerships can enhance rural-urban linkages and are an effective way to encourage economic development and environmental sustainability in both the urban and rural areas.

2.2 Urban Nexus approach

The Nexus approach is a means of integrating '*management and governance across sectors and scales*' (Hoff, 2011). The concept of Nexus applied in urban areas and cities can be considered to be relatively new. The term Urban Nexus comes from the Urban NEXUS project 2013-2014. This project was established to study, identify, and document the "*operationalisation of the NEXUS approach in cities and metropolitan regions.*" This approach was used as cities are complex systems in which all the parts and subsystems continuously interact. In addition, cities are the most vulnerable to climate change and are already experiencing its impacts, as well as disasters resulting from floods, droughts, landslides and other calamities. Decisions in one sector are increasingly understood as affecting the outcomes of the other sectors, and new research frameworks point to the need for enhancing data systems to quantify these interactions (Ramaswami et al. 2017). For example, a shift to urban agriculture creates opportunities to increase energy efficiency by reducing transport distances of food and pumping of water to cities, increase access to healthy foods in "urban food deserts" in poor neighborhoods where there is little to no fresh produce locally available, and reduce pressures on ecosystems services by recycling water and nutrients from wastewater in urban areas (Walker et al, 2014).

"*The Urban NEXUS is an approach which guides stakeholders to identify and pursue possible synergies between sectors, jurisdictions, and technical domains, so as to increase institutional performance, optimize resource management, and service quality*" (GIZ and ICLEI, 2014).

"*The Urban Nexus approach examines the interdependencies between water, energy and food/land and the synergies and competing uses of these resources, requiring a shift from a sectoral to a cross sectoral, integrated approach. It challenges existing structures, sector policies and procedures to promote the protection and use of water, energy and food/land in a balanced manner, countering traditional silo thinking and divided responsibilities that often result in poorly coordinated investments, increased costs and underutilized infrastructure and facilities. The Urban Nexus approach is an action-oriented guiding principle within the vision of a circular economy, where waste is viewed as a resource. Multi-sectoral and multilevel approaches which integrate resources contribute to improved resource efficiency*." (UNESCAP, 2019)

In order to build sustainable cities and communities, it is important to promote a good quality of life among the population as well as safeguarding the people's health. As cities continue to grow, it is important to build urban environments that are not only sustainable, but also ensure the wellbeing of their inhabitants. Building a Nexus community will be a major step in achieving sustainability in our towns and cities. Water, energy, and food security, affordability and accessibility to disadvantaged groups that often lack equitable access are all aspirations of an urban WEF nexus model, complementing "circular abundance" (Brears, 2015).

2.3 Case studies of Urban Nexus projects

With the rapid rise of urban population, cities around the world are increasingly looking for new ways of thinking and solutions to solve the growing challenges of food supply, water and energy management. An integrated approach was needed to facilitate decision-making in order to overcome the challenges faced by these cities. Coordination of programs and their plans across urban systems is essential to increase efficiency, reduce duplication, and avoid conflicts in supporting integration of the WEF sectors (Hopkins et al, 2016). However, existing "legacy" guidance systems that affect water,

food, and energy production and distribution are frequently "silo'ed" and solutions are considered independently of one another (Brugmann et al, 2014).

The Urban NEXUS project 2013-2014 was funded by the German Development Cooperation, GIZ on behalf of the BMZ) to develop the "Operationalisation of the NEXUS approach in cities and metropolitan regions", including a baseline study (GIZ and ICLEI, 2014), identifying and documenting existing good practices (case studies). This study was based on already existing examples of established concepts and practices of integrated planning. Several cities have embarked on the implementation of an Urban NEXUS approach to find urban solutions using a collaborative approach that integrates two or more systems, services, policy or operational "silos".

a. Curitiba in Brazil

Curitiba is considered to be an example of innovative urban planning to improve the quality of life of its citizens. The city is renowned for its 'Green Exchange program' where the city offered incentives such as a flat rate for all distances in exchange of waste, waste-for-transit (or food) employment program which lessened waste and bolstered social inclusion and health. Today 85% of residents use public transport and 70% of the city's residents recycle. Buses no longer in use are repurposed as mobile schools and work spaces (GIZ and ICLEI, 2014).

The city adopted the Urban Nexus programme in 2014. It encouraged stakeholders to work in an integrated and collaborative manner instead of in silos. A committee was created with the participation of the main stakeholders who were involved in each stage of the planning and development process in the city. This helped find solutions through comprehensive zoning to scale up jurisdictions, while re-integrating systems through the simultaneous design and implementation of water, drainage, sewerage and roads (GIZ and ICLEI, 2014).

b. Da Nang City, Viet Nam

Da Nang City is one of the fastest growing cities in Viet Nam, with a current population of more than one million.. In 2015, it had over 4.5 million visitors, and numbers are expected to continue rising in the coming years. However this expansion has led to increased pressure on its existing resources. As a coastal city, Da Nang also faces disaster risks associated with sea level rise, floods and typhoons. The wastewater collection system is inadequate, and this increases environmental risks including groundwater pollution and methane emissions. GIZ implemented a nexus project in collaboration with the Department of Planning and Investment. This project aimed to introduce an innovative wastewater management system to the city that can improve wastewater management as well as capture biogas to produce energy and supply fertilizer for agriculture. The Da Nang People's Committee established a Nexus Task Force to ensure institutional coordination in order to find solutions to these existing problems. Implementation of an innovative wastewater management system contributed to national and local climate actions while increasing the resilience of the city towards flooding risks (GIZ and ICLEI, 2014).

c. The 'Integrated Resource Management' in Asian Cities

The Urban Nexus' project is co-designed and jointly implemented by the United Nations Economic and Social Commission for Asia and the Pacific and GIZ (with funding from BMZ) and in partnership with ICLEI. The project supports twelve cities in seven countries, namely: China, India, Indonesia,

Mongolia, Philippines, Thailand and Viet Nam. These projects have been implemented in order to find solutions to existing problems in these cities by using innovative and collaborative methods to ensure the participation of all stakeholders (GIZ and ICLEI, 2014).

