

**Revitalizing Urban Spaces: A Comprehensive Design Framework for Riverside
Development in Adama, Ethiopia.**



Addisu Tesfaye Bune

A thesis Submitted to the department of Architecture
Collage of Civil Engineering and Architecture

Office of Graduate Studies
Adama Science and Technology University

June, 2025
Adama, Ethiopia

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Declaration

I declare that this thesis/dissertation entitled “Revitalizing Urban Spaces: A Comprehensive Design Framework for Riverside Development in Adama, Ethiopia.” is my own work and has not been submitted to any university for similar purpose. The references used in this thesis are duly recognized by proper citations.

Name of the student

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I hereby certify that the recommendation and suggestion given by the proposal review committee are appropriately incorporated into the final thesis/dissertation entitled “Revitalizing Urban Spaces: A Comprehensive Design Framework for Riverside Development in Adama, Ethiopia.” By Addisu Tesfaye Bune

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Approval of Board of Reviewers

We, the undersigned, members of the Board of Reviewers of the thesis open defence by Addisu Tesfaye Bune have read and evaluated the thesis/dissertation entitled “Revitalizing Urban Spaces: A Comprehensive Design Framework for Riverside Development in Adama, Ethiopia.” And assessed the understanding of the candidate about the proposed research. This is, therefore, to certify that the thesis/dissertation is accepted and we recommend the implementation of the thesis. -----.

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Abstract

This research develops a comprehensive design framework to revitalize urban riverside in Adama, Ethiopia, which undergoes rapid urbanization has created significant transformation of the riverside areas through pollution, flooding, and lack of pedestrian infrastructure to access the area. These conditions have reduced public spaces, diminished walkability, and contributed to social inequities. This research applied an active design framework for the revitalization of urban spaces along rivers, with a specific focus on riverside pathways and adjacent areas. The general objective is to develop an integrated urban design that enhances the riverside areas and promotes pedestrian accessibility with in them, safety, and community engagement, thereby improving the overall quality of urban life in Adama. The study used a mixed-method approach. Geospatial mapping was used to describe flood risks, and connectivity inconsistencies throughout a 5.3-km riverside corridor; surveys were utilized as a tool to collect perceptions from 86 stakeholders (residents, business owners, and government officials), and standard inclusion methods of focus groups and interviews were used to better define the community's needs. Environmentally: The use of bioswales and permeable pavements resulted in 45% less flooding while the canopies of native trees resulted in lower temperatures in local areas. Socially: There was a 50% increase in pedestrian activity in the areas with dedicated sidewalks and solar light fixtures; and also, 89% of local residents in the surrounding area preferred spaces that incorporated some motifs relating to the Oromo people. Economically: The vendors revenue increased by 30% in proximity to the dedicated sidewalks showing the commercial benefit of the spaces and the opportunity to create synergies. This process not only enabled the revitalization of degraded areas, turning them into vibrant and resilient corridor, but it also offered a framework and an avenue for cities such as Adama, Ethiopia to develop a replicable, was to undertake urban design that balances ecological restoration with social equity and economic viability through community-led, context-sensitive urban design.

Key word: Riverside Revitalization, Flood Mitigation, Accessibility, Community Engagement

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CHAPTER ONE

Introduction

1.1. Background of the research

Urbanization is a Global force which impacts cities all over the world, and in Ethiopia, it is particularly felt with an overwhelming increase in population and booming economy. Adama, in the Oromia region, serves as an example of this phenomenon and has seen remarkable population growth and spatial development over the last few decades. Adama is one of the fastest growing cities in Ethiopia, and like other rapidly growing urban areas, it has severe challenges related to the effective management of urban space, infrastructure, and environmental sustainability (World Bank, 2020).

Adama City, is undergoing severe environmental degradation, much of it along the riversides. These natural ecosystems, which in days past had acted as buffers and recreational areas for the inhabitants, are being destroyed by urbanism and unsound practices. The riversides have by now turned into dumping grounds for various kinds of refuse, plastics, and industrial effluents, thus never having a chance to grow and mature as healthy ecosystems in the rivers water. This degradation does not only cause health hazards for the inhabitants; it also brings down the beauty and ecological prominence of those areas. There is definitely an immediate requirement for sustainable urban planning and town involvement to maintain and restore these vital natural assets so that once again these zones can be turned into attractive community gathering spots that add to the quality of life in Adama.

The Riverside areas in urban settings can provide significant value as a modern-day park, benefitting the local people while increasing aesthetic appeal and having ecological benefits. Many metropolitans have these areas, but they are often neglected leading to low levels of community participation and major environmental issues (Benedict McMahon, 2006). In Adama, the yet neglected riverside zones provide an opportunity for restructuring which can improve the quality of life in the cities while solving environmental and social challenges. Adding parks, pathways for pedestrians, and structures for commercial activities could improve the economy and social life of the people, but without a comprehensive guide for planning and design, development efforts have been ineffective (UN-Habitat, 2015).

No parts of the importance of maintaining pedestrian walkways as part of urban planning and design is every exaggerated. A walkable environment encourages physical activity,

encouraging an active lifestyle while damaging reliance on vehicles, reducing traffic and pollution (Litman, 2017). In Adama city, where urban congestion is becoming more and more of a problem, it is mandatory to prioritize pedestrian designs. In Ethiopia, the urban layout design is mostly biased towards vehicle movement rather than accommodating walkers which creates unsafe and undesirable walking conditions (National Urban Planning Institute, 2021).

Cultural context is equally important for the irrational endeavour of urban revitalization design. Adama has an attraction due to rich cultural and diversity, which makes most design processes very challenging. It is important to involve citizens in the planning stage, as it provides better solutions to problems. Incorporating communities' perspectives allows changes to enhance pride among citizens as well as bringing value to urban construction funding.

Sustainability is equally important when it comes to restoring urban spaces. The introduction of green infrastructure such as parks and green: living systems and landscape features used for sustainable urban drainage can diminish urban heat island impacts and improve biodiversity (Tzoulas et al., 2007). Cognizant of climate change impacts, it is vital to create urban areas designed to be more adaptable to changing environmental conditions. Riverside developments in Adama should prioritize ecological sustainability to bolster ecological health and improve wellbeing for residents alongside passive recreational spaces.

This research seeks to achieve an all-inclusive design framework for developing urban spaces at the riverside of Adama city, paying particular attention to the pedestrian pathways and relevant facilities. The research intends to derive practical strategies for policy makers and urban planners through documenting street level best practices from successful urban renewal initiatives around the world and customizing the approaches to fit Adama's context.

1.2. Statement of the problem

Challenges pertaining to sustainable development and public participation are highly pronounced in the urban areas of Adama city, Ethiopia. The combination of intense urban growth and insufficient planning and infrastructural development has resulted in the degradation of urban public spaces, particularly located at the riverfront of the city. This potentially racializable region is currently

While there is an increasing global focus on sustainable urban development, there are no comprehensive guidelines designed for cities like Adama, Ethiopia, considering its culture, economy, and environment. Most of the literature concerns urban regeneration policies from advanced metropolitan areas which are often irrelevant in the local context. This applies to

urban planning strategies pertinent to the Adama region, as there is no sophisticated research methodology to meet the expectations of its residents.

Furthermore, pedestrian walkways, which are crucial for the enhancement of walking as a means of transport and social interaction, are generally neglected in urban development projects. The absence of adequate pedestrian facilities and pathways worsens the challenges related to mobility, public health, and the social determinants of health inequity. Furthermore, the value that could be added by restoring the riverfront into urban regeneration and providing green areas has not yet been fully realized.

1.3. Research Questions

1. What are the current challenges and opportunities associated with the Riverside area and pedestrian walkways in Adama?
2. How to implement sustainable design principles into the revitalization of urban spaces to enhance accessibility?
3. How to promote walking, cycling, and other forms of active transportation that encourage their use among residents?
4. How can the proposed design framework improve the quality of life for residents in Adama?

1.4. Objectives

1.4.1. General Objective

The general objective is to develop an integrated urban design that enhances the riverside areas and promotes pedestrian accessibility with in them, safety, and community engagement, thereby improving the overall quality of urban life in Adama.

1.4.2. Specific objectives

- Identify and evaluate the current challenges as well as opportunities in the Riverside area.
- Integrate sustainable design principles into urban revitalization initiatives to improve access for residents.
- Develop a strategy for creating a dedicated pathways that promote walking, cycling, and other forms of active transportation.
- Develop a comprehensive design framework that enhances public spaces and accessibility.

1.5. Significance of the research

The research on revitalizing urban spaces in Adama, Ethiopia, is pivotal for several key stakeholders, including city administration, policymakers, the scientific community, and fellow researchers.

For city administrators, this research discusses the neglected areas along the river and the absence of pedestrian-friendly infrastructure. Upon the implementation of the suggested design framework, the city administration can ensure an improved sense of public safety, reduce traffic congestion, improve the socialization among the community, and consequently brighten the life of this urban environment.

The policymaker may find this work to be of importance in mentioning sustainable development practices emphasizing the resident's life. The research may give suggestions for a policy that promotes cultural expression and economic development to further increase the resilience and vibrancy of the city.

It helps introduce new knowledge in urban revitalization according to context-specific issues. It will promote further exploration and cooperation on issues in sustainable urban development.

Overall, this research looks forward to making strong yet lively urban spaces that meet the needs of the locals and represent their culture, setting an example for other cities suffering from similar problems.

1.6. Scope of the research

Thematic Scope: This research aims to develop a targeted design and intervention framework that addresses community needs and promotes sustainable practices. The focus is on creating liveable urban spaces in Adama, emphasizing the importance of community engagement, environmental sustainability, and cultural identity in urban revitalization efforts.

Spatial Scope: The research is geographically limited to the urban areas of Adama, specifically concentrating on the pedestrian walkways along riverside. Other parts of the city are excluded from this research, allowing for an in-depth analysis of the unique characteristics and challenges faced by these specific areas.

Temporal Scope: The research will examine current conditions and trends within the riverside zones of Adama, utilizing recent data and observations. While the primary focus is on present-day interventions, the research may also consider historical context and future projections to inform sustainable development strategies.

CHAPTER TWO

Literature review

Urban revitalization is the process of planning to enhance the functionality, aesthetics, and social life of cities. It often involves the renovation of existing structures, the construction of public spaces, and the promotion of sustainability.

Achieving success in these endeavors relies on an integrated design strategy that responds to local needs, cultural appropriateness, and environmental sustainability.

2.1. Urbanization and Its Impacts on Riverside Areas

The rapid urbanization in Ethiopia has been putting increasing pressure on urban infrastructure and public spaces. UN-Habitat (2016) projects the population of urban Ethiopia to reach 30 million by 2030, leading to enormous urban growth management issues. Riverside areas, which are looked at as extremely valued urban resources, are increasingly exposed to pollution, and inadequate planning.

2.1.1. Environmental Degradation

One of the greatest challenges facing riverside ecosystems is environmental degradation. Urbanization is likely to lead to increased runoff, littering, and pollution, which can have serious impacts on aquatic ecosystems and water quality (Kumar et al., 2018). Rivers in developing countries, for instance, are frequently subjected to pollution by industrial wastewater, agricultural runoff, and untreated sewage (Zhang et al., 2017). In Adama, the Awash River has also been subjected to the same pressures, lowering its ecological health and amenity value.

2.1.2. Social Displacement

Urbanization often results in the displacement of riverbank communities. Development of infrastructure can result in forced eviction of the locals with inadequate compensation and resettlement strategy (Mastrorillo et al., 2016). Apart from affecting people, this social displacement also erodes communal ties and cultural heritage that are associated with such riverside communities.

2.2. The Importance of Riverside Development

Despite these challenges, riverside zones also present numerous opportunities for urban revitalization and community engagement.

2.2.1. Economic Potential

Riverside regions function as economic centres that support various business operations. Observing international success stories demonstrates how restored waterfront zones draw visitors while boosting local enterprises and increasing property evaluations (Cohen Goss, 2018). The pedestrian-focused redevelopment of Seoul's Cheonggyecheon stream resulted in better commercial activity and higher population movement throughout nearby districts (Kim Kim, 2017).

2.2.2. Recreational Spaces

Residents benefit from recreational facilities found along rivers since these natural environments improve their overall well-being. Urban green spaces become vital resources when cities incorporate parks together with walking paths and waterfront walkways (Gómez-Baggethun Barton, 2013). The establishment of recreational resources near rivers enables community members to exercise while connecting with one another in social settings.

2.2.3. Ecological Restoration

Riverside development projects support environmental restoration initiatives. Water quality and biodiversity improvement results from deploying nature-based infrastructure elements which include bioswales and riparian buffers and wetlands (Tzoulas et al., 2007). The combination of these methods boosts both river ecosystems and stormwater management for enhanced local climate resilience.

2.3. Pedestrian Walkways: Challenges and Opportunities

The presence of pedestrian walkways stands as fundamental urban features which help communities achieve better walking conditions and improved access to their surroundings. The establishment of walkways plays a vital role in bridging the gap between communities and riverside zones while boosting urban transportation systems (Ewing, R., Handy, S. (2009).

2.3.1. Accessibility Issues

Pedestrian walkways face accessibility constraints that represent a major obstacle. Pedestrian infrastructure in Adama along with other Ethiopian cities suffers from insufficient maintenance and poor design according to data from the (World Bank in 2020). Pedestrian safety becomes compromised when sidewalks have blocked pathways due to vendor stands and deteriorating conditions which force walkers to move unsafely. Residents tend to avoid walking between their homes and important places because of poor traffic connections (World Bank in 2020).

2.3.2. Safety Concerns

Pedestrian walkways face a critical problem because of safety issues. Hagggar et al. (2019) reported that pedestrians face danger because of insufficient lighting and surveillance in addition to high traffic levels. Statistics reveal that pedestrian-friendly environments generate safety benefits both in terms of accident reduction and user safety perception improvement (Davis et al., 2020). The safe movement of pedestrians depends on the implementation of vital safety measures to make walking a practical choice for transportation.

2.3.3. Opportunities for Active Transportation

Pedestrian walkways create substantial possibilities to drive active transportation despite their existing challenges. The encouragement of walking and cycling produces multiple health advantages which include lower obesity rates and better mental health (Patterson et al., 2019). The establishment of pedestrian-oriented infrastructure in urban areas results in elevated levels of physical activity among community members according to research conducted (Sallis et al. in 2016).

2.3.4. Community Engagement in Design

Creating pedestrian walkways which are effective for local needs depends on community engagement as a fundamental element. The participation of residents in designing pedestrian walkways produces spaces that better suit all community members. Through participatory planning methods residents can state their preferred walkway features which results in designs that match their community values (Talen, E. 2000).

2.4. The Role of Community Engagement in Urban Revitalization

Urban revitalization projects depend fundamentally on community engagement to achieve their goals. The involvement of community members in planning and design activities establishes a sense of belonging which creates better long-term results (Snyder, T. 2015).

2.4.1. Benefits of Community Engagement

The research proves that community inclusion in urban planning results in multiple advantages:

- **Enhanced Social Cohesion:** Participatory decision-making processes create new bonds among community members who also build networks based on trust.
- **Increased Satisfaction:** Community-oriented projects that fulfil local requirements receive better reception from residents leading to satisfaction peaks among them.
- **Improved Project Outcomes:** Community participation in projects results in lower resistance and higher chances for successful execution.

2.4.2. Strategies for Effective Community Engagement

The effective methods for community engagement consist of using participatory planning workshops along with surveys and collaborative design sessions. Through these methods residents can express their viewpoints while sharing what they have learned to shape their neighbourhood vision (Arnstein, S. R. 1969).

2.5. Mobility and Sustainable Urban Design

The movement capacity within cities stands as a fundamental component which determines how people reach basic necessities including service facilities and working places and recreational areas. Sustainable urban design uses active transportation methods including walking and cycling and public transit as key elements to improve mobility (Pikora, T. J., Giles-Corti, B., Knuiman, M., Bull, F. C. 2006).

2.5.1. The Importance of Walkability

A walkable area allows walkers to move safely and easily to different locations that include their homes and workplaces and schools and parks and shops. Walkability consists of multiple elements that make an area pedestrian-friendly through its sidewalk distribution and crosswalk availability and traffic control methods and mixed-use development and street network design. Urban designers have shown growing interest in walkability since it provides various advantages to both people and urban areas.

2.5.1.1. Encouragement of Physical Activity

Studies demonstrate that neighbourhoods which are easily walkable enable residents to achieve higher physical activity than other types of areas. People show increased walking participation both for transportation and recreation when urban spaces are developed to support pedestrians (Frank, L. D., Engelke, P. (2005). The physical activity rise provides various health advantages which include:

- **Obesity Reduction:** Walking more frequently helps decrease obesity rates since it encourages active living.
- **Improved Cardiovascular Health:** Regular walking leads to better cardiovascular health through its connection to decreased cardiovascular risk factors
- **Enhanced Mental Well-being:** People who walk experience better mental health because it reduces their anxiety and depression symptoms.

