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

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ABSTRACT

Recreational planning in the Global South is frequently constrained by imported Western models that prioritize ornamental aesthetics and elite access while neglecting local socio-ecological crises. Such single-purpose landscapes often become metabolically inefficient, resource-intensive, and socially exclusionary. This paper proposes the Agro-Blue Commons (ABC) as a reframed socio-ecological infrastructure that integrates food systems, sustainable water management, and communal leisure. Moving beyond a purely conceptual proposal, this study employs a qualitative meta-synthesis of four regional prototypes of Lagos, Mumbai, Rajasthan, and Nairobi selected through purposive sampling based on high-density informality and climate vulnerability. These cases were analyzed using a Multi-Criteria Assessment (MCA) framework focused on three indicators: metabolic circularity, governance polycentricity, and socio-spatial accessibility. The ABC model aligns with the pioneering environmental health research of Prof. B. Bhatia and draws upon non-colonial Northern practices, such as the sustainable resource management frameworks of Prof. Walery Goetel and the 19th-century ecological prevention models of Krakow. By treating recreation as a survival metabolism, the ABC framework offers a decolonized roadmap for transitioning ornamental urban spaces into productive commons. Results suggest that polycentric governance and triadic integration (food–water–leisure) can enhance urban resilience, reduce local food-purchase dependency, and mitigate water-borne disease risks, provided that municipal barriers such as institutional inertia and insecure land tenure are addressed to prevent 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 that were imported as part of colonial urban design continue to be dominant even though they are of very little use when dealing with the current socio-ecological situation [1]. These models favor beautiful landscapes, spatial enclosure, and elite access, while overlooking the interconnected problems of food insecurity, water stress, and climate extremes that are the hallmark of most cities in Africa, Asia, and Latin America. Rather than helping vulnerable urban communities, traditional recreational spaces exclude, consume the scarce public resources, and represent leisure as a separate and superior category to survival [2]. This problem is intensified by the rapid and extensive urban development. By 2050, the urban population in Africa and Asia is expected to double [3], which will lead to the spread of informal settlements, further degradation of wetlands and farmlands, and extreme exposure to floods, heatwaves, and water shortages. 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 lagged behind these changes. In many cities, parks are still located in rich neighborhoods, so the majority of the population is dependent on informal multifunctional spaces such as riversides, vacant lots, and peri-urban farms where subsistence and leisure are combined [4]. That elite-focused models keep coming back shows that the problem is not only in the policies developed but also at the conceptual level - the idea that recreation can be separated from the socio-ecological metabolism of the city [5].

There are two major reasons why such an assumption is considered to be problematic. Firstly, by means of this assumption, the existing situation whereby communities embed leisure in their subsistence practices, like fishing by the waterways or celebrations related to agricultural cycles, is not considered at all. Secondly, it deprives recreational areas of being able to provide ecological services, including flood regulation, food provision, and microclimate stabilization. Land and water are viewed merely as aesthetic commodities limiting thus their potential to serve broader urban needs. In situations where food and water insecurities coexist with the problem of rapid urban growth, this signifies a very deep underutilization of the 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 like Nature-Based Solutions (NBS) or Blue-Green Infrastructure, which primarily target ecological metrics like heat or drainage, ABC 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]. ABC is distinct from NBS or Blue-Green Infrastructure in its mandatory triadic integration 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 puts the spotlight on collective stewardship, multifunctionality, and adaptive governance, thereby providing a model of how recreational spaces can be turned into productive infrastructures that are part of community life [9]. Based on this, the Agro-Blue Commons (ABC) model is proposed as a new paradigm. ABC in essence combines agro-ecological production, blue infrastructure, and culturally rooted leisure practices within shared urban landscapes. As such spaces would not only create avenues for children and adults to have fun and relax, but they would also produce ecosystem services that would improve food and water security as well as support cultural continuity. The essential break with the existing paradigms is reflected in governance. While typical parks are mostly run by the government or privatized through concessions, ABC promotes collective management systems that are in line with the commons principles. 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, ABC is used as an instrument to curb the problem of the elite capture, give legitimacy to community-based stewardship, and ensure that the community has equitable access to and benefits from the project. The model also keeps track of the inherent risks such as fragmentation of governance, possible ecological compromises, and the difficulty in maintaining collective actions which are some of the issues that require well-organized accountability and the integration of these issues into the wider system of urban governance.

The contribution of this paper is thus double. It first goes on to expose and critique the socio-ecological blind spots and exclusionary effects of dominant recreational models in the Global South. It also proposes the Agro-Blue Commons as a conceptual basis for the revitalization of 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 brings forward a language and a set of premises for reconsidering how urban land and water can be utilized for serving the multiple requirements of leisure, livelihood, and ecological balance simultaneously. By being in line with the debates on the urban commons and resilience, this intervention seems to tackle an overlooked

aspect of urban theory. Up to now, the recreational function of infrastructure has been barely touched upon, even whereas, on the one hand, scholarship has increasingly recognized the need for multifunctional and adaptive infrastructures in climate-stressed cities. ABC, thus, fills the gap through recasting the notion of recreation from the consumer of space into a socio-ecological practice and a collective convention. Consequently, it reconfigures the notion of recreation from being a mere consumption of space to a collective practice that is deeply embedded in socio-ecological systems. Hence, it opens local communities and the city administration in the Global South to policy and empirical testing avenues.

