THE ROADS TO SUSTAINABLE DEVELOPMENT: POLICY PRIORITIES FOR INDUSTRIAL ECOSYSTEMS IN AFRICA

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Columbia Capstone Project

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Executive Summary

Context

Arise Integrated Industrial Platforms Limited (ARISE IIP), a leading developer of industrial parks in Africa, has partnered with the Government of Benin to develop the Glo-Djigbé Industrial Zone (GDIZ), a flagship initiative to drive industrialization, boost value-added production, and attract foreign investment. To support this effort, graduate consultants from Columbia University were engaged to provide strategic recommendations for strengthening GDIZ's role of industrialization process and regional manufacturing hub. While Benin has made progress through reforms and infrastructure development, it still faces critical challenges: electricity remains expensive and unreliable, waste management systems are lacking, the labor market is under skilled, and the economy is overly dependent on unprocessed raw exports like cotton and cashew. These constraints limit Benin's global competitiveness and the full realization of GDIZ's industrial transformation potential.

Scope of Challenge

Benin's industrial growth faces three core challenges. High electricity costs (i.e. over $0.50/kWh) and heavy reliance on imports leave the sector, especially GDIZ, at a major disadvantage. The agro-industrial system is inefficient, with unmanaged textile waste and widespread cashew smuggling due to weak price incentives, undermining local processing. Additionally, the economy remains tied to low-value exports like raw cotton, limiting value capture and hindering diversification into higher-margin industries.

Policy Recommendations

First, reduce energy costs and improve access by subsidizing industrial electricity tariffs in GDIZ, developing a 50 MW solar plant through a public-private partnership and securing green financing such as climate funds and green bonds to expand renewable infrastructure.

Second, transform the agro-industrial sector by establishing textile recycling hubs, updating waste management laws, and offering tax incentives for sustainable practices. To support local cashew processing and reduce smuggling, a Minimum Support Price (MSP) and Community-Based Quota System should be introduced.

Third, to achieve industrial upgrading and diversification, Benin needs to shift toward higher-margin industries—from cotton to apparel, or from raw cashew nuts to snack products. Benin should utilize the economic complexity framework and leverage its current comparative advantages in trade. This includes launching high-level initiatives to attract investment into local manufacturing, such as promoting the country as a production base for global brands.

Introduction

Industrialization remains one of the most potent levers for economic transformation, particularly in Africa, where countries are striving to reduce reliance on raw commodities and leapfrog into value-added manufacturing. Rooted in the developmental stage's theory of Friedrich List, which maps a nation's evolution from agrarian society to fully industrialized economy, Africa's path to prosperity lies in strategic industrial upgrading. For many African countries, including Benin, this transition is no longer aspirational but essential for achieving inclusive growth, job creation, and regional competitiveness.

Central to this strategy is the development of industrial zones dedicated ecosystems that concentrate infrastructure, investment, and innovation to drive value-added production. ARISE Integrated Industrial Platforms (ARISE IIP), a leading public-private developer across 11 African countries, plays a critical role in this transformation. In Benin, ARISE IIP is developing the Glo-Djigbé Industrial Zone (GDIZ) in partnership with the government—a flagship project designed to shift Benin's economy from primary exports toward processed and manufactured goods.

This report, developed through field research and stakeholder engagement in Cotonou, examines how Benin can unlock the full potential of GDIZ and its broader industrial strategy. It identifies three central policy challenges—energy access, agro-industrial inefficiencies, and long-term industrial upgrading—and proposes integrated, evidence-based solutions to foster sustainable industrial development.

About Benin

The Republic of Benin, located in West Africa and bordered by Nigeria, Togo, Burkina Faso, and Niger, holds a strategic position as a regional trade gateway. With a population estimated at 14.7 million as of April 2025, Benin remains classified as a low-income country, ranking 173 out of 193 on the UN Human Development Index, with a score of 0.504 (2022).

Benin's economy is agriculture-dominated, with raw cotton accounting for 34.6% of export earnings (USD 1.4 billion in 2023), followed by cashew nuts and soybeans. This export profile reflects a persistent dependency on unprocessed commodities, exposing the country to global price volatility and limiting value creation.

However, Benin has taken significant steps toward transformation. The Glo-Djigbé Industrial Zone (GDIZ)—a 1,640-hectare site located 45 km from the Port of Cotonou—is a centerpiece of Benin's industrial strategy. Expected to attract $1.4 billion in investment during its first phase and create 300,000 jobs by 2030, GDIZ aims to reorient the economy toward manufacturing and value-added exports in sectors like textiles, agribusiness, and food processing.

Benin's Economic Outlook

Benin's macroeconomic trajectory in recent years has been positive, reflecting strong policy reforms, fiscal consolidation, and infrastructure investment:

- GDP Growth: Real GDP growth reached 6.7% in 2024, up from 6.4% in 2023, with per capita growth at 4.1%.
- Inflation: After peaking at 2.8% in 2023, inflation eased to 1.2% in 2024, driven by falling energy and transport prices.
- Fiscal Balance: The fiscal deficit dropped from 4.1% to 3.0% of GDP—meeting the West African Economic and Monetary Union (WAEMU) convergence criteria for the first time in five years.
- Public Debt: Debt levels are on a downward path, projected at 53.4% of GDP in 2024, supported by improved revenue mobilization.

Benin's economy benefits from monetary stability as a member of the WAEMU, using the CFA franc (XOF), which is pegged to the euro. However, the country remains heavily reliant on electricity imports (over 80%), particularly from Nigeria and Côte d'Ivoire, limiting its industrial competitiveness and highlighting the need for domestic energy investments.

Despite progress, structural challenges persist: high electricity costs, underdeveloped value chains, limited skilled labor, and vulnerability to commodity cycles. Overcoming these bottlenecks will require targeted policy interventions—particularly in energy, agro-processing, and export diversification—which are explored in detail throughout this report.

Challenge 1: Access to Energy and Stable Electricity

1. Introduction:

In recent years, Benin has been reforming its economic structure. It has boosted economic growth and nationwide infrastructure development. However, despite having a high rate of economic growth, per capita consumption of electricity in Benin is among the lowest in the world due to limited access to and availability of electricity among Benin people (Millennium Challenge Corporation). In 2023, only around 56.50% of Benin's population had access to electricity, yet there are significant disparities between urban and rural areas (Macrotrends). Only one of five people living in rural areas can access electricity while urban areas have a much higher access rate of around 65%, (ICLEI).

Benin electricity depends on neighboring countries. This has been the case since 2007. The lack of reliable electricity hinders industrialization. In the country, the costs of electricity are divided into two categories: residential consumers and industrial usage. While specific figures for industrial tariffs are not publicly available, the residential tariff stands at USD 0.56 per kilowatt-hour (kWh). It is generally assumed that industrial tariffs are set lower than residential rates. When comparing residential electricity tariffs across neighboring countries and with potential competitors such as Bangladesh, the following figures emerge:

- Togo: USD 0.215/kWh
- Mali: USD 0.215/kWh
- Senegal: USD 0.180/kWh
- Ghana: USD 0.125/kWh
- Côte d'Ivoire: USD 0.119/kWh

These metrics show that Benin's residential electricity price is more than double those of its regional peers.