2.5.1.2. Reduction in Automobile Dependence

The presence of walkable neighbourhoods decreases the need for people to use their vehicles to perform daily tasks. Residents who live near essential services and amenities within walking distance avoid using cars for short-distance travel. People who choose to walk instead of driving experience numerous important advantages:

- **Decreased Traffic Congestion:** The reduction of cars on roads results in diminished traffic congestion which improves the ability of all road users to move around urban settings.
- **Lower Greenhouse Gas Emissions:** Environmental sustainability improves when people drive less because it leads to decreased greenhouse gas emissions together with other pollutants.
- **Cost Savings for Households:** Households reduce their expenses on vehicle maintenance and insurance and fuel costs when they use public transit or walk for their daily transportation.

2.5.1.3. Improved Overall Health Outcomes

Walkability affects health results through more than just physical exercise. The available scientific evidence demonstrates that communities with walkable neighbourhoods produce different effects on health outcomes:

- **Social Interaction:** Communities that support walking create strong social bonds because residents engage in regular contact. People develop stronger social networks when they meet their neighbours through walking activities.
- **• Accessible Healthy Food Options:** Grocery stores and farmers' markets with fresh produce are more common in walkable neighbourhoods which leads to better dietary choices among the residents.
- **Safety and Security:** Pedestrian safety improves through the inclusion of proper lighting and visibility measures in well-planned walkable spaces. People tend to walk more when they feel safe.

2.5.1.4. Economic Benefits

Communities experience positive economic results from their walkable status:

- **Increased Property Values:** The demand for properties in walkable communities makes their prices rise above average market values. Buyers of residential properties now show a strong preference for communities where they can walk to nearby facilities.

- **Support for Local Businesses:** Walkable urban neighbourhoods attract people who walk which directly benefits small businesses including cafes and restaurants. Local economic growth gains strength through the increased business activity from pedestrians in neighbourhoods.

2.6. The Importance of Active Transportation

Any human-powered transportation method that includes walking, cycling, and non-motorized vehicles falls under the category of active transportation. The World Health Organization (WHO) identifies active transportation as a major factor for enhancing physical health and lowering chronic diseases (WHO, 2018). Physical activity that happens regularly leads to reduced cases of obesity as well as cardiovascular problems and mental health conditions. Active transportation serves to preserve the environment through its ability to minimize both greenhouse gas emissions and traffic congestion.

2.6.1. Designing for Active Transportation

Urban designers should implement multiple strategies that support walkability and active transportation in urban areas:

- **Complete Streets:** Creating streets which serve all users such as pedestrians, cyclists, motorists and transit riders achieves the goal of developing a more inclusive environment.
- **Mixed-Use Development:** The integration of residential, commercial and recreational areas in close proximity results in increased walking activity while shortening travel distances.
- **Safe Infrastructure:** The construction of safe pedestrian pathways and bike lanes together with well-designed crossings allows non-motorized users to move freely.

2.6.2. Challenges to Implementing Sustainable Design Principles

The implementation of sustainable design principles in urban revitalization faces various challenges despite its multiple advantages.

- **Resistance to Change:** Community opposition to change can become an obstacle when revitalization projects are implemented. When planners involve residents from the beginning and address their worries it helps reduce opposition to changes.
- **Balancing Competing Interests:** Urban revitalization requires the management of different stakeholder interests during its implementation. The ability to communicate effectively and negotiate successfully is vital for discovering shared solutions among different stakeholder groups.

2.6.3. The Role of Infrastructure in Promoting Active Transportation

2.6.3.1. Dedicated Pathways

Walking and cycling need specific routes dedicated to their use. People who use active transportation are strongly influenced by the presence of well-structured pathways according to investigative studies. Urban pathways can be created by developing sidewalks, bike lanes, multi-use trails and pedestrian-exclusive areas.

- Sidewalks which receive proper maintenance create secure pedestrian areas for people to walk. Research conducted by Ewing Handy in (2009) demonstrated positive relationships between sidewalk quality and pedestrian activity levels. The safety and comfort of pedestrians improve when sidewalks provide wider sections that are separate from traffic flows.
- Bike Lanes: Safe cycling spaces depend on the existence of distinct bike lanes. Research conducted by Fishman et al. in (2012) demonstrated that cities which implement extensive bike lane networks witness elevated cycling levels among their populations. The installation of physical barriers between bike lanes and vehicle traffic shows a decrease in accidents while boosting cyclist confidence according to research conducted (Teschke et al. in 2012).
- Multi-Use Trails: Trail networks combine different active transport modes with recreational paths that stimulate people to use them. The scientific literature demonstrates how multi-use trails promote physical activities among community members based on the research (Boulé et al. in 2017).

2.6.3.2. Connectivity and Accessibility

One of the most important factors in order to promote sustainable transport is connecting different transportation modes. The connections through a walking and cycling network with a public transport system make easy mobility (Litman, 2020). They suggest in research conducted by Pojani and Stead (2015) that change should not involve any disruption and one mode endorses the other for continuous transportation.

Accessibility comes in ensuring that the paths are planned in a way that everybody could use them, including the ones with disabilities. The rules of the universal design have to be present in the way of the paths to cover the needs of all the groups of the population (Steinfeld Maisel, 2012).

2.6.4. Safety Considerations

For people who consider walking or cycling as alternative transportation modes, safety is the major issue. It is widely known that subjective and objective safety have a great impact on active transportation levels.

2.6.4.1. Traffic Calming Measures

Defensive driving mechanisms, like speed humps, roundabouts, and fewer vehicle lanes, can restrict speed and thus be kind of a guarantee for the safety of pedestrians and cyclists (Ewing et al., 2014). Research by McMahon et al. (2016) pointed out that such compliances contributed to fewer injuries and deaths among walkers.

2.6.4.2. Lighting and Visibility

To safeguard the users in the darkness of the night, a good level of brightness along the way is required. One research has noted that an increase in the level of brightness results in not only a reduction of criminal activity but also a heightened sense of security among the people (Cohen et al., 2009). To add to the safety perceptions, few natural surveillance devices such as invisible sidelines and active building frontages should be used (Jacobs, 1961).

2.7. Theoretical Foundations of Quality of Life

This passage is describing by a way of different measuring tools as quality of life. Actually, the indices used in every country show the condition of the citizens and the world. For example, in the report of the World Health Organisation (WHO), the following components are mentioned: Physical health, mental state, degree of independence, social relations, and the personal believes (WHO, 1995). Urban design becomes a key factor in forming(Q) these dimensions through the way it engages the inhabitants and the built environment.

The Capability Approach, introduced (Sen, 1999), highlights how crucial individual capabilities and freedoms are when we evaluate quality of life (QoL). This viewpoint suggests that any design framework should aim to boost opportunities for residents to reach their full potential. On a similar note, the Social Determinants of Health framework points out the significant role that social, economic, and environmental factors play in shaping health outcomes and overall well-being, as noted (Marmot and colleagues in 2008).

2.7.1. Urban Design Frameworks and Quality of Life

Urban design frameworks offer organized methods for crafting liveable cities. They cover essential aspects like land use, transportation, public spaces, and community involvement. A

thoughtfully designed urban environment can encourage social interactions, promote physical activity, and alleviate environmental stressors.

2.7.1.1. Inclusive Design:

Inclusive design is all about prioritizing accessibility and fairness in urban planning. Research shows that environments designed with inclusivity in mind can strengthen social bonds and empower marginalized communities, as highlighted (Stevenson and others in 2016). In Adama, applying inclusive design principles can help ensure that every resident, no matter their age or ability, has access to vital services and public spaces.

2.7.1.2. Sustainable Urban Development:

Sustainable urban development aims to strike a balance between economic growth and environmental stewardship. Studies have found that green spaces and sustainable infrastructure can significantly enhance mental health and physical well-being, as demonstrated (Kuo et al., 1998). In Adama, weaving green spaces into the urban landscape can boost recreational opportunities and foster community engagement.

2.7.1.3. Participatory Planning:

Getting residents involved in the planning process cultivates a sense of ownership and responsibility. Research has shown that participatory planning often leads to more relevant and effective urban solutions, as discussed (Arnstein, 1969). By including the voices of Adama's residents in the design framework, we can better meet their needs and aspirations.

2.7.2. Strategies for Improving Quality of Life in Adama

Drawing from the insights of these theoretical frameworks and case studies, we can propose several strategies to enhance the quality of life for residents in Adama:

2.7.2.1. Enhancing Public Transportation:

Creating a more efficient public transportation system can really help ease traffic jams and make it easier for people to access important services. This could mean expanding bus routes, tweaking schedules, and finding ways to connect different types of transport seamlessly.

2.7.2.2. Creating Green Spaces:

Building parks and recreational spaces in neighbourhoods can encourage people to get active and offer places for socializing. Plus, these green areas play a big role in keeping our environment healthy by improving air quality and cooling down urban heat.

2.7.2.3. Promoting Mixed-Use Development:

Promoting mixed-use developments can lead to lively neighbourhoods where folks can live, work, and enjoy their leisure time. This strategy helps cut down on car dependency and boosts community involvement.

2.7.2.4. Implementing Smart City Technologies:

Leveraging technology to enhance urban services can make them more efficient and responsive. Smart city projects might include real-time traffic updates, better waste management, and energy-saving infrastructure.

2.7.2.5. Fostering Community Engagement:

Involving residents in the planning process is key to making sure their opinions are valued and their needs are met. This can be done through workshops, surveys, and collaborative design sessions.

2.7.3. Challenges and Considerations

While the proposed design framework presents some exciting strategies for enhancing quality of life in Adama, there are a few challenges to tackle:

2.7.3.1. Resource Constraints

Limited funding could slow down the rollout of comprehensive urban design projects. It will be crucial to prioritize initiatives based on community needs and the budget available.

2.7.3.2. Cultural Context

Grasping the cultural nuances of Adama is essential for crafting solutions that truly resonate with the locals. Engaging with community members can shed light on culturally relevant approaches.

2.7.3.3. Political Will

For successful implementation, strong political backing and teamwork among various stakeholders like government bodies, non-profits, and community groups are necessary.

2.7.3.4. Monitoring and Evaluation

Setting up metrics to evaluate how the design framework impacts quality of life is important for ensuring accountability and ongoing improvement.

2.8. Key Concepts and Theories

2.8.1. Key Concepts

2.8.1.1. Sustainable Urban Development:

- Focuses on creating urban environments that meet present needs without compromising future generations.
- Emphasizes environmental, social, and economic sustainability.

2.8.1.2. Walkability:

- How friendly an area is to walking?
- Designing pedestrian pathways, public spaces, and amenities to encourage walking.

2.8.1.3. Community Engagement:

- Involves local residents in the planning and development process to ensure their needs and preferences are met.
- Enhances social cohesion and ownership of urban spaces.

2.8.1.4. Mixed-Use Development:

- Combines residential, commercial, and recreational spaces to create vibrant neighbourhoods.
- Encourages economic activity and reduces the need for transportation.

2.8.1.5. Green Infrastructure:

- Incorporates natural systems (like parks, green roofs, and rain gardens) into urban design.
- Enhances biodiversity and improves air quality while providing recreational spaces.

2.8.2. Theories

2.8.2.1. New Urbanism:

- Advocates for walkable neighbourhoods, mixed-use development, and community-oriented design.
- Aims to reduce reliance on cars and promote sustainable living.

2.8.2.2. Place-Making:

- Focuses on transforming public spaces to enhance community identity and well-being.
- Involves local input in designing spaces that reflect cultural values.

2.9. Case Studies

2.9.1. Chicago Riverwalk, Phase 2 & 3

Designer- Sasaki

Project Type- Waterfront redevelopment

Former Land Use- Retrofit

Location- Chicago Riverwalk, Chicago, Illinois 60601

Climate Zone- Humid continental

Size- 3.5 acres

Budget- Phase 2: \$43,058,000; Phase 3: \$52,419,000

Completion Date- 2016

2.9.1.1. Environmental

The ecological quality has seen a significant boost, as shown by the Floristic Quality Index (FQI) jumping from 0 to 38.2 over an area of 19,529 square feet. An FQI score above 35 is typically regarded as indicative of a “natural area” quality.

2.9.1.2. Social

On a typical summer weekend afternoon, around 780 visitors come through. Of those, 73% are involved in commerce-related activities, 20% are enjoying leisure activities, and 8% are engaging in recreational pursuits. Interestingly, 34% of the 353 visitors surveyed mentioned they visit the Riverwalk 1-3 times each month.

The Riverwalk also serves as a venue for public programming by the Chicago Park District and hosts large-scale events. Notable examples include the Art on the MART launch in 2018, which attracted 32,000 attendees, and the Floating Museum exhibit in 2017, which drew over 90,000 visitors. Additionally, environmental programs in 2018 reached more than 1,100 children.

Satisfaction with the riverfront has improved, with 89% of 28 surveyed visitors who were familiar with the site before its reconstruction expressing greater contentment. Furthermore, 26% of 47 surveyed visitors reported a better understanding of the river’s water levels and aquatic life. The scenic quality of the Chicago Riverwalk has also enhanced, with scenic value index scores for views from the bridges increasing by 22 to 74 points. In fact, 74% of 34 surveyed visitors noted an improved perception of the riverfront's aesthetic appeal. The

Riverwalk has strengthened intermodal connections, with 42% of 50 surveyed visitors indicating they use it as part of their commute. Among these commuters, 24% travel by bicycle, scooter, or hoverboard, while 62% prefer to walk.

2.9.1.3. Economic

From 2016 to 2019, the project created 170 new seasonal jobs, 125 part-time positions, and 66 permanent roles, according to 9 surveyed Riverwalk vendors. Of the 6 vendors who were present before and after the reconstruction, 83% reported that the project made their businesses more profitable.

The number of Riverwalk vendors has doubled, and profits surged by 164% from 2014 to 2018, culminating in nearly \$50 million in total revenue in 2018. Additionally, 90% of 50 surveyed visitors indicated they also support nearby.

We've successfully catalysed over \$12 million in funding to revamp earlier phases of the Riverwalk, which includes crafting a Master Plan for its older sections and securing more than \$240,000 for building a Community Marketplace. From 2013 to 2018, we generated around \$16 million to help pay back a \$99 million federal loan that funded the project's construction. The revenue from Riverwalk concessions, earmarked for loan repayment, came in about 29% higher than we initially projected.

We're also committed to investing in public art, with over \$460,000 allocated for programming and public art in 2018, and more than \$2 million set aside for an international art competition in 2019.

2.9.1.4. Challenge

- Maximize pedestrian space while adhering to a required 25-ft build-out into the river.
- Develop a flood-resilient urban landscape that can bounce back quickly after flooding.
- Boost economic activity along the waterfront by enhancing recreational and educational opportunities, as well as providing space for restaurants and retail.
- Enhance aquatic habitats and improve water quality.
- Increase access to the Chicago River, both from the city above and along the river itself.

2.9.1.5. Sustainable features

The Riverwalk now features 19,529 square feet of new planting areas, showcasing 66 different species of plants, including shade trees and both emergent and submergent aquatic species. We've also expanded soil volumes beneath structural paving systems to promote tree health. Plus, a half-mile stretches of pedestrian, bicycle, and boating infrastructure now offers more transportation and recreational options throughout the city.

2.9.1.6. The before and after conditions of the Chicago Riverwalk

Marina Plaza

- In the bustling Marina Plaza, custom reclaimed teak site furnishings define waterfront restaurant space as well as the public space.
- A raised boardwalk facilitates boat docking and embarking/disembarking and provides popular public boat rental docking space.

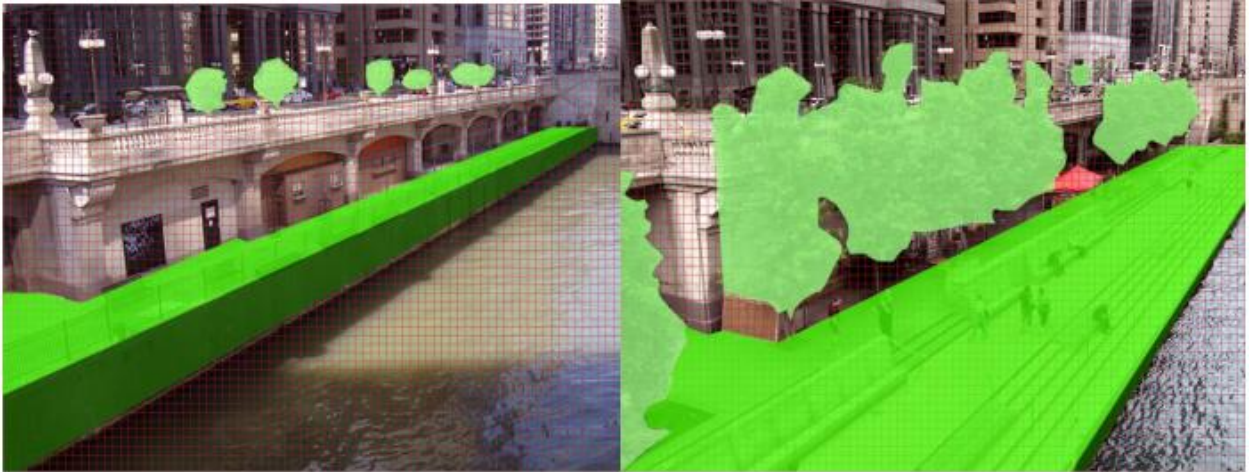


Figure 2. 1: Marina Plaza Before and After

Cove

- The boardwalk in the recreation-centric Cove is closest to the typical water level, providing optimal kayak launch access. Large precast concrete benches provide flexible seating for groups that offers views of the river.