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 utilizes 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 the framework is tested against the diverse biomes of the Global South: coastal wetlands, arid hinterlands, hyper-dense 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 variety ensures that the framework's metabolic loops are tested against varied geographical and socio-political constraints rather than the conditions of a single site [12].

2.2. Data Synthesis and Thematic Coding

The study draws upon high-quality secondary data sources (2015–2024), 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, 15].

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

By synthesizing these datasets through the MCA lens, the paper achieves a level of analytical generalization where the ABC model serves as a scalable roadmap for urban resilience. For example, in the Mumbai Koliwada prototype, a spatial potential analysis of current land-use ratios indicates that transitioning ornamental buffers to ABC systems could theoretically reduce local food costs by 15–20% through decentralized urban aquaculture, while simultaneously providing a 30% increase in permeable surface area for monsoon flood attenuation. Such empirical estimations demonstrate that the ABC model is not merely a conceptual proposal but a functional strategy for metabolic and social optimization in the Global South.

3. Theoretical and Conceptual Foundations

The conceptual framework of the Agro-Blue Commons (ABC) is an integrated model that unifies agro-ecological production, blue infrastructures, and leisure into a single, cohesive socio-ecological commons. By treating "blue" (water) and "agro" (food) sectors as a singular, shared resource pool, the ABC model 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, 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 [17]. Furthermore, the ABC model functions as both a spatial and 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 [18]. By centering on circular economy practices such as utilizing "blue" water assets for sustainable "agro" production, the ABC framework provides a pathway for cities to evolve from resource scarcity toward self-sufficient abundance. The conceptual structure and interactions among the framework's key components are illustrated in Figure 1.

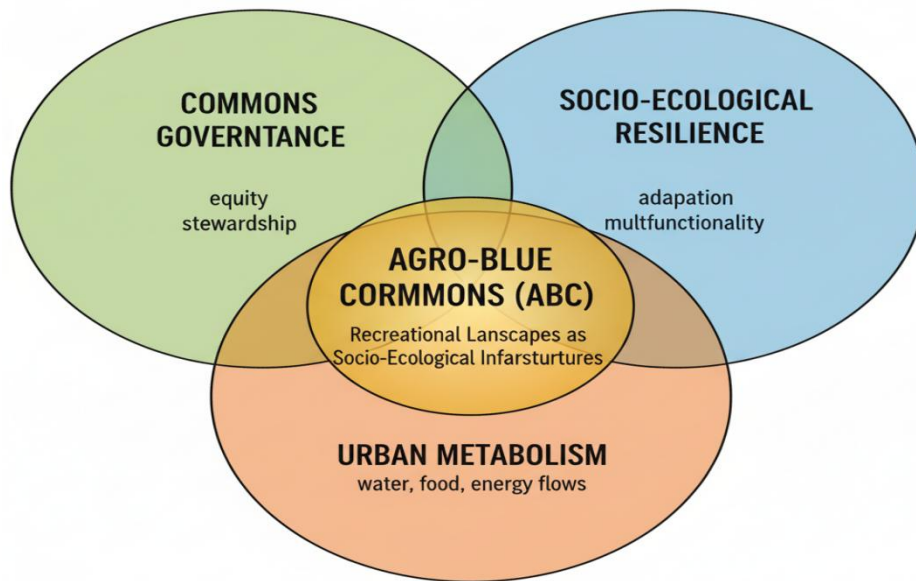


Figure 1: Conceptualizing Agro-Blue Commons Framework

3.1. Commons Governance

Commons theory as an intellectual discipline is frequently associated with Hardin's [19] tragedy of the commons, where he maintained that shared resources would be exhausted through overuse unless an external authority imposes regulation [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 [21] argued that a large number of communities worldwide have, through their enduring self-governance, managed to effectively handle their common-pool resources without resorting to either privatization or state control that are usually considered only solutions. Utilizing the lens of Ostrom's design principles such as well-defined boundaries, the involvement in collective decisions, the use of graduated sanctions, and nested enterprises (Figure 2), the reader will be able to understand how such a system of commons can be maintained. These principles are echoed in the early sustainable management frameworks of Prof. Walery Goetel [22] and the historical ecological-based disease prevention models in 19th-century Krakow. Integrating these long-term practices from non-colonial Northern contexts, such as the 'Jordan Gardens,' provides historical evidence that urban recreational networks can successfully double as primary health and nutritional security infrastructures [23].

More than that, the idea of commons governance in urban contexts has been expanded to the spheres of public spaces, digital platforms, and cultural heritage [24, 25]. The results of these works display how the co-beneficial management of a resource can have an impact on how the resource is kept free from enclosure, commodification, and exclusion, while spreading new ways of solidarity. On the other hand, the urban commons might not be completely safe from problems of elite capture, unequal participation, or fragmentation of authority. It is in fact these problems that will be major hindrances in the case of cities of the Global South where the co-existence of institutional weaknesses, informal governance, and unequal power relations further complicate the collective stewardship. The ABC model takes these understandings and applies them to recreational planning. It sees urban land and water not as assets to be privatized or as liabilities to be cut from a cities' budgets, but as common-pool resources which necessitate shared governance. By making recreation a by-product of food and water commons, ABC changes the narrative from leisure provision as a luxury to the collective right to multifunctional landscapes through the community's stewardship. This new angle not only makes access fairer but also naturally incorporates resilience into the practices of the community, hence being consistent with Ostrom's point about the necessity of adaptive, polycentric governance..

