



Agro-Blue Commons: Reframing Recreation Through Food–Water–Leisure Integration in the Global South

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Article History

Received: January 13, 2026

Accepted: June 25, 2026

Published: August 10, 2026

Abstract

Recreational planning in the Global South is frequently shaped by imported Western models that prioritize ornamental aesthetics and access for affluent groups while inadequately addressing local socio-ecological challenges. Such single-purpose landscapes often become metabolically inefficient, resource-intensive, and socially exclusionary. This paper proposes the Agro-Blue Commons (ABC) as an integrated form of socio-ecological infrastructure combining urban food systems, sustainable water management, and communal recreation. Moving beyond a purely conceptual framework, the study employs a qualitative cross-case synthesis of four regional prototypes located in Lagos, Mumbai, Rajasthan, and Nairobi. These prototypes were selected through purposive sampling based on their high levels of informality, population density, and vulnerability to climate change. The cases were analyzed using a multi-criteria assessment (MCA) framework structured around three key criteria: metabolic circularity, polycentric governance, and socio-spatial accessibility. The ABC model draws on the environmental-health research and selected European resource-management traditions, including Walery Goetel's sustainability-oriented framework and nineteenth-century ecological prevention initiatives implemented in Kraków. By conceptualizing recreation as a survival metabolism, the ABC framework provides a decolonized roadmap for transforming ornamental urban spaces into productive commons. The findings suggest that polycentric governance and the integrated provision of food, water, and recreation may strengthen urban resilience, improve access to locally produced food, and reduce exposure to water-related health risks. However, these benefits depend on addressing institutional inertia, insecure land tenure, fragmented municipal responsibilities, and the risk of green gentrification.

Keywords:

protected areas; recreation impacts; land use change; off-site impacts; environmental footprint; sustainable tourism

1. Introduction

Recreational planning in the Global South is affected by the past and present flaws of low-income neighborhoods that have come to public attention through a series of riots. Western Park models imported through colonial urban planning continue to dominate, despite their limited effectiveness in addressing contemporary socioecological challenges [1]. These models prioritize aesthetic landscapes, spatial enclosure, and elite access while overlooking the interconnected challenges of food insecurity, wa-

ter scarcity, and climate extremes that characterize most cities in Africa, Asia, and Latin America. Rather than supporting vulnerable urban communities, traditional recreational spaces promote exclusion, consume scarce public resources, and portray leisure as a distinct and superior domain separate from survival [2]. This challenge is further intensified by rapid and extensive urbanization. By 2050, the urban population in Africa and Asia is projected to double [3], resulting in the expansion of informal settlements, further degradation of wetlands and agricul-

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tural land, and increased exposure to floods, heat waves, and water scarcity. Integrating forecasting implications for these demographic trends is essential to ensure the ABC model can adapt to the rising population density and shifting age structures that will define these regions [3]. Recreational planning has failed to keep pace with these changes. In many cities, parks remain concentrated in affluent neighborhoods, leaving much of the population dependent on informal multifunctional spaces, such as riversides, vacant lots, and peri-urban farms, where subsistence and leisure coexist [4]. The continued dominance of elite-focused models indicates that the problem lies not only in policy but also at the conceptual level, where recreation is treated as separate from the socio-ecological metabolism of the city [5].

There are two major reasons why this assumption is problematic. First, it overlooks the existing reality that communities integrate leisure into their subsistence practices, such as fishing along waterways and celebrating agricultural cycles. Secondly, it deprives recreational areas of being able to provide ecological services, including flood regulation, food provision, and microclimate stabilization. Land and water are often regarded solely as aesthetic commodities, thereby limiting their potential to address broader urban needs. In contexts where food and water insecurity coexist with rapid urbanization, this represents a significant underutilization of limited ecological resources [6,7]. Therefore, a change in direction is crucial. Recreation should not be thought of as just an extra facility but as a part of the socio-ecological commons. Unlike broader concepts, such as Nature-Based Solutions (NBS) and Blue-Green Infrastructure, which primarily focus on ecological outcomes such as heat mitigation and stormwater drainage, the ABC framework is defined by its triadic integration of survival metabolism. A landscape is only an ABC if it inextricably links three functions: food production, water harvesting, and communal leisure infrastructure [8].

The ABC framework differs from Nature-Based Solutions (NBS) and Blue-Green Infrastructure through its mandatory integration of the three core dimensions of survival metabolism. While NBS may focus solely on ecological metrics (e.g., carbon sequestration), a landscape is only an ABC if it inextricably links food production, water harvesting, and communal leisure infrastructure. Commons theory emphasizes collective stewardship, multifunctionality, and adaptive governance, providing a framework for transforming recreational spaces into productive infrastructures that are integrated into community life [9]. Based on this, the Agro-Blue Commons (ABC) model is proposed as a new paradigm. In essence, the ABC framework integrates agroecological production, blue in-

frastructure, and culturally rooted leisure practices within shared urban landscapes. Such spaces would not only provide opportunities for children and adults to engage in recreation and relaxation but also generate ecosystem services that enhance food and water security while supporting cultural continuity. The essential break with the existing paradigms is reflected in governance. Unlike conventional parks, which are typically managed by government authorities or privatized through concession agreements, the ABC framework promotes collective management systems aligned with the principles of the commons. However, the implementation of such collective systems must contend with significant 'governance realism' barriers, including insecure land tenure, municipal institutional inertia, and the constant risk of elite capture in high-value urban corridors [10,11]. Thus, the ABC framework serves as a mechanism to mitigate elite capture, legitimize community-based stewardship, and ensure equitable community access to and benefits from the project. The model also recognizes inherent risks, including fragmented governance, potential ecological tradeoffs, and the challenges associated with sustaining collective action. Addressing these issues requires well-structured accountability mechanisms and their integration into the broader urban governance framework.

The contribution of this paper is twofold. First, it identifies and critically examines the socioecological blind spots and exclusionary effects of dominant recreational models in the Global South. It also proposes the Agro Blue Commons as a conceptual framework for revitalizing recreational planning. Based on the governance of the commons, socio-ecological resilience, and urban metabolism, the framework reconceptualizes recreation as a regenerative infrastructure rather than a decorative element. It introduces a conceptual framework and a set of guiding principles for rethinking how urban land and water can be utilized to simultaneously support leisure, livelihoods, and ecological balance. By being in line with the debates on the urban commons and resilience, this intervention seems to tackle an overlooked aspect of urban theory. To date, the recreational function of infrastructure has received limited attention, although scholarship has increasingly recognized the need for multifunctional and adaptive infrastructure in climate-stressed cities. Thus, the ABC framework fills this gap by recasting recreation from a consumer of space into a socioecological practice and a collective institution. Consequently, it reconfigures the concept of recreation from the mere consumption of space to a collective practice deeply embedded in socio-ecological systems. Accordingly, it provides local communities and city administrations in the Global South with

new opportunities for policy development and empirical evaluation.