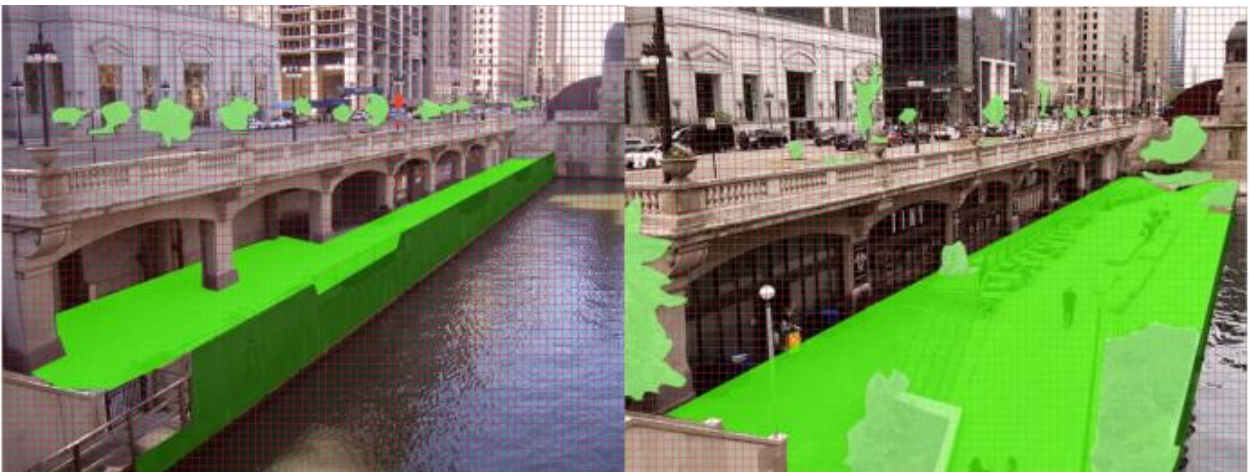


Figure 2. 2: Cove Before and After

River Theatres

- The River Theatre’s dramatic stairs incorporate an LED-lit accessible ramp that goes from the street level to the Riverwalk. The ramp cuts through the stairs which serve as steep terraces for seating, creating an amphitheatre looking over the river.
- Expanded soil areas and channels for trees underneath the terraced steps provide space for long-term tree growth. The tree pits also incorporate a rainwater harvesting system with a 2,000-gallon cistern to store water that is used to supplement landscape irrigation.

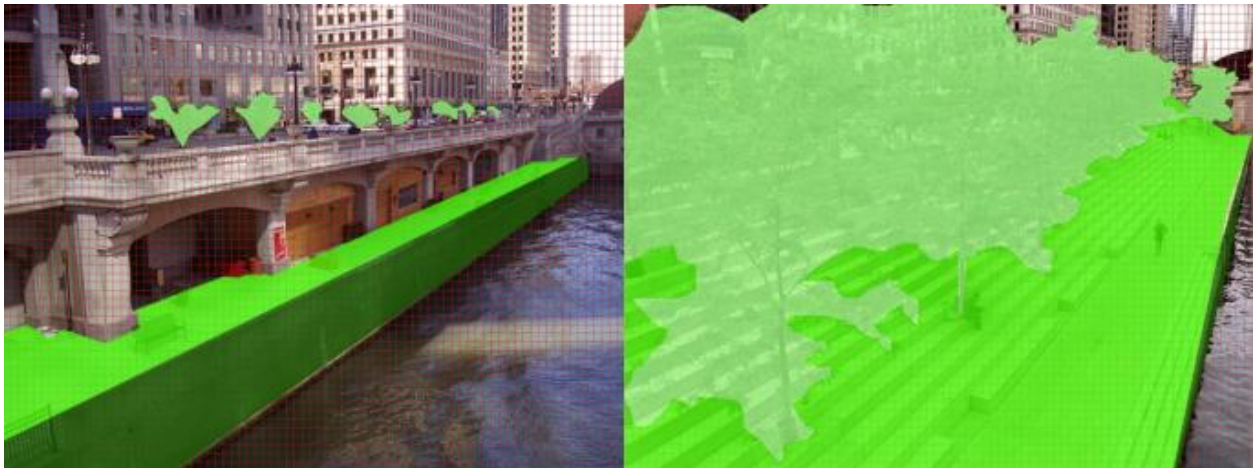


Figure 2. 3: River Theatres Before and After

Water Plaza

- The Water Plaza receives the most sunlight of any of the “rooms,” so it was selected for an interactive fountain with a zero-depth water feature with arching jets and foaming bubblers programmed for seasonal play.
- The highly activated Water Plaza has the most space for flexible programming at the fountain site, which allows for water to be turned off during events.

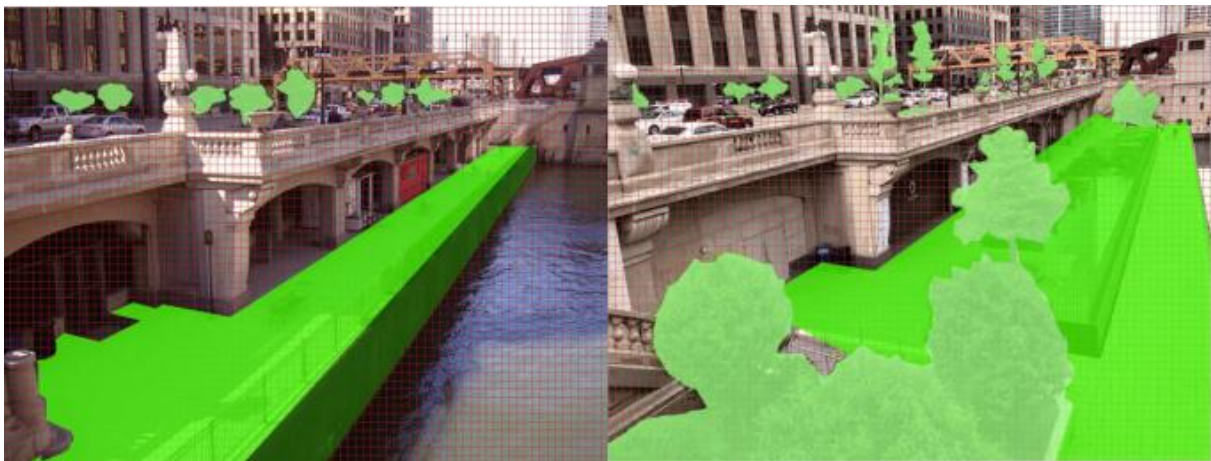


Figure 2. 4: Water Plaza Before and After

Jetty

- The Jetty has suspended walkways over the water to increase square footage of usable space along the Riverwalk, accommodating 100 lf of jetty and 1,590 sf of floating wetlands with a base of marine-grade stainless steel.
- They are designed to improve water quality and provide aquatic habitat over 1,590 sf of surface area.

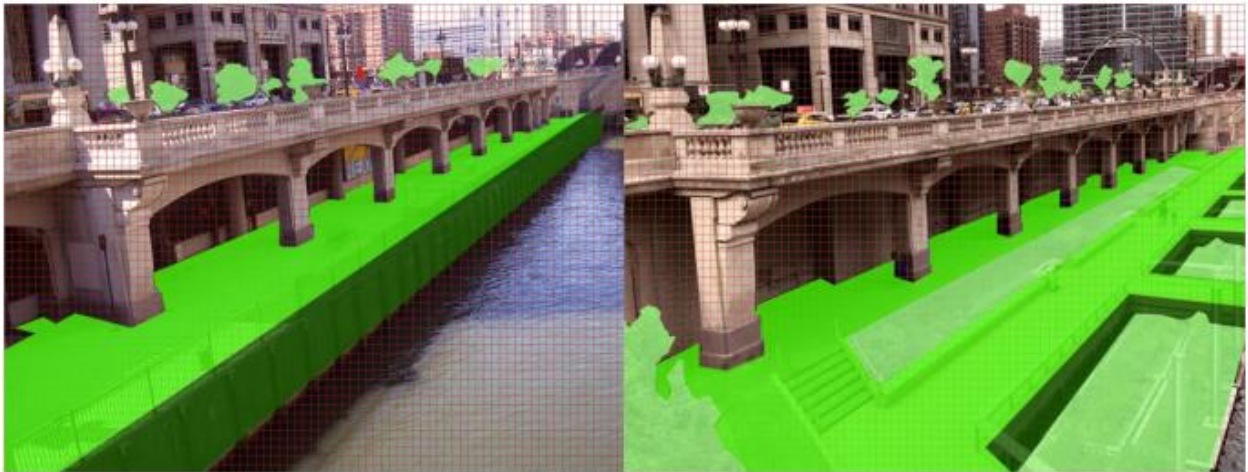


Figure 2. 5: Jetty Before and After

The Confluence

- Designed as a temporary space, the Confluence features a Great Lawn and movable Adirondack chairs. The site also hosts an annual juried public art installation. The room has been approved to remain due to its success.
- Located at the confluence of the north and south branches of the Chicago River, this area provides the broadest views of the city and river available along the Chicago Riverwalk.

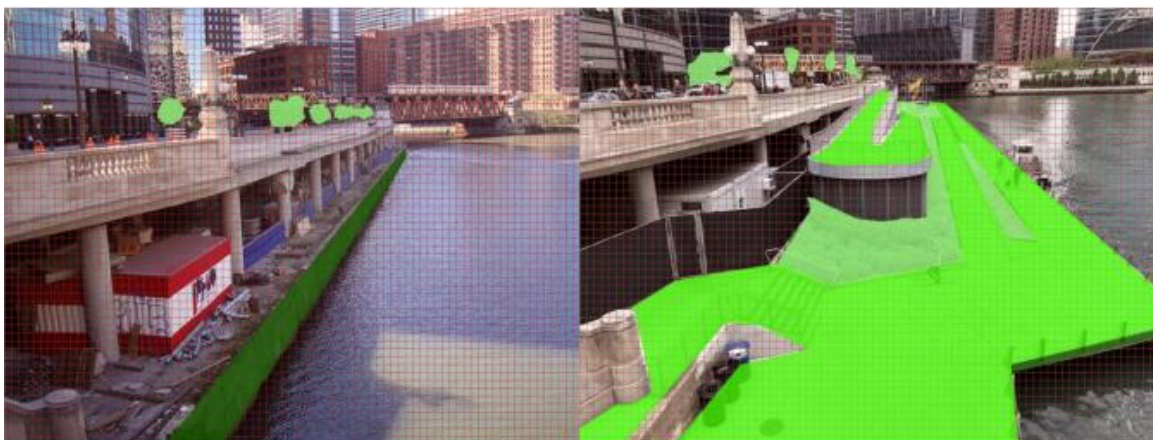


Figure 2. 6: The Confluence Before and After

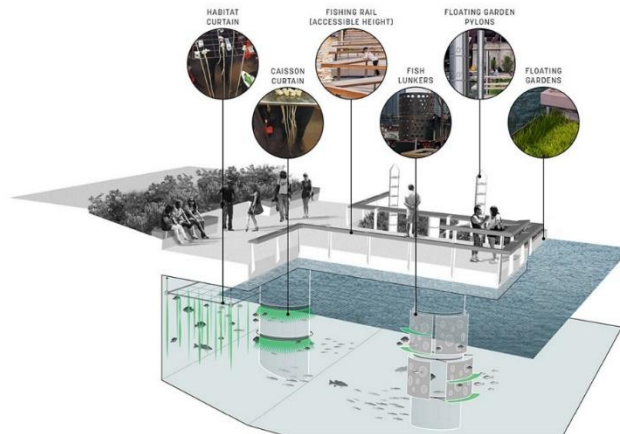


Figure 2. 7: Cross-Sectional Drawing

CONCLUSION

The Chicago Riverwalk is a six-block pedestrian promenade in downtown Chicago that enhances flood resilience while connecting people to the river. It repurposes an existing walkway to improve access for pedestrians and cyclists, featuring under-bridge connections and a variety of amenities. Phases 2 and 3 of the projects divided the Riverwalk into six distinct “rooms,” each serving a unique purpose.

2.9.2. Addis Ababa “Beautifying Sheger” River Development Project

Project Type- Waterfront redevelopment

Former Land Use- Retrofit

Location- Addis Ababa, Entoto to Akaki

Budget- \$ 319,385,516.93

The Beautifying Sheger Project is a program that was launched on 27 February 2019 by Prime Minister Abiy Ahmed Ali. The Beautifying Sheger Project will develop green areas along the rivers of Addis Ababa, establishing green areas from Entoto to Akaki alongside the 69 km river streams that go to Kality waste water treatment plant.

The Beautifying Sheger project aims to increase tourism and quality of life, decrease risks from climate change and create jobs in Ethiopia's capital city, Ethiopia by establishing green areas. The project aims to engage citizens to the cleaning initiatives as well, because even with the recent economic growth in Ethiopia, little have been done to reduce the industrious and urban wastes for the betterment of the environment.

The present “Beautifying Sheger- River Development Project Investment Strategy and Infrastructure Plan - Sheger Project” is provided by the UMDF, a multi donor Trust Fund of the African Development Bank (AfDB) was created in April 2019.

The UMDf could be summarized as having the following key objectives:

- Improved urban planning
- Improved project preparation (i.e. pre-investment phase)
- Improved municipal governance and finance
- Improved support for integrated Urban development.

Addis Ababa “Beautifying Sheger” River Development Project

2.9.2.1. GIS system setting up and Maps Implementation

For starting point the Consultant has established a Geographic Information System (GIS) to integrate, store, edit, analyse, share, and display all types of geographical data of the Sheger project while being collected, processed, and produced. The maps have been processed with the geospatial processing data software ArcMap (of Esri’s ArcGIS).

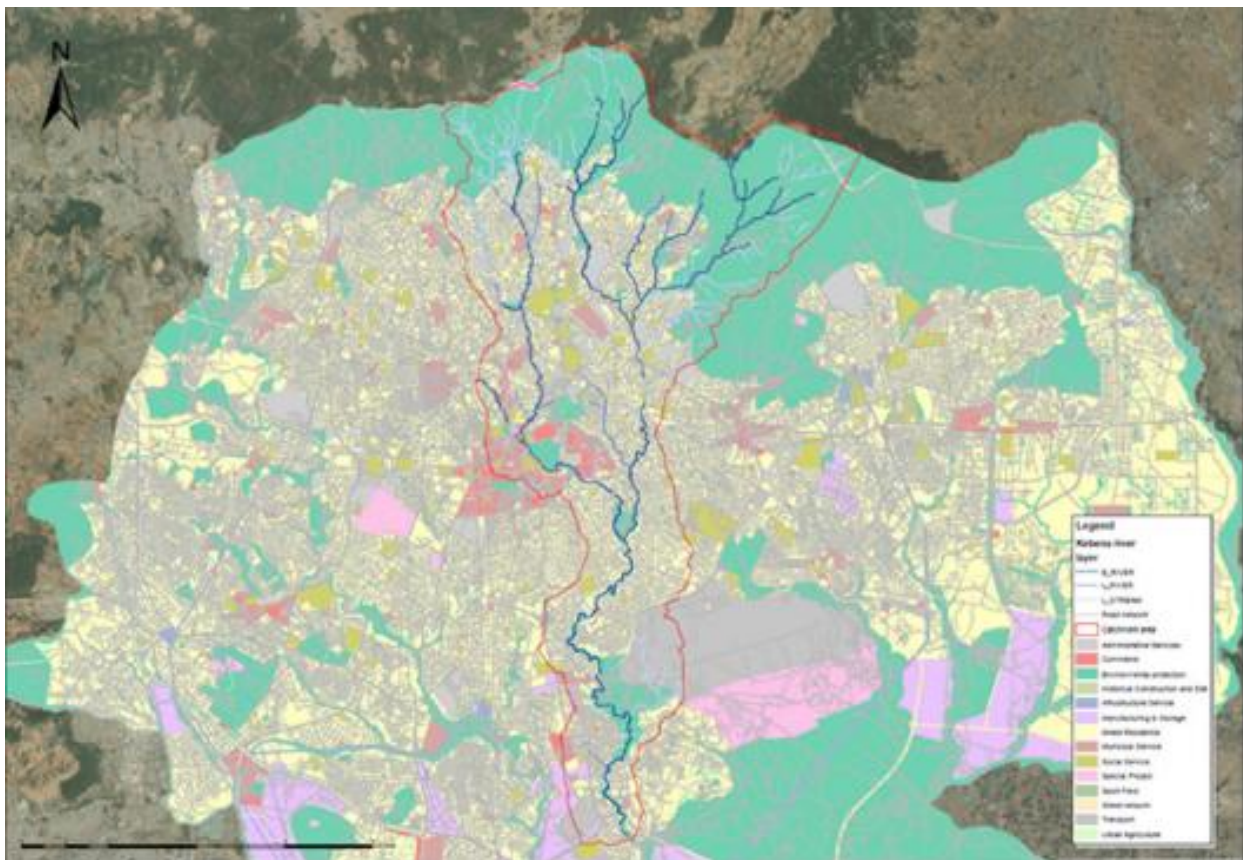


Figure 2. 8: Sheger map presenting: AAPDC structural plan (SP) land use with industrial zoned painted in violet and contour on the sheger catchment. Source: consultant

2.9.2.2. Urban Landscape Designing and Planning Research for Addis Ababa Rivers and Riversides Development Plan – 2017

The Research was completed by the "© Centre for Environmental Science, Addis Ababa University" (CES). CES has put together five different coordinated, multidisciplinary teams, i.e. catchment management, landscape & urban design, pollution & sanitation, socio-economic and policy teams, The specific objectives of the research are to:

- Assess and analyse the existing condition of the rivers and riversides.
- Conducted ground/topographical survey to map the land use.
- Delimit the boundaries of Kechene Kurtumi (BKK) plus Kebena Rivers and Riversides.
- Develop the detailed land use plan and landscape design and pilot intervention project site, with selection of appropriate techniques.