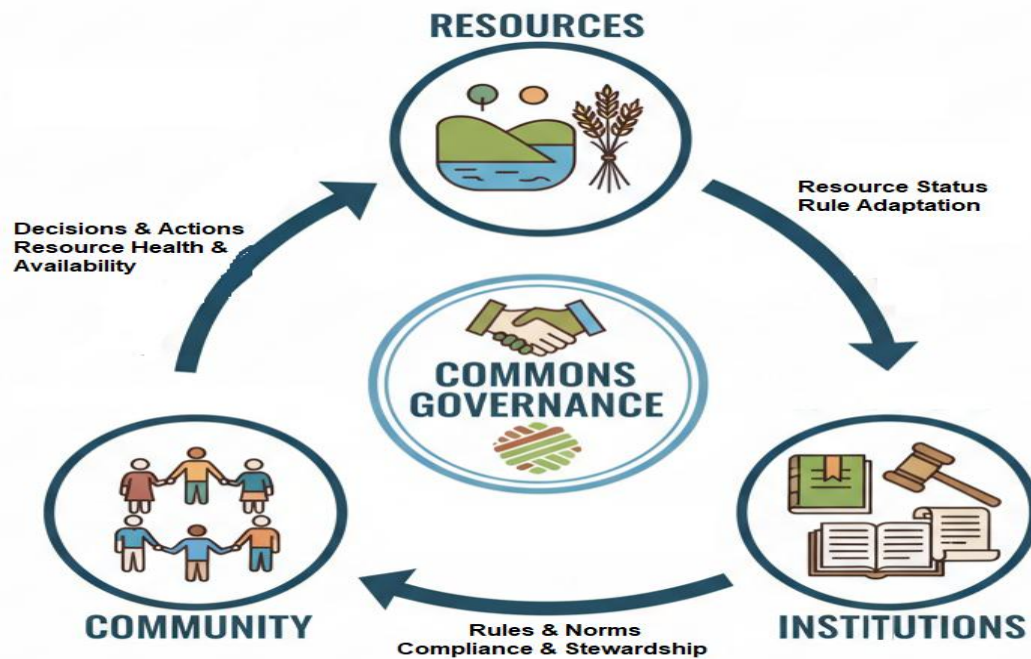


Figure 2: Schematic representation of Ostrom's framework for commons sustainability

3.2. Socio-Ecological Resilience

Another key theoretical origin for this study is the theory of resilience which looks at socio-ecological systems as complex, adaptive and interconnected [26].

Resilience is generally looked at as the capacity to absorb shock but here, it is the capacity to change and transform under pressure [27]. In city settings, resilience, is a feature of infrastructures that are multivariate in function, communities that can self-adjust and aspects of the city where nature and humans are seamlessly integrated. Most recreational planners do not consider resilience in their plans at all. Parks are treated simply as pretty spots made of grass and trees, often overlooked in terms of their relationship with the natural cycles or the people's work [28, 29]. As such, they hardly provide any protective or regenerative natural functions when the area is flooded or when there is drought or food scarcity. On the other hand, ABC raises resilience through multifunctionality which is the very essence of recreational landscapes (see Figure 3). The integration of farming in the landscapes of ABC places not only provides for a varied diet but has also the potential of lowering the temperature of the city and increasing the nutrient level in the soil [30, 31]. Blue infrastructures such as wetlands, ponds, and canals can mitigate floods, recharge aquifers, and regulate microclimates [32]. Cultural and leisure practices woven into these systems sustain social cohesion, mental health, and cultural continuity which are critical dimensions of resilience often overlooked in infrastructural planning.