2. Methodology

This research employs a comparative case-study synthesis to evaluate the structural validity and metabolic potential of the Agro-Blue Commons (ABC) framework. Moving beyond narrative description, the study employs a Multi-Criteria Assessment (MCA) framework to analyze four regional prototypes: the Lagos Mangrove-Agro-Park, Rajasthan's Arid Catchment Commons, Mumbai's Koliwada Rooftop Networks, and Nairobi's Peri-urban Riparian Strips.

2.1. Sampling Strategy and Selection Criteria

The prototypes were selected using a purposive maximum variation sampling strategy [12], ensuring that the framework was evaluated across the diverse biomes of the Global South, including coastal wetlands, arid hinterlands, hyperdense urban cores, and riparian fringes [13]. Selection was governed by three distinct criteria:

1. The presence of high-density informal settlements.
2. Critical environmental profiles characterized by acute water scarcity or chronic flood risk.
3. Documented histories of informal collective action in local food production.

This diversity ensures that the framework's metabolic loops are evaluated across a range of geographical and sociopolitical constraints rather than under the conditions of a single site [12].

2.2. Data Synthesis and Thematic Coding

The study draws upon high-quality secondary data sources (2010–2026), including municipal planning documents, socio-ecological resilience reports, and satellite land-use datasets. This meta-synthetic approach allows for the collection of extensive regional information, offering a broader analytical scope than traditional localized fieldwork [14].

Data were systematically processed using a thematic coding framework that evaluated each prototype across three primary analytical axes:

1. Metabolic Circularity: Measured by the ratio of on-site water reuse potential to urban food output.
2. Governance Polycentricity: Evaluated by the degree of local autonomy and community agency in land-use decisions.

3. Socio-Spatial Accessibility: Assessed by the physical proximity and economic affordability of these spaces for marginalized residents.

2.3. Analytical Generalization

The cross-case synthesis permits analytical generalization by identifying recurring relationships across the four prototypes rather than treating them as directly replicable models. The Mumbai Koliwada case is particularly illustrative because bottom-up planning in this fishing community demonstrates how locally grounded knowledge and community priorities can shape urban spatial interventions [15]. Within the present analysis, this case is interpreted as evidence that the applicability of ABC principles depends on the characteristics of existing land-use systems and the social practices embedded within them. Accordingly, the analysis does not assume uniform outcomes across sites; instead, it identifies conditions under which productive, ecological, and recreational functions may be brought into closer spatial relationship. This provides a basis for extending the framework beyond the individual prototypes while retaining sensitivity to differences in environmental conditions, resource availability, and community organization.

3. Theoretical and Conceptual Foundations

The conceptual framework of the Agro-Blue Commons (ABC) is an integrated model that unifies agroecological production, blue infrastructures, and recreation within a single socio-ecological common. By treating “blue” (water) and “agro” (food) systems as a shared resource base, the ABC framework addresses the systemic pressures of rapid urbanization and resource scarcity in the Global South. This approach moves beyond traditional siloed management, viewing these infrastructures as multifunctional landscapes that provide essential ecosystem services, ranging from climate regulation to local food security [16]. The framework is grounded in contemporary research on the water-energy-food-ecosystems (WEFE) nexus, which argues that resource governance in developing nations is inseparable from social empowerment and regional resilience [16]. Furthermore, the ABC framework functions as both a spatial and a social intervention. It is designed to mitigate the inherent contradictions of collective systems through coordinated, community-led governance that recognizes the vital role of “informal” urban spaces in providing regenerative services [17]. By centering on circular-economy practices, such as using water

resources for sustainable agroecological production, the ABC framework provides a potential pathway for cities to transition from resource scarcity towards more self-

sufficient urban systems. The conceptual structure and interactions among the framework's key components are illustrated in Figure 1.

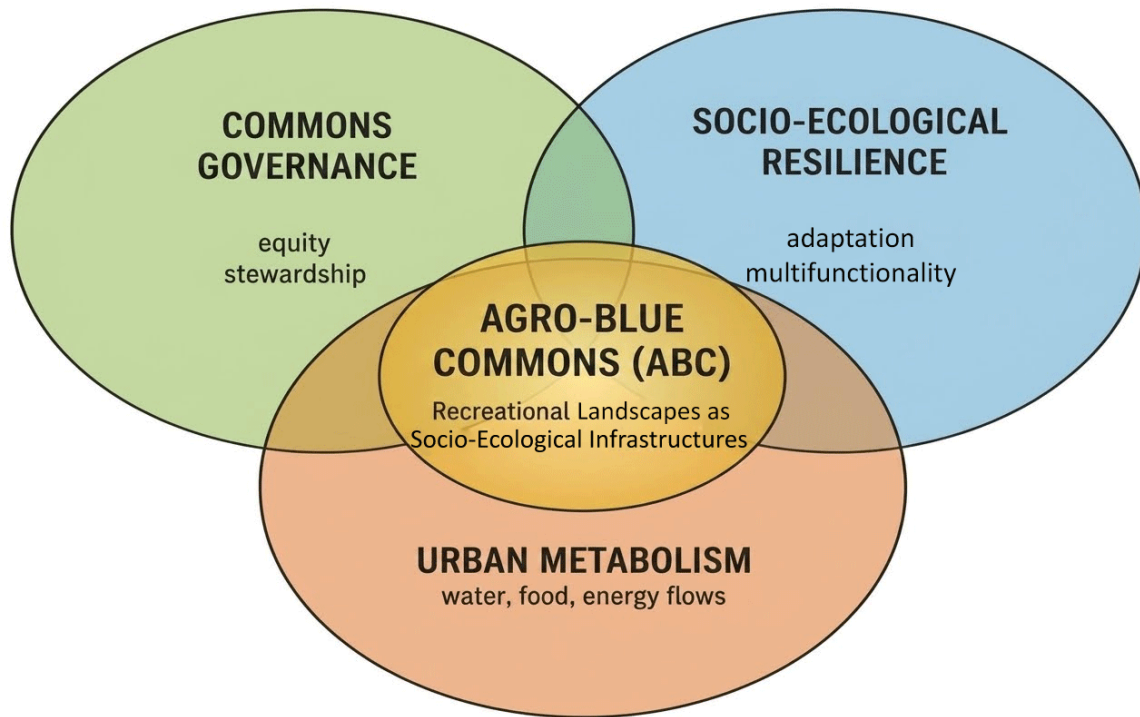


Figure 1: Conceptualizing Agro-Blue Commons framework.

