

Promises and Pitfalls of Agro-Industrial Transformation: *An Empirical Diagnostic of Senegal's Agropole Sud*

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Abstract

While Agro-Industrial Parks (AIPs) are widely promoted across Sub-Saharan Africa to connect smallholders with manufacturing, their success varies drastically. High-profile failures like Senegal's earlier Mpal Agropole demonstrate that poorly planned projects risk deepening national debt without delivering social impact. To ensure new initiatives do not repeat these mistakes, this research investigates the structural conditions required for AIP success, focusing on Senegal's flagship Agropole Sud: a project with the potential to transform the livelihoods of thousands of local farmers, women, and youth.

I synthesized scattered interdisciplinary literature into an operational, five-dimensional framework spanning strategic commitment, institutional capacity, spatial design, business ecosystems, and capability building. Using a qualitative *ex-ante* case study design, I evaluated Agropole Sud's master plans, policy blueprints, and development bank appraisal reports against this theoretical benchmark.

I found that while Agropole Sud benefits from strong political backing and physical infrastructure designs, capability building (upgrading local human capital) remains the most critical yet neglected pillar. Modern economic competitiveness depends on a region's capacity for value-addition rather than raw material export. Prioritizing local workforce skills, technical training, and smallholder integration reinforces all other pillars, turning physical facilities into a self-sustaining engine for growth.

Ultimately, this study provides actionable policy recommendations for the Agropole Sud Development Program to prevent execution bottlenecks. Future research can further refine this evaluation framework by applying it across other emerging agro-industrial initiatives in Africa.

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Abbreviations

AfDB: African Development Bank

AIP: Agro-Industrial Park

AIC: Agro-Industrial Centre

ARM: Agence de Régulation des Marchés (*Market Regulation Agency*)

ASCODEM: Association Sénégalaise des Commerçants et Délégués de Marché (*Senegalese Association of Traders and Market Delegates*)

BMN: Bureau de Mise en Niveau (*National Upgrading Office*)

BOS: Bureau Opérationnel de Suivi du Plan Sénégal Émergent (*PSE Operational Monitoring Office*)

CAC / CAS: Centre d'Agrégation et de Services (*Aggregation and Service Center*)

DPMI: Direction des Petites et Moyennes Industries (*Directorate of Small and Medium Industries*)

FAO: Food and Agriculture Organization of the United Nations

FONSIS: Fonds Souverain d'Investissements Stratégiques (*Sovereign Fund for Strategic Investments*)

GoS: Government of Senegal

IsDB: Islamic Development Bank

ITA: Institut de Technologie Alimentaire (*Food Technology Institute*)

M&E: Monitoring and Evaluation

PAP 3: Third Priority Action Plan (*Programme d'Actions Prioritaires 3*)

PIU: Project Implementation Unit

PNDAS: Programme National de Développement des Agropoles du Sénégal (*National Agro-Industrial Park Development Program of Senegal*)

PPP: Public-Private Partnership

PSE: Plan Sénégal Émergent (*Emerging Senegal Plan*)

PZTA-Sud: Projet de Zone de Transformation Agro-Industrielle Sud (*Southern Agro-Industrial Processing Zone Project / Agropole Sud*)

R&D: Research and Development

RCT: Randomized Controlled Trial

SCE: Société de Construction et d'Exploitation (*Construction and Operations Company*)

SME / SMI: Small and Medium Enterprises / Small and Medium Industries

TVET: Technical and Vocational Education and Training

UNIDO: United Nations Industrial Development Organization

WACOMP: West Africa Competitiveness Support Programme

Introduction

“Most of the world's poor people earn their living from agriculture, so if we knew the economics of agriculture we would know much of the economics of being poor” (Schultz, 1980, p. 639).

Over sixty years later, development economics, especially in Africa, are still in a quest to figure out how agriculture, which employs most of sub-saharan economies' workforce, can serve as a primary engine of economic development. On the other hand, modern high-income economies are marked by a fall in the importance of farmland and an increased investment in knowledge-intensive production. This contrast has prompted policymakers to seek strategies capable of transforming agriculture into a catalyst for structural transformation rather than merely a subsistence sector.

One policy response to this challenge has been the emergence of Agro-Industrial Parks (AIPs). AIPs, also referred to as agropoles, are geographically concentrated production and processing hubs designed to strengthen linkages among farmers, processors, service providers, government institutions, and research organizations. Although AIPs have become an increasingly prominent instrument of agricultural and industrial policy across Africa, their performance has varied considerably. First developed in the East Asian "tiger economies" before spreading to South Asia and, more recently, Africa, African experiences have produced sharply contrasting outcomes. While Gabon's Nkok Special Economic Zone successfully attracted significant private investment, Nigeria's Calabar Free Trade Zone is widely regarded as an institutional failure (Tandem & Centre for Development Alternatives, 2021). More broadly, the African Development Bank (AfDB) concludes that, with a few notable exceptions, African AIPs have fallen short of both their operational and developmental objectives (AfDB, 2021).