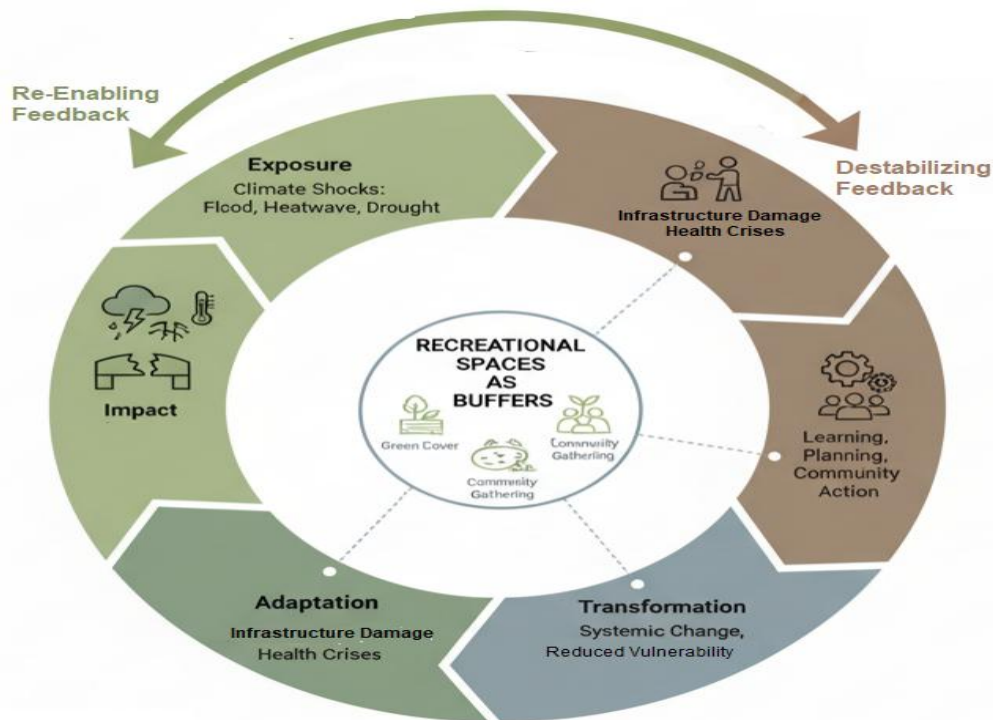


Figure 3: Socio-Cultural Resilience Cycle

Moreover, the literature on resilience also highlights the significance of the diversity, modularity, and feedback mechanisms [33]. ABC implements these ideas by designing habitats where ecological and social functions are combined but also separated. For example, crop variety in agro, parks increases the ecological balance, while cultural celebrations linked to agricultural seasons form the feedback loops that heighten community stewardship. ABC parks, therefore, through redundancy and flexibility, have the capacity to take in shocks without turning into dysfunction. In this way, the authors of this paper recover the status of recreation from being a vulnerable facility to a contributor to the resilience of urban systems under scarcity of resources.

3.3. Urban Metabolism

The third theoretical line is urban metabolism, which comprises the concept of cities as systems of flows of energy, materials, water, food, and waste that sustain urban life [34]. Based on the same concept, the city is a living organism that depends almost entirely on energy and resources that are imported from the outside world. Moreover, seen through this lens, these systems can be considered to going circular by sourcing locally, reusing, recycling, repairing, and engaging in the regeneration of ecosystems. (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 for urban agriculture; wetlands can filter greywater for irrigation; harvested crops can support 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 isolated drain on resources but part of regenerative flows that enhance urban sustainability. Moreover, urban metabolism emphasizes equity in resource distribution. Metabolic flows often reflect socio-spatial inequalities, with affluent areas consuming disproportionate resources while marginalized districts face scarcity and 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 foregrounds equity and inclusivity in resource governance.

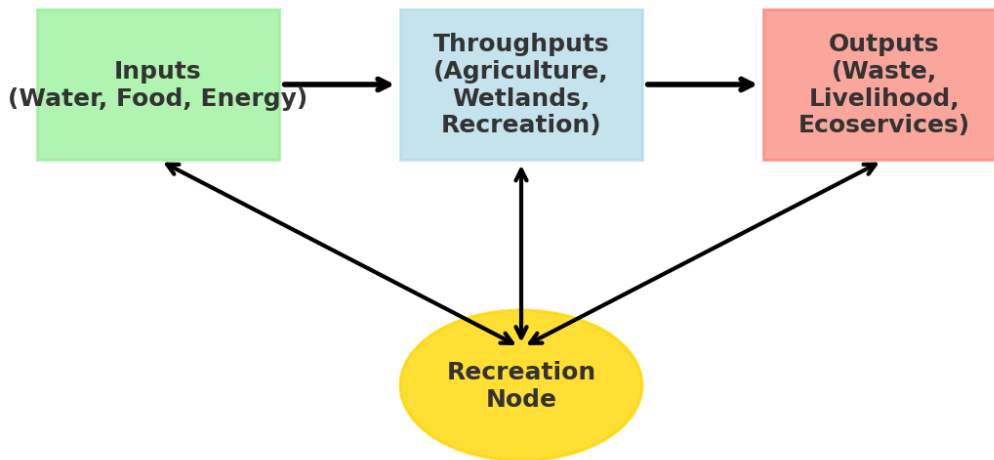


Figure 4: Urban Metabolism Framework

ABC bridges the divide by incorporating a triple bottom line into the design of parks. The organic waste generated in markets can be used for composting, which in turn can be used to grow food locally. Wetlands help to purify greywater that can be used for irrigation. The harvested crops can be sold at the local market. Leisure activities and festivals help to keep the culture alive and promote the circulation of reciprocity. Thus recreational green spaces are the places where energy, water, and nutrients are not just used but circulated and conserved. The coupling of agro, ecology and blue infrastructure guarantees that the time spent in nature is not only a pleasure but also contributes to the improvement of the environment. Furthermore, an urban metabolism approach highlights fairness in the sharing of resources. Metabolic flows are a reflection of socio, spatial inequalities, whereby wealthy neighborhoods have a disproportionate share of resources in terms of pollution and scarcity. Locating recreational spaces within shared metabolic systems, ABC is a step forward to ecological redistribution that lessens the environmental burdens of underprivileged 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, social, ecological resilience, and urban metabolism, when combined, provide not only different but complementary perspectives for the transformation of recreational planning in the Global South. Commons theory is centered on the institutional and collective aspects of custodianship of the resource, especially in the act of resisting enclosure and at the same time allowing shared use [19]. Social, ecological resilience describes the human qualities of adaptability to deal with climate shocks and systemic risks and hence it develops the idea of diversity, redundancy, and learning in complex systems as being of paramount importance [38]. In contrast, urban metabolism puts the emphasis on the material and infrastructural flows that cities use to sustain themselves and presents a window through which the consumption, transformation, and potential regeneration of land, water, and energy can be viewed [39].