3.1. Commons Governance

Commons theory is frequently associated with Hardin's [18,19] "tragedy of the commons," which argues that unregulated shared resources may be depleted through overuse unless managed through appropriate institutional arrangements [20]. This argument has been criticized on various grounds, particularly for portraying collective action as a predetermined outcome and for ignoring the variety of institutional arrangements. In her work, Elinor Ostrom [20] argued that numerous communities worldwide have effectively managed their common-pool resources through enduring systems of self-governance without resorting to either privatization or state control, which are often regarded as the only viable solutions. By applying Ostrom's design principles, including clearly defined boundaries, participation in collective decision-making, graduated sanctions, and nested enterprises (Figure 2), the framework demonstrates how such a commons-based system can be effectively sustained. These principles are echoed in the early sustainable management frameworks of Prof. Walery Goetel [21] and the historical ecological-

based disease prevention models in 19th-century Krakow. Integrating these long-term practices from selected Northern contexts, such as the Jordan Gardens, provides historical indications that urban recreational networks can support public health and nutritional security [22,23].

Furthermore, the concept of commons governance has been extended to urban contexts, including public spaces, digital platforms, and cultural heritage [24,25]. The findings of these studies demonstrate how the collaborative management of shared resources can help prevent enclosure, commodification, and exclusion while fostering new forms of solidarity. However, urban commons are not immune to challenges such as elite capture, unequal participation, and fragmented authority. These challenges are particularly significant in cities across the Global South, where institutional weaknesses, informal governance, and unequal power relations further complicate collective stewardship. The ABC model takes these understandings and applies them to recreational planning. It views urban land and water not merely as assets to be privatized or liabilities within municipal budgets, but as potential common-pool resources that require shared gov-

ernance. By making recreation a co-product of food and water commons, the ABC framework shifts the narrative from viewing leisure as a luxury to recognizing it as a collective right embedded within multifunctional landscapes through community stewardship. This perspective not

only seeks to promote more equitable access but also integrates resilience into community practices, thereby aligning with Ostrom's emphasis on the importance of adaptive, polycentric governance.



Figure 2: Schematic representation of Ostrom's framework for commons sustainability.

3.2. Socio-Ecological Resilience

Another key theoretical foundation of this study is resilience theory, which conceptualizes socioecological systems as complex, adaptive, and interconnected [26].

Resilience is generally understood as the capacity to absorb shocks; however, in the present context, it is conceptualized as the capacity to adapt and transform under pressure [27]. In urban settings, resilience is reflected in multifunctional infrastructure, communities capable of self-adaptation, and urban environments where natural and human systems are seamlessly integrated. Many con-

ventional recreational plans do not adequately consider resilience. Parks are often treated primarily as ornamental spaces composed of grass and trees, with limited consideration of their relationship with natural cycles or community livelihoods [28,29]. As a result, they provide limited protective or regenerative ecological functions during floods, droughts, or periods of food scarcity. In contrast, the ABC framework enhances resilience through multifunctionality, which constitutes the core principle of recreational landscapes (see Figure 3). The integration of farming into Agro Blue Commons (ABC) landscapes not only supports a more diverse diet but also has the potential to

reduce urban temperatures and enhance soil nutrient content [30,31]. Blue infrastructures such as wetlands, ponds, and canals can mitigate floods, recharge aquifers, and regulate microclimates [32]. Cultural and leisure practices in-

tegrated into these systems promote social cohesion, mental well-being, and cultural continuity, all of which are critical dimensions of resilience that are often overlooked in infrastructure planning.

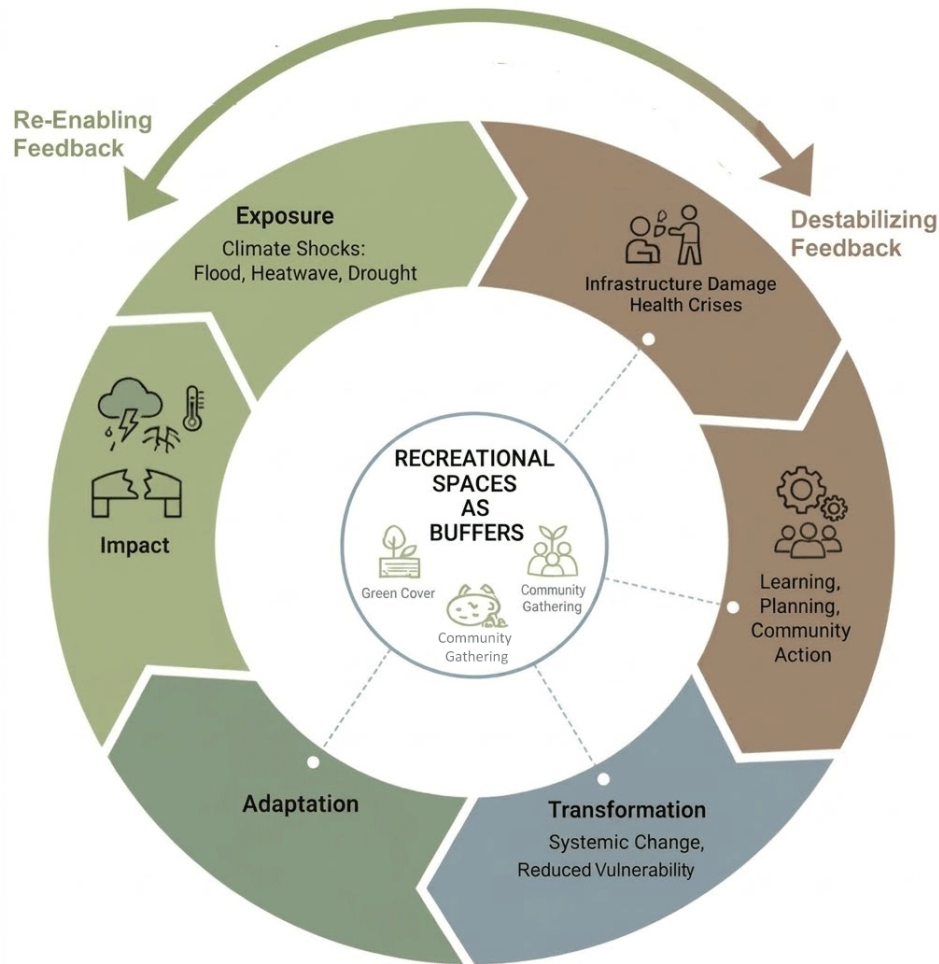


Figure 3: Socio-cultural resilience cycle.

Moreover, the resilience literature highlights the importance of diversity, modularity, and feedback mechanisms [33]. The ABC framework implements these principles by designing habitats in which ecological and social functions are integrated while remaining functionally distinct. For example, crop diversity in agro parks enhances ecological stability, while cultural celebrations associated with agricultural seasons create feedback loops that strengthen community stewardship. ABC parks, therefore, have the capacity, through redundancy and flexibility, to absorb shocks without becoming dysfunctional. In this way, the study repositions recreation from a vulnerable urban amenity to a fundamental contributor to the

resilience of urban systems under conditions of resource scarcity.