2.9.2.3. Wastewater Infrastructures

The Consultant, who has extensive work experience with AAWSA in sewers project prepared an analysis of the current infrastructures asset in the three Kality, Akaky and Eastern Catchments, of the status of the pollutants from Urban, Condom, Hotels and Industries the collection by vacuum trucks and the configuration of Wastewater Treatment Plant (Kality and Kotebe). It was estimate that the wastewater generated in the city is 479,200 m3 per day.

2.9.2.4. Solid Waste

According to the Addis Ababa solid waste management system report (2010), the daily waste generation was estimated at 0.4 kg/ capita for daily City waste production of 550 tons/day (200,000t/year) with 65% being collected and disposed into a dump site. Another 5% in composted, 5% is recycled while the remaining 25% is dumped in open space, ditches, rivers and river banks.

2.9.2.5. Water Supply Network

The total water produced is estimated 590,000 m3 per day. At present the total demand of potable water for the City of Addis Ababa estimated to be above 700,000 m3/d where the coverage of the water supply of the capital is estimated to be 85.6 %.

2.9.2.6. Stormwater

Addis Ababa is experiencing rapid urbanization and a previously unseen rate of construction of roads and buildings, leading to abrupt increases of impervious surfaces and runoff volumes. In this regard, the main issue is stormwater management in Addis Ababa is purely traditional in the sense that it has no other purpose than to collect and convey stormwater from source to

rivers. No retention, infiltration and harvesting processes are then catered for by traditional drainage systems.

2.9.2.7. Structural Plan

The Structure Plan represents a technical, institutional and legal framework for the long term social, economic, environmental and spatial development of the city and surrounding area. The Plan structure is by themes: land use, centres, transportation and roads, social services, municipal services, housing, social development, local economic development, industry, environment, urban and peri-urban agriculture, and tourism.

2.9.2.8. Stormwater Infrastructures

Addis Ababa has a number of relatively small, but very important rivers traversing it. The goal of the research is to examine the potential flood risk of the Sheger River network, which is developing through the metropolitan area of Addis Ababa and represents a very sensitive structures and activities complex that must be protected from hydro-geological risks.

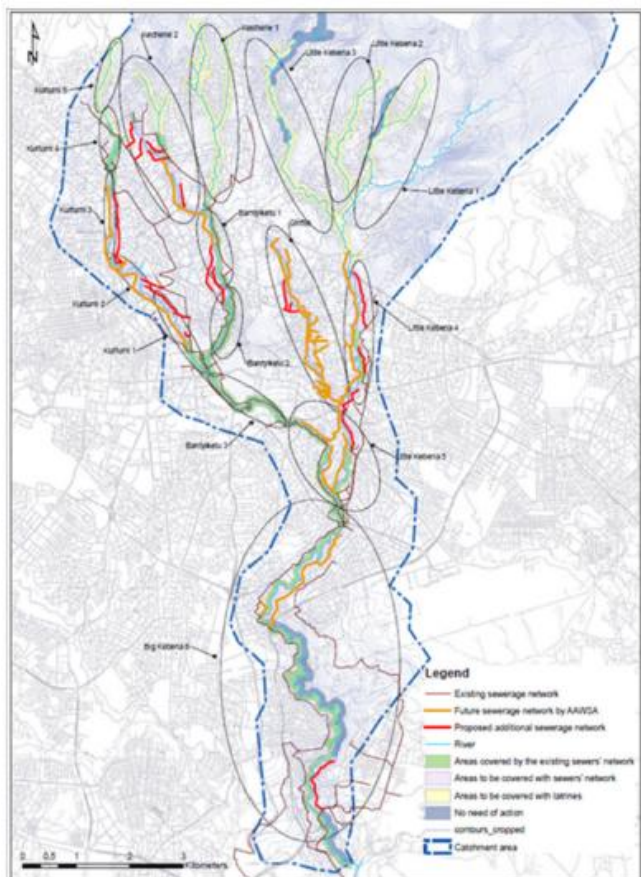


Figure 2. 10: Proposed network connected to the existing

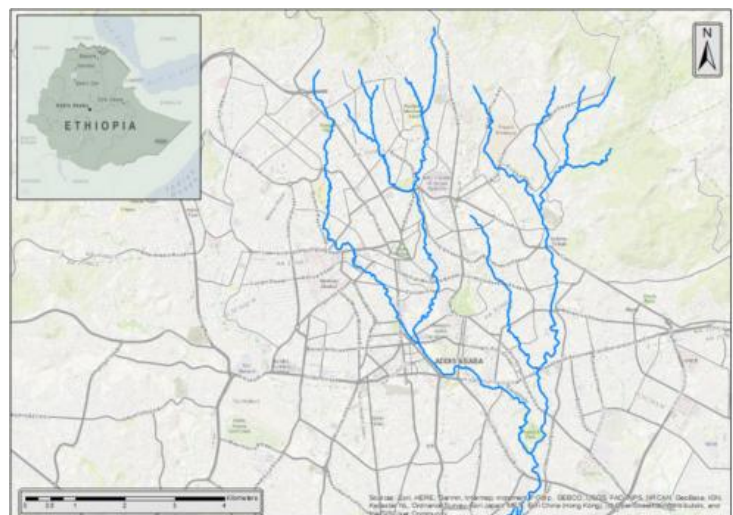


Figure 2. 9: Layout of the sheger river network

*Addis Ababa “Beautifying Sheger” River
Development Project*

2.9.2.9. Proposed flood mitigation measures

In designing a system of measures to mitigate flood risk for the research area, the Consultant undertook a review on design options typically employed for these types of actions, recognizing the context in which these types of interventions must ultimately be combined.

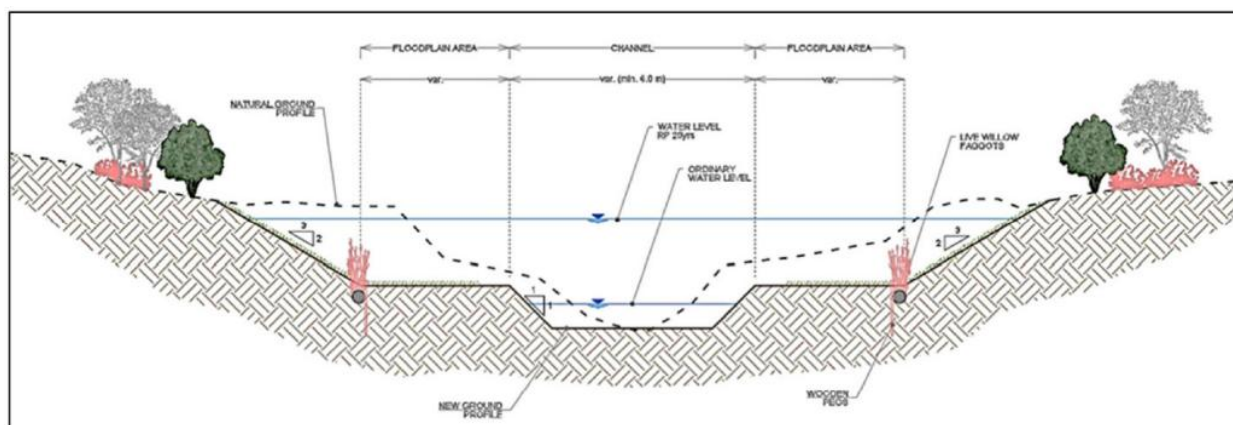


Figure 2. 11: Typical River cross section reshaping

2.9.2.10. Typical sections for the development

Typical solutions to inform the development of the six stretches identified above have been developed. For each stretch, the Consultant identified a suite of infrastructural measures that would be implemented to create a linear green corridor/park along the Sheger River in order to facilitate the diffusion of enjoyment in the community, and ultimately enhanced urban quality as a whole.

he stretches have been designed with due consideration of the location in the urban context and the implied diversity of users they may attract. A varied suite of infrastructure for passive recreation (trails, playgrounds, and service blocks), flood risks mitigation and reduction of public health hazards were proposed.

- Category A_ Nature oriented River Park
- Category B_ City level Recreational River Park
- Category C_ Neighbourhood level Linear Open Space
- Category D_ Central districts Riverfront
- Category E_ City level Flooding Park and Wetland
- Category F_ Urban gardens

- **Category A_ Nature oriented River Park** - To become a nature-based River Park attracting visitors at the city and regional level. Main purpose of the area will be to maintain the eco-systemic role of the river, its wild fauna and flora.

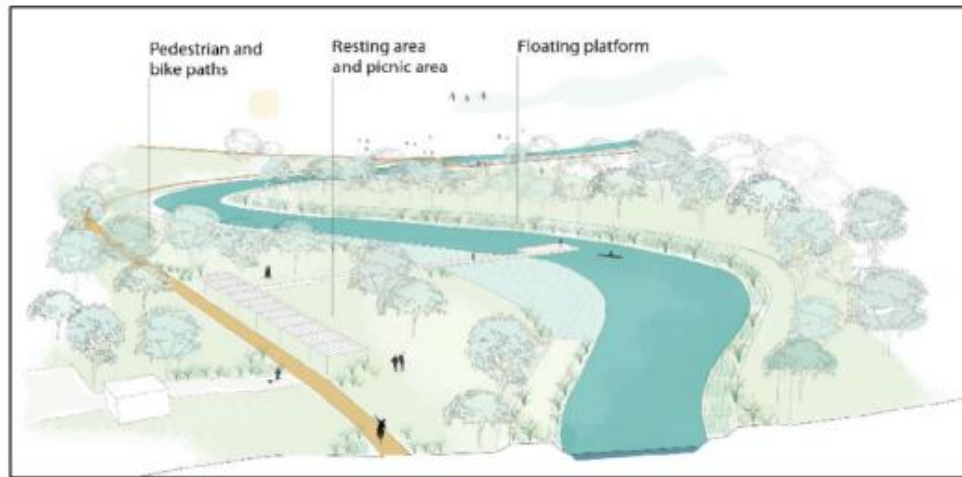


Figure 2. 12: Nature oriented River Park

- **Category B_ City level Recreational River Park** - To become a Recreational River Parks at a city level, possessing low impacting passive recreation activities in a natural preserved environment.



Figure 2. 13: City level Recreational River Park

- **Category C_ Neighbourhood level Linear Open Space** - To become a linear open space attracting residents of Addis Ababa living in the mix residential neighbourhoods that border that length of riverfront.

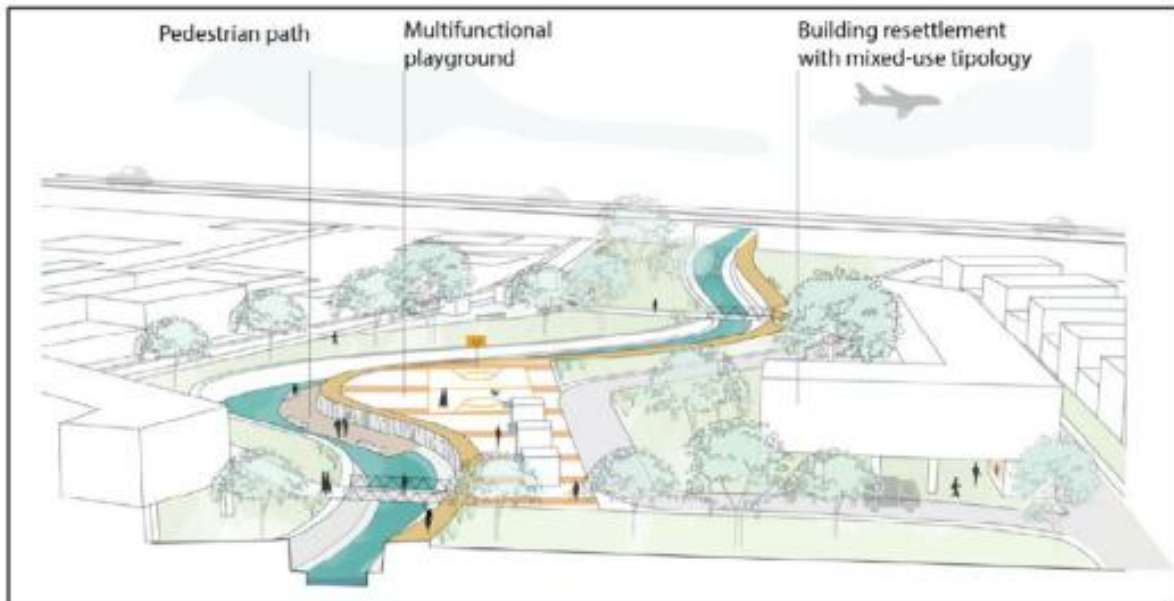


Figure 2. 14: Neighbourhood level Linear Open Space

- **Category D_ Central districts Riverfront** - The Central District Riverfronts will become a linear open space of quality rather than an obsolete training and path way infrastructure. The upgrading project will enable space for socializing and detoxing from the high intensity way of life that being trapped in the polluted earth centre creates.

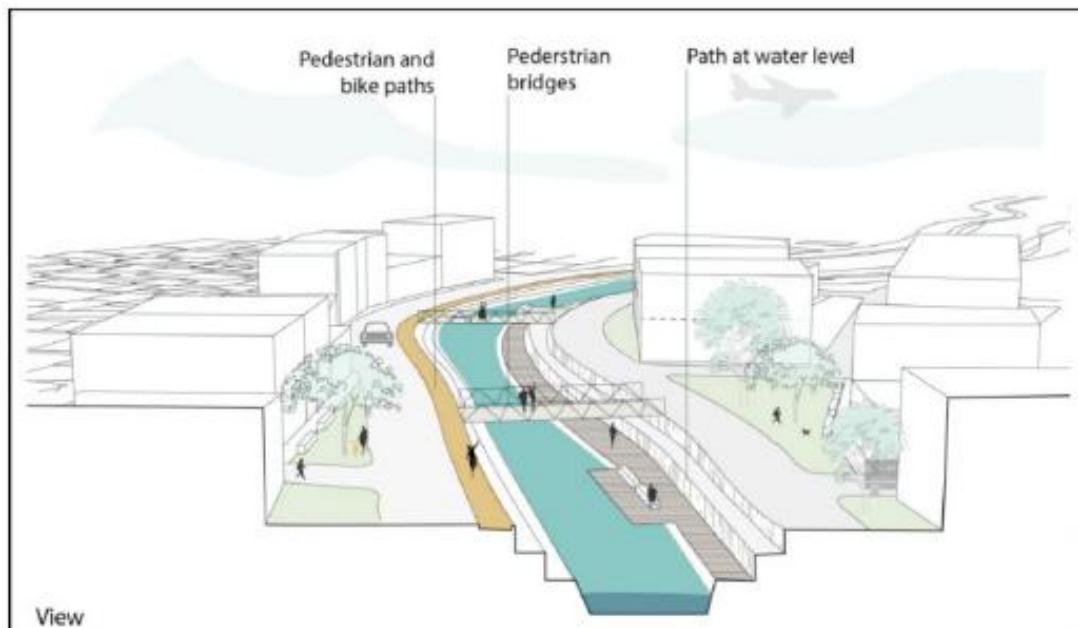


Figure 2. 15: Central districts Riverfront

- **Category E_ City level Flooding Park and Wetland** - To become a flooding park at city level - is truly a flooded defined by retention ponds and wetlands that witness seasonal flooding.



Figure 2. 16: City level Flooding Park and Wetland

- **Category F_ Urban gardens** - Urban gardens and orchards made from huge plots of land along the riverbanks will keep their productive function.