These mixed experiences suggest that establishing an agro-industrial park alone is insufficient to generate structural transformation. Evidence indicates that many AIPs have struggled to foster productive linkages with domestic firms, stimulate industrial upgrading, and generate broader economic spillovers (Farole, 2011; AfDB, 2021). In some cases, they have functioned primarily as enclaves or vehicles for political patronage, with their potential benefits undermined by excessive tax incentives, weak integration with local economies, and limited institutional reform

(FAO, 2017; Saleman and Jordan, 2014). Understanding why some AIPs succeed while others fail is therefore essential for assessing whether recent projects like the Agropoles of Senegal possess the essence of flourishing parks. Building on the determinants identified in the existing literature, this paper asks: To what extent does Senegal's Agropole Sud possess the institutional, spatial, and economic foundations necessary to drive regional structural transformation?

To evaluate the developmental trajectory of Senegal's Agropole Sud, this study resolves a key challenge in the literature: existing research on AIPs remains fragmented. I address this by synthesizing these scattered insights into an operational, multidimensional framework defined by five core pillars: political commitment, institutional capacity, infrastructure design, productive ecosystems, and capability building. Beyond these foundational dimensions, I argue that sustainable agro-industrial transformation fundamentally hinges on a critical cross-cutting driver: locally embedded knowledge production and innovation. Applying this lens demonstrates that physical infrastructure yields limited returns without continuous investment in "the quality of human agents" (Schultz, 1980, p. 643).

Literature Review

What Are AIPs and Why Are They Built?

Agro-Industrial Parks (AIPs) represent far more than conventional industrial real estate; they constitute deliberately planned spatial configurations of complementary hard and soft infrastructure designed to catalyse inter-firm collaboration, knowledge spillovers, localized innovation, and value addition across agricultural supply chains. Unlike agro-based clusters, which typically evolve endogenously through uncoordinated market forces, AIPs are targeted policy interventions engineered to construct the structural preconditions under which such clusters can coalesce and scale.

AIPs can be rigorously theorized through the lens of New Structural Economics. As Lin (2011) posits, economic development is an endogenous, continuous process of structural transformation wherein a nation's industrial architecture evolves in tandem with its changing factor

endowments. Because structural upgrading requires concurrent, large-scale investments in both physical infrastructure and soft institutional capabilities, pure market mechanisms frequently suffer from severe coordination failures. Governments must therefore act as facilitating agents, stepping in to resolve these structural bottlenecks and provision the requisite public goods that de-risk private capital deployment. Within this lens, AIPs serve as a key state-led policy instrument to coordinate targeted, multi-sectoral investments around priority agricultural commodities.

What determines whether they succeed?

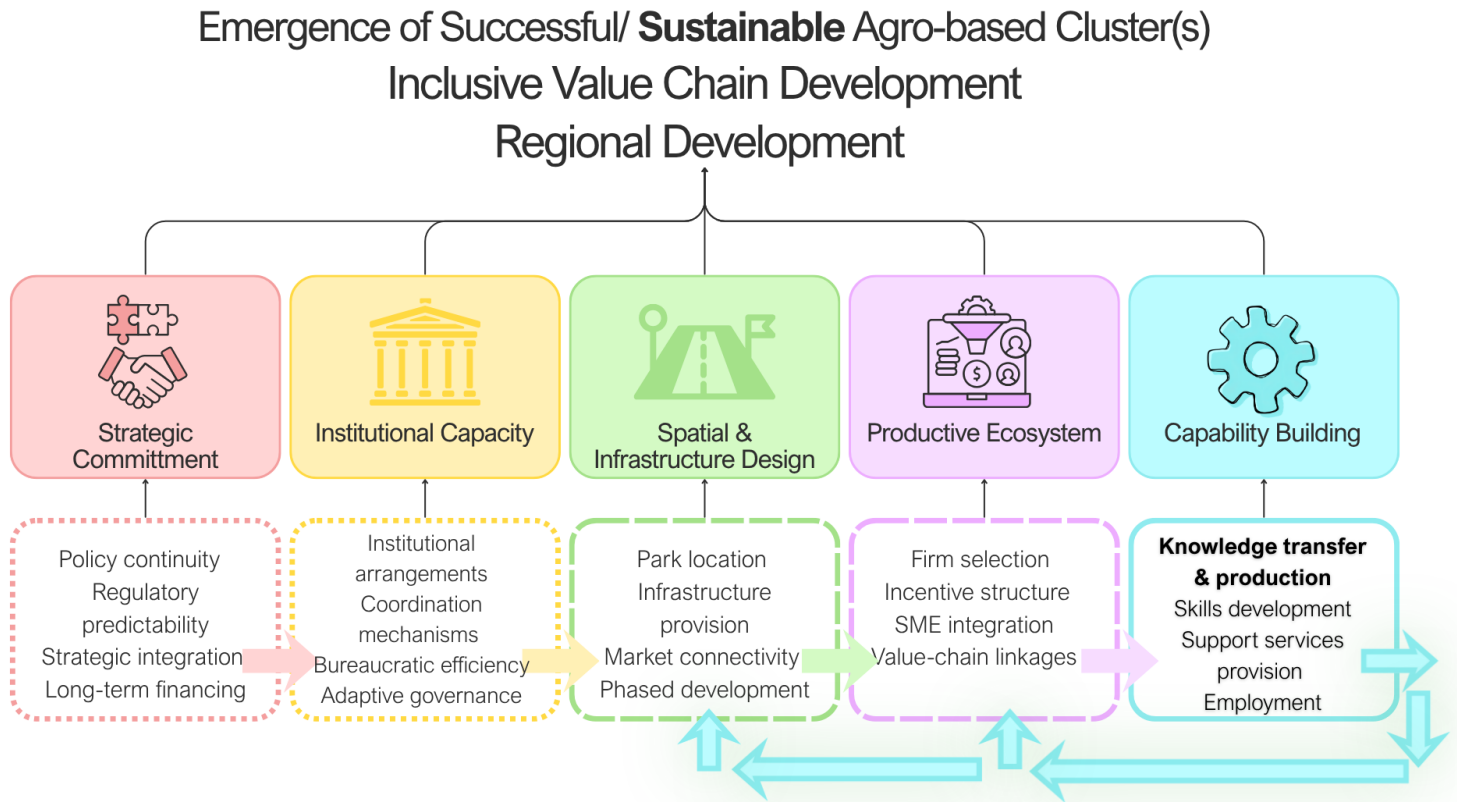
The scholarly consensus suggests that the trajectory of an Agro-Industrial Park depends less on its physical inauguration than on the overarching political, institutional, and microeconomic conditions that govern its capacity to generate productive linkages and sustained industrial upgrading. Comparative empirical evidence from Special Economic Zones and AIPs across Africa indicates that projects frequently fail when states adopt blueprint models poorly adapted to local factor endowments, neglect foundational utility provision and regulatory predictability, or allow short-term political rent-seeking to supersede developmental objectives (Farole & Moberg, 2014). In the case of Africa, the literature therefore insists that high-level political commitment must be paired with administrative coherence for AIP growth. Similarly, high quality infrastructure and tax incentives are repeatedly mentioned. However, state-of-the-art infrastructure alone is insufficient to guarantee a competitive advantage. As Porter (1998) demonstrates, firm-level international competitiveness is rooted in the quality of the surrounding microeconomic environment, specifically access to specialized inputs, business services, human capital, and localized tacit knowledge. Applied to AIPs, spatial proximity must actively translate into high-density, functional linkages connecting primary producers, industrial processors, input suppliers, academic research institutes, and output markets.