Furthermore, as of September 2024, electricity tariffs in Bangladesh are reported as follows:

- Residential: USD 0.064/kWh
- Industrial: USD 0.102/kWh

This means that Benin's residential tariff is more than eight times higher than that of Bangladesh.

2. Why This Matter

Benin relies mostly on government agencies in terms of power generation. The country is currently in a struggle to keep up with rising demand. Expanding and upgrading the national grid is tough, mainly due to limited funding and a shortage of technical know-how (NIRAS).

Energy storage systems, such as battery setups for mini solar plants in places like Grand Popo, showcase the urgent need for innovative solutions. To tackle Benin's electricity shortages means that the country should rely on private companies for stepping in, especially those bringing affordable and efficient renewable energy options. Unfortunately, private investment in electricity remains low because potential investors face serious difficulties getting loans at reasonable rates. This means there's still a big gap between what people need and what private businesses can provide.

Electricity prices in Benin are significantly higher compared to countries like Bangladesh. If Benin really wants to keep up and scale up in a competitive textile sector, it needs to keep electricity costs low enough to avoid putting businesses at a long-term disadvantage.

In addition, a stable power supply is a key factor for attracting foreign direct investment. Investors seek environments where infrastructure supports consistent production without costly interruptions. Electricity enables value-added processes such as agro-processing (turning raw agricultural products into finished goods), which can help Benin move beyond exporting raw materials to producing higher value products domestically.

To that end, we recommend the establishment of a dedicated electricity subsidy program for industrial consumers within GDIZ. Ideally, the subsidy should be funded within the existing national budget. However, if fiscal space is constrained, one alternative would be to apply a modest surcharge on residential electricity tariffs and recover the funds through a transmission and distribution levy mechanism to support industrial electricity supply.

3. Policy Recommendations

i. Dedicated Industrial Electricity Powerhouse

To immediately tackle the exorbitant electricity prices faced by manufacturers, the Government (Ministry of Energy) should introduce a special industrial tariff or subsidy for power consumed in GDIZ. This could involve discounted rates during peak production periods or the government absorbing a portion of costs in the short run.

In parallel, ARISE could accelerate installation of on-site solar panels and generators (already planned as part of GDIZ infrastructure to supply cheaper power to tenants. Key long-term projects should include dedicated power generation for GDIZ (e.g. a solar farm or gas-fired plant via PPP to provide stable electricity at <$0.10/kWh). High energy costs are undermining competitiveness

in sectors like textiles. An immediate relief on utility costs will improve the profit margins for investors and signal responsiveness, while paving the way for longer-term sustainable energy solutions (discussed in the sustainability section).

Implementation Plan

- Develop Renewable Energy Infrastructure (Green Power Strategy)**:** Aim to transition GDIZ to majority renewable energy over the next 5–10 years. ARISE and the Government should plan a captive renewable power project – for example, a sizable solar farm with battery storage dedicated to GDIZ, potentially complemented by wind or biomass energy. This can be executed as a PPP, leveraging climate finance or concessional loans. By phasing this in, GDIZ can meet its target of exclusive renewable energy use, drastically cutting carbon emissions and insulating industries from volatile fuel costs. In the long term, sustainable industrial zones must be low-carbon.
- Given Benin's high sunlight exposure, solar is ideal for daytime energy, and agro-waste (like cashew shells or rice husks) could fuel biomass generators for additional power. Clean energy not only addresses the energy cost challenge sustainably but also becomes a marketing point (products made with green energy). This aligns with global investors' and buyers' expectations for lower-carbon supply chains.

ii. Leverage Global Partnerships and Green Funding

Both ARISE and the Government should actively seek partnerships with international organizations focused on sustainable industry. For example, collaborate with UNIDO or the World Bank's eco-industrial park programs for technical assistance, and engage climate funds (Green Climate Fund, etc.) for grants or soft loans to finance the renewable energy and waste projects. Explore issuing Green Bonds or working with impact investors to fund GDIZ's green infrastructure (the fact that GDIZ has ISO-certified environmental management can be a selling point).

Global expertise and financing can significantly accelerate GDIZ's sustainability initiatives and reduce the financial burden on the government. Public-private coordination in approaching these partners will ensure proposals meet both local needs and donor criteria. In the long term, this could make GDIZ a showcase for sustainable industrialization in Africa, aligning with Benin's climate commitments and attracting a niche of eco-conscious investors.

Implementation plan:

- First of all, introduce "Green Incentives" for Clean Operations: To encourage companies to minimize their environmental footprint, integrate sustainability criteria into the incentive structure. For instance, offer an additional tax rebate or grant for firms that achieve certifications like ISO 14001 or adopt circular economy practices (such as reusing at least

50% of their waste). ARISE and the Government could also waive import duties or VAT on equipment that improves environmental performance (e.g. solar panels, water recycling systems).

- Aligning incentives with sustainability will mainstream eco-friendly practices. Companies are more likely to invest in energy-efficient machinery or recycling lines if there is a tangible financial payoff. This supports GDIZ's image as a green industrial zone and can attract environmentally conscious investors, including those tapping into green finance opportunities

iii. Infrastructure Financing and Construction Expertise from China

China is not only Africa's largest trading partner and creditor, but also its single largest renewable energy (RE) investor since 2000 (Xue, X). Some enterprises from China possess extensive experience in constructing power plants, transmission lines, and renewable energy projects across Africa. These corporations are sometimes involved in large-scale infrastructure development and have demonstrated technical capability and efficiency in delivering complex energy projects. They often do collaboration projects with Chinese development banks, offering low-interest loans or Engineering-Procurement-Construction (EPC) contracts. This framework whose structure is integrated helps reduce upfront capital costs for host countries, accelerating the development of energy infrastructure without burdening national budgets.

For instance, Ethiopia initiated its Gibe III Hydropower Project, generating 1,870 MW of electricity, in 2010 which was funded and constructed by companies from China. The project substantially boosted the country's power generation capacity and relieved its energy problem. The estimated cost for electro-mechanical and hydraulic steel structure works is $495 million. Local media reported that 85 percent of the cost was financed by a loan from the Industrial and Commercial Bank of China (ICBC) (Directors, H. R. C.). Similarly, Nigeria's Zungeru Hydropower Project (700 MW) also benefited from Chinese concessional loans, resulting in enhanced energy security and grid stability. Ideally, Chinese firms could play a pivotal role in investing in a power plant project for the Glo-Djigbé Industrial Zone (GDIZ).

iv. Public-Private Partnerships (PPPs)

When taking a glance at how China has been doing for its industrial park's strategy, China is globally recognized as the leader in solar photovoltaic (PV) technology. The country has lowered the costs of solar panels, inverters, and battery storage systems through large-scale manufacturing and innovation. Therefore, it is urgent to form partnerships with Chinese firms that could possibly enable Benin to access these affordable renewable energy solutions. This effort could make large-scale solar farms or mini-grid systems feasible choices for the GDIZ and reduce the cost of clean energy infrastructure while ensuring reliable electricity for industrial operations.