By mixing these three frameworks, we come to recognize an alternative recreation model. Through the commons governance, shared landscapes are not only secured as accessible but also equitably managed [40]; through the resilience perspectives, adaptive space designing methodologies are made available [41]; and through metabolic analysis, recreational planning is 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 the 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 be a simple solution to the problems of these tensions but rather it aims to use these tensions as productive areas of negotiation that can lead to the development of more just and adaptive recreational infrastructures (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 Governance	Collective management of shared resources through rules, norms, and stewardship practices.	Ensures equitable access, legitimacy of local stewardship, and accountability in managing recreational landscapes.	Risks of elite capture, governance fragmentation, and weak enforcement in resource-poor settings.	Provides institutional scaffolding for participatory governance of recreational spaces.
Socio-Ecological Resilience	Adaptive capacity of linked human-ecological systems to withstand and transform under shocks.	Frames recreation as multifunctional spaces that buffer climate shocks (flood control, cooling, food security) while supporting community cohesion.	May overlook power inequalities and cultural dynamics that shape access to resilient spaces.	Supplies adaptive design principles to integrate recreation with climate resilience and community wellbeing.
Urban Metabolism	The flow of materials, energy, food, and water through cities and their infrastructures.	Highlights the role of recreational landscapes in recycling resources, regenerating ecosystems, and reducing waste.	Often technocratic, focusing on efficiency without addressing equity or cultural dimensions.	Embeds recreation within resource flows, linking leisure with production and ecological services.
Agro-Blue Commons (ABC) (Synthesis)	Integrated socio-ecological commons that merge governance, resilience, and metabolic functions.	Recreation becomes a productive and regenerative infrastructure delivering ecological services, food/water security, and cultural continuity.	Challenges remain in scaling, balancing ecological trade-offs, and ensuring governance coherence.	Offers a novel 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 answer to the spatial mismatch that characterizes Global South urbanism. Spatial mismatch herein refers to the phenomenon where the land is mostly given over to high, maintenance, single, use recreational zones which bring little benefit to the urban poor. 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 infrastructures in the urban context, converts the unused or environmentally sensitive land into highly productive socio, ecological assets. Hence, the focus of planning is changed from mere beautification to functional productivity, thereby making sure that urban land, use policies not only satisfy climate adaptation goals but also cater to the 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 thorough integration, which allows one single landscape element to carry out various infrastructure functions at the same time, thus drastically cutting down on municipal capital and operational expenditures. As an example, blue infrastructures in the form of retention ponds and restored canals do not simply beautify the environment; they act as flood, control systems capable of managing water levels, hence reducing the necessity for expensive grey concrete drainage systems [47]. Cultivating these green spaces together with agro, ecological

production creates a circular metabolic loop. Organic urban waste in the loop is turned back into nutrient input for food crops, and the rainwater collected is used for irrigation instead of potable water. This regenerating logic drastically decreases the monetary cost of upkeep in comparison with ornamental parks that are traditionally subject to energy, intensive external inputs such as chemical fertilizers and motorized maintenance [48].

4.3. Comparative Analysis of Framework Performance

The main divergence of the ABC model from standard urban planning can be seen very clearly through its capacity to resolve the clash of different rationalities between state, led technocratic planning and the urban poor's lived experience [49]. Traditional ornamental parks function on the logic of passive consumption, whereby the state hands over a finished product, which is mostly economically irrelevant to the local community. This, consequently, results in a high failure rate of such parks in the Global South, where they fall into disuse due to the lack of both, municipal funding and community investment [50]. Whereas 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 is mostly a fiscal burden, the ABC space is a productive natural asset that sequesters carbon, filters greywater, and through agro, ecological harvests provides a continuous income stream [51, 52]. Changing such space from a luxury good to a critical infrastructure guarantees that the community will continue protecting the space even when the state neglects it, as the landscapes performance is directly connected to the community's own 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	Aesthetic "greenery" with low biodiversity.	High-performance flood control and nutrient cycling.
Maintenance Model	Fiscal drain (requires constant 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 is the distribution of authority and risk across various scales, community, municipal, and non, state actors, to prevent the tragedy of the commons or state, led mismanagement [55]. In this setup, Community Stewardship Councils are in charge of the detailed, daily management that reduces the costs of monitoring through peer, to, peer accountability [56]. To prevent councils from replicating local power imbalances, the model advocates for a quota-based participatory structure. This ensures that marginalized groups, including women and informal laborers, have legal standing in stewardship decisions, thereby mitigating internal gender and class inequities that often complicate collective management. Also, the ABC model, in order to avoid the tragedy of the common and to secure long, term resilience, advocates a nested governance structure that separates the duties of community prosumers and municipal facilitators (Table 3). This polycentric arrangement guarantees that the leisure function of the space does not replace the productive function. For example, the Community Stewardship Council operates Temporal Zoning, which is a mechanism where different activities are time, sequenced in the same physical space, during the week, certain zones are dedicated solely to agriculture, on weekends they are made available to eco, tourism or cultural festivals, thus, both calorie and social yield potentials are maximized. At the same time, Municipal Facilitation allows these commons to be safeguarded by law and land, titling, thus, the private sector is prevented from taking over. This institutional redundancy is essential for resilience; in case one part of the system breaks down for example municipal funding dries up the local stewardship layer keeps the landscape's primary life, support functions thus, a complete systemic degradation which is typical in neglected public parks is avoided [57].