3.3. Urban Metabolism

The third theoretical foundation of this study is urban metabolism, which conceptualizes cities as systems of interconnected flows of energy, materials, water, food, and waste that sustain urban life [34]. Based on the same concept, the city can be understood as a living organism that depends substantially on energy and resources imported from outside its boundaries. Moreover, from this perspective, these systems can become more circular by promoting local resource use, reuse, recycling, repair,

and ecosystem regeneration. (Figure 4) In contrast, traditional recreational planning is metabolically inefficient. ABC addresses this gap by embedding recreational spaces within circular metabolisms. Organic waste from markets can be composted to support urban agriculture; wetlands can filter greywater for irrigation; harvested crops can supply local food markets; and festivals or leisure activities can reinforce cultural circuits of reciprocity. In this way, recreational landscapes become metabolic nodes where energy, water, and nutrients are cycled rather than dissipated [35,36]. The integration of agro-ecology and blue infrastructure ensures that recreation is not an iso-

lated drain on resources but a component of regenerative flows that enhance urban sustainability. Moreover, critical approaches to urban metabolism emphasize equity in resource distribution. Metabolic flows often reflect socio-spatial inequalities, with affluent areas consuming disproportionate shares of resources while marginalized communities experience resource scarcity and greater exposure to pollution [37]. By situating recreational spaces within shared metabolic systems, ABC aims to redistribute ecological benefits and mitigate environmental injustices. This aligns with the commons perspective, which emphasizes equity and inclusivity in resource governance.

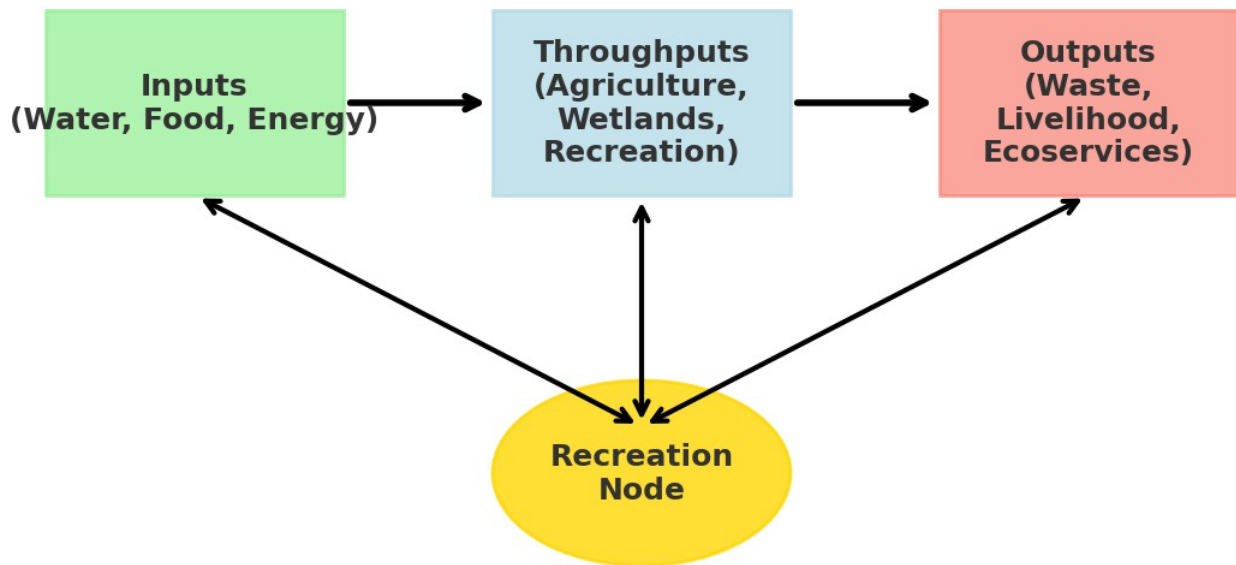


Figure 4: Urban metabolism framework.

The ABC framework further bridges this divide by incorporating a triple-bottom-line approach into park design. Organic waste generated from markets can be composted and subsequently used to support local food production. Wetlands help purify greywater for use in irrigation, while harvested crops can be sold in local markets. Leisure activities and festivals help to keep the culture alive and promote the circulation of reciprocity. Thus, recreational green spaces function as areas where energy, water, and nutrients are not merely consumed but circulated and conserved. The integration of agroecology and blue infrastructure ensures that time spent in nature is not only a recreational experience but also contributes to environmental improvement. Furthermore, an urban metabolism approach highlights fairness in the sharing of resources. Metabolic flows reflect socio spatial inequalities, whereby affluent neighborhoods consume a disproportionate share of resources while marginalized ar-

ea experience pollution and scarcity. By locating recreational spaces within shared metabolic systems, the ABC framework represents a potential step towards ecological redistribution that may lessen the environmental burdens experienced by disadvantaged communities. This is in line with the commons understanding that resource governance is fundamentally about fairness and inclusiveness.

3.4. Synthesizing the Agro-Blue Commons Framework

Each of the three concepts, commons governance, socio-ecological resilience, and urban metabolism, provides a distinct but complementary perspective for transforming recreational planning in the Global South. Commons theory centers on the institutional and collective dimensions of resource custodianship, particularly in resisting enclosure while enabling shared use [19]. Socioecological re-

silience describes the capacity of human systems to adapt to climate shocks and systemic risks, emphasizing the importance of diversity, redundancy, and learning within complex systems [38]. In contrast, urban metabolism emphasizes the material and infrastructural flows that sustain cities and provides a framework for examining the consumption, transformation, and potential regeneration of land, water, and energy [39].

By integrating these three frameworks, an alternative model of recreation emerges. Through commons governance, shared landscapes can be secured as accessible spaces and managed more equitably [40]; through resilience perspectives, adaptive spatial-design methods

can be developed [41]; and through metabolic analysis, recreational planning can be grounded in the material realities of food, water, and energy flows [42]. Moreover, these frameworks do not fit together like pieces of a jigsaw puzzle: a set of issues arises between communal management and state authority [43], between ecological regeneration and the competing uses of the land [44], and between metabolic efficiency and socio-cultural values [45]. In fact, the Agro Blue Commons is not intended to provide a simple solution to these tensions; rather, it aims to utilize them as productive spaces for negotiation that can contribute to the development of more just and adaptive recreational infrastructure (Table 1).

Table 1: Theoretical synthesis for the Agro-Blue Commons (ABC) framework.