Furthermore, the long-term developmental dividend of these spatial interventions hinges on their capacity to build local capabilities and induce continuous technological learning. Drawing on Lundvall's (2016) national systems of innovation framework, innovation is recognized as an interactive process emerging not merely from formal R&D institutions, but through iterative, ongoing exchanges among firms, public regulatory bodies, research entities, and financial actors.

Synthesizing these theoretical perspectives, I contend that human capital upgrading and innovative synergies represent the binding constraints of AIP success, dictating whether physical infrastructure, political commitment, and governance frameworks ultimately yield a dynamic productive ecosystem or an isolated economic enclave.

The Analytical Framework

Drawing on the comparative literature on Agro-Industrial Parks, the effectiveness of an AIP appears to depend on five interrelated dimensions. Each dimension represents a necessary condition for the emergence of competitive agro-based clusters.



1. Strategic and Longstanding Political Commitment:

Agro-industrial parks represent capital-intensive, path-dependent investments whose long-term viability hinges on the state's capacity to signal credible and sustained policy commitment. Given the pronounced temporal asymmetry between high upfront capital expenditures and

delayed financial returns, private investors face substantial exposure to regulatory volatility, political turnover, and policy hold-up risk. Strategic political commitment mitigates these institutional risks by establishing institutional continuity, maintaining predictable legal regimes, and structurally embedding park frameworks within national macroeconomic and sectoral development agendas. Consequently, credible commitment lowers the risk premium for private capital, facilitates long-term resource mobilization, and ensures agro-industrial parks operate as integrated catalysts for structural transformation rather than isolated spatial enclaves (Tandem & Centre for Development Alternatives, 2021). Furthermore, to optimize factor proportions across targeted agrifood chains, park development must explicitly align with national comparative advantages (FAO, 2017).

Sub-Dimensions	Structural & Policy Indicators	Quantitative & Performance Metrics
Political Stability & Political Continuity	- Binding legislative frameworks/decrees establishing park authority - Explicit inclusion in national medium/long-term development plans	- Longevity of supporting legal decrees across political transitions - Number of government ministries actively engaged in governance
Strategic Policy Integration	- Alignment with national industrial, agricultural, and food sovereignty strategies - Trade policy alignment (e.g., import substitution, export promotion)	- Ratio of public agricultural capital expenditure dedicated to park ecosystem development
Long-Term Financial Commitment	- Multi-year fiscal budget allocation - Co-financing agreements with multilateral development institutions	- Co-financing structure ratio (Public : Donor : Private)

2. Institutional and Governance Capacity:

Foundational, political commitment is insufficient in isolation to guarantee agro-industrial park efficacy. Successful operationalization demands continuous horizontal and vertical coordination across a heterogeneous network of public ministries, municipal authorities, private investors, financial intermediaries, park managers, research institutions, and primary producers, actors whose strategic objectives and incentive structures routinely diverge. In the absence of robust governance arrangements, systemic coordination failures exacerbate transaction costs, induce infrastructure implementation delays, erode policy coherence, and stifle private investment capital. Institutional capacity therefore serves as the primary operational mechanism translating high-level political intent into programmatic execution, empowering state bodies to manage complex public-private linkages, navigate exogenous shocks, and sustain the long-term competitiveness of the park ecosystem.