An astonishing example is the Garissa Solar Power Station in northeastern Kenya. The project was facilitated through a partnership between the Chinese state-owned corporations and Kenyan entities, and stood as East Africa's largest photovoltaic project. China's Jiangxi Corporation for International Economic and Technical Cooperation was thoughtfully selected to construct the 50-megawatt plant and the construction was fully financed by the China Export-Import Bank at a cost of approximately $135 million. The project was commissioned in 2019 with the expectation of supplying renewable electricity to around 70,000 households.. This project reaped benefits from China's cost-effective technology. Hence, it has been allowing Kenya to secure an affordable renewable energy goal (Dialogue Earth). Benin could leverage Chinese expertise to accelerate the deployment of solar infrastructure in GDIZ and capitalize on the country's high solar irradiance (approximately 5.5 kWh/m²/day) to provide affordable daytime electricity and relieve domestic electricity burden. Not only would this initiative reduce production costs for manufacturers, it also aligns with global trends toward greener and more sustainable industrial operations.

Implementation plan:

The PPP process would start with tripartite discussions between ARISE IIP, the Benin government, and Chinese investors to define the partnership scope and responsibilities for GDIZ's energy development. It is vital to establish a solid foundation for both parties in the early stages, therefore planning everything carefully would likely take around three to six months. Afterward, legal and financial advisors would draft contracts outlining risk-sharing, revenue models, and regulatory compliance, finalized within six to nine months. Once the framework is set, energy infrastructure development—such as power plants or renewable systems—would begin, lasting two to three years. Upon completion, ARISE would manage GDIZ operations, while Chinese partners maintain the energy systems. The PPP would include performance monitoring and allow for adjustments to meet evolving energy demands.

Project Assumptions:

The proposed project involves developing a 50 MW solar photovoltaic (PV) plant in Benin, drawing parallels to Kenya's Garissa solar project in scale. The partnership model would involve Chinese firms providing 40-50% of the financing through equity investments. The Beninese government or ARISE IIP would contribute the remaining 50-60%, either in the form of equity or through land and infrastructure support. The utmost main goal of the project is to generate power to GDIZ tenants at a competitive tariff of less than $0.10/kWh, which would really enhance the zone's industrial competitiveness.

The project would also strengthen energy security by lowering Benin's heavy reliance on electricity imports, which currently account for approximately 80% of its supply, primarily from Nigeria and Côte d'Ivoire (Africa Energy Portal). The project would further empower green branding for GDIZ and enable low-carbon manufacturing processes that aligns with international standards. The project is expected to generate 200–300 temporary jobs during construction and

30–50 permanent positions in operations, with companies from China providing technology transfer and training for local technicians. In terms of environmental matters, the solar plant could offset approximately 70,000–80,000 tons of CO_2 annually, replacing fossil fuel-based power generation (Index 1).

Challenge 2 - Sustainable Transformation: Strengthening Benin's Agro-Industrial Value Chains

Introduction

Benin's textile and agricultural sectors—particularly cashew production—represent key engines for economic transformation and industrial growth. However, these sectors face pressing structural challenges, including inefficient textile waste management, a shortage of skilled labor, and widespread cashew smuggling. This part of our report presents three strategic challenges along with policy recommendations and actionable solutions to ensure a sustainable, inclusive, and industrially resilient Benin.

Textile Waste Management in Benin

1. Context

Benin's textile industry, particularly in the scope of the Glo-Djigbé Industrial Zone (GDIZ), has become an important and vibrant sector. Yet, on the other hand, the rapid expansion of the industry is accompanied by the important environmental and operational problem of textile waste mismanagement. The industry generates tons of waste, such as fabric offcuts, defective clothing, alien synthetic fibers and dye residues. Most of these materials cannot decompose, pose dangers to public health and impede industrial productivity. This happens because, aside from the narrow waste management strategy, Benin faces not only environmental degradation but also the severe risk of being outcompeted in global markets due to unregulated excess production costs.

There is no specific legislation at the moment in Benin to deal with the management of textile waste. Although the country has general laws on the environment through the Code de l'Hygiène Publique et de la Protection de l'Environnement, these are not specifically aimed at the risks brought about by the textile sector. Therefore, the handling of textile waste remains largely informal, and there are no regulations governing it; this involves dumping or improper disposal. In urban areas across Cotonou and Parakou, such practices have resulted in clogged drainages, which form part of the causes of flooding and water pollution in these cities (AfDB, 2019). In addition, the absence of structured recycling programs or incentives means that precious fibers that would have been reapplied are still wasted in landfills.

The global context thus provides an instructive illustration on the matter. Circular textile systems, transforming waste to opportunity, have been pioneered by countries like Pakistan or Turkey. Factories in Pakistan process thrown-away fabrics to produce not only insulation fibers but also low-grade textile ones. Turkey's Zero Waste Initiative pursued through strong policy enforcement and industrial investments has also created recycling hubs and eco-certification systems. Such international models remind us that Benin can choose to embrace a circular economy path, which

involves for it reusing, repairing or repurposing garment materials in order to extend their life cycle and to shift the industry's ecological burden.

2. Policy Recommendations

i. **Establish Integrated Recycling Infrastructure and Strengthen Public-Private Partnerships:** Benin needs to scale up the recycling of textiles by creating centralized recycling hubs located in industrial parks like GDIZ, with the help of relevant partners such as ARISE IIP. Such centers would receive fabric scraps, faulty garments, or post-consumer textiles for conversion into new items like padding, insulation material, or regenerated fibers, at a favorable eco-economic impact for the locality. Through public-private partnerships, the government can ensure that domestic and foreign investors are provided with the right conditions to collaborate in the development of waste-to-resource initiatives. These relationships can help the businesses to acquire the technology transfer, workforce training, and commercialization of the recycled textile products that they need to build a stable textile waste value chain.

ii. **Incentivize Circular Economy Practices and Update the Regulatory Framework:** The administration shall create an investment environment through fiscal policy instruments that favor environmentally friendly production. Tax holidays for enterprises introducing recycling technologies, lowered entrepreneurs' taxes for businesses incorporating recycled materials, and VAT exemptions for eco-friendly products can be the options for it.

    On the other hand, the current concern is that the existing regulatory framework is outdated and does not ensure sufficient compliance. There should be unambiguous laws concerning waste belonging to the hazardous category, disposal of synthetic fibers, and management of dye effluent. This two-pronged strategy of incentivization and enforcement will thereby hasten the shift to a circular textile economy in Benin.