Table 3: The ABC Governance Matrix 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, macro-technical support (e.g., flood sensors).	Sovereign oversight and regulatory compliance
Knowledge Partners	Monitoring metabolic health (soil/water quality), capacity	Advisory and monitoring access

Governance Tier	Primary Responsibility	Resource Rights
(NGOs/Academia)	building.	

5. Spatial Configurations and Applications

The ABC (Agro, Blue, Cultural) schema can be applied to a wide range of Global South city spaces, including very crowded informal settlements and even the peri, urban agricultural belts. By harmonizing ecological restoration with social utility, the framework is thus moving beyond theoretical urbanism towards practical spatial strategies. Next, the four applications demonstrate the frameworks capacity to respond to the unique socio, economic and environmental challenges in rapidly urbanizing contexts.

5.1. Agro-Wetland Parks

The case of restored wetlands in coastal cities of the Global South is particularly exemplifying the above argument as these areas are able to provide the various functions of flood buffering, fishery grounds, and recreational sites at the same time. For instance, the building of gray infrastructure into mangrove and marshland zones has increased flood risks and removed locals from their traditional ways of life in cities such as Lagos, Nigeria, or Dhaka, Bangladesh [58, 59]. The ABC framework suggests that these zones be transformed into multifunctional commons. The mangrove ecosystems of Lagos, notably those at the Lekki Peninsula and the Badagry Creek, present an excellent case for agro-wetland parks. Instead of using the areas to create luxury real estate by land reclamation, these zones can be maintained as natural sponges capable of production. In terms of space, this means a tiered model: the innermost area consists of protected mangroves for carbon storage and natural hurricane barriers; a surrounding zone allows the local community to perform sustainable aquaculture and artisanal fisheries; and an outer zone of relaxation offers boardwalks and public spaces for cultural events (Figure 5). By combining flood control with food security (fisheries) and culture, the model ensures that local communities, who often suffer first from climate disasters, will have a direct interest in the care of the land.

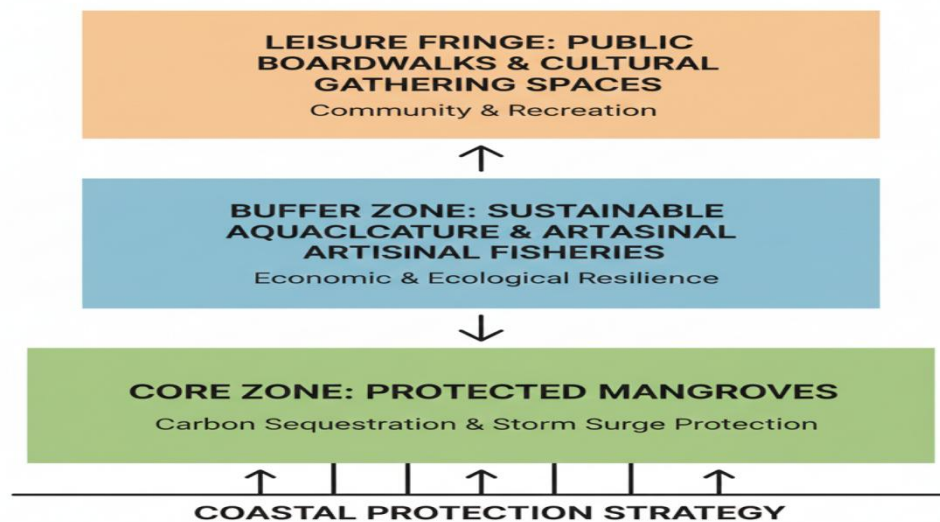


Figure 5: A tier design framework for Agro-Blue Commons in Coastal areas

3.5. Community Irrigation Commons

Water management in desert and semi, desert regions is often considered solely from a practical or technocratic standpoint. In contrast, the ABC framework incorporates local wisdom to transform irrigation canals and water reservoirs into public spaces for both leisure and water. In Rajasthan, a state in India, the restoration of johads (earthen water retention structures managed by the community) has proved that water is a more enduring resource if it is closely connected with the social fabric [60]. A community irrigation common spatially transforms the traditional reservoir into a blue, cultural node. Conventionally, in the peri, urban areas, these water bodies are mainly used for groundwater recharge and agricultural irrigation. However, through proper landscaping and the addition of ghats (stepped platforms), these places turn into venues for cultural festivals, religious ceremonies, and everyday social interactions. This arrangement opposes the privatization trend of water resources in cities of the Global South, where the poor are usually excluded from clean water access because they cannot afford it [61, 62]. The framework by designing irrigation as a common makes sure

that water remains a visible and celebrated part of the urban fabric, thus it is also a good way of co, responsibility of the community for its maintenance.