Sub-Dimensions	Structural & Policy Indicators	Quantitative & Performance Metrics
Administrative & Legal Framework	- Autonomous institutional governance body - Streamlined regulatory environment (e.g., One-Stop-Shop administrative windows)	- Average processing time (days) for investor permits, land access, and licensing - Statutory clarity score on PPP frameworks
Multi-Stakeholder Coordination	- Formally established inter-ministerial steering committees - Structured consultation platforms connecting public, private, and producer groups	- Meeting frequency and operational action-item resolution rate of steering committees - Inclusion rate of local producer unions in governance decisions
Adaptive Governance & M&E	- Operationalized M&E systems - Risk-mitigation mechanisms for macroeconomic or climatic shocks	- Regularity of published audit and M&E reports - Implementation rate of corrective policy recommendations

Notes: PPP= Public-Private Partnership; M&E= Monitoring and Evaluation.

3. Spatial and Infrastructure Design:

The spatial architecture of an agro-industrial park fundamentally conditions the microeconomic environment for resident firms. Strategic geographic positioning and multi-modal transport connectivity reduce spatial friction and logistics costs, thereby enhancing firm-level access to input markets, consumer centers, and specialized business services. This physical backbone relies on resilient infrastructure, spanning basic utilities, industrial sites, and specialized facilities tailored for agro-industrial activities.

To safeguard public capital, a phased infrastructure deployment model must calibrate physical expansion with real market demand. Successful deployment depends on evaluating critical parameters, including land availability and affordability, verified demand for proposed facilities, a promising cost-benefit analysis, and strategic location trade-offs balancing proximity to infrastructure versus consumer markets. By managing these factors, planners hedge against the fiscal burdens of oversized developments. Far from serving as passive physical assets, an optimized spatial configuration creates the structural preconditions for spatial clustering, inter-firm interaction, and localized agglomeration economies that drive firm productivity and competitive advantage (Tandem & Centre for Development Alternatives, pp. 27, 35).

Sub-Dimensions	Structural & Policy Indicators	Quantitative & Performance Metrics
Strategic Geographic Positioning	- Proximity to major primary production hubs and raw material catchment areas - Multi-modal transport network access (ports, highways, secondary feeder roads)	- Average distance (km) and transport travel time to primary agricultural zones - Distance (km) and logistics costs to export ports and primary urban consumer markets
Infrastructure Provision & Quality	- Dedicated industrial site servicing (water, high-voltage electricity, waste treatment) - Specialized post-harvest facilities (cold-chain storage, lab testing, processing sites)	- Utility reliability rates (e.g., power outage frequency/duration per month) - Cold storage capacity (m^3) per unit of targeted perishable output

Spatial Architecture & Phasing	- Hub-and-spoke spatial layout (e.g., central processing hub vs. aggregation centers) - Phased construction model matched to market demand	- Land utilization and occupancy rate of developed industrial lots (%) - Ratio of central park footprint to regional collection platform footprints
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4. Firm Ecosystem and Productive Linkages

The long-term competitiveness of an agro-industrial park is dictated not merely by physical tenancy or occupancy rates, but by the density and quality of inter-firm networks. A strategically targeted corporate ecosystem induces agglomeration economies by encouraging technological diffusion, knowledge spillovers, localized supplier networks, innovation linkages, green growth linkages, and deep value-chain integration. Conversely, relying solely on unconditioned fiscal concessions or prioritizing export orientation without embedding local suppliers risks inducing enclave development, wherein economic value creation remains geographically and operationally isolated from the host economy. Productive ecosystems materialize when investment promotion frameworks align tenant incentives with broader national development objectives, foster structural backward and forward linkages with domestic smallholders and SMEs, and cultivate mutually reinforcing synergies across the broader agricultural value chain (Tandem & Centre for Development Alternatives, pp. 30–37).