By introducing integrated recycling centers and implementing sound regulatory and incentive systems, Benin can turn its textile waste issues into an opportunity rather than a problem. In this context, the strategy will include both investments in circular systems and the formulation of a policy environment that promotes sustainability. In the long run, the two-pronged approach would allow the country to meet international sustainability standards, so that it can be attractive to green financing and increase its competitiveness in the global textile market.

GDIZ could be the front runner, claiming the place for circular innovation and transformation. Moreover, partnerships of the public and private sectors will contribute towards achieving not only scaling but also sustaining the efforts. In terms of waste created from garments, this is not just an environmental jurisdiction. It is something that makes the industry resilient and people in society inclusive.

3. Implementation Plan

i. Establishing Centralized Recycling Hubs

Recycling operations should be sited in industrial parks that have been specifically developed for industrialization, e.g., the Glo-Djigbé Industrial Zone (GDIZ). These hubs would concentrate on textile waste processing from large as well as small manufacturers, and they would take care of the collection and categorization of the waste as well. Economies of scale could enable them to commission the manufacture of new recycled textile products and to push upcycling entrepreneurship (AfDB, 2022). Indeed, the approximated capital cost (inclusive of equipment, plant construction, and staffing) of a medium-sized recycling entity, according to similar models in West Africa, is $1.5 to $2 million (GIZ, 2021). The annual recurring cost (ARC), which covers maintenance tasks, utilities, and labor, will most likely be in the range of between $300,000 and $500,000, depending on the size and location of the plant.

ii. Tax Incentives for Eco-Friendly Practices

There should be a well-elaborated incentive regime that will help not only attract but also build the needed confidence of private investors in recycling technologies and recycled inputs. Such considerations may comprise tax exemption on the machinery used for recycling, lower corporate tax rates for enterprises that favor the circular economy, and no VAT for recycled textile items. Ghana and Kenya, among other countries, have employed the same fiscal stimulus package and achieved significant success with private sector involvement (UNEP, 2021). In the area of public investment, the focus will be on land provision and regulation supervision. On the other hand, the private sector will provide the equipment, such as machinery, and the operating costs, to lead to a co-financed model of infrastructure development.

iii. Encouraging PPPs (Public-Private Partnerships)

The establishment of public-private partnerships can result in joint investments in recycling centers and innovations in WtR (Waste-to-Resource) technologies. Global apparel brands and recycling tech can collaborate with cities to co-create WtR plants, offer technical advisory services, and embrace particular roles in the local industry via joint ventures with recyclers. The government should ensure that these partnerships are fully aligned with the national development priorities to mobilize concessional loans and technical assistance from AFDB, the World Bank, and GCF. Moreover, green bonds and the applicability of performance-based financing may be evaluated to incorporate sustainability over the long term. The establishment of a national fund led by a mixed governance structure representing multi-stakeholder constituencies would be an appropriate mechanism to smooth coordination, guarantee accountability, and eventually optimize social returns in employment-related and resource conservation endeavors.

Labor Skills Gap in Benin's Textile Sector

1. Context

Yet, even with the development prospects that Benin's textile and apparel industry has to offer, it faces an acute problem of skilled labor availability. There are skill vacancies in the labor market as the available workforce does not fully meet the requirements of modern textile plants. The majority of Benin workers learn by experience, using non-formalized and undiploma-type knowledge that makes them unattractive for employment and less productive. Based on the International Labour Organization (ILO, 2021), more than 70% of textile workers in Benin learn skills through practice, although there might be a lack of structured curricula, safe working environments, and green production technologies.

The problem becomes even more pressing, as Benin hopes not only to attract international apparel brands but also to increase its export volume. The factories will not be able to keep up with international production quality standards, and consequently, they will experience very high defect rates and operational inefficiencies. Despite Benin's adoption of good policy through its national TVET direction (PSDEFPT, 2017), the situation is not responded to. Infrastructure is dilapidated, teaching materials are developed with no input from the private sector, and budgeting is poor. Global employers are also slow to recognize such certifications, which ultimately serve to devalue training programs.

2. Policy Recommendation

1. **Modernize Training Centers and Embed Sustainable Curriculum**
   To enhance the readiness of a workforce, vocational centers around industrial areas like GDIZ should be equipped with industry-standard tools—machines such as looms, cutters, or dyeing labs—so as to emulate the factory conditions. An updated curriculum, based on the competency achieved, should incorporate production processes that are environmentally friendly, equipment upkeep, quality verification, and sustainable development in manufacturing. National agencies need to align training policies and certify programs that are internationally recognized to strengthen employment opportunities for graduates.
2. **Develop Strategic Public-Private Partnerships for Skills Development**
   The government ought to design training materials together with the investors, both of whom should pay for the construction of the factory. Moreover, public-private partnerships with foreign brands and local manufacturers can facilitate the acquisition of capital and hands-on experience. Drawing from models such as the ILO–H&M–GAP initiative in Bangladesh, these partnerships will help in aligning training programs with the global production standards, identify competitiveness of export, and prepare the labor force. Special emphasis is to be given to women's and youth empowerment in addition to accommodating the new workforce that is proficient in dealing with sustainability requirements.

Through updating training centers and establishing opportune public-private partnerships, Benin has the capacity to overcome the skills shortage that hinders the productivity of the textile and

apparel industry. Such initiatives will provide workers with both technical and sustainability-related education to help align them with the international standards and will increase the integration between vocational training and the requirements of the business. Through collaboration, investment, and inclusive program design, Benin will be able to create a workforce that is educated and equipped to support a competitive and ecologically friendly textile industry.

3. Implementation Plan

i. Improve and Reorganize Vocational Training Institutions

Vocational schools close to industrial parks, like GDIZ and Bohicon, should be modernized with factory-relevant machines, for example, cutting machines, looms, and dyeing equipment. The training center establishment cost is estimated to take between $500,000 and $1 million (GFA Consulting Group, 2021). The curriculum at these institutions should be based on skills mastery and encompass themes of environmentally friendly production, machine upkeep, and quality assurance. National level awarding bodies for certificates of competency have to ensure that there is uniformity of standards and international view of skills.

ii. Promote Public-Private Partnerships with Apparel Firms

Large clothing firms more and more take into account the skill level of workers when buying from West Africa. Benin's government should encourage these types of partnerships by defining co-design of training content, co-funding of facilities, and creating internships. The yearly costs per trainee are planned to range between $300 and $600, which will include the instructor, the equipment needed, and the certification. These collaborations are partially funded by an industrial levy, a national TVET budget, and corporate social responsibility (CSR) contributions from each of the participating firms.