Theoretical Lens	Core Focus	Key Insights for Recreation	Limitations in Isolation	Contribution to ABC Framework
Commons	Collective	Ensures equitable access,	Risks of elite	Provides
Governance	management of shared resources through rules, norms, and stewardship practices.	legitimacy of local stewardship, and accountability in managing recreational landscapes.	capture, governance fragmentation, and weak enforcement in resource-poor settings.	institutional scaffolding for participatory governance of recreational spaces.
Socio-Ecological	Adaptive capacity of linked human-	Frames recreation as	May overlook	Supplies adaptive
Resilience	ecological systems to withstand and transform under shocks.	multifunctional spaces	power inequalities	design principles to
Urban	that buffer climate shocks (flood control, cooling, food security) while supporting community cohesion.	Highlights the role of	and cultural dynamics that shape access to resilient spaces.	integrate recreation with climate resilience and community wellbeing.
Metabolism	The flow of materials, energy, food, and water through cities and their infrastructures.	recreational landscapes in recycling resources, regenerating ecosystems, and reducing waste.	Often technocratic,	Embeds recreation
Agro-Blue Commons (ABC)	Integrated socio-ecological commons	Recreation becomes a	Challenges remain	Offers a novel
(Synthesis)	that merge governance, resilience, and metabolic functions.	productive and regenerative infrastructure delivering ecological services, food/water security, and cultural continuity.	in scaling, balancing ecological trade-offs, and ensuring governance coherence.	paradigm for Global South recreational planning: multifunctional, equitable, and adaptive.

4. The Agro-Blue Commons Model

4.1. Structural Rationale

The ABC model is positioned as a strategic response to the spatial mismatch that characterizes urbanism in the Global South. Spatial mismatch herein refers to the phe-

nomenon in which land is predominantly allocated to high-maintenance, single-use recreational zones that provide limited benefits to urban poor communities. At the analytical level, it can be said that conventional planning causes a division between exchange value, the appreciation of real estate through aesthetic landscaping, and use value, which includes survival needs such as food and water. The ABC model, by embedding survival infrastruc-

tures within the urban context, transforms underutilized or environmentally sensitive land into highly productive socioecological assets. Hence, the focus of planning shifts from mere beautification to functional productivity, ensuring that urban land-use policies not only address climate adaptation goals but also respond to immediate livelihood pressures [46].

4.2. Metabolic Efficiency and Infrastructure Co-Benefits

The main source of the operational efficiency of the ABC model lies in its functional integration, which allows a single landscape element to perform various infrastructure functions simultaneously, thus potentially reducing municipal capital and operational expenditures. For example, blue infrastructure in the form of retention ponds and restored canals does not simply beautify the environment; it also functions as a flood-control system capable of managing water levels, thereby potentially reducing the need for expensive grey concrete drainage systems [47]. Cultivating these green spaces alongside agroecological production creates a circular metabolic loop. Within this loop, organic urban waste is converted into nutrient inputs for food crops, and harvested rainwater is used for irrigation instead of potable water. This regenerative logic may reduce maintenance costs compared with ornamental parks that rely on energy-intensive external inputs, such as chemical fertilizers and motorized maintenance equipment [48].

4.3. Comparative Analysis of Framework Performance

The primary divergence of the ABC model from conventional urban planning is evident in its potential to address the conflict between the different rationalities of state-led technocratic planning and the lived experiences of low-income urban communities [49]. Traditional ornamental parks operate on the logic of passive consumption, whereby the state provides a finished product that is largely economically irrelevant to the local community. Consequently, some such parks may experience operational decline in the Global South, where they can fall into disuse because of insufficient municipal funding and limited community investment [50]. The ABC model, through its multifunctional landscape, treats biodiversity and recreation as benefits that come together with production and water management. While a conventional park may represent a continuing fiscal responsibility, an ABC space can function as a productive natural asset that sequesters carbon, treats greywater, and potentially provides an income stream through agroecological harvests [51,52]. Transforming such spaces from luxury goods into critical infrastructure may encourage communities to continue protecting them even when state support declines, particularly where the landscape's performance is directly linked to local food and water security [53,54]. The comparative performance of traditional ornamental parks and the Agro-Blue Commons model across key ecological, economic, social, and governance dimensions is summarized in Table 2.

Table 2: Comparative performance of ornamental parks vs. the Agro-Blue Commons model.

Performance Metric	Traditional Ornamental Park	Agro-Blue Commons (ABC)
Primary Economic Value	Property tax and real estate appreciation.	Livelihood security and resource cost-savings.
Ecological Function	Primarily aesthetic greenery, potentially with limited biodiversity.	Potential flood attenuation and nutrient cycling.
Maintenance Model	Continuing fiscal responsibility requiring municipal funding.	Self-sustaining (subsidized by production and circularity).
Social Role	Passive consumption of space.	Active stewardship and “prosumer” participation.
Resilience Factor	High vulnerability to budget cuts or drought.	Institutional redundancy via polycentric governance.

4.4. The Polycentric Resilience Model

The durability of the ABC model depends on polycentric governance, which involves the distribution of authority and risk across multiple levels, including community, municipal, and non-state actors, to reduce the risks of re-

source overuse and state-led mismanagement [55]. In this setup, Community Stewardship Councils are responsible for detailed daily management, reducing monitoring costs through peer-to-peer accountability [56]. To prevent councils from replicating local power imbalances, the model advocates for a quota-based participatory structure. This

is intended to ensure that marginalized groups, including women and informal laborers, have formal representation in stewardship decisions, thereby helping to mitigate gender and class inequities that often complicate collective management. Also, the ABC model, to avoid the tragedy of the commons and ensure long-term resilience, advocates a nested governance structure that separates the responsibilities of community prosumers and municipal facilitators (Table 3). This polycentric arrangement is intended to ensure that the leisure function of the space does not replace its productive function. For example, the Community Stewardship Council implements temporal zoning, a mechanism through which different activities are sequenced within the same physical space. Dur-

ing the week, certain zones are dedicated exclusively to agriculture, whereas on weekends, they are made available for ecotourism or cultural festivals. Thus, both food-production and social-use potentials may be increased. At the same time, municipal facilitation enables these commons to be safeguarded through legal recognition and land titling, thereby preventing private sector appropriation. This institutional redundancy is essential for resilience; in the event that one part of the system breaks down, for example, if municipal funding declines, the local stewardship layer maintains the landscape's primary life support functions, thereby preventing the systemic degradation typically observed in neglected public parks [57].

Table 3: The ABC governance matrix for nested stewardship.

Governance Tier	Primary Responsibility	Resource Rights
Community Stewardship Council	Daily maintenance, harvest scheduling, internal dispute resolution	Usufruct rights (right to use and harvest)
Municipal Facilitator	Legal land-titling, cross-sectoral policy alignment, and macro-technical support (e.g., flood sensors).	Sovereign oversight and regulatory compliance
Knowledge Partners (NGOs/Academia)	Monitoring metabolic health (soil/water quality), capacity building.	Advisory and monitoring access

5. Spatial Configurations and Applications

The ABC (Agro, Blue, Commons) framework can potentially be applied across a wide range of urban spaces in the Global South, including high-density informal settlements and peri-urban agricultural belts. By harmonizing ecological restoration with social utility, the framework moves beyond theoretical urbanism towards practical spatial strategies. Next, the four applications demonstrate the framework's capacity to respond to the unique socioeconomic and environmental challenges in rapidly urbanizing contexts.