Sub-Dimensions	Structural & Policy Indicators	Quantitative & Performance Metrics
Tenant Selection & Incentive Structure	- Criteria-based tenant admission favoring value-addition over raw extraction - Performance-conditioned tax and tariff incentives (tied to local sourcing/hiring)	- Ratio of tenant firms engaged in secondary/tertiary processing vs. primary packing - Volume of private capital investment mobilized by tenant firms

Value-Chain & Backward Linkages	- Outgrower and contract farming institutional schemes - Structured off-take agreements between lead anchor firms and local smallholders	- Share of raw agricultural inputs sourced domestically vs. imported (%) - Total number of smallholder farmers integrated into formal supply contracts
SME Integration & Clustering	- Subcontracting opportunities for local business service providers - Physical space and incubation facilities allocated for local SMEs	- Share of park tenancies occupied by domestic SMEs (%) - Inter-firm transaction density (value of trade conducted between firms)

Note: SME= Small and Medium Enterprises

5. Capability Building and Inclusion

The development impact of agro-industrial parks extends well beyond capital mobilization and output expansion; its ultimate success rests on the structural upgrading of local human capital and institutional capabilities. By institutionalizing workforce development programs, facilitating technology and knowledge spillovers, providing specialized business support services, and developing core principles around the inclusion of people, environment, and profitability in decision-making processes, agro-industrial parks enable local enterprises to enhance total factor productivity while reducing systemic dependence on foreign technical expertise. Capability building thus transforms the park from an isolated production site into a dynamic engine of inclusive, self-sustaining economic transformation, ensuring that productivity gains and technology adoption are deeply absorbed by the domestic economy rather than concentrated within foreign or lead firm enclaves (Tandem & Centre for Development Alternatives, p. 42).

Sub-Dimensions	Structural & Policy Indicators	Quantitative & Performance Metrics
Skills Development & Technical Training	- Dedicated TVET centers - Specialized agricultural and industrial skill development partnerships	- Number of workers/farmers receiving accredited technical training annually - Local labor absorption rate (ratio of local hires to total workforce)

Knowledge Transfer & Innovation	- Formal collaboration frameworks with universities and research institutes - Specialized extension and business incubation services	- Number of joint R&D projects or technology transfer initiatives established - Adoption rate of improved agricultural techniques/technologies among linked farmers
Inclusive & Sustainable Growth	- Target inclusion programs for youth and women across value chains - Environmental management plans and circular economy provisions (waste recycling)	- Share of direct and indirect jobs created for women and youth (%) - Number of smallholders gaining access to subsidized financial or technical services

Notes: TVET= Technical and Vocational Education and Training; R&D= Research and Development.

The Case of Senegal's Agropoles

1. Brief Presentation

Senegal's contemporary Agropole policy was established under the *Plan Sénégal Émergent* (PSE) in 2014, with its initial flagship project, Agropole Sud (PZTA-Sud), formally approved by the African Development Bank in December 2019 and scheduled for inauguration in 2027. Implemented through the *Programme National de Développement des Agropoles du Sénégal* (PNDAS) and masterplanned under the Senegal 2050 Vision, the initiative aims to organize the country into territorially distinct agro-industrial zones centered on priority value chains. Each zone is anchored by an AIP. The framework divides Senegal into five strategic regional agropoles, North, South, East, West, and Centre, each specialized in target agricultural products and backed by dedicated infrastructure investments.

Agropole	Regions Covered	Priority Value Chains	Planned Infrastructure	Financing
South	Ziguinchor, Kolda, Sedhiou	Mango, cashew, and maize	→ One central agro-industrial module → Three regional agro-industrial modules → Five departmental platforms	57 billion CFA francs (FCFA)
North	Louga, Saint-Louis, Matam	Rice, onion, and livestock value chains	Three agro-industrial parks Fifteen CAS' Rehabilitation of the Mpal ¹ Agropole	189 billion CFA francs (FCFA)
Centre	Kaolack, Diourbel, Fatick, Kaffrine	Groundnut, salt, and cereal value chains	One central agro-industrial module Four regional agro-industrial modules Seventeen departmental platforms	108 billion CFA francs (FCFA)
West	Sandiarra, Nguenienne, Malicounda	Dairy, poultry, and sheep value chains	→ One agro-industrial infrastructure of 1160 hectares → Three Agricultural Development and Training Centres → One area allocated to nomadic cattle herders → Six agricultural zones designated for private-sector investment → One AIC	56 billion CFA francs (FCFA)
East	Tambacounda, Kedougou	Fonio and cotton value chains	NA	NA

Notes: Data adapted from the official website of the Programme National de Développement des Agropoles du Sénégal. (n.d.). Abbreviations: AIC= Agro-Industrial Centre; CAS= Aggregation and Service Center.

As detailed in the table above, the five agropoles vary significantly in their geographical scope, priority value chains, and financial commitments. Collectively, however, they constitute a unified national strategy spanning Senegal's key agricultural zones and diverse sectors including cereals, horticulture, livestock, cotton, cashew, and groundnuts. Despite regional variations, each agropole operates under a shared institutional logic: clustering primary production, industrial processing, and specialized support services within a geographically concentrated ecosystem.

¹ Mpal is a commune located in the Saint-Louis region of northern Senegal, designated as a strategic processing and collection hub for key agricultural value chains (including rice, onions, and dairy) within the Agropole Nord infrastructure layout.

Consequently, these agropoles function not as isolated development projects, but as localized expressions of a single national framework.

Given the scope of this national program, the following section focuses specifically on Agropole Sud. As one of the most advanced attempts to operationalize Senegal’s strategy, this case is uniquely suited to evaluate whether the state-led agro-industrial park policies can establish the institutional and organizational conditions required for dynamic agro-based cluster formation.