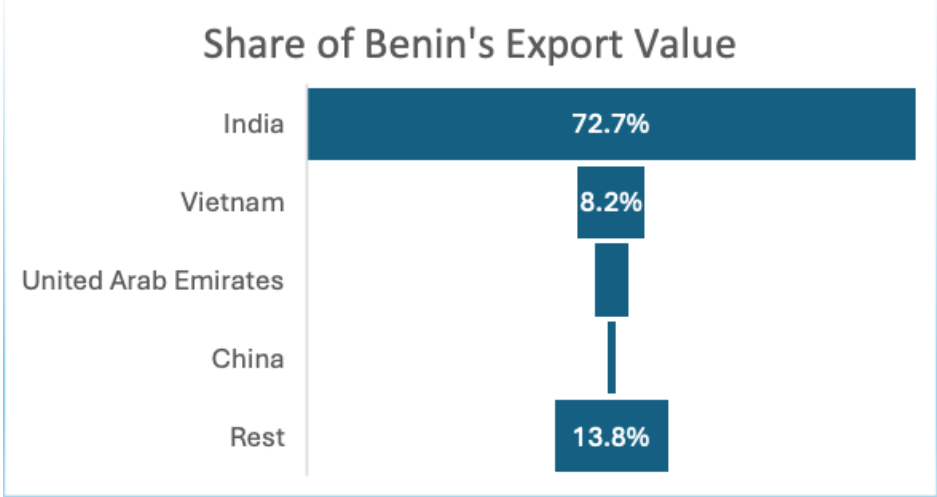
iii. Embed Sustainability-Oriented Skills in Training

Employees need to be trained in the knowledge of eco-friendly raw materials, water-saving dyeing processes, waste minimization, and energy-saving production. Institutions should also integrate live demonstration modules, drawing from successful initiatives such as the ILO's sustainable textile programs. To make sure financing is consistent in the long run, the government might consider involving blended finance mechanisms such as youth employment bonds, performance-based funding, and the provision of technical assistance to developmental partners like AFD, ILO, and EU. A national textile training fund with a multi-stakeholder tendency to be realized through an inclusive board made up of various stakeholders and matching resources can significantly improve the level of coordination.

Cashew Smuggling in Benin

1. Context

Contributing approximately 40% of GDP and employing over 70% of the workforce, the agriculture sector significantly impacts Benin's economy. The agricultural sector primarily consists of smallholder farms, producing key crops such as cashew, cassava, yams, and beans. Within this agricultural landscape, cashew production is especially critical, positioning Benin among the world's leading cashew-producing nations. According to the World Integrated Trade Solution, Benin exported over 136,706 metric tons of cashews in 2023, valued at over $112 million, primarily destined for markets in India, Vietnam, and the United Arab Emirates (World Bank, 2025). Despite this robust export market, Benin continues to face significant challenges, notably due to its low rate of local cashew processing. This deficiency exacerbates issues such as smuggling, resulting in substantial government revenue losses and limiting the potential for economic growth and industrial expansion.



Source: World Integrated Trade Solution

A notable issue emerged following the government's decision in April 2024 to ban raw cashew exports. Although this policy was designed to boost domestic processing and support the country's industrialization goals, it inadvertently led to a surge in informal cross-border trade. Neighboring countries such as Togo, Nigeria, and Ghana, where export regulations are more lenient and price incentives are greater, have become primary destinations for smuggled cashew nuts. This illegal trade is primarily driven by the substantial price differentials between local and international markets, with farmers seeking to maximize profits.

In 2024 alone, India and Vietnam collectively imported approximately 475,000 tons of raw cashew nuts that were officially recorded as coming from Ghana. However, Ghana's actual production ranged only between 150,000 and 160,000 tons. A significant volume of these shipments

originated in Burkina Faso, Mali, and Côte d'Ivoire, but were rerouted through Ghanaian ports to mask their true origins (Food Business Africa, 2025). Benin itself loses an estimated 70,000 tons of cashews annually to smuggling into Nigeria and Togo. This is largely because countries like Vietnam and India offer up to 100% higher prices than what is available in the domestic market. As a result, many Beninese farmers opt to sell their crops abroad, undermining the local processing industry and weakening national economic resilience.

2. Policy Recommendations

i. Minimum Support Price (MSP) System

By protecting farmers from market fluctuation and explorations by intermediaries, a minimum support price system would guarantee farmers selling price for cashew nuts at minimum. Following implementation strategy would be proposed to enact the policy incentives of minimum support price: (1) Establishing government-run procurement centers in major cashew-producing regions. (2) Enabling direct transactions between farmers and government-authorized buyers. (3) Utilizing secure digital payment methods, such as mobile banking. (3) Channeling cashews directly to local processors, particularly within the GDIZ, which is equipped with modern processing infrastructure, including sorting and storage facilities, packaging lines, and a dedicated export terminal. GDIZ also offers training programs, technical assistance, and market access support, making it a strategic hub capable of efficiently absorbing and processing increased volumes of domestic cashew supply.

Learning from India's successful MSP system, Benin should carefully align procurement volumes with the processing capabilities of local industries to prevent issues like stockpiling. Additionally, robust border control and enhanced digital tracking systems must be implemented to minimize smuggling.

ii. Community-Based Quota System

Implementing a community-based quota system also addresses the cashew smuggling problem, and this policy has been implemented by many exporting countries. This policy enhances transparent pricing mechanisms that allow local factories to remain competitive without taking too much advantage of farms and causing burdens to them. Governments can manage and oversee the quota allocation and track farmers' contribution using paper ledger or digital platforms. By implementing a supply export quota system, the government can ensure sufficient supply for domestic needs to remain competitive. For instance, China set a quota on rare earth materials that guarantees domestic producers to have sufficient and low cost manufacturing inputs (eezyimport). In terms of moving up the value chain, restricting the exports of certain inputs, such as raw materials, results in lower input prices for downstream sectors which would in turn gain price advantage in export markets. Farmers are encouraged to apply for an export license in order to be allowed to sell excess products to the international market. This approach would not only generate higher export and tax revenue, but would also create and maintain more jobs in the promoted

sectors. Therefore, in developing countries aiming to advance in the manufacturing value chain, export restrictions on raw materials and intermediate goods can significantly encourage domestic and foreign investment in higher-value downstream manufacturing sectors.

In Benin's case, the quota system requires farmers to sell a designated percentage (typically 40% to 60%) of their cashew harvest domestically at regulated prices. Farmers would then freely sell the remainder of their harvest on the international market. Management would involve: (1) Local cooperatives and community-elected committees ensuring transparent and fair quota distribution. (2) Implementation of mobile technology or ledger-based systems for compliance tracking. (3) Prices are regularly adjusted according to global market conditions to ensure fairness for both farmers and processors.

To promote farmer participation, complementary incentives such as subsidized agricultural inputs, guaranteed minimum price insurance, microloans, and bonuses for increased yields would be provided.

As a result, farmers can benefit from improved income security as they gain reliable access to markets. By establishing a regulated trading platform accompanied by attractive incentives, the policy can significantly reduce the smuggling issue in Benin. Additionally, fostering community ownership promotes dynamic local participation as Benin moves up the value chain and achieves industrial growth. Ultimately, this stability in the supply chain also makes the sector more appealing to international investors and attracts more foreign direct investment.