5.1. Agro-Wetland Parks

The case of restored wetlands in coastal cities of the Global South particularly exemplifies this argument, as these areas can simultaneously provide flood buffering, fishery grounds, and recreational functions. For instance, the construction of gray infrastructure within mangrove and marshland zones has increased flood risks and dis-

placed local communities from their traditional ways of life in cities such as Lagos, Nigeria, and Dhaka, Bangladesh [58,59]. The ABC framework suggests that these zones be transformed into multifunctional commons. The mangrove ecosystems of Lagos, particularly those of the Lekki Peninsula and Badagry Creek, provide an excellent setting for the development of agro-wetland parks. Instead of using these areas for luxury real-estate development through land reclamation, these zones can be maintained as natural sponges with carefully managed productive functions. Spatially, this translates into a tiered model: the innermost area consists of protected mangroves for carbon storage and natural hurricane barriers; a surrounding zone enables local communities to practice sustainable aquaculture and artisanal fisheries; and an outer recreational zone provides boardwalks and public spaces for cultural events (Figure 5). By combining flood management with support for food security through fisheries and cultural functions, the model may provide local communities, which often experience the earliest impacts of climate-related disasters, with a direct interest in land stewardship.

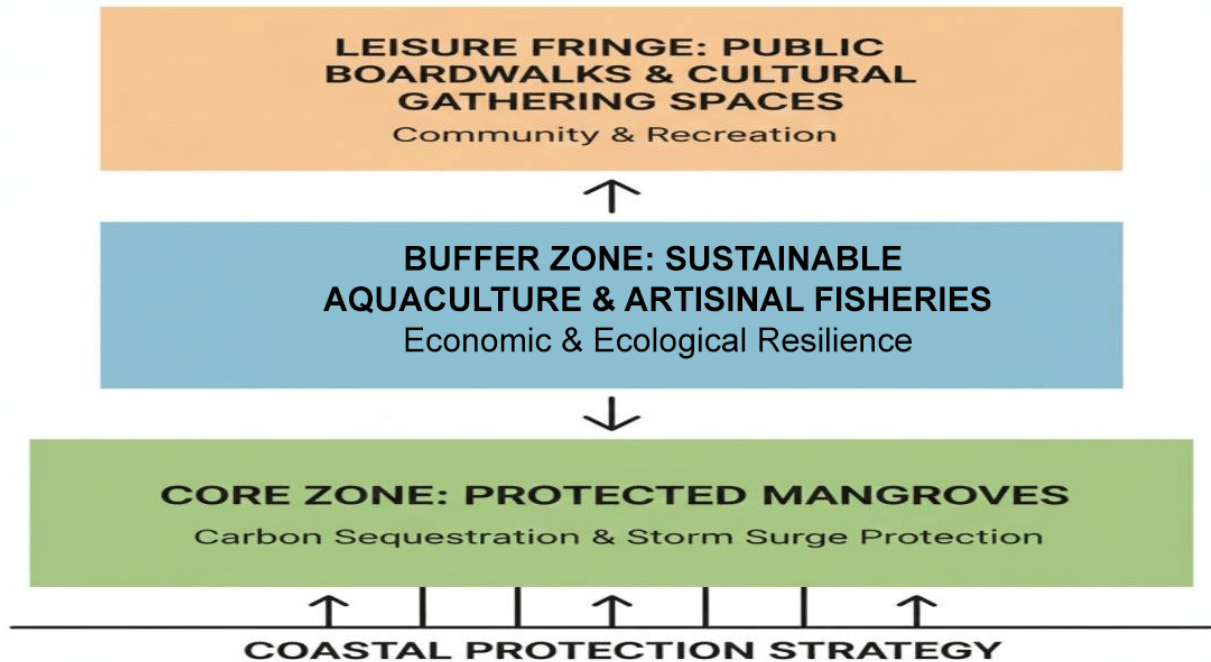


Figure 5: A tier design framework for Agro-Blue Commons in coastal areas.

5.2. Community Irrigation Commons

Water management in desert and semi-desert regions is often considered solely from a practical or technocratic perspective. In contrast, the ABC framework incorporates local knowledge to transform irrigation canals and water reservoirs into public spaces that support both leisure and water management. In Rajasthan, a state in India, the restoration of johads (earthen water retention structures managed by the community) has demonstrated that water can serve as a more enduring resource when closely integrated with the social fabric [60]. A community irrigation common spatially transforms the traditional reservoir into a blue cultural node. Conventionally, in peri-urban areas, these water bodies are primarily used for groundwater recharge and agricultural irrigation. However, through appropriate landscaping and the addition of ghats (stepped platforms), these spaces are transformed into venues for cultural festivals, religious ceremonies, and everyday social interactions. This arrangement may challenge trends towards the privatization of water resources in cities of the Global South, where low-income communities are often excluded from access to clean water because of affordability constraints [61,62]. By designing irrigation as a commons, the framework seeks to ensure that water remains a visible and valued component of the urban fabric, thereby fostering shared community responsibility for its maintenance.

5.3. Rooftop Agro-Blue Networks

When land prices are high and open space is limited in dense urban cores, the ABC framework extends its application vertically. Rooftops of slums and low-income residential blocks can be transformed into agroecological gardens interconnected through decentralized rainwater harvesting systems. This application is particularly relevant to cities such as Cairo and Mumbai, where concrete-dominated environments contribute to extreme heat island effects and limit access to fresh produce [63]. The network feature of this setup is critical. These rooftops are interconnected through shared water collection and distribution systems, thereby creating a decentralized blue infrastructure rather than isolated garden plots. From a spatial perspective, such networks operate as floating commons. They provide cooling through evapotranspiration, while also creating inclusive spaces for children and other groups that are often socially excluded from street-level public spaces [64].

Studies show that urban farming in these areas can fulfill up to 20% of a household's vegetable consumption, while social interactions on these community terraces enhance neighborhood social capital, increasing its capacity to withstand economic downturns [65]. Furthermore, achieving 20% vegetable self-sufficiency through rooftop commons represents significant potential; however, substantial local resistance to implementation remains in in-

formal and low-income settings. Most existing buildings in the Global South are not structurally capable of supporting the static and dynamic loads associated with saturated soil and water tanks without major retrofitting [66]. The ABC framework addresses this issue by implementing light-touch blue infrastructure through hydroponic and vertical aeroponic systems that minimize structural weight while maximizing water recirculation. Besides, the fact that these networks are decentralized makes a Commons-Based Maintenance Fund necessary. In this fund, a portion of the surplus yield is sold to cover the electricity costs of shared solar-powered water pumps, thereby enabling the network to continue operating without dependence on unstable municipal grids [67].