2. Empirical Evaluation of Agropole Sud: Applying the Analytical Framework

Because Agropole Sud is scheduled for full inauguration around 2027, this analysis evaluates its *ex-ante* institutional design alongside ongoing operational rollouts. Conducting a diagnostic evaluation at this stage provides actionable insights while project parameters remain adaptable.

The empirical foundation for this analysis draws on official documentation from the PNDAS, AfDB appraisal reports, and national master planning strategies.

Framework Dimension	Design Strengths & Empirical Findings	Operational Gaps & Failure Risks
Strategic Commitment	Institutional Architecture: Coordinated by the Ministry of Economy, Ministry of Industry, Ministry of Trade/SMEs, ARM, BMN, and ITA. Financial Structure: \$74.66M total budget (\$36.76M AfDB [49.2%]; \$23.64M IsDB co-financing [31.7%]; \$14.26M GoS [19.1%]). Policy Continuity: Formally integrated across successive national plans: <i>PSE</i> $\rightarrow$ <i>PAP 3</i> $\rightarrow$ <i>Sénégal 2050 Vision</i>.	Long-term implementation delays: Mpal Agropole took >10 years to launch and required continuous recapitalization post-2017. Rhetorical repetition: Detailed plan design in <i>Sénégal 2050</i> replicates earlier <i>PSE</i> frameworks without guaranteeing operational delivery. Indicator limitation: Formal policy commitments reflect paper intent (<i>de jure</i>)

		rather than institutional track record (<i>de facto</i>).
Institutional Capacity	Formal Governance Architecture Realized (100% Target Match): • <i>PSE (BOS) Management Committees:</i> 2 / 2 operational. • <i>PZTA-Sud Regional Steering Committees:</i> 3 / 3 operational. • <i>FONSIS Construction & Operations Co. (SCE):</i> 1 / 1 operational (includes single window / one-stop shop).	Execution & Bureaucratic Friction: High risk of inter-agency coordination bottlenecks between central ministries, donor PIUs (AfDB/IsDB), and local municipal entities. Disbursement Lag: Vulnerability to delayed fund absorption and public procurement bottlenecks during implementation.
Spatial & Infrastructure	Hub-and-Spoke Infrastructure Setup: • <i>Central Hub:</i> Adéane (80 ha; 22 ha secured for processing, storage, and cold chain; 29 km to airport; 98 km to Port of Ziguinchor). • <i>Regional Modules-Adéane:</i> Bignona (61 km), Sédhiou (145 km), Kolda (154 km). Processing Capacity (Target vs. Current [2019–2025]): • <i>Mango:</i> 43,000 tons/yr target vs. 7,000 tons/yr current (16.3%). • <i>Cashew:</i> 16,000 tons/yr target vs. 5,000 tons/yr current (31.3%). • <i>Maize:</i> 20,000 tons/yr target vs. 2,000	Logistical Friction & Spatial Overextension: Infrastructure deployment across a 150 km radius risks escalating transport costs and severe maintenance backlogs. Usability Deficit: Physical asset creation does not ensure industrial usability or immediate private tenant onboarding.

	tons/yr current (10.0%). • <i>Access Roads</i>: 372 km target vs. 0 km completed (0.0%).	
Productive Ecosystem	Support Ecosystem: BMN, DPPI, ITA, ASCODEM, WACOMP, and producer organizations. Institutional Metrics: • <i>Operational Support Units</i>: 5 target vs. 2 current. • <i>SMEs Benefiting from BMN Upgrades</i>: 50 target vs. 28 current (56.0%).	Information Asymmetry & Enclave Risks: No publicly accessible firm selection criteria, admission guidelines, or domestic sourcing quotas. Opaque Smallholder Integration: CAC/CAS aggregation frameworks exist in policy documents, but operational rules for smallholders remain undefined, favoring export-oriented lead firms over local suppliers.
Capability Building	Employment Targets (Target vs. Actual): • <i>Direct Industrial Jobs</i>: 700 target vs. 250 current (35.7%). • <i>Indirect Industrial Jobs</i>: 1,600 target vs. 250 current (15.6%). Smallholder Capacity Targets: • <i>Farmers Accessing Services</i>: 4,000 target vs. 0 current (0.0%). • <i>Farmers Accessing Training</i>: 6,000 target vs. 0 current (0.0%).	Temporal Sequencing Failure: Capacity-building and training programs stand at 0% execution undermining initial absorptive capacity. Superficial vs. Structural Upgrading: Reliance on basic input distribution over long-term R&D integration, vocational training, and managerial knowledge transfer.