Supporting Policies and Expected Outcomes

To ensure the success of these transformative policy frameworks, Benin must adopt a set of strategic supporting policies that reinforce and sustain the momentum of change. First, subsidies targeted at local processors are vital to mitigate the higher costs associated with procuring cashews domestically. These financial incentives will empower processors to compete with international buyers and maintain a stable demand for locally grown nuts. Equally important is the implementation of cutting-edge digital traceability systems. Through mobile apps and QR-code tracking, the government can monitor the flow of cashews from farm to factory, reducing corruption, ensuring quota compliance, and building trust in the supply chain.

Education forms another cornerstone of sustainable reform. By equipping farmers with knowledge on sustainable practices, market trends, and the immense benefits of local processing, Benin can cultivate a generation of cashew producers who are not only more efficient but also more invested in the long-term success of the industry. Finally, no policy can thrive without the infrastructure to support it. Improved transportation networks and rural logistics systems will dramatically lower the cost and time of getting cashews from farm to processor, unlocking new efficiencies and expanding market access for remote farming communities.

The impact of these combined efforts will be profound. With a reliable, high-quality supply of cashews flowing to local processors, Benin will sharply reduce smuggling and reclaim control over

one of its most valuable agricultural exports. Farmers, in turn, will enjoy stable incomes and greater economic security, reinvigorating rural economies across the country. As the sector stabilizes, the formalization of trade will open the door to increased foreign investment, positioning Benin not only as a global cashew powerhouse but as a beacon of inclusive, sustainable industrial growth in West Africa.

Conclusion

Benin stands at a pivotal moment in its path toward sustainable industrial transformation. The integrated implementation of a Minimum Support Price (MSP) system and a Community-Based Quota model for cashew production, coupled with supportive measures such as subsidies, digital traceability, farmer education, and rural infrastructure development, offers a powerful response to the ongoing challenges of smuggling and underutilized processing capacity. Simultaneously, the textile sector, burdened by poor waste management practices and regulatory gaps, demands a shift toward a circular economy, supported by centralized recycling hubs, fiscal incentives, and public-private partnerships.

Equally critical is addressing the labor market mismatch by upgrading vocational training, fostering sustainable manufacturing skills, and aligning educational programs with industry demands, particularly for women and youth. Together, these strategic interventions offer a blueprint for inclusive growth, environmental stewardship, and long-term economic resilience. If implemented cohesively, they will not only curb illicit trade and reduce environmental harm but also unlock industrial value chains, attract green investment, and solidify Benin’s position as a forward-looking, competitive player in both regional and global markets.

Challenge 3 - Benin's Long-term Growth Strategy

1. Context

In Challenges 1 and 2, this paper proposed a set of short-term policy measures aimed at enhancing Benin's industrial competitiveness as an investment destination. Building on that foundation, Challenge 3 focuses on longer-term structural strategies to ensure Benin's sustainable growth trajectory.

In this section, we present our proposed approach—grounded in an analysis of Benin's current situation, industrial structure, and competitive environment—on how the country can, over the medium to long term, break away from its reliance on primary commodities and move toward greater industrial diversification and upgrading.

2. Analysis on Current State on Benin and Argument - Why this matter?

i. Industrial Structure

To reiterate, Benin's industrial structure is excessively dependent on primary commodities. For example, raw cotton alone accounts for approximately 34.5% of Benin's total exports in 2024, illustrating the country's high reliance on low value-added goods.

Benin's heavy reliance on primary commodities represents a missed opportunity for economic growth, as the country effectively exports "low-margin" products while the more profitable manufacturing of finished goods is captured by other countries.

Take raw cotton—one of Benin's key export products—as an example. The value added through processing is substantial: the export price of garments is more than ten times that of raw cotton. Specifically:

- In 2024, the average export price of raw cotton was approximately USD 1.48 per kilogram.[1]
- In contrast, the average export price of ready-made garments (RMG) from Bangladesh to the EU was about USD 16.07 per kilogram in 2024.[2]

This stark disparity clearly illustrates the significant value that lies in downstream manufacturing.

[1] Business Insider. *Cotton*. Accessible at https://markets.businessinsider.com/commodities/cotton-price?utm_source=chatgpt.com

[2] Fibre2Fashion. *Unit prices of Bangladesh's RMG exports to EU dropped in 2024*. Accessible at https://www.fibre2fashion.com/news/international-textiles-trade-news/unit-prices-of-bangladesh-s-rmg-exports-to-eu-dropped-in-2024-301031-newsdetails.htm?utm_source=chatgpt.com

Therefore, over the medium to long term, Benin must move away from an industrial structure dependent on the production and export of low-margin primary commodities. Instead, the country should diversify and upgrade its industrial base toward higher-value-added activities, such as the export of finished goods with greater profit margins. Ultimately, this should include the development of more lucrative industries—such as industrial machinery, electronics, or automobiles—that offer even higher value capture.

ii. Trade Structure

Another important point to highlight about Benin is that, while the country should aim to become a major exporter of finished products—textiles being a prime example—it is currently reliant on exports to competing nations that occupy that very position. In 2024, Bangladesh was Benin's second-largest export destination for raw cotton, accounting for 27.73% of its total cotton exports, following the UAE at 36.65%.

In essence, Benin is supplying low-margin raw materials to Bangladesh, a country that currently holds a dominant position in high-margin finished goods production and export. This dynamic benefits Benin's competitors and undermines its own long-term growth potential. To address this, Benin must build the capabilities needed to produce and export finished goods itself. Over the medium to long term, it should aim to capture the value currently realized by countries like Bangladesh and transition into a more advanced position in the global value chain.

Based on the above, Benin's growth strategy should rest on two key pillars.

First, the country must transition away from an industrial structure dependent on primary commodities and build one that enables the production and export of higher-margin finished goods. In the longer term, this should evolve toward the development of high-value opportunity industries, thereby advancing the overall sophistication of Benin's industrial base.

Second, Benin must reform its current export structure—which effectively benefits its competitors by supplying them with low-margin inputs—and, over time, position itself to replace these countries within the global supply chain by assuming their roles.

In the following section, we examine the policy directions that can help realize this growth strategy.

3. Terminology - Economic Complexity Model

The idea that industrial diversification and upgrading enhance a country's capacity to generate value-added is well established in academic literature. Research by Harvard's Growth Lab showed that the diversity and complexity of a nation's industrial base heavily influenced its growth prospects. In fact, countries with higher economic complexity tended to achieve faster and more sustainable development, all else being equal. This concept is known as *Economic Complexity* and is quantitatively measured by the *Economic Complexity Index (ECI)*. In understanding Economic Complexity, one valuable tool is *the Atlas of Economic Complexity*, developed by the Harvard Growth Lab. This analytical platform allows for the quantitative assessment of ECI and provides cross-country comparisons of how nations have historically diversified and upgraded their industrial structures.

For instance, it enables users to trace the specific growth trajectories countries have followed—such as transitioning from the production of primary commodities to the manufacturing of finished goods in agriculture and textiles, and further advancing into higher value-added sectors such as machinery or electronics.