3.6. Rooftop Agro-Blue Networks

When land prices are very high and there is no open space in dense urban cores, the ABC framework extends its reach vertically. Roofs of slums and low, income residential blocks can be turned into agro, ecological gardens interconnected through decentralized rainwater harvesting systems. This usage fits perfectly the situation of cities like Cairo or Mumbai where the concrete surroundings cause extreme heat islands and also make it difficult to get fresh produce [63]. The network feature of this setup is very important. These rooftops are interconnected through shared water collection and distribution systems, thus creating a decentralized blue infrastructure instead of being isolated garden plots. From a spatial point of view, such networks operate as floating commons. They offer cooling by evapotranspiration, which

lowers the need for mechanical air conditioning, at the same time they create a safe, raised environment for women and children, two groups that are often socially excluded in 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 the social interactions on these community terraces increase the social capital of the neighborhood making it capable to resist better economic downturns [65]. Also, 20% of vegetable self-sufficiency through rooftop commons is a huge potential; however, there are still huge local resistances to the implementations in informal or low-income settings. Most of the existing buildings in the Global South are not structurally sound to hold the static and dynamic loads of saturated soil and water tanks without a major retrofit [66]. The ABC framework solves this issue by implementing Light-Touch Blue Infrastructure through hydroponic or vertical aeroponic systems that allow for weight minimization while maximizing water recirculation. Besides, the fact that these networks are decentralized means that a Commons-Based Maintenance Fund becomes necessary. In this fund, a part of the surplus yield is sold in order to be able to pay for the electricity costs of shared solar-powered water pumps, thus the network can continue to operate without depending on unstable municipal grids [67].

3.7. Peri-Urban Agro-Cultural Corridors

Peri, urban farmlands are the most hotly disputed lands in the Global South, and they are often the first to be taken for speculative real estate development [68]. The ABC approach proposes that these lands be preserved not just as green belts fixed in nature, but as agro, cultural corridors that are living and evolving. Such corridors work as protective buffers that serve as the foundation of a community's cultural identity, besides offering critical ecosystem services. These corridors are designed to be open and inviting physically, so that city dwellers can easily get to farm areas for leisure and learning. In the city outskirts of Nairobi or Hanoi, the corridors can become places for agro, tourism and cultural festivals that are seasonally linked to the harvests. The coming together of these elements generates a diversified economy for farmers living on the outskirts, thereby increasing the value of the 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.

3.8. Comparative Insights Across ABC Prototypes

By distilling these four prototypes, it is evident that ABC is not a prescriptive, fixed model, but rather a flexible spatial logic that mediates the antagonism of rationalities between state, led technocratic planning and the actual 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, tell us of a fundamental change in the way we value urban infrastructure (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 leisure 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 is critically dependent on the shift from passive green spaces to active resource regimes. For example, whereas traditional parks are generally regarded as financial burdens, the integrated agro, wetland or rooftop models, in contrast, operate as productive natural capital that continuously yields socio, economic benefits, such as local food supply and reduced costs of managing floods [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. Be it through the vertical networks in Mumbai or the peri-urban corridors of Nairobi, the ABC model enables socially and politically, residents to claim their right to the city, thus, lobbying against land grabbing and unsustainable sprawl [73]

4. Discussion

The Agro, Blue Commons model breaks down traditional disciplinary barriers by seeing agriculture, water management, and recreation not as separate activities but as interconnected infrastructures that support urban resilience and cultural vitality. Although the spatial prototypes in Section 4 illustrate how the framework can be adapted to different landscapes, their most important message is that they can challenge the knowledge power of Western recreational models [74]. By defining leisure as one of the products of the urban metabolism, the ABC model theoretically and practically charts the way for resolving 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 socio, ecological systems that can support human life.

(ii) Politics and the Commons: Dealing with the tension between governmental power, elite capture, and the collective stewardship.

(iii) Socio, Ecological Transitions: Considering the dangers, inadequacies, and the possibility of decolonization of urban planning in the Global South.

4.1. 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 the Western models that are brought in and view parks as decorative places where public capital is wasted, the ABC framework sees recreation as a co-product with food and water systems [76]. This transition is not only a visual change but is also a deep transformation of the system since it changes the landscapes that are hardly used into survival infrastructures where the management of caloric and water output is done together with social interaction [77]. Besides that, green infrastructure must move beyond passive greenery to address food-energy-water nexus challenges, several scholars have in recent times, proposed this idea [78]. Here, the ABC is a socio-technical transition, where the value of a park is determined by its metabolic contribution. In this case, by making leisure activities a part of the irrigation canals or gardens on the roof, the framework implies that leisure can be preserved as an essential aspect of urban metabolism rather than an item that is liable to municipal budget cuts. This is especially important for the residents of urban informal settlements who have only limited or no pure leisure space at all and whose main focus is just to get their livelihood needs met [79].

4.2. Navigating the Friction of the Commons

When it comes to the application of ABC, it is intensifying the issues of collective action, even though the theoretical basis of the commons is well-established. The overlay of economic production (fisheries, crops) with public leisure is leading to a distinct risk of functional collision in which recreational use might interrupt the agricultural yields or result in the elite capture of productive resources [19, 80]. The studies on urban commons show that communing is a social practice that is supported by an institutional framework in order to avoid the depletion of shared resources [81]. One way that ABC requires a rights-based governance layer that goes beyond participation to institutionalized stewardship. This means that there should be legally binding agreements that protect these hybrid spaces from being taken over by real estate developers, especially in cities where land-use conversion is led 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].