5.4. Peri-Urban Agro-Cultural Corridors

Peri-urban farmlands are among the most contested lands in the Global South and are often the first to be converted for speculative real estate development [68]. The ABC approach proposes that these lands be preserved not merely as fixed green belts, but as living and evolving agro-cultural corridors. Such corridors function as protective buffers that support community cultural identity while providing critical ecosystem services. These corridors are designed to be physically open and accessible, al-

lowing urban residents to easily access agricultural areas for leisure and learning. In the urban outskirts of Nairobi and Hanoi, these corridors can become spaces for agro-tourism and cultural festivals that are seasonally linked to harvest cycles. The convergence of these elements generates a diversified economy for farmers living on the outskirts, thereby increasing the value of land as a productive common rather than as a plot for residential development [69]. The corridors thus form a political and social alliance capable of opposing land grabbing and unsustainable sprawl by matching the aesthetic and recreational needs of the urban middle class with the farmers' livelihoods.

5.5. Comparative Insights Across ABC Prototypes

By synthesizing these four prototypes, the analysis suggests that the ABC is not a prescriptive or fixed model but rather a flexible spatial logic that can mediate between state-led technocratic planning and the lived experiences of marginalized urban populations [69]. The cross-continental application of these prototypes, along with the coastal mangroves of West Africa and the terraced rice fields of Southeast Asia, demonstrates a fundamental shift in how urban infrastructure is valued (Table 4).

Table 4: Comparative prototypes of the Agro-Blue Commons in the global south.

Prototype	Ecological Base	Recreational Potentials	Governance Challenges	Innovative Opportunities
Agro-Wetland Parks	Mangroves and coastal marshes	Birdwatching, canoeing, and aquaculture gastronomy	Urban expansion and commodification risks	Integrating mangrove restoration with flood-resilient recreation
Community Irrigation Commons	Canals, reservoirs, and <i>johads</i>	Cultural festivals (<i>ghats</i>), shaded groves, and storytelling	Technocratic water management and state dominance	Reframing irrigation as a socio-ecological commons
Rooftop Agro-Blue Networks	Vertical urban surfaces and rain-harvesting	Safe elevated social spaces and gardening	Fragmented participation and technical maintenance	Decentralized "floating commons" in hyper-dense cores
Agro-Cultural Corridors	Terraced paddies and peri-urban farms	Harvest festivals and culinary biodiversity hubs	Tourism dominance and unequal benefit sharing	Creating anti-sprawl coalitions via agro-tourism

Instead of viewing agriculture, water management, and recreation as competing land uses, the ABC framework considers them as mutually reinforcing components of a multifunctional public infrastructure [70]. From an analytical perspective, the success of these prototypes depends on the transition from passive green spaces to active resource regimes. For example, whereas traditional parks

may be regarded as continuing financial responsibilities, integrated agro-wetland or rooftop models may operate as productive natural capital that generates socio-economic benefits, such as support for local food supply and potentially reduced flood-management costs [71]. This shift is important for institutional resilience; by incorporating local traditions and economic survival into the landscape,

the framework safeguards these places through community stewardship even when the government is absent [72]. Besides, these prototypes subvert the commodification of urban space by virtue of the commons as an instrument of democratic resilience. Whether through vertical networks in Mumbai or peri-urban corridors in Nairobi, the ABC model enables socially and politically marginalized residents to claim their right to the city, thereby resisting land grabbing and unsustainable urban sprawl [73]

6. Discussion

The Agro-Blue Commons model breaks down traditional disciplinary barriers by recognizing agriculture, water management, and recreation not as separate activities but as interconnected forms of infrastructure that support urban resilience and cultural vitality. Although the spatial prototypes presented in Table 4 illustrate the adaptability of the framework across diverse landscapes, their most significant contribution lies in challenging the dominance of Western recreational paradigms [74]. By defining leisure as a component of urban metabolism, the ABC model theoretically establishes a potential pathway for addressing the clash of rationalities between state-led beautification and community-led survival [75]. The next paragraph highlights the shift of the paradigm through three essential aspects:

- (i) The reconsideration of the physical infrastructure: From decorative plants to technically integrated socio-ecological systems that support human life.
- (ii) Politics and the Commons: Dealing with the tension between governmental power, elite capture, and collective stewardship.
- (iii) Socio-Ecological Transitions: Considering the dangers, inadequacies, and the possibility of decolonization of urban planning in the Global South.

These three overarching aspects provide the analytical structure for the six subsections that follow:

6.1. Infrastructural Inversion

The ABC model carries out an infrastructural inversion by giving recreation a central role in urban planning instead of being its peripheral element. Unlike imported Western models that view parks primarily as decorative spaces where public capital is expended, the ABC framework considers recreation a co-product of food and water systems [76]. This transition represents not only a visual change but also a potential transformation of the system, as it seeks to convert underutilized landscapes into survival infrastructure where the management of food and water outputs occurs alongside social interaction [77].

Furthermore, green infrastructure must move beyond passive greenery to address food energy water nexus challenges, an approach that several scholars have recently proposed [78]. Here, ABC represents a socio-technical transition in which the value of a park is determined by its metabolic contribution. In this case, by integrating leisure activities into irrigation canals or rooftop gardens, the framework suggests that leisure can be preserved as an essential component of urban metabolism rather than as an element vulnerable to municipal budget cuts. This is particularly important for residents of urban informal settlements who have limited or no dedicated leisure spaces and whose primary focus is meeting their livelihood needs [79].

6.2. Navigating the Friction of the Commons

In the application of ABC, collective action challenges are intensified, even though the theoretical foundations of the commons are well established. The integration of economic production, including fisheries and crops, with public recreation creates a distinct risk of functional conflict, whereby recreational activities may disrupt agricultural production or lead to the elite capture of productive resources [19,80]. Studies on urban commons show that communing is a social practice supported by an institutional framework to prevent the depletion of shared resources [81]. The ABC framework therefore requires a rights-based governance layer that extends beyond participation towards institutionalized stewardship. This requires legally binding agreements that protect these hybrid spaces from being taken over by real estate developers, particularly in cities where land-use conversion is driven by speculative capital [82]. Without a polycentric approach to governance that involves farmers, cultural leaders, and state actors in decision-making, it would be difficult to achieve legitimacy and adaptability [83].

6.3. Nature-Based Solutions and Cultural Resilience

Additionally, the ABC framework further advances nature-based solutions by offering a cultural-recreational dimension that is often missing in technocratic environmentalism. Some applications of NbS frameworks concentrate primarily on ecological metrics, such as the extent of flood mitigation or the amount of carbon sequestration [84]. Yet, the ABC prototypes reveal that resilience is just as much about social cohesion. In the case of johads in Rajasthan or rice-fish systems in Southeast Asia, community dedication to maintaining ecological buffers is deeply rooted in cultural ceremonies and festivals. In this way,

environmental management ceases to be a top-down imposition and becomes a bottom-up manifestation of local stewardship identity, hence, the infrastructure remains culturally persistent even in the absence of the state [85,86]. It is the same idea, consistent with a landscape approach that seeks to reconcile different land use purposes from a socio-ecological resilience perspective. By developing a local identity, the ABC model ensures that sustainability is not merely a matter of ecological metrics but is connected to living cultural practices, particularly through the use of traditional ecological knowledge (TEK) to address contemporary climate challenges.