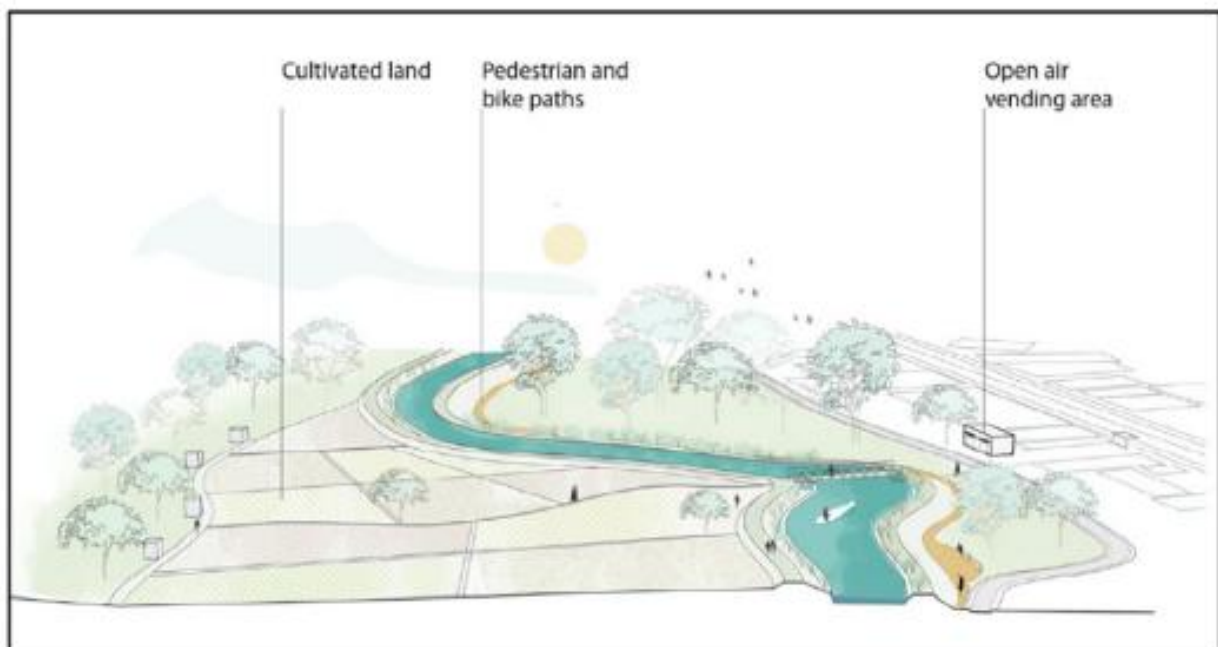


Figure 2. 17: Urban gardens

2.9.2.11. Conclusions

In that light an made an infrastructure plan and a costed plan. A set of unit cost were made for the main categories of works and multiplied by the quantities of works identified in the Infrastructures Plan providing a cost of works.

2.10. Key Debates and Controversies

2.10.1. Debates

1. Balancing Development and Preservation
 - Tension between new development and preserving existing structure
2. Pedestrian Accessibility vs. Vehicle Traffic
 - Prioritizing pedestrian-friendly designs versus efficient vehicle movement.
3. Equity in Urban Design
 - Ensuring equitable access to revitalized spaces for all community members.
4. Cultural (local) Appropriateness vs. Global Standards
 - Applying global design standards versus reflecting local contexts.
5. Long-term Maintenance vs. Initial Investment
 - Balancing upfront development costs with planning for ongoing maintenance.

2.10.2. Controversies

1. Balancing Development and Preservation
 - Potential displacement of local communities.
2. Pedestrian Accessibility vs. Vehicle Traffic
 - Resistance from motorists and businesses when rethinking road infrastructure for pedestrians.
3. Equity in Urban Design
 - Systemic inequalities that may leave marginalized groups behind in revitalization efforts.
4. Cultural (local) Appropriateness vs. Global Standards
 - Difficulty in integrating global design principles with local cultural elements.
5. Long-term Maintenance vs. Initial Investment
 - Challenges in securing funding for maintenance post-revitalization efforts, leading to neglected spaces.

2.11. Gaps

Despite growing international attention to urban regeneration and sustainable development, there is a significant knowledge deficit in overall strategic plans that are adaptive to the local environment, particularly in rapidly expanding urban locations like Adama, Ethiopia. Despite the existence of various studies on the urban design regulation and pedestrian facilities in other global settings, there is hardly any research grounded in Adama that addresses the social, cultural, and environmental dynamics of the locality.

There is limited information on incorporating walking infrastructure into city renewal in Ethiopian cities, which is important to enhance walkability.

The lack of studies on how to utilize Adama's riverfront to develop green spaces that can boost community activity and environmental sustainability.

This research aims to fill in the gaps by developing a combined design scheme that revives Adama's urban areas and enhances pedestrian connections while promoting sustainable practices suitable for the context.

2.12. Conceptual, Theoretical and Empirical Framework

Conceptual Framework: Centres on sustainable urban design, community engagement, and ecological resilience. It proposes revitalizing riverside pedestrian pathways through green infrastructure (bioswales, shade trees), mixed-use development, and culturally inclusive public spaces to enhance walkability, social cohesion, and economic vitality.

Theoretical Foundation:

- New Urbanism (walkable neighbourhoods, reduced car dependency).
- Participatory Planning, ensuring community co-design (Oromo cultural motifs) for ownership and equity.

Empirical Framework:

- Quantitative: Geospatial (GIS) mapping of flood risks and connectivity gaps; surveys
- Qualitative: Stakeholder interviews and focus groups identifying local needs.
- Case Studies: Adapts lessons from Chicago Riverwalk (economic multipliers) and Addis Ababa's "Beautifying Sheger" (flood-resilient green corridors).

CHAPTER THREE

Research Methodology

3.1. Research area

Adama, which is in Ethiopia's Oromia region, is the focus of this research because of its fast urbanization and particular problems with social services, infrastructure, and environmental sustainability. To ensure a varied representation of socioeconomic backgrounds, demographics, and urban conditions, the research focus on a number of neighborhoods within Adama.

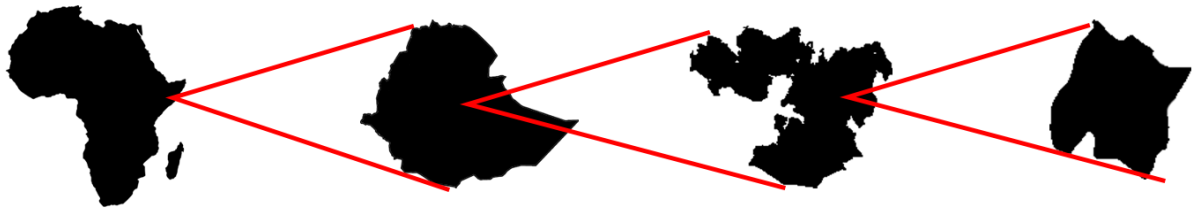


Figure 3. 1: Location Map

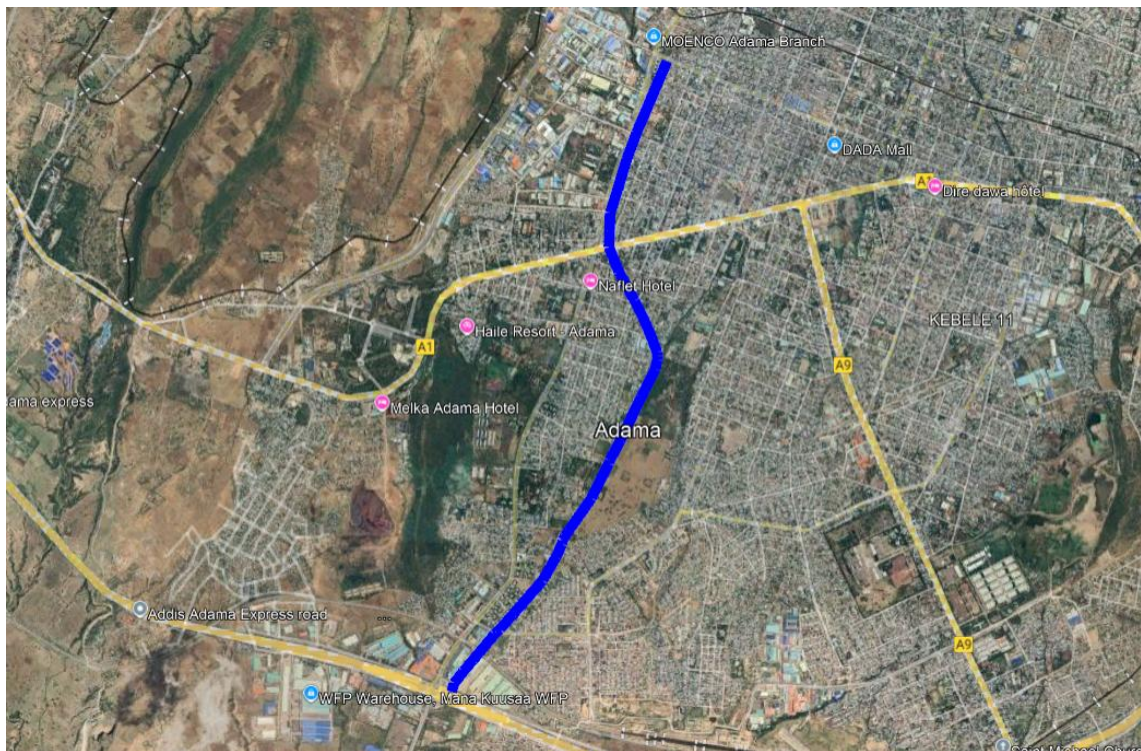


Figure 3. 2: Site Location: From MOENCO Adama to Duket condominium

Site Location = Adama, Ethiopia.

Site Length = 5.3 km

Climate = semi-arid (has little rain but not completely dry)

Land-use = Water body

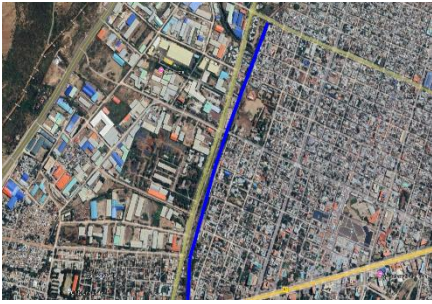


Figure 3. 4: Tractor Factory



Figure 3. 3: Oda Resort & Hotel



Figure 3. 5: Duket condominium

3.2. Research design

The purpose of this research is to develop a comprehensive design framework for sustainable urban revitalization in Adama, Ethiopia, emphasizing the riverfront and pedestrian walkways. The research will assess the existing conditions of these sites through permits and stakeholder engagement; the latter includes interacting with community members, local officials, and urban planners to earn the fullest range of views possible. Data will be collected using qualitative means such as interviews and focus groups, and quantitative surveys to comprehend community needs. The expected outcomes include an informed understanding of the present condition, recommendations for design interventions that mitigate urban liabilities, and recommendations to spur more participation from community members in the revitalization effort and thereby support the sustainable development of Adama.

3.3. Sources of data

Primary Data Sources

Survey: I developed a structured questionnaire for residents, business owners, and government officials to systematically collect data on their perspective concerning riverside development.

Interviews: I conducted in-depth interviews with persons from all demographic groups within the community to understand better their experiences and views relating to the development.

Observation: I observed and recorded activities occurring around the river study area alongside the timely interaction and activities that explain the survey findings.

Focus Group Discussions: Together with the Youth Network for Sustainable Development (YNSD), a local NGO, I facilitated group discussions to explore riverside development and related topics further, ensuring that community members were engaged in meaningful dialogues.

Secondary Data Sources

Books, Journals, and Reports: A number of published articles were selected that addressed various distorted and relevant information pertaining to the given topic. The books offered critical analysis, theoretical discussion, and case studies, so that perspectives on the subject matter were expanded.

Online database: Information was abundant by way of ongoing internet search and AI. This allowed me to access a wealth of online articles and research with further investigation of the topic.

Government sources: Data and information from government sources were limited, however an overall demographic data was drawn from government sources. This information was important to provide context and to locate the research within society.

3.4. Sampling design

The sampling design for this research aims to gather comprehensive insights from various stakeholders involved in or affected by the revitalization of urban spaces in Adama, Ethiopia. The primary objective is to ensure that the voices of diverse community members are represented, facilitating a holistic understanding of their needs, preferences, and concerns regarding the proposed development of Riverside areas and pedestrian walkways.

3.4.1. Sample Population

The sample population will consist of individuals residing in the Riverside area of Adama, as well as residences, local business owners and government officials. The rationale for including these groups is based on their direct involvement with or impact from urban development projects.

3.4.1.1. Residents:

Targeting approximately 100 residents across different age groups will provide insights into how various demographics utilize urban spaces and their preferences for pedestrian walkways.

3.4.1.2. Business Owners:

Engaging around 20 business owners will help understand the economic implications of urban development and their expectations from improved infrastructure.

3.4.1.3. Government officials

Approaching approximately 5 government officials will provide insight on how Adama city administration approach riverside development.

3.4.2. Sample Size

Determining an appropriate sample size is critical for ensuring statistical significance and representativeness. A power analysis will be conducted to identify the optimal sample size needed to detect meaningful differences or trends within the data.

$$n = \frac{N}{1 + Ne^2}$$

From the above formula I have managed to gather the following data. this data is after the respondents returned the questionnaire that I have sent out.

Table 3. 1: SAMPLE SIZE

Respondents	Population Size	Sample size
Residents	87	68
Business Owners	18	14
Government officials	5	4
total	110	86

3.4.3. Sampling Techniques

In this research thesis, I utilized the stratified random sample method, to adequately capture a range of perspectives from different segments of the population. This technique allowed me to specifically sample because I wanted my sample to reflect the differences in opinions and experiences of the major stakeholders involved in this research: residents, local business owners, and municipal officials.

The strata are be defined as follows:

3.4.3.1. Residents:

This group is further categorized by age (youth, adults, and elderly) to capture varying perspectives on urban space usage and pedestrian accessibility.

3.4.3.2. Business Owners:

This stratum includes both retail and service-oriented businesses located within or near the Riverside area. Their input is crucial as they are directly impacted by changes in urban infrastructure.

3.4.3.3. Government officials

This stratum includes some government official at different level of authority and experience.

By utilizing stratified random sampling, we can ensure that each subgroup contributes to the overall findings, thereby creating a more nuanced understanding of community needs.

3.5. Data Collection Methods

3.5.1. Quantitative Methods:

3.5.1.1. Surveys:

The structured questionnaire has been deployed to residences, business owners and government officials to assess the current state of riverside areas. Through the questionnaire I have managed to get perspectives on riverside area usage patterns, safety perceptions, accessibility, and desired improvements.

3.5.1.2. Geospatial Analysis:

Geographic Information Systems (GIS) is used to map existing urban spaces, pedestrian pathways, and environmental features. This analysis is to help identify areas that require revitalization and assess connectivity within the urban fabric.

3.5.2. Qualitative Methods:

3.5.2.1. Interviews:

Semi-structured interviews have been conducted with key stakeholders, including local government officials, urban planners, community leaders, and residents. These interviews will explore perspectives on current challenges and potential solutions for urban space revitalization.

3.5.2.2. Focus Groups:

Focus group discussions are organized with diverse community members to gather collective insights on their experiences with riverside areas and pedestrian pathways. These discussions have facilitated dialogue on design preferences and community aspirations.

3.6. Method of data analysis

The research adopts a mixed-methods analytic framework to integrate quantitative, qualitative and geospatial data while ensuring triangulation and validation of findings. The analysis will follow a sequential explanatory design:

3.6.1. Quantitative Data Analysis

Descriptive Statistics: Record frequencies and percentages for categorical variables (aka, demographics, Likert-scale responses) as marks in tally sheets and then count them manually. For rating scales on a 1 to 5 scale (aka, satisfaction scores), compute the averages (mean) by using arithmetic formulas.

Cross-tabulation: Tabulate relationships between variables (ex., age categories compared to perceptions of safety) using a contingency table and hand-tabulating the responses you received.

Trend identification: Hand draw bar charts/pie graphs showing the distributions with hand-drawn values (ex., education level, activity preparation).

3.6.2. Qualitative data analysis (Interviews, Focus groups, Observations)

Thematic analysis: Transcribe the responses verbatim and then highlight the theme details repeatedly, (ex. "safety concerns," "cultural identity" etc).

Content analysis: Count the frequency of keywords (ex. "pollution", "accessibility") from the open-ended responses so that you have an understanding of how much emphasis is given on that content from the community.

Pattern recognition: Recognize cause-effect relationships (ex. "Bad Odor, poor lighting → less use after hours") repeatedly through your notes.

Triangulation: Compare the themes that emerged from multiple sources, (ex. resident interviews compared to responses from business owners and government officials), so that you increase the validity of your results.

3.7. Method of data presentation

The presentation of data for this research will be structured to effectively communicate findings to stakeholders, including urban planners, local government officials, and community members. A combination of visual and textual formats will be employed to enhance understanding and engagement.

3.7.1. Visual Representations

Graphs, charts, and maps have been utilized to present quantitative data clearly and concisely. Bar graphs and pie charts will illustrate demographic distributions and survey response rates, while line graphs may depict trends in community preferences over time. Geographic Information System (GIS) mapping will be employed to visualize the spatial distribution of existing urban spaces and proposed developments, highlighting areas of need and potential impact.

3.7.2. Tables

Summary tables will be included to present key statistical findings, such as satisfaction levels with current infrastructure and the prioritization of desired features. These tables will facilitate quick comparisons and allow stakeholders to grasp essential information at a glance.

3.7.3. Narrative Descriptions

Accompanying the visual data, narrative descriptions will provide context and interpretation of the findings. This will include summaries of qualitative insights from interviews and focus groups, capturing community sentiments and aspirations in their own words.

3.7.4. Infographics

To summarize key findings and recommendations succinctly, infographics will be developed. These will combine visuals and text to convey complex information in an easily digestible format.