When aiming to upgrade industrial structures and pivot from low-value to higher-value sectors, tools like the Atlas can be instrumental in identifying promising industries for diversification and guiding strategic decision-making based on empirical data and historical patterns.

4. Policy Recommendation

i. Policy for Upgrading the Industrial Structure: Strengthening Upstream and Downstream Processes (and the Potential for Vertical Integration)

As a first step toward advancing industrial upgrading, it is essential to expand the scale of industry by enhancing the value added to primary commodity exports, while simultaneously scaling up current production. To achieve this, two key measures are required:

First, upstream policies should focus on adding value to raw material production through R&D; and second, downstream policies should prioritize capacity building and knowledge acquisition for the manufacturing of finished products. For the former, expanding government support for research and development is critical to strengthening upstream processes and enabling the production of higher-quality raw materials.

For the latter, in the textile sector for example, it is understood that both the government of Benin and ARISE IIP are already working to capture the entire value chain—from cotton cultivation and harvesting to spinning, weaving, and garment manufacturing—as highlighted by ARISE IIP's

Chief Development Officer Ramakrishnan Janarthanan, who stated, "We want to capture the whole value chain."[3]

Given this context, in addition to project finance through instruments such as World Bank or IMF-backed loans, there is a need for direct support from institutions like the World Bank in capacity building and knowledge transfer. Through such financing and technical assistance, Benin can acquire the necessary know-how and managerial expertise in spinning, weaving, and sewing—areas where current capacity remains limited. Project finance can also be used to lease or purchase equipment for these stages of production, thus enabling the establishment of a full-fledged finished goods manufacturing and export system.

In the medium to long term, Benin should also consider pursuing vertical integration across the entire value chain—from harvesting to spinning, weaving, and garment production—to secure a stable supply of raw materials and maximize cost efficiencies through in-house distribution and production.

ii. Policy for Transition of Trade Structure:

In transforming its export structure, one critical priority for Benin is to reduce its reliance on the current arrangement in which it exports raw cotton to countries like Bangladesh—a strong potential competitor in finished textile production. As mentioned in Section (1) on industrial upgrading, it is essential that Benin establish a fully integrated domestic production system encompassing the entire textile value chain, from harvesting to spinning, weaving, and garment manufacturing, in order to improve the quality of its finished goods.

However, in addition to building this end-to-end domestic capability, Benin must also focus on attracting as many international textile manufacturers as possible to establish production facilities within its borders. For instance, global sportswear brand Nike currently operates factories in Bangladesh. Attracting international firms like Nike or Uniqlo to invest in production facilities in Benin would not only enhance local manufacturing capacity but also enable the transfer of valuable know-how in finished goods production.

To this end, Benin should actively pursue a strategy of high-level "top sales diplomacy" led by cabinet-level officials to engage directly with the leadership of these global firms. Such efforts could be supported through collaboration with ARISE and the GDIZ, using incentives such as further reductions in utility costs within the GDIZ to make Benin more attractive as a manufacturing base.

At present, the trade environment is relatively favorable for Benin. For example, due to tariff measures introduced under the Trump administration, Bangladeshi textile exports face an

[3]Tutor2u. *From Farm to Fashion: Benin's Path to Industrialisation*. Accessible at https://www.tutor2u.net/economics/blog/from-farm-to-fashion-benins-path-to-industrialisation

additional 34% tariff, while Benin faces only 10%. This significant difference in tariff rates gives Benin a potential cost advantage and presents an opportunity to capture some of Bangladesh's market share in the manufacturing sector.

It is therefore vital for Benin to intensify its top-level outreach efforts over the next four years while President Trump remains in office. The aim should be to secure factory investments during this window, so that even if tariff rates change under a future administration, companies will already have committed sunk costs in Benin—making them less likely to reverse their investment decisions.

5. Implementation Plan

Phase 1: Foundation (0–4 Years)

Objective: Strengthen primary production and build basic institutional and physical infrastructure

- **Establish a National R&D Promotion Program**
  - **Description:** Launch R&D funding and institutions for quality improvement in raw cotton, cashew, and other key commodities
  - **Partners:** Ministry of Agriculture, Livestock and Fisheries, CGIAR (Consultative Group on International Agricultural Research), ARISE IIP

- **Initial Investment in Industrial Park Infrastructure**
  * Related to Challenge 1
  - **Description:** Strengthen basic utilities (water, electricity, logistics) in GDIZ and other special economic zones
  - **Financing:** Project finance via World Bank/IMF and PPP schemes
  - **Partnership:** Foreign Photovoltaic Panel Producer, Grid Operator

- **High-Level "Top Sales" Outreach to Global Manufacturers**
  - **Description:** Launch a strategic campaign led by cabinet-level officials to directly engage executives of major global textile and apparel firms (e.g., Nike, Uniqlo).
  - **Incentives:** Highlight current tariff advantages (e.g., Bangladesh 34% vs. Benin 10%) and offer additional incentives such as reduced utility costs or land leases within the GDIZ.
  - **Partners:** ARISE IIP, GDIZ, Ministry of Industry and Trade, Presidency

Phase 2: Integration and Capacity Building (4–10 Years)

Objective: Develop downstream and intermediate production capabilities; pilot vertical integration

- **Pilot Vertical Integration Projects**
  - **Description:** Launch model factories integrating cotton ginning, spinning, and garment assembly under one roof
  - **KPIs:** Increase in domestic value added, export volume, and job creation

- **Knowledge Transfer and Expert Exchange**
  - **Description:** Invite experienced managers and technicians from countries like Bangladesh, Turkey, and India
  - **Tools:** MOUs on technology transfer; scholarship and expert exchange programs

- **Accelerated Attraction of Foreign Industrial Investment**
  - **Description:** Based on Phase 1 top-sales engagements, launch a formal program to facilitate the establishment of production facilities by foreign firms, particularly in the textile and agro-processing sectors.
  - **Tools:** Fast-track licensing, equipment lease support, co-financing with DFIs (e.g., IFC), and on-site investor assistance in GDIZ.
  - **Goals:** Secure at least 3 anchor tenants by Year 10; increase share of domestically produced finished textiles in exports
  - **Partners:** UNIDO (United Nations Industrial Development Organization), World Bank, bilateral donors, private equity firms

Phase 3: Expansion and Upgrading (10–20 Years)

Objective: Advance into higher-value production and form internationally competitive industry clusters

- **Support for Product Sophistication and Diversification**
  - **Description:** Move from basic textiles to higher-end products such as fashion textiles and automotive interior materials
  - **Instruments:** Low-interest equipment loans and export subsidies

- **Regional Value Chain Development**
  - **Description:** Build regional production networks with countries like Nigeria and Togo for component supply and final assembly
  - **Partners:** ECOWAS, AfCFTA coordination frameworks

- **National Strategy to Improve Economic Complexity Index (ECI)**

- **Description:** Reform export basket by supporting the development and export of new, higher-complexity products

6. Case study/ Prospective Example: Possible Vertically Integrated Models by industry

The following outlines possible vertically integrated models by industry.