6.4. Analytical Heuristics

Drawing on emerging evidence from local prototypes, the ABC model is best understood as a flexible heuristic rather than a prescriptive framework. Its analytical strength lies in its ability to reconcile the competing rationalities of state-led technocratic planning and local survival logics [87]. For example, in West Africa, the issue is to open up state-led irrigation to other stakeholders, whereas in South Asia, the emphasis is on preventing the privatization of communal wetlands [88]. Research on urban acupuncture indicates that small-scale, culturally-rooted interventions can result in disproportionately large systemic impacts [89]. This flexibility enables the ABC model to serve as a boundary object, facilitating communication between municipal hydrologists focused on drainage and local residents whose primary focus is food sovereignty [90]. By aligning the aesthetic preferences of urban residents with the needs of farmers, these green corridors foster political and social alliances that can effectively resist land grabbing and uncontrolled urban sprawl [69].

6.5. Commodification and Trade-Offs

The ABC framework is still vulnerable to the threat of green-led gentrification, which could undermine its regeneration efforts. As productive landscapes gain in ecological and aesthetic value, they attract speculative capture by elites [91]. Furthermore, the scaling up of such commons is constrained by institutional inertia, particularly the entrenched structure of municipal finance, which makes it difficult for local governments to shift from dependence on short-term land-sale revenues to long-term valuations of ecosystem services [92]. To implement changes, it is vital to be aware of these risks. Recreational infrastructures could negatively impact production or harm the ecological balance if the systems are not well designed. Environmental projects are criticized because, in the absence of strong pro-poor measures, even well-intentioned actions may

serve as a tool for climate gentrification [93]. Therefore, scaling up ABC requires a fundamental shift in municipal accounting practices, whereby the long-term economic benefits of self-sustaining and community-managed landscapes, such as reduced flood remediation costs, are prioritized over immediate real estate revenues [94].

6.6. Synthesizing a Global South Paradigm for Planning

The ABC framework represents an intellectual challenge to the dominance of Northern recreational paradigms [95]. Rather than treating countries in the Global South as passive recipients of externally developed ideas, it recognizes them as sites of innovation where integrated sustainability is advanced through a framework that acknowledges the coexistence of agriculture, water, and culture. This is also consistent with Southern Urbanism, which argues that urban planning should be grounded in the distinctive, often informal, practices of cities in the Global South rather than imitating Euro-American urban histories [96]. The model advocates breaking down disciplinary silos so that planners, hydrologists, and farmers no longer work in isolation, thereby creating a future in which agriculture, water management, and recreation are recognized as interconnected functions of a unified infrastructure. ABC serves both as a locally grounded solution and as a conceptual framework for action. It envisions futures in which agriculture, water, and recreation interact synergistically to sustain human and ecological wellbeing. It paves the way for decolonized urban planning by placing the shared stewardship of nature at the heart of the twenty-first-century resilient city [5].

7. Conclusions

The ABC framework represents a fundamental shift away from the exclusive and resource-intensive recreational models that dominate urban planning across much of the Global South. By challenging the false division between productive land and leisure space, the ABC model demonstrates that urban agriculture, water management, and recreation can be integrated into a single life-supporting infrastructure. This comprehensive integration transforms neglected or environmentally sensitive areas into highly functional natural assets that provide essential services, including flood control and nutrient cycling, while supporting cultural continuity and food security. A realistic municipal transition to ABC requires three steps: (i) Policy De-zoning to allow agriculture in public parks, (ii) Infrastructure retrofitting to support decentralized grey-water harvesting, and (iii) Co-management Agreements

that shift maintenance responsibilities from the state to community-led production contracts. To move beyond conceptual prototypes and achieve systemic change, the following proposals are presented:

- i. Rather than the traditional municipal management dominated by the state, municipalities should move towards Community Stewardship Councils which will provide day-to-day oversight and peer-to-peer accountability.
- ii. To avoid “green gentrification” and speculative enclosure, the ABC (agro-blue commons) areas must be guarded by legal frameworks and land-titling protections that will guarantee communal rights to the land’s outputs.
- iii. Planning departments should prioritize the long-term value of ecosystem services, such as reduced flood remediation costs and improved local food security, over short-term profits from land sales.
- iv. Planning should combine ecological cycles with local cultural rituals to make sure that the infrastructure stays culturally persistent, and the community continues to maintain it even when the state neglects it.
- v. Establish online platforms for ‘Common Action of Experts’ to disseminate lifelong learning experiences and good practices. This should focus on the effective prevention of water-borne diseases and the production of nutrient-rich, pollutant-free food through knowledge-based societies.

Within this decolonial approach, valuable insights can also be drawn from selected Northern practices, including those from Poland. For example, Prof. Walery Goetel was a pioneering advocate of sustainable natural resource management, a concept later adopted by the IUCN in 1956 [22]. Furthermore, historical practices in Kraków, including Józef Dietl’s emphasis on hygienic and environmental approaches to public health and Henryk Jordan’s development of publicly accessible recreational spaces for children and youth, provide historical precedents for linking preventive health with urban recreation [97,98]. Essentially, Agro-Blue Commons is not only a practical roadmap but also a theoretical provocation for the decolonization of urban planning. It positions the Global South as a source of innovation where the collective stewardship of nature forms the foundation of a resilient and just twenty-first-century city. In addition, the primary barrier to scaling up the ABC framework remains institutional inertia, particularly the rigid separation of responsibilities across urban departments. The success of the ABC framework is measured by reduced food dependency and improved groundwater recharge, whereas failure is indicated by green gentrification, in which environmental im-

provements lead to the displacement of the communities the model was designed to serve.

List of Abbreviations

ABC	Agro-Blue Commons
MCA	Multi-Criteria Assessment
NBS	Nature-Based Solutions
NGOs	Non-Governmental Organizations
TEK	Traditional Ecological Knowledge
WEFE	Water-Energy-Food-Ecosystems

Author Contributions

Conceptualization and methodology: D.E.J. and I.D.J.; Investigation, validation, resources, data curation, writing—original draft preparation, writing—review and editing, visualization, supervision, and project administration: D.E.J., I.D.J., K.S.D., and P.A.O. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Funding

The study did not receive any external funding and was conducted using only institutional resources.

Acknowledgments

The authors gratefully acknowledge the valuable support and constructive feedback provided by the reviewers, as well as the colleagues who reviewed the manuscript.

AI Declaration

The authors confirm that Gemini and QuillBot were used exclusively for language polishing, paraphrasing, and improving the readability of content originally written by them. These tools were not used to source, generate, or contribute to any substantive data, information, or literature included in the manuscript. All concepts, results, and literature reviews presented herein reflect the authors’ original work. The authors take full responsibility for the accuracy, originality, integrity, and scientific content of the manuscript.

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