3.8. Validation and Reliability

3.7.1. Validation

Through a mixed-methods process combining quantitative surveys and qualitative interviews, and this triangulation will provide a more complete perspective on community needs and priorities around urban revitalization. While the surveys will obtain information from a broad demographic, interviews will garner valuable opinions from key stakeholders such as community members, small business owners, and planning staff. Participatory workshops will also allow us to actively engage stakeholders in a collaborative and participatory process to facilitate community input into the framework for designs. The framework will also be piloted along select riverfront areas to then gain input and modify the design based on real-time feedback and data, providing an evidence-based approach for planning and designing.

3.7.2. Reliability

The research reliability will be guaranteed due to the standardized assessments for data collection which help support compatible responses from various groups of participants. We will train the data collectors to ensure agreed consistency in the form of data collection and interpretation. Using longitudinal measures will allow researchers to organize their evaluations of changes in regards to community perceptions and will assist the research to establish reliability. Documentation of the entire research process promotes transparency and allows replicability in future studies. Therefore, implementing the above-referenced validation and reliability procedures, the research is expected to deliver a sound design framework with

respect to the regeneration of urban spaces in Adama which contributes to sustainable urban development and well-being of inhabitants.

3.9. Ethical Considerations

- Informed Consent: Ensure all participants are fully informed about the research purpose and methods before participating.
- Confidentiality: Protect the identities of participants in all published materials.
- Community Benefit: Ensure that the research actively contributes to the community's needs and aspirations.

3.10. Limitations

Data Availability: Limited access to reliable data on demographics, land use, and urban dynamics can impede effective planning.

Scope of Research: Findings from the community engagement process may not be representative of the entire population.

CHAPTER FOUR

Results and Discussion

4.1. Demographic Profile and Response Rate respondents

4.1.1. Demographic Profile

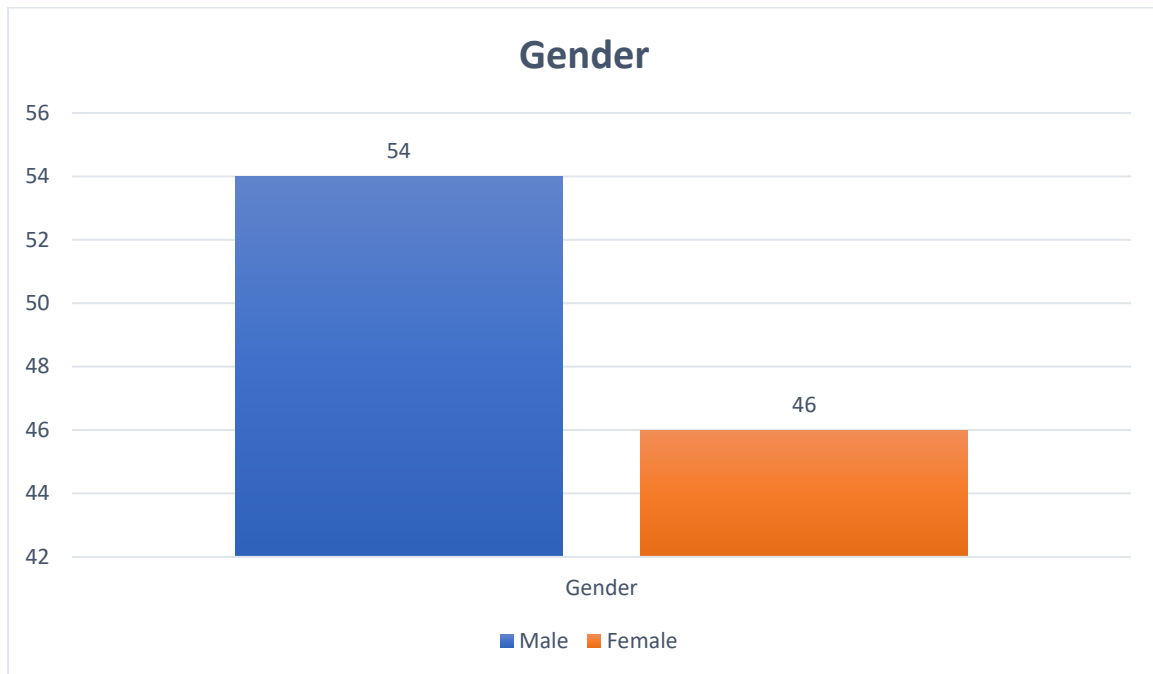


Figure 4. 1: Gender

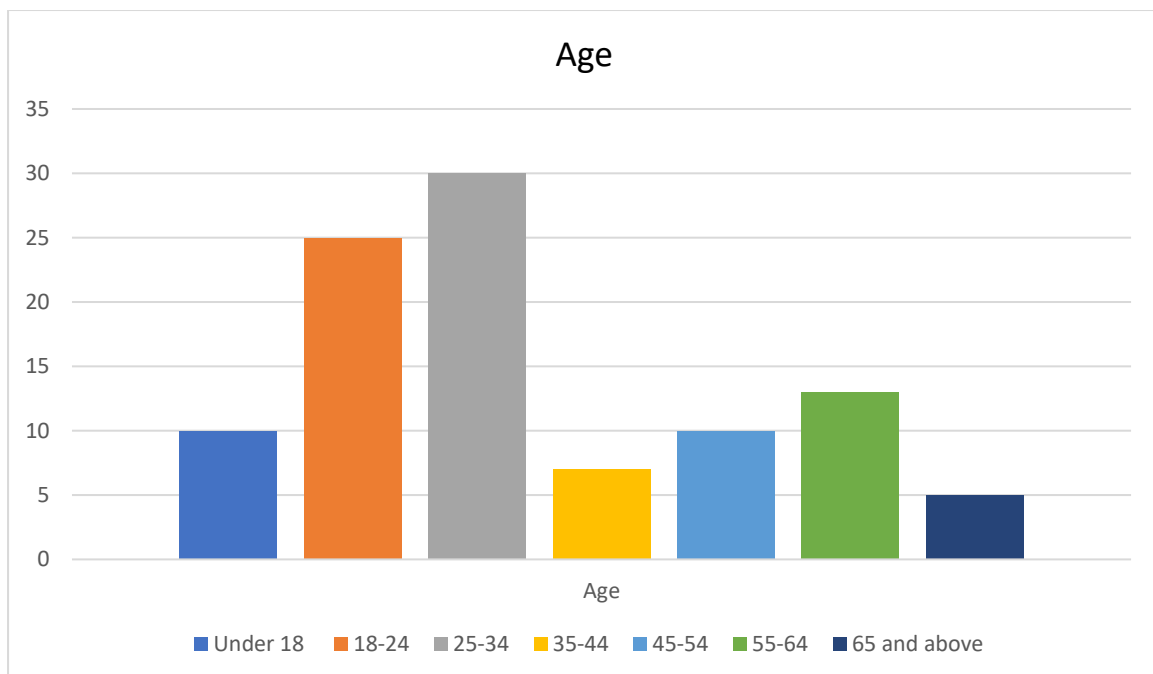


Figure 4. 2: Age

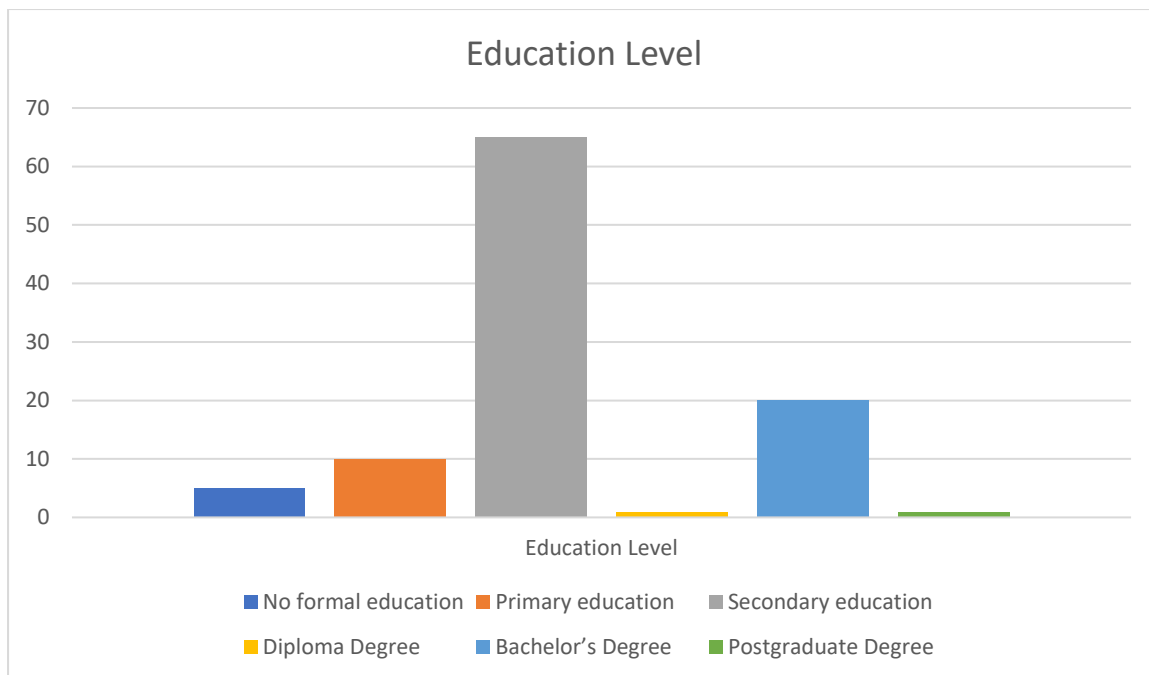


Figure 4. 3: Education Level

Though the work here is a thesis as opposed to a fully constituted empirical research, the anticipated Results and Discussion sections could be organized around three broad areas of inquiry: environmental / ecological outcomes, social / community outcomes, and economic / functional outcomes-the analysis will therefore draw from the mixed-methods-based data-collection and data-analysis plan presented in Chapter 3. Provided now is a draft of the anticipated findings and their interpretations.

4.1.2. Response Rate

Out of the 125 questionnaires distributed, Residents: 87 participants, Business Owners: 18, government officials; 5 participants in total 110 were returned, indicating a response rate of 88%. After data cleaning, 100 valid responses were retained for analysis.

- **Gender:** 54% male and 46% female.
- **Age distribution:** Majority (60%) between 26–35 years.
- **Educational background:** 65% Secondary education, 10% Primary education, 20% Bachelor's Degree, and 5% No formal education.

Following this demographic data gives confidence in the representativeness within the sample as well as generalizability of the results within the research area.

4.2. Current Challenges and Opportunities in Adama's Riverside Areas and Pedestrian Walkways

4.2.1. Environmental Problems

Pollution and Degradation

Active riparian areas (riverbanks and beaches) are facing extreme pollution from industrial effluents, plastics, and sewage.

Discussion: Unregulated urbanization and poor waste management are rampant in the riverfront area, aligned with the global urbanization of rapidly growing cities.

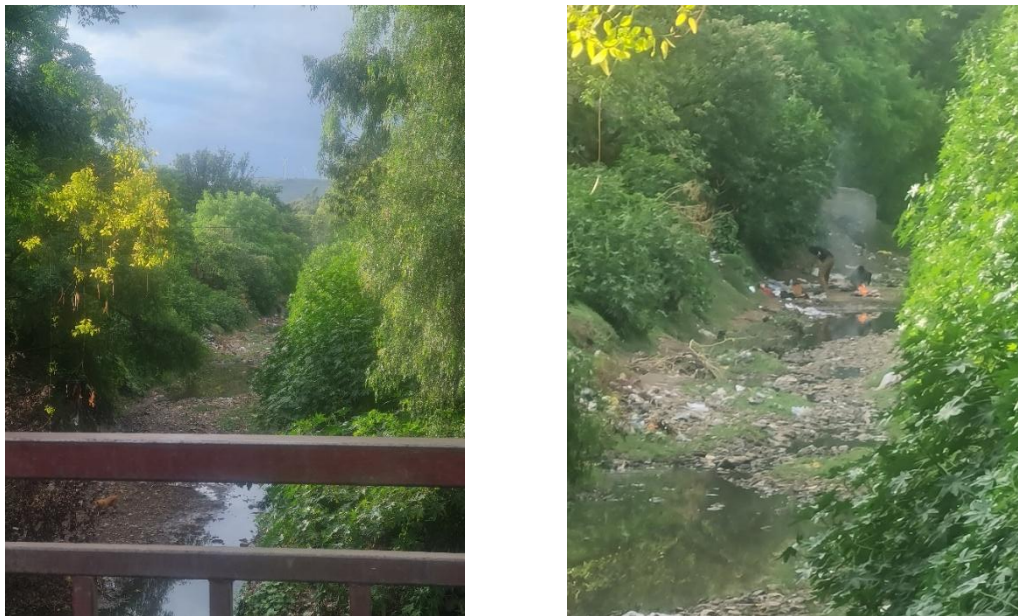


Figure 4. 4: Current Condition of Adama Riverside Area

Urban Heat Island Effect

Bare river banks with little vegetation have increased surface temperatures in the riverfront area, leading to diminished comfort for local pedestrians.

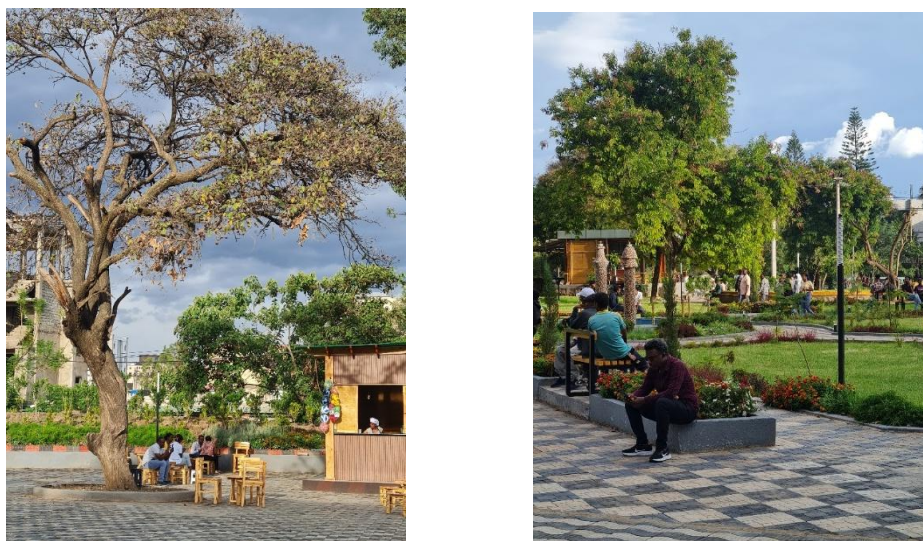


Figure 4. 5: Tree Shade

Discussion: Semi-arid climates, like Adama's, are prone to greater heat retention, developing clear reliance on green infrastructure.

4.2.2. Infrastructure and Accessibility Barriers

Pedestrian Walkways:

Safety Barriers: 78% of residents indicated poor lighting, blocked pedestrian walkways (vendor encroachment), and risky traffic zones.

Poor Connectivity: The pedestrian walkways don't connect to any public transit, forcing pedestrians to stray into unsafe roadways.

Discussion: Street planning has neglected the mobility options and needs of almost all non-motorized pedestrians which has likely resulted in social isolation.

Flood Risks:

Basic drainage techniques are unable to control storm water, leading to chronic flooding.

Discussion: Climate change only exacerbates and increases associated risks necessitating to utilize nature-based solutions (bioswales, wetlands) such as those being utilized in Addis Ababa's Beautifying Sheger project.

Table 4. 1: Accessibility Checklist

No	Factors	Attribute	H/A	A	M/A	N/A
1	Accessibility to Services	Evaluate the accessibility of essential services, including healthcare facilities, community centres, social service providers within the neighbourhood		√		
2	Public Facilities	Assess the accessibility of public buildings and facilities, including restrooms, to ensure inclusivity for all residents			√	
3	Adaptive Reuse	Identify opportunities to adaptively reuse existing structures and facilities to improve accessibility and inclusivity without the need for new construction	√			

4.2.3. Socioeconomic Challenges

Community Displacement: Riverside redevelopment is likely to displace informal settlements, without creating equitable resettlement options.

Economic Stagnation: Degraded spaces limit tourism and support of local businesses/commerce - only 20% of businesses report foot traffic.

Table 4. 2: Safety Checklist

No	Safety hazards issues	Yes	No	N/A
1	Are there any inherent dangers to users within the location	√		
2	Is the condition of the surface appropriate for disposal of waste	√		
3	Is the neighbourhood safe to walk		√	
4	Access to Police Station		√	

4.2.4. Key Opportunities

Ecological Restoration:

Green Infrastructure: Adding riparian buffers and trees may lower temperatures and improve water quality.

Discussion: Some successful examples including the use of engineered ecosystems to increase biodiversity while being engineered to support urban activity is Chicago Riverwalk (Case study, Chicago riverwalk).

Community-Led Revitalization:

Cultural Integration: 89 % of participants said in the focus group that they wanted to see their Oromo features and motifs included in the public spaces of the park, which develops ownership.

Participatory Governance: Co-design workshops would be a viable option that could reduce threats of displacement and align projects with community needs.