4.3. Nature-Based Solutions and Cultural Resilience

Additionally, the ABC framework further nature-based solutions by offering a cultural-recreational dimension that is usually missing in technocratic environmentalism. Most NbS frameworks concentrate on ecological metrics like the volume of flood mitigation or 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, the community's dedication to the maintenance of ecological buffers is deeply rooted in cultural ceremonies and festivals. This way, environmental management ceases to be a top-down imposition and becomes a bottom-up manifestation of local

identity, hence, the infrastructure remains culturally persistent even in the absence of the state [85, 86]. It is the same idea as the landscape approach that tries to reconcile different land-use purposes from the perspective of socio-ecological resilience. Through developing a local identity, the ABC model makes sure that sustainability is not merely a matter of ecological metrics, but that it is connected to live cultural practices, especially through the use of traditional ecological knowledge (TEK) to cope with climate changes today.

4.4. Analytical Heuristics

Drawing on new evidence from local prototypes, the ABC model is thus regarded as a flexible heuristic rather than a strict guide. The model's analytical strength is its ability to deal with different conflicts between state-led technocratic planning on the one hand and local survival logic on the other [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, thus facilitating communication between municipal hydrologists who are concerned with drainage and local residents whose main focus is food sovereignty [90]. Through matching the aesthetic preferences of the city population with the needs of the farmers, these green corridors generate a political and social alliance that can successfully resist land grabbing and unrestrained urban sprawl [69].

4.5. 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]. On top of that, the scaling up of such commons is limited by institutional inertia, that is, the locked-in nature of municipal finance which makes it very difficult for local governments to move away from relying on short-term land-sale profits and towards long-term valuations of ecosystem services [92]. To be able 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, to be able to scale up the ABC, it is inevitable to radically change the way municipalities keep their accounts, i.e., economic gains through self-sustaining and community-managed landscapes, such as reduced costs of flood remediation should be prioritized over immediate real estate revenue [94].

4.6. Synthesizing a Global South Paradigm for Planning

The ABC framework is a kind of intellectual rebellion against the knowledge supremacy of the Northern recreational paradigms [95]. The Southern countries in the Global South are not considered as those who are given the ideas from outside but rather as a place where integrated sustainability is experimented with by a framework that acknowledges the co-existence of agriculture, water, and culture. This is also in line with Southern Urbanism, which argues that urban planning should be based on the distinctive, often informal, practices of cities in the Global South rather than imitating Euro-American urban histories [96]. The model suggests the breaking down of disciplinary silos so that planners, hydrologists, and farmers will no longer be working in isolation to create a future where agriculture, water management, and recreation are seen as different functions of a single, unified infrastructure. Hence, ABC is at once a local remedy and a conceptual prompt to action. It is a gesture to the construction of futures where agriculture, water, and recreation mutually provide for the continuation of life. It paves the way for a decolonized urban planning, with the shared stewardship of nature at the heart of the 21st-century resilient city [5].

5. Conclusions

The ABC framework is a pivotal shift away from the exclusive and resource-heavy recreational models that are used globally in most urban areas dominating the Global South. By negating the false division between productive land and leisure space, the ABC model reveals that urban agriculture, water management, and recreation may be combined to form one, life-supporting infrastructure. This thorough integration turns neglected or environmentally sensitive areas into highly functioning natural assets that provide essential services such as flood control and nutrient cycling while maintaining 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 for decentralized greywater harvesting, and (iii) Co-management Agreements that shift maintenance from the state to community-led production contracts. To shift away from conceptual prototypes and bring about systemic change, the following proposals are put forward:

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- i. Rather than the traditional municipal management dominated by 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 ought to focus on valuing ecosystem services over a longer period, such as reduced costs of flood remediation and increased local food security, rather than getting quick profits through 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 efficient prevention of water-borne diseases and the production of pollutant-free, nutrient-rich food through knowledge-based societies

In this decolonized approach, valuable insights can be drawn from non-colonial Northern practices, such as those from Poland. For example, Prof. Walery Goetel was a worldwide pioneer of the sustainable natural resource management concept adopted by the IUCN in 1956 [22]. Furthermore, historical practices in Krakow, such as Prof. Dietel's ecological prevention of malaria and Prof. Henryk Jordan's establishment of open-access health-focused gardens, provide long-term evidence of the success of integrating primary health prevention with urban recreation. Essentially, Agro-Blue Commons is not only a practical roadmap but also a theoretical provocation for the decolonization of urban planning. It portrays the Global South as a testing ground for innovations where collective management of nature becomes the foundation of a resilient and just city of the twenty-first century. In addition, the primary barrier to scaling remains institutional inertia—specifically the rigid separation of urban departments. A successful ABC is measured by reduced food dependency and improved groundwater recharge; failure is indicated by green gentrification, where improvements lead to the displacement of the community the model was built to serve.

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AI Declaration

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List of Abbreviation

ABC: Agro-Blue Commons.

MCA: Multi-Criteria Assessment.

NBS: Nature-Based Solutions

NGOs: Non-Governmental Organizations.

WEFE: Water-energy-food-ecosystems

Q-MCA: Qualitative Multi-Criteria Assessment

SES: Social-Ecological Systems

IAD: Institutional Analysis and Development

BGI : Blue-Green Infrastructure

TEK: Traditional Ecological Knowledge

Authors Contribution

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

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Conflicts of Interest

The authors declare no conflict of interest.

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