- **Cashew to Confectionery:** Benin is a major cashew producer, exporting nuts in raw form. A company like *Benin Cashew SA* could co-invest in a joint venture with an international confectionery firm to produce cashew-based chocolate snacks and other nut-based confections within GDIZ. Instead of just exporting raw or shelled cashews, Benin would host a facility that roasts cashews, integrates them with cocoa or other ingredients, and packages branded snacks for export. This captures vastly more value domestically – from flavoring and packaging to branding.

  It also creates skilled jobs in food processing, marketing, and quality control. The presence of a foreign partner (perhaps a known chocolate or snack brand) ensures world-class processing expertise and opens access to global retail markets. Such a venture would exemplify moving up the complexity ladder: transforming an agricultural product into a finished consumer good on Beninese soil.

  <u>Côte d'Ivoire: From Raw Cashews to Processed Exports Diversification</u>

  Côte d'Ivoire is renowned for its cashew and has aggressively promoted domestic cashew processing in recent years. The government introduced a comprehensive package of incentives and policies: it set a minimum farm-gate price for cashews, offered tax breaks to processing firms, imposed levies on raw nut exports, and facilitated the construction of processing factories and zones. These measures, often implemented through public-private partnerships, have paid off.

  Domestic processing capacity surged from about 68,500 tons in 2015 to 350,000 tons by 2024. One flagship partnership is with Singapore's Valency International, which built a state-of-the-art cashew factory in Abidjan (backed by development financiers like Norfund and IFC). This plant creates over 18,321 jobs (66% for women), and is expected to generate around $70 million in export earnings.

  Overall, Côte d'Ivoire's push for local cashew processing has markedly increased the country's value retention from its cashew crop. The ultimate goal is to process 50% of all raw cashews locally by 2030, up from roughly 10–15% a few years ago. This shift has begun diversifying Côte d'Ivoire's export basket and enhancing the complexity of its agricultural exports by moving into packaged kernels, flavored cashew snacks, and other cashew-based products instead of raw nuts.

- **Soybeans to Beverages:** Soy is another export crop with greater processing potential. GDIZ could attract a soy-based beverage producer (for example, a maker of soy milk or plant-based protein drinks) to set up operations adjacent to existing soybean processing mills. In this arrangement, local soybean processors would supply soybean concentrate, flour, or milk base directly to the beverage plant next door. The beverage company, possibly a foreign investor specializing in dairy alternatives, would then formulate and package soy milk, yogurts, or protein shakes on-site.

  By co-locating near the raw material source, the beverage producer benefits from fresh, reliable inputs and lower transport costs, while the soybean processor gains a steady high-value client. Benin would thus start exporting refined products like bottled soy drinks or protein beverages – a big step up from exporting raw or crushed soy. This not only adds value but also diversifies the types of exports (entering the food and beverage category, which is more complex than basic agro-commodities).

  Thailand: Building a Soy Milk Industry (Vitamilk)

  Thailand offers a prime example of nurturing a soy beverage industry through domestic enterprise and industrial infrastructure. As early as the 1950s, Thai company Green Spot Co. introduced Vitamilk, Southeast Asia's first bottled soy milk. Decades later, the company expanded production by investing 4 billion baht in a new plant located in the Nong Khae Industrial Estate, Saraburi. By situating the facility in an agro-industrial zone, the company benefited from reliable utilities and logistics while efficiently sourcing soybeans from Thai farmers. Today, Vitamilk dominates the Thai soy milk market and exports about 30% of its output across Asia and Africa.

  Soy beverages account for 95% of Green Spot's revenues (around 8 billion baht, or $250 million, in 2016). The industry's growth has been supported by health-focused marketing and public initiatives – e.g. Thailand's government and the company jointly promote soy milk in schools as a nutritious, affordable drink. The outcome is a vertically integrated model: local farmers get a steady market for soybeans, processing happens domestically, and the final product (branded soy milk in bottles/cartons) is sold widely, including export markets in East Asia and Africa. This has diversified Thailand's agro-exports (beyond traditional rice or sugar) into higher-value beverage products.

7. Expected Outcomes and Long-Term Impact

By implementing these strategies, Benin can expect transformative outcomes in the coming years:

- Improved Economic Complexity: A broader range of export industries and more sophisticated products will lift Benin's ECI score. As Benin begins to export goods like

processed foods, textiles, and simple manufactures, its global ranking in economic complexity should rise, reflecting a deepening of productive knowledge in the economy.

- Diversified Export Base: Benin's export portfolio will become far more balanced. The over-reliance on a few raw commodities will diminish as new export streams (apparel, snacks, beverages, electronics parts, etc.) grow. This diversified export base makes the economy more resilient to shocks, since a slump in one commodity can be offset by stability in other sectors.
- Greater Value Addition and Domestic Wealth Creation: By retaining and processing raw materials at home, Benin will capture much more value domestically. Instead of exporting cheap raw cotton and importing expensive finished textiles, Benin can begin to export its own finished textiles. This means higher incomes for local farmers and workers, more tax revenue, and better trade balances. The industrial economy will create upstream and downstream linkages that multiply jobs – from farming communities supplying raw inputs to factory workers and service providers in logistics and maintenance.
- Increased Investor Interest: Success breeds success – as early entrants thrive in GDIZ and global brands take notice, investor interest in Benin will accelerate. A reputation as a new West African manufacturing hub with a supportive policy environment will draw in not only large multinationals but also smaller specialized firms looking for the next opportunity. Over time, Benin could become a preferred destination for investment in certain niches (for example, West Africa's go-to location for cashew confectionery or eco-friendly apparel), which further reinforces diversification.
- Enhanced Industrial Resilience: A more complex, value-added industrial economy will be structurally stronger. Benin will be less vulnerable to commodity price fluctuations or unilateral trade measures, because it won't be just a raw-material exporter. Integrated value chains in-country mean firms are more self-reliant and adaptable, and the economy can better withstand external shocks (like global supply chain disruptions or shifts in demand). The development of local technical skills and management expertise will also contribute to long-term resilience, as a skilled workforce can drive continual upgrading and innovation

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Appendix

Index 1:

Emissions Avoided by Replacing Fossil Fuels:

- Emission factor for fossil fuel generation in West Africa (based on diesel or heavy fuel oil) ranges between 0.7 – 0.9 tons of CO_2 per MWh generated.

Solar PV capacity factor in Benin:

- Solar plants in West Africa generally have a capacity factor of 20–22%, given the high solar irradiance (~5.5 kWh/m²/day).

Annual generation calculation:

- 50 MW × 20% capacity factor × 8,760 hours/year = ~87,600 MWh/year.

CO_2 offset calculation:

- 87,600 MWh/year × 0.8 tons CO_2/MWh = ~70,000 tons of CO_2/year (rounded up to 70,000–80,000 tons CO_2 annually for variability).

Sources:

- IRENA's Renewable Power Generation Costs Report (2021).
- World Bank carbon emission factors for Sub-Saharan Africa.