Notes: Abbreviations: AfDB = African Development Bank; ARM = Agence de Régulation des Marchés; ASCODEM = Association Sénégalaise des Commerçants et Délégués de Marché; BMN = Bureau de Mise en Niveau; BOS = Bureau Opérationnel de Suivi du Plan Sénégal Émergent; CAC / CAS = Centre d'Aggrégation et de Services; DPPI = Direction des Petites et

Moyennes Industries; FONSI = Fonds Souverain d'Investissements Stratégiques; GoS = Government of Senegal; IsDB = Islamic Development Bank; ITA = Institut de Technologie Alimentaire; PAP 3 = Third Priority Action Plan; PIU = Project Implementation Unit; PSE = Plan Sénégal Émergent; PZTA-Sud = Projet de Zone de Transformation Agro-Industrielle Sud; R&D = Research and Development; SCE = Société de Construction et d'Exploitation; SME = Small and Medium Enterprises; WACOMP = West Africa Competitiveness Support Programme. Data compiled by the author based on official project appraisal reports, official websites (AfDB, 2019; Ndiaye, 2023; PNDAS, n.d.).

Diagnostic 1: Political Credibility vs. Disbursement Velocity (Dimensions 1 & 2)

Although agro-industrial parks have featured prominently in Senegalese policy rhetoric for nearly a decade, originating under the PSE with the Mpal Agropole, historical precedence raises critical questions regarding state execution capacity. The operational stalling and inefficient capital utilization of the Mpal project demonstrate that high-level policy inclusion does not guarantee developmental success. While the recent *Sénégal 2050 Vision* reaffirms commitment to the agropole model, the heavy media visibility of Agropole Sud compared to its regional counterparts raises the risk of performative political signaling over substantive execution.

This historical friction creates clear execution risks for Agropole Sud's \$74.66 million financing structure, co-funded by the AfDB, the IsDB, and the Senegalese government. Given past institutional bottlenecks, the project remains highly vulnerable to disbursement lags, bureaucratic friction, and fiscal absorption constraints.

Crucially, the case of Agropole Sud exposes an analytical limitation in traditional metrics for Dimension 1 (Strategic Commitment): formal governance indicators primarily measure *de jure* intent rather than *de facto* capability. Evaluating true political commitment requires assessing state track records, institutional memory, and historical project management performance rather than relying solely on official policy documentation.

Diagnostic 2: Spatial Efficiency vs. Regional Logistics Friction (Dimension 3)

Spatially, Agropole Sud spans three administrative regions (Ziguinchor, Kolda, Sédhiou) organized through a hub-and-spoke configuration. The primary collection and processing hub, the 80-hectare central module at Adéane, is strategically situated near the RN6 highway, local SENELEC power infrastructure, and the Port of Ziguinchor. Surrounding this hub are three

15-hectare regional modules located at an average distance of 120 km. While this large-scale spatial footprint aims to centralize raw material aggregation from outlying Casamance value chains, its considerable scale risks inducing construction delays and fiscal overextension, particularly within an institutional context unproven in managing complex multi-nodal platforms.

Beyond spatial layout, a critical tension emerges regarding the project's heavy reliance on capital-intensive physical modernization. While modern processing facilities and specialized cold-chain units are prioritized, there is a structural imbalance between physical infrastructure provision and local human capital upgrading. Drawing on Griliches' (1969) principle of capital-skill complementarity, physical assets yield minimal productivity unless paired with a skilled local workforce capable of operating and maintaining them. Without parallel investments in technical training for domestic smallholders and local agro-enterprises, high-spec physical assets risk significant underutilization.

Rather than assuming physical modernization alone will automatically attract long-term investment, the framework must prioritize upgrading domestic absorptive capacity, teaching local actors to add value using provided facilities. Failing to align physical infrastructure with human capabilities exposes Agropole Sud to the classic "white elephant" risk identified in development literature (Robinson & Torvik, 2005): creating costly, technologically advanced facilities that suffer rapid capital depreciation, remain unexploited by the local economy, and ultimately fail to trigger self-sustaining local investment.

Diagnostic 3: Opaque Network Architecture & Enclave Vulnerabilities (Dimension 4)

A fundamental prerequisite for cluster emergence is the creation of dense, transparent backward and forward linkages between anchor tenant firms, domestic SMEs, and primary producer organizations. However, an analysis of Agropole Sud's institutional rollouts reveals a pronounced information asymmetry regarding firm selection mechanisms and network admission criteria. While formal frameworks reference structural mechanisms such as Aggregation and Service Centers (CAS) and regional producer platforms, public documentation lacks explicit operational guidelines on SME tenant selection, domestic procurement quotas, or standardized off-take contracts.

This opacity undermines the strategic ambition of food sovereignty outlined in the *Sénégal 2050 Vision*. Despite policy rhetoric emphasizing regional value addition, project implementation remains heavily skewed toward primary export commodities (mangoes and cashews). Without legally bound domestic sourcing quotas or targeted incentives for local secondary processors, Agropole Sud risks replicating classic enclave dynamics, wherein foreign or large lead firms extract regional raw materials for export while generating minimal technological spillovers for the local economy.

Furthermore, the lack of accessible metrics regarding tenant allocation, such as the ratio of operational domestic firms versus foreign investors or signed off-take agreements, presents a critical analytical constraint. While this data deficit may partly reflect the project's phased implementation timeline, early-stage transparency is essential for reducing network transaction costs. If local SMEs and agricultural cooperatives cannot clearly discern how to access incubation services, technical assistance, or industrial space, physical spatial proximity will fail to translate into a dynamic, integrated productive ecosystem.