All these case studies show how cities in developing countries have adopted the Urban Nexus approach in order to promote sustainable development and to ensure the well-being of their inhabitants. This will help to build more resilient and sustainable cities and to promote the implementation of SDG 11. The government of Mauritius is thinking along the same lines in order to promote sustainable cities and communities in order to pave the way for the development of a sustainable island state.

3. THE MAURITIAN CONTEXT

Mauritius is a Small Island Developing State (SIDS) which covers an area of around 2000 km^2. The island is already urbanised to more than 50%. During the last years, about 33% of agricultural land has been converted to built-up areas (StatsMauritius, 2014). Planning as an "informal activity" related to the development of estates, town and villages has been the practice since colonisation in Mauritius (NDS, 2003). However, Planning as a formal responsibility of the government has been developed only since the enactment of the Town and Country Planning (TCP) Act in 1954. Therefore, urban planning can be considered to be quite recent although legislation for control of buildings, that is the Building Act and Building Regulations existed since 1919.

A survey was carried out in order to investigate the weaknesses of the Mauritian planning framework. Twenty face to face in-depth interviews were carried out with the main stakeholders (planners in the local authorities, planners from the main parent ministry and planners from the private sector) in order to understand the different perspectives of the main stakeholders in the decision making process.

The main weaknesses identified were the following:

- Some legislation are very old and outdated: example the Town and Country Planning Act of 1954
- Lack of resources available especially concerning the enforcement and monitoring of existing strategies and policies. Authorities are always short staffed or under equipped.
- The strategies of the master plan – the National Development Strategy Scheme, which promote sustainable development, are not implemented. This plan dates from 2003 and has still not been reviewed.
- Mismatch between strategic planning and implementation
- There is a fragmentation of legislation and authorities as there are too many authorities involved in urban planning and development control. This is a drawback in implementation and enforcement of policies.
- Legislations relating to planning and development control exist but there is a lack of follow up in the implementation and enforcement mechanism due to a lack of resources and technical know-how.
- There is a lack of participation of the population due to the top-down approach.
- The different authorities work in silos as there is a lack of holistic approach and harmonisation.

The main issue identified is that there is not a holistic land use planning in the Republic of Mauritius and if there was an integrated land use planning it was going to be an effective tool for the betterment of the quality of living of the citizens.

4. IMPLEMENTATION OF AN URBAN NEXUS IN MAURITIUS

An integrated approach is vital to the implementation of the goals and targets of the SDGs and the 2030 Agenda. The adoption of an Urban Nexus approach, where all stakeholders, including the citizens, would work in collaboration would be very beneficial to the land use planning framework in Mauritius. Implementation an Urban Nexus approach can bring about positive changes in the Mauritian planning framework, namely:

a. Residents and other stakeholders are encouraged to enact and to maintain positive changes in their cities and communities by looking at resources differently. For example, in Nashik, India city planners encouraged city officials and residents to make positive changes that are sustainable in the long term. This Urban Nexus project allowed them to conclude that interdepartmental planning is crucial for success, especially when getting the public involved (GIZ and ICLEI, 2014).
b. The bottom-up approach can be promoted with the collaboration of all stakeholders so that the population can be involved in the decision process
c. There would be better coordination and collaboration between the national government and the local authorities. Local governments can be encouraged to identify potential areas of implementation for the urban nexus.
d. Capacity building and training should be provided to staff of local authorities. Local project planners and engineers are key actors in selecting technological solutions. Their capacities can be boosted to ensure they understand what technologies provide nexus solutions and how these can be effectively implemented.

4. CONCLUSIONS

Cities will continue growing due to the benefits they offer and it is very important to create and develop sustainable cities. The urban nexus approach can help develop solutions in the Mauritian context as it involves identifying, understanding and acting on interrelationships among urban stakeholders and sectors. This approach will enable authorities to overcome the weaknesses of the framework and to work in a holistic and integrated manner. Urban nexus has the potential to provide cost-effective, environmentally friendly solutions which are sustainable, while generating benefits for multiple sectors. Promoting the nexus approach between urban sectors can contribute to global, national and local climate mitigation targets and strengthen adaptive capacity and resilience of cities to cope with climate change and, more generally, can contribute to sustainable development and ensure that SDG goals are met.

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7. KEY TERMS AND DEFINITIONS

Sustainable cities: it is a city that minimises the inputs and outputs

Sustainable community: A sustainable community manages its human, natural, and financial capital to meet current needs while ensuring that adequate resources are available for future generations

Urban nexus: *The Urban Nexus approach examines the interdependencies between water, energy and food/land and the synergies and competing uses of these resources, requiring a shift from a sectoral to a cross sectoral, integrated approach*

Integrated approach: an approach taking into consideration aspects closely connected with the complex nature of the cities and communities