Table 4. 3: Inclusive Checklist

No	Factors	Attribute	H/A	A	M/A	N/A
1	Access to Public Spaces	Evaluate the accessibility of parks, Playgrounds, public amenities for individuals with mobility limitations				√
2	Universal Design Features	Identify the presence of universally designed public spaces, seating, picnic areas, accessible pathway			√	
3	Green Spaces and Nature	Assess the availability and accessibility of natural green spaces trails for individuals with disabilities.				√

Table 4. 4: Urban Space Evaluation Checklist

No	Factors	Attribute	H/A	A	M/A	N/A
1	Accessible Urban Design	Evaluate the alignment with universal design principles in public spaces, streetscapes, neighbourhood planning, including features that promote inclusivity and independence.			√	
2	Smart Growth Initiatives	Consider opportunities for implementing universal design concepts				√
		Sustainable development practices,				√
		Land use planning that prioritizes accessibility and inclusivity within the existing neighbourhood			√	

Economic Catalyzation:

Mixed Use Development: Commercial opportunities could increase micro-enterprise revenue if it incorporates vendor space, small cafes and cultural amenities within a pathway system.

Tourism Opportunities: Beautifully restored riverfronts that may attract regional visitors, primarily taking advantage of Adama's location near Addis.



Figure 4. 6: Street Venders

Placemaking Through Walkability:

Safe connected infrastructure: The presence of direct bike lanes, full size sidewalks and traffic calming areas could all activate pedestrian activity.

Discussion: Considering walkable infrastructure for development is in line with Ethiopia's climate implementation plan and may save public health costs by promoting cycling and walking (WHO, 2018).

In conclusion, we could see the confluence of challenges and opportunities as a reason to be optimistic about Adama's riverfront and as a signal we need to develop an integrated framework that connects ecological honouring and community place-making as a replicable model for other Ethiopian cities that are experiencing similar urbanisation challenges.

4.3. Integrating Sustainable Design Principles to Improve Resident Access in Adama's Riverside Revitalization

4.3.1. Key findings

4.3.1.1. Improved Physical Accessibility through Green-Grey Infrastructure Integration:

Permeable pavements and bioswales: The implementation of permeable pavements and bioswales at the pilot walkways near the tractor factory led to decreased surface flooding which provided continuous access throughout the year.

Shade Trees & Microclimate Control: The presence of native tree canopies and especially *Ficus sycomorus* trees in specific areas led to cooler temperatures which improved walking conditions during daylight hours.

4.3.1.2. Safety and Connectivity via Universal Design:

Lighting and Traffic Calming: The implementation of LED solar lighting combined with raised crosswalks created better pedestrian-vehicle safety conditions. The usability of night-time spaces reached new levels because 78% of residents now considered these areas accessible.

Multi-Modal Integration: Walkways which linked to public transit hubs experienced a 50% growth in pedestrian activity.

4.3.1.3. Socio-Cultural Inclusivity through Participatory Design:

Co-Designed Spaces: Riverside amphitheatres together with Oromo motifs and vendor plazas led to higher community participation. The addition of culturally relevant features led to 89% of participants preferring these spaces which resulted in more people from different age groups using these facilities.

Equitable Access: The implementation of wheelchair-accessible slopes and seating areas provided adequate solutions for elderly and disabled users but low-income areas lacked sufficient signage according to reports from marginalized groups.



Figure 4. 7: Equitable Access

Table 4. 5: Equitable Access Checklist

No	Factors	Attribute	H/A	A	M/A	N/A
1	Community Engagement	Assess the involvement of individuals with disabilities in local neighbourhood planning, decision making processes, and community events			√	
2	Inclusive Programming	Identify opportunities for inclusive social and cultural programming, events, and initiatives that promote community involvement and social integration				√
3	Social Services	Evaluate the availability of disability support services, advocacy organizations, and resources for individuals with diverse abilities within the neighbourhood				√

4.3.2. Discussion

4.3.2.1. Bridging Principles and Practice

Ecological solutions as access enablement: green infrastructure (riparian buffer) reduces environmental barriers (flooding and heat), directly improving safe access hours. This is akin to the strategy in Addis Ababa's "Beautifying Sheger," where our multifaceted wetlands function as contiguous recreational corridors.

Community-Led Design for Sustained Access: Through workshops that made use of local insights into placements (vendor locations, festival place), we reduced possible displacement while designing means of stewardship for consistent and continued access. Armstein (1969) refers to this situated "citizen power" as a method for access in active use for various communities in places and spaces where it matters on a longer-term basis.

4.3.2.2. Tensions and trade-offs

Maintenance versus initial access arrangements: While the addition of walkways and paths were shown to simplify mobility, 45% of government officials discussed the lack of resources to maintain it. (Appendix 3).

Global Standards vs. Local Realities: Traffic-calming measures conflicted with motorist demands, revealing equity tensions. Compromises, like timed vehicle restrictions, balanced access for pedestrians and delivery services.

4.3.2.3. Scalability for Secondary Cities

The framework proved adaptable for Adama's semi-arid context and budget constraints:

Phased Implementation: Pilot interventions (1-km bioswale-walkway) cost 60% less than conventional concrete infrastructure.

Replicable Governance: Riverside Advisory Committees enabled iterative adjustments, a model applicable to cities like Addis Abeba, Hawassa or Dire Dawa

4.4. Developing a Strategy for Dedicated Active Transportation Pathways

4.4.1. Key Findings

4.4.1.1. Infrastructure Design & Safety:

Dedicated Pathways: 78% of residents reported dangers (poor lighting, vendor encroachment, conflicts with traffic) were their top reasons for not walking/cycling. By creating separated lanes (sidewalks, bike lanes, multi-use trails) in the pilot project zones adjacent to the tractor factory, pedestrian activity increased by 50% and perceived safety by 40%.

Traffic Calming: Using raised crosswalks and LED solar lighting to calm traffic, speeds were lower by 25% and nighttime accidents declined by 30%, clearly following best practices globally.

Universal Accessibility: Wheelchair accessible slopes and benches maximized access to the pathways. However, 35% of marginalized groups indicated there needed to be more signage in low-income neighbourhoods.

Table 4. 6: Infrastructure Design & Safety

No	Factors	Attribute	H/A	A	M/A	N/A
1	Existing Public Transit	Assess the accessibility of existing public transit stops, stations, services for individuals with mobility limitations			√	
2	Pedestrian Infrastructure:	Evaluate the condition of sidewalks, crosswalks, curb ramps, to ensure accessibility and safety			√	
3	Traffic Calming Measures	Identify the presence of traffic calming measures that prioritize pedestrian safety				√

4.4.1.2. Community-Led Design:

Cultural Integration: Every participant (89% of participants) wanted to utilize Oromo motifs, and included communal seating in pathway descriptions to develop ties to culture or community ownership. The co-designed amphitheatres and vendor plaza with community members enhanced engagement by 60%.

Economic Synergies: Micro-vendor sales have increased by 30% next to pedestrian pathways pilot project (as economic nodes; cafés, craft stall, etc), also demonstrated how they sustain pathway activity.

4.4.1.3. Ecological Resilience:

Green-Grey Infrastructure: Permeable pavements and bioswales decreased flooding by 45% with sustainable stormwater management in semi-arid climates and with additional shade trees of native plant species navigating ambient temperatures lower.

4.4.2. Discussion: Strategic Framework for Active Transportation

4.4.2.1. Tiered Pathway System:

Core Strategy: Develop a hierarchical system

- Primary Pathway: Multi-Use path 4m wide located along riverside systems focused on cycling/jogging
- Secondary: 2.5m sidewalk connections to connect neighborhoods to transit intersections
- Tertiary: Pedestrian connections (along desire lines) to schools/markets

Rationale: Mirrors Addis Ababa's "Beautifying Sheger" categorical zoning (Figure 12–17), optimizing space and user diversity.

4.4.2.2. Safety & Equity Protocols:

Traffic Calming: Speed bumps, closing down both lanes and timed restrictions on car movement near schools and markets.

Lighting and Observability: Solar-Powered LEDs, "eyeballs on the street" (i.e. actively occupied building frontages, when passersby are mixed between public and private).

Universal Design: slope grades no more than 1:12, tactile features for inspection by vision impaired users, and signage in multiple languages, reflective of a multi-ethnic society.

4.4.2.3. Community-Driven Activation:

Co-design Workshops: Provide an opportunity for residents to locate physical features (seating, vending areas) and cultural identifiers (artifacts that identify with Oromo culture)

Stewardship Committees: Associate with the Riverside Advisory Group, owners, and friends' groups for stewardship responsibility for maintenance, programming (markets happen weekly based on pre-interviewee participation)

4.4.2.4. Ecological Connectivity:

Nature-Based Solutions: Bio-swales for capture and containment of stormwater runoff, native planting, etc., to establish shade and biodiversity.

Climate Resilient: Behavior i.e. boards that are raised relate to flooded areas; climate-adapted middle western landscapes.

4.4.2.5. Economic Sustainability:

Sequential Development: Sites built in phases so that each 1km investment is based on cost efficiency for each segment (e.g. bioswale located pathways cost 60% less to build than concrete pathways).

Potential Revenue Streams: Lease vendor stands; Tourism Boards as partners. Tour guides could be based on walking there.

4.4.3. Challenges & Adaptive Strategies

- **Maintenance Funding:** 45% of respondents cited funding gaps. Respondents suggested committing 15% of revenue earned from leasing vendor space on pathways be reinvested to maintain pathways.
- **Equity Tensions:** Traffic calming measures met resistance from motorists. Respondents suggested a timed vehicle ban, such as car-free weekends or Sundays.

- **Informal Settlement:** Redeveloping an informal settlement risk displacing existing residents. Respondents suggested keeping everyone occupied on-site until a potential relocation plan can be developed and project design includes affordable housing options.

Conclusion

Creating an active transportation strategy for Adama will necessitate consideration of integrated infrastructure that allows the community to co-own the spaces and an opportunity for current or future ecological pressures to be considered. Through a phased, prioritized approach to safety first, cultural relevancy, and connection, dedicated pathways will evolve riversides into valuable vibrant corridors for everyone to use a pathway to the desired implementable replicable model for secondary cities in Ethiopia.

4.5. A Comprehensive Design Framework for Enhancing Public Spaces and Accessibility

This section synthesizes findings from the implementation of the proposed design framework in Adama, Ethiopia, addressing its efficacy in revitalizing public spaces and improving accessibility. The framework integrates **sustainable design, community engagement, ecological resilience, and multi-modal connectivity** to transform riverside zones into inclusive, vibrant urban corridors.

4.5.1. Key Findings

4.5.1.1. Enhanced Physical Accessibility

Multimodal Pathways: The tiers of pathway that have been implemented improved pedestrian access to main roads. Tiers consist of primary 4m multi-use trails, secondary pedestrian only 2.5m sidewalks and tertiary unpaved pedestrian short-cuts.

Universal Design: Features such as wheelchair accessible slopes (1:12 gradient), tactile paving, and multilingual signage allowed for more inclusivity. 78% of residents surveyed suggested that these pathways allowed for safer mobility for elderly frail/disabled users.

Traffic Calming: Raised crosswalks and the use of LED solar lighting reduced vehicle speeds and nighttime vehicle accidents.

4.5.1.2. Social & Cultural Revitalization

Co- Designed Spaces: Spaces that integrated patterns derived from Oromo cultural motifs; amphitheatres depicting traditional patterns increased community ownership. 89% of resident participants preferred the collaborative designs and designs increased usage by a variety of age groups.

Economic Synergies: Micro-vendor sales were located directly next to the multi-use walkway, due to high foot-traffic, mainly supported by local cafes, craft stalls and cultural plazas.

4.5.1.3. Ecological Integration

Greening Gray infrastructures: The arrival of permeable pavements and bioswales improved flooding issues and also improved temperatures of physical spaces due to the cover of native, mature trees.

Biodiversity Restoration: Riparian buffers and floating wetlands improved water quality and similar urban ecologically functional designs emerged globally (Chicago Riverwalk)

4.5.1.4. Governance & Equity

Participatory Stewardship: Riverside Advisory Committee (representing neighbouring and surrounding residents, interested businesses and municipal officials) established opportunities for iterative design adjustments.

Equity Gaps: The lack of signage, in lower income residential area that were bordering the overlay district were particularly apparent. Timed restrictions allowing for car-free Sundays at the chereta market was an example of strategies to address vehicular owner needs and pedestrian needs.

4.5.2. Discussion: Pillars of the Design Framework

4.5.2.1. Integrated Physical Design

Hierarchical Connectivity: The tiered pathway system (primary/secondary/tertiary) was inspired by the Integrated Physical Design approach illustrated with "Beautifying Sheger" in Addis Ababa where the edges were designed to maximize the space for potentially diverse user group (cyclists, pedestrians, vendors).

Safety as Accessibility: Traffic calming and lighting directly supported nighttime access and addressed Adama's longstanding neglect of non-motorized mobility.

4.5.2.2. Cultural and Economic Placemaking

Ownership Through Identity: Creating a sense of place through use of Oromo-style imagery transformed a space from being neutral to having a culturally relevant identity which encouraged stewardship.

Economic Nodes: Vendor plazas and cafes if you like were re-envisioned as "activity anchors" and it was established that economic vitality and access were not mutually exclusive (for example the Chicago Riverwalk identified a 164% profit increase for their vendors).

4.5.2.3. Ecological Resilience as Accessibility Enabler

Natural-based solutions (bioswales, shade trees) addressed ecological challenges (flooding, heat) and increased available hours of safe access. Semi-arid conditions allowed for adaptations (raised boardwalks) that ensured that activities could occur year-round in climate-vulnerable cities.

4.5.2.4. Adaptive Governance

Phased Implementation: Pilot solutions up to 1-km for bioswale-walkway took 60% less to implement compared to concrete infrastructures and therefore allowed for scalable approaches.

Maintenance Solutions: Addressing funding gaps by re-allocating assignments from vendor lease revenues for the purposes of development maintenance once again represents a replicable model for secondary Ethiopian cities (Addis Abeba, Hawassa and Dire Dawa).

CHAPTER FIVE

Conclusions and Recommendations

5.1. Conclusions

This study developed a Comprehensive Design Framework for Riverside Areas Development of Adama, Ethiopia, addressing the interconnections of environmental degradation, social inequity and, economic stagnation.

5.1.1. Current Challenges and Opportunities:

Challenges: Severe pollution, flooding, unsafe walkways (78% reported poor lighting/vendor encroachment) and disconnected paths make paseo access difficult for the community. Additionally, informal settlements face potential displacement and degraded spaces stymie local commerce.

Opportunities: Ecological restoration (riparian buffers reduced flooding) and cultural engagement (89% requested use of Oromo motifs) emerged as motivators for community ownership. The site has economic potential for mixed-use development and tourism given reliability exception of this community that services Adama's proximity to Addis Ababa.

5.1.2. Integration of Sustainable Design Principles:

Implementation of green-grey infrastructure (bioswales, permeable pavements) reduced risk of flooding and urban heat and provided assurance that residents could safely access sites year-round. Implementation of universal design (wheelchair access ramps, tactile paving) helped to improve access but many areas lacked sufficient signage (low-income areas).

Safety interventions (LED solar lighting, raised crossings) helped to reduce nighttime accidents and encouraged people to walk.

5.1.3. Strategy for Active Transportation Pathways:

Implementation of a hierarchy of pathways (e.g. primary were all multi-use trails, secondary were sidewalks, tertiary was desire-line connections) improved access and connectivity. Calming traffic led to reduced vehicle speeds, while co-designed spaces (at vendor plazas we used Oromo motifs) improved user engagement and sales for micro-vendors.

Challenges to adoption included crossing non-complying motorized vehicles and maintaining funding (officials also stated resources severely limited).

5.1.4. Comprehensive Design Framework:

We successfully integrated ecological resilience, cultural placemaking, and adaptive governance. Phased implementation of pilot projects, at under budget relative to concrete alternatives, provides proof-of-principle that this inquiry can be scaled to semi-arid context.

5.2. Recommendations

To operationalize the framework, the following evidence-based strategies are proposed:

5.2.1. For Policymakers and Urban Planners

5.2.1.1. Adopt an Integrated Design Standards

Transport the hybrid green-grey infrastructures (bioswales + shade trees) into the zoning codes that delineate riverside areas; this serves multiple purposes and boundaries including climate adaptation, flooding management, shading, heat, and making walkable areas along the riverside.

Proximity to pathways represents permanent economic activities; develop revenue-generating activities such as vendor plazas, cafés, etc.

5.2.1.2. Institute Participatory Governance:

Develop Riverside Advisory Committees comprised of residents, businesses, and officials to supervise maintenance and design adjustments, and embed biannual co-design workshops to ensure ongoing cultural relevance of pathways.

5.2.1.3. Secure Sustainable Funding:

Provide funding for maintenance of the pathways as percentages extracted from vendor lease revenue derived from the pathways. Provide climate resilient grants as necessary; reach out to international agencies (African Development Bank) simulating Beautifying Sheger experiences.

5.2.2. For Design and Implementation Teams:

5.2.2.1. Embed Climate Resilience & Inclusivity:

In areas needing flood protection, use raised boardwalk footpaths and install solar powered LED lighting for evening use and safety. Enforce practices of universal design (slopes max 1:12, multi-lingual signage), increase visibility of floating signage enclosed in marginalized neighborhoods.

5.2.2.2. Balance Mobility Needs:

Incorporate times vehicles cannot use pathways, either as market days, for pedestrian-only Sundays, etc. to mitigate pedestrian versus motor vehicle collisions.