Diagnostic 4: Human Capital Gap and Temporal Misalignment in Agropole Sud (Dimension 5)

The ultimate dividend of an Agro-Industrial Park relies on its capacity to upgrade local human capabilities and institutionalize technological learning. However, an evaluation of Agropole Sud reveals a stark temporal misalignment between hard infrastructure deployment and human capability building. While multilateral appraisal documents project ambitious employment creation targets and aim to integrate over 4,000 farmers into structured service and extension networks, operational capacity-building metrics remain unrealized in the early implementation phase.

This delay represents a structural flaw in project sequencing. In accordance with phased development principles (Dimension 3) and adaptive governance (Dimension 2), farmer inclusion and workforce training must occur concurrently with physical construction. Preparing smallholders and local agro-SMEs prior to full park inauguration ensures that domestic actors possess the technical and managerial absorptive capacity needed to utilize industrial processing hubs immediately upon completion.

As Schultz (1980) emphasizes, economic development relies less on the physical volume of nonhuman capital than on enhancing the "quality of human agents". The foundational dividend of an AIP lies not in importing high-tech machinery, but in embedding managerial skills, specialized agricultural R&D, and localized knowledge transfer into host communities. While short-term inputs (such as seed distribution or introductory workshops) offer basic support, long-term economic sovereignty requires institutionalizing ongoing collaboration among primary producers, research bodies, and private firms.

Without explicit commitment from both public institutions and private lead-firms to fund local R&D and build collaborative ecosystems, Agropole Sud risks remaining a high-capital physical platform with limited local economic absorption.

3. Strategic Policy Recommendations

Based on the empirical evaluation of Agropole Sud against the five-dimensional framework, four concrete policy priorities emerge for project planners, the PNDAS, and development partners:

a) Prioritize Phased "Pilot" Development Over Physical Overextension

To safeguard public capital and adapt to on-the-ground operational realities, planners should adopt a strict quality-over-quantity approach. Rather than attempting to simultaneously scale all nine planned infrastructural sites across Ziguinchor, Kolda, and Sédhiou, resources should focus heavily on operationalizing the central module at Adéane. Lessons from this primary pilot hub can then dynamically inform the expansion of secondary regional modules and departmental platforms.

b) Institutionalize Transparent Network Access & Firm Integration

To mitigate enclave risks and combat information asymmetry, PNDAS and its partners must establish and publicly disseminate clear, criteria-based tenant admission frameworks. Local SMEs, agricultural cooperatives, and smallholder unions require transparent guidelines detailing procurement quotas, off-take mechanisms, and eligibility criteria for incubation and extension services. Making these rules public is essential for triggering localized cluster externalities

c) Establish Microeconomic Data Collection & Impact Monitoring

Current empirical evaluations of industrial parks in Senegal are frequently constrained by aggregated regional survey data from institutions like the World Bank, which fail to isolate AIP-specific impacts from broader macroeconomic variables. PNDAS should implement dedicated, enterprise-level monitoring systems. Key indicators to track continuously include:

- *Administrative efficiency*: Average duration (days) to obtain operating permits and business licenses.
- *Workforce dynamics*: Hours of technical training completed per employee and time/cost required to resolve labor disputes.
- *Linkage density*: Ratio of domestic vs. foreign sourcing contracts signed by anchor firms.

Early and transparent data collection will de-risk the investment environment for private capital while providing actionable evidence for future AIP iterations across Sub-Saharan Africa. The conduction of RCTs could also be considered to evaluate causality.

d) Elevate Human Capital & R&D Investment to Parity with Physical Infrastructure

In alignment with Schultz's (1980) emphasis on human agents, technical training programs and academic R&D collaborations must be funded and prioritized at parity with civil engineering projects. Partnerships with local universities and vocational institutes should be institutionalized early to embed managerial capabilities, technological adaptation, and localized innovation within the domestic labor force. Furthermore, addressing governance vulnerabilities through rigorous independent audits is vital to prevent rent-seeking practices from distorting resource allocations.

Conclusion & Broader Implication

Rather than serving as an indictment of policy ambition, this analytical evaluation provides a diagnostic safeguard. Identifying structural vulnerabilities, such as fund misallocation, performative implementation, or institutional rent-seeking, is essential if current initiatives are to avoid the path-dependent failures of past projects like Mpal. Unexamined policy failures guarantee their eventual repetition; rigorous, transparent evaluation is what prevents capital-intensive infrastructure from degenerating into empty physical monuments.

This inquiry ultimately prompts a broader re-examination of development theory itself. Standard paradigms treat ‘economic development’ as a linear, universal blueprint that assumes any nation can replicate high-income outcomes simply by adopting imported institutional models. However, the operational reality of Senegal’s agropoles demonstrates that economic transformation is fundamentally heterodox, path-dependent, and deeply shaped by local political economy, history, and culture. Long-term economic sovereignty cannot be imported through high-spec infrastructure; it must be cultivated from within by building adaptive institutions, localized innovation systems, and endogenous human capabilities.

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