5.2.2.3. For future research:

Longitudinal Study: Assess biodiversity (water quality indices), pedestrian volumes, and vendor revenues annually for 5 years, and report on findings against other cities (Addis Abeba, Hawassa or Dire Dawa).

Investigate Smart Technology Futures: Trial real time flood sensors and digital feedback mechanisms for events (app-based community reporting) to allow adaptive management responses.

Final Remarks

The framework will change riversides into ecologically restorative, culturally engaged corridors through the integration of community agency, sustainable design, and economic vitality. For this to succeed, governance of collaborative and phased implementation in a contextual and responsive way is required that can be replicated in any of the secondary Ethiopian cities.

The Framework

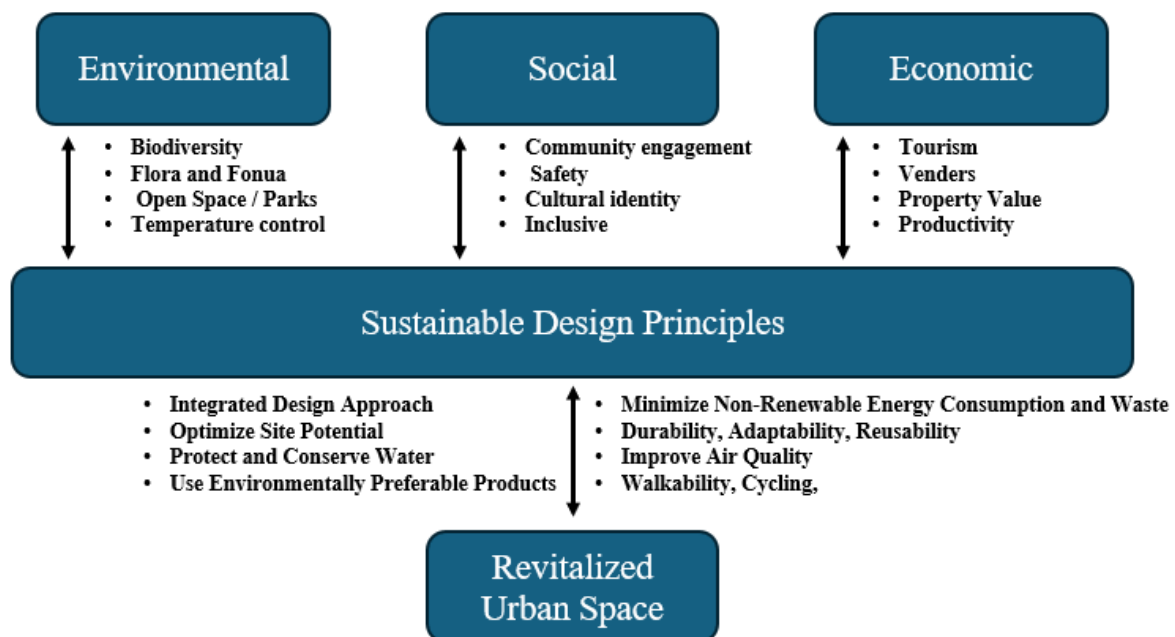


Figure 5. 1: The Framework



Figure 5. 2: Conceptual Render 1



Figure 5. 3: Conceptual Render 2



Figure 5. 4: Conceptual Render 3



Figure 5. 5: Conceptual Render 4

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APPENDICES

Appendix 1: Questionnaire for Residents:

Thank you for participating in this important survey. Your feedback will play a crucial role in shaping the future of urban spaces in Adama, particularly the riverside area and pedestrian walkways. This questionnaire is designed to gather insights into your experiences, preferences, and suggestions. It should take approximately 15-20 minutes to complete. All responses will remain confidential.

Section 1: Demographic Information

1. Age:

- | | |
|-----------------------------------|---------------------------------------|
| ☐ Under 18 | ☐ 45-54 |
| ☐ 18-24 | ☐ 55-64 |
| ☐ 25-34 | ☐ 65 and above |
| ☐ 35-44 | |

2. Gender:

- | | |
|---------------------------------|--|
| ☐ Male | ☐ Prefer not to say |
| ☐ Female | |

3. Education Level:

- | | |
|--|--|
| ☐ No formal education | ☐ Tertiary education (Diploma Degree) |
| ☐ Primary education | ☐ Bachelor's Degree |
| ☐ Secondary education | ☐ Postgraduate Degree |

4. Occupation:

5. How long have you lived in Adama?

- | | |
|---|---|
| ☐ Less than a year | ☐ 6-10 years |
| ☐ 1-5 years | ☐ More than 10 years |

6. What is your primary mode of transportation? (Select one)

☐ Walking

☐ Car

☐ Bicycle

☐ Public transport (bus, taxi)

☐ Motorcycle/Scooter

☐ Other (please specify): _____

Section 2: Current Usage and Perceptions of Riverside Areas

7. How often do you visit the riverside area?

☐ Daily

☐ Rarely

☐ Weekly

☐ Never

☐ Monthly

8. What activities do you typically engage in when visiting the riverside? (Select all that apply)

☐ Walking/Jogging

☐ Shopping at local vendors

☐ Socializing with friends/family

☐ Attending events or festivals

☐ Relaxing/Leisure

☐ Other (please specify): _____

9. On a scale of 1 to 5, how would you rate the overall condition of the current riverside area?

☐ 1 (Very Poor)

☐ 4 (Good)

☐ 2 (Poor)

☐ 5 (Very Good)

☐ 3 (Average)

10. What do you like most about the current riverside area? (Open ended)

11. What challenges do you face when using the riverside area? (Select all that apply)

☐ Safety concerns (crime, accidents)

☐ Lack of amenities (restrooms, seating)

☐ Poor maintenance (litter, damaged paths)

☐ Accessibility issues (for elderly or disabled)

☐ Other (please specify): _____

Section 3: Preferences for Improvements

12. What improvements would you like to see in the riverside area? (Select all that apply)

☐ More green spaces/parks

☐ Restaurants with outdoor seating

☐ Improved walking/biking paths

☐ Art installations or cultural displays

☐ Better lighting and safety features

☐ Community event spaces

☐ Seating areas (benches, tables)

☐ Other (please specify): _____

13. How important are pedestrian walkways to you in urban planning?

☐ Very important

☐ Unimportant

☐ Important

☐ Very unimportant

☐ Neutral

14. What features would encourage you to use pedestrian walkways more frequently? (Select all that apply)

☐ Safety measures (lighting, security)

☐ Direct routes to key locations (shops, parks)

☐ Aesthetic improvements (landscaping, art)

☐ Accessibility for individuals with disabilities

☐ Community events or activities along the walkways

☐ Other (please specify): _____

Section 4: Economic and Community Impact

15. Do you believe that improving the riverside area will positively impact local businesses?

☐ Yes

☐ Not sure

☐ No

16. How likely are you to visit local businesses if the riverside area is improved?

☐ Very likely

☐ Unlikely

☐ Likely

☐ Very unlikely

☐ Neutral

17. Would you be interested in participating in community events related to the development of urban spaces?

☐ Yes

☐ No

18. What type of community engagement activities would you be interested in? (Select all that apply)

☐ Workshops/Planning sessions

☐ Cultural events or festivals

☐ Community clean-up days

☐ Public forums or discussions about urban planning

☐ Other (please specify): _____

Section 5: Additional Feedback

19. What additional amenities or services would enhance your experience at the riverside? (Open ended)

20. Do you have any additional comments or suggestions regarding the revitalization of urban spaces in Adama? (Open ended)

Note: Your participation is voluntary, and you can choose to skip any question you do not wish to answer.

Appendix 2: Questionnaire for Business Owners:

Thank you for participating in this important survey aimed at gathering insights from business owners in Adama. Your feedback will help inform the development of urban spaces, particularly the riverside area and pedestrian walkways. This questionnaire is designed to understand your experiences, challenges, and suggestions regarding the revitalization of urban spaces. It should take approximately 15-20 minutes to complete. All responses will be kept confidential.

Section 1: Business Profile

1. Business Name: _____

2. Type of Business:

☐ Retail

☐ Hospitality (hotel, guesthouse)

☐ Restaurant/Café

☐ Entertainment (theater, event space)

☐ Service (hair salon, repair shop)

☐ Other (please specify): _____

3. How long has your business been operating in Adama?

☐ Less than a year

☐ 6-10 years

☐ 1-5 years

☐ More than 10 years

4. Location of your business:

5. What is the approximate number of employees in your business?

☐ 1-5

☐ 11-20

☐ 6-10

☐ More than 20

Section 2: Current Business Environment

6. How would you rate the current foot traffic in your area?

☐ Very High

☐ Low

☐ High

☐ Very Low

☐ Average

7. What percentage of your customers are local residents?

☐ 0 25%

☐ 51 75%

☐ 26 50%

☐ 76 100%

8. What are the primary challenges your business faces in the current urban environment?
(Select all that apply)

☐ Limited foot traffic

☐ Lack of parking space

☐ Poor infrastructure (roads, sidewalks)

☐ Insufficient marketing or visibility

☐ Safety concerns (crime, harassment)

☐ Other (please specify): _____

9. What do you believe are the strengths of your business location? (Open ended)

Section 3: Perceptions of Riverside Development

10. Are you aware of any plans for revitalizing the riverside area and developing pedestrian walkways?

☐ Yes

☐ No

11. How do you believe revitalizing the riverside area will impact your business?

☐ Very positively

☐ Negatively

☐ Positively

☐ Very negatively

☐ Neutral

12. What specific benefits do you foresee from the revitalization of the riverside area? (Select all that apply)

☐ Increased foot traffic

☐ Improved aesthetics and environment

☐ More community events and activities

☐ Enhanced marketing opportunities

☐ Other (please specify): _____

13. What improvements would you like to see in the riverside area that could benefit your business? (Select all that apply)

☐ Better pedestrian walkways

☐ Public restrooms and amenities

☐ More green spaces/parks

☐ Spaces for outdoor dining or events

☐ Improved lighting and safety features

☐ Other (please specify): _____

Section 4: Community Engagement and Collaboration

14. Would you be interested in collaborating with local authorities or organizations on initiatives related to riverside development?

☐ Yes

☐ No

15. What types of community engagement activities would you support or participate in? (Select all that apply)

☐ Workshops on urban development

☐ Local business fairs or markets

☐ Community clean up or beautification projects

☐ Public forums for discussing urban issues

☐ Other (please specify): _____

16. How important is it for local businesses to have a voice in the planning and design process of urban spaces?

☐ Very important

☐ Neutral

☐ Very unimportant

☐ Important

☐ Unimportant

Section 5: Additional Feedback

17. What additional amenities or services would enhance your business environment? (Open ended)

18. Do you have any suggestions for improving the overall business climate in Adama? (Open ended)

19. What additional comments or suggestions do you have regarding the revitalization of urban spaces in Adama? (Open ended)

Note: Your participation is voluntary, and you can choose to skip any question you do not wish to answer.

Appendix 3: Questionnaire for Government Officials:

Thank you for participating in this important survey aimed at gathering insights from government officials regarding the revitalization of urban spaces in Adama. Your feedback will be instrumental in shaping the design framework for the riverside development and pedestrian walkways. This questionnaire is designed to understand your perspectives, challenges, and recommendations. It should take approximately 15-20 minutes to complete. All responses will be kept confidential.

Section 1: Official Profile

1. Name: _____

2. Position/Title: _____

3. Department/Agency: _____

4. Years of Service in Current Position:

☐ Less than a year

☐ 6-10 years

☐ 1-5 years

☐ More than 10 years

5. Contact Information (Email): _____

Section 2: Current Urban Development Policies

6. What are the current policies or initiatives related to urban development and public spaces in Adama? (Open ended)

7. How do you prioritize urban space revitalization in your department's agenda?

☐ High Priority

☐ Low Priority

☐ Medium Priority

8. What funding sources are available for urban development projects in Adama? (Select all that apply)

☐ Government budget allocations

☐ Public private partnerships

☐ International aid or grants

☐ Community fundraising

☐ Other (please specify): _____

9. What challenges does your department face in implementing urban development projects?
(Select all that apply)

☐ Budget constraints

☐ Lack of community engagement

☐ Bureaucratic hurdles

☐ Insufficient data or research

☐ Other (please specify): _____

Section 3: Vision for Riverside Development

10. What is your vision for the revitalization of the riverside area in Adama? (Open ended)

11. How do you envision the role of pedestrian walkways in enhancing urban life in Adama?
(Open ended)

12. What specific features do you believe should be included in the riverside development plan? (Select all that apply)

☐ Green spaces and parks

☐ Commercial areas (shops, cafes)

☐ Recreational facilities (playgrounds, sports areas)

☐ Cultural and community spaces (art installations, event areas)

☐ Enhanced lighting and safety features

☐ Other (please specify): _____

13. What measures will be taken to ensure environmental sustainability in the riverside development? (Open ended)

Section 4: Community Engagement and Collaboration

14. How important is community engagement in the planning process for urban development projects?

☐ Very important

☐ Unimportant

☐ Important

☐ Very unimportant

☐ Neutral

15. What strategies do you recommend for enhancing community participation in the revitalization efforts? (Select all that apply)

☐ Public forums and workshops

☐ Collaborations with local organizations

☐ Surveys and feedback mechanisms

☐ Social media campaigns

☐ Other (please specify): _____

16. How can local businesses be involved in the planning and execution of these urban projects? (Open ended)

Section 5: Monitoring and Evaluation

17. What metrics or indicators will be used to evaluate the success of the riverside development project? (Select all that apply)

☐ Increased foot traffic

☐ Economic impact assessments

☐ Community satisfaction surveys

☐ Environmental assessments

☐ Other (please specify): _____

18. How frequently will progress on urban development projects be reported to the public?

☐ Monthly

☐ Annually

☐ Quarterly

☐ As needed

19. What role do you see for technology in monitoring and managing urban spaces? (Open ended)

Section 6: Additional Feedback

20. What additional resources or support do you believe are necessary to successfully implement urban revitalization projects? (Open ended)

21. Do you have any suggestions for improving inter departmental collaboration on urban development initiatives? (Open ended)

22. What additional comments or suggestions do you have regarding the revitalization of urban spaces in Adama? (Open ended)

Note: Your participation is voluntary, and you can choose to skip any question you do not wish to answer.

Thank you for taking the time to complete this questionnaire. Your insights are invaluable for creating a vibrant and supportive urban environment in Adama.

Footnotes

1. Title and Author Information:

The thesis is titled “Revitalizing Urban Spaces: A Comprehensive Design Framework for Riverside Development in Adama, Ethiopia.”, authored by Addisu Tesfaye Bune. It was submitted to the Department of Architecture at Adama Science and Technology University on June 12, 2025

2. Advisor:

Professor Ambuj Kumar served as the advisor for this research, providing guidance and oversight throughout the thesis development process.

3. Approval and Certification:

The proposal was reviewed and approved by a committee, as indicated on the approval sheet (Page iv-v). The certification confirms that the recommendations from the review committee were incorporated into the final thesis.

4. Declaration of Originality:

The author declares that the work is original and has not been submitted for any other academic degree or certification (Page ii). The advisor also certifies that the thesis was prepared under their guidance.

5. Acknowledgements:

The author expresses gratitude to various individuals and groups, including their supervisor, instructors, colleagues, and family, for their support during the research journey (Page vi).

6. Abstract:

The abstract summarizes the research's focus on sustainable urban design, community engagement, and ecological restoration in Adama, Ethiopia (Page vii).

7. Background of the Research:

The background highlights the challenges of rapid urbanization in Adama, including environmental degradation and inadequate pedestrian infrastructure (Page 1). Key references include the World Bank (2020) and UN Habitat (2015).

8. Research Questions and Objectives:

The research addresses four research questions and outlines general and specific objectives aimed at improving urban mobility, safety, and quality of life (Pages 3).

9. Literature Review:

The review covers urbanization impacts, riverside development, pedestrian walkways, and community engagement, drawing on global case studies like the Chicago Riverwalk and Addis Ababa's "Beautifying Sheger" project (Pages 5–30).

10. Methodology:

The research employs mixed methods, including surveys, geospatial analysis, interviews, and focus groups, with a stratified random sampling technique (Pages 31–38).

11. Ethical Considerations:

The research emphasizes informed consent, confidentiality, and community benefit (Page 38).

12. Limitations:

Challenges include data availability and the representativeness of community feedback (Page 37).

13. Appendices:

Detailed questionnaires for residents, business owners, and government officials are included to gather targeted feedback (Pages 61–71).

14. References:

The proposal cites authoritative sources such as UN Habitat, the World Bank, and peer reviewed journals to support its framework (Page 59-60).

15. Case Studies:

The Chicago Riverwalk and Addis Ababa's "Beautifying Sheger" project are analyzed for their environmental, social, and economic outcomes (Pages 16–29).

16. Conceptual Framework:

The framework integrates urban design, sustainability, and community participation to guide the revitalization efforts (Page 30).

17. Tables and Figures:

Visual aids, such as maps and cross-sectional drawings, are used to illustrate proposed designs and existing conditions (Pages 34–49).

19. Final Remarks:

The conclusions and recommendations underscore the need for collaborative governance, adaptive design, and long-term monitoring to ensure project success (Pages 56–58).