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DEVELOPMENT OF A SUSTAINABLE REVENUE GENERATION REAL ESTATE THROUGH AQUA GUT TECHNOLOGY IN THE PRESENT-DAY NIGERIA

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ABSTRACT

Aqua Gut technology is a type of chemical composition used in nursing catfish to maturity. It is enhanced by aqua feed supplement; this could coexist in Real Estate investment outfit. Due to challenges faces by real and estate owner in creating fish pond in their leaving locations to support their personal job as result of current economic realities in Nigeria. There is need for individuals to create fish ponds in their living areas. This creates a sustainable additional revenue generation to a would-be Real Estate Investor and residents. The aqua bio gut is a natural ingredient with varying colour and consistency which does not affect product performance with regular management and control. The aqua gut technology is catfish management system in which a fish pond is constructed, in a residential property that is income producing with less power and water requirement. As the residential property earn income, the fish pond will also be generating income, the would-be owner can sell the products from the pond to generate additional income, or the residents of the estates can show interest in the products, which can generate additional income to the tenants by purchasing the products from the investor. This singular arrangement could help as alternate means to generate income and a means to prompt payment of rent by the occupants.

KEYWORDS: *Income, Residential property, Real estate, Product performance, Fish pond*

INTRODUCTION

Nigeria's real estate sector is expansive and filled with opportunity, but faces growing challenges in sustaining profitability amidst rising operational costs, climate unpredictability, and infrastructural inefficiencies. As investors and developers seek innovative ways to maintain competitive advantages, sustainable practices have become more than just ethical obligations they are emerging as viable pathways for additional revenue generation (Adebayo, 2020).

In Nigeria's real estate sector has experienced steady growth over the past decade, particularly in urban centers such as Lagos, Abuja, and Port Harcourt. however, the sector is not without constraints. Developers grapple with fluctuating construction costs, water supply limitations, power instability, and regulatory bottlenecks. Additionally, as Nigeria's urban population continues to swell – with over 50% of the population

expected to live in cities by 2030, the demand for housing and infrastructure is outpacing sustainable supply (Ameh and Akpabio, 2021).

Relevance of Sustainable Revenue Models

There is a growing awareness among investors and homeowners about sustainability, prompting developers to incorporate eco-friendly solutions that enhance property value and market appeal. In this context, green infrastructure, including water management systems, is no longer a luxury, it's becoming a necessity. The traditional real estate model relies heavily on property sales and rental income. While effective, this approach can be limiting in times of market volatility. Sustainable revenue models, such as those enabled by Agua Gut Technology, offer an alternative pathway. By turning essential utilities like water into managed and monetizable systems, developers can not only reduce dependency on unreliable municipal sources but also generate ongoing revenue through resale, recycling, or value-added community services.

This study aims to bridge the knowledge gap between technological potential and practical implementation. By the end of this guide, readers will understand how Agua Gut Technology can be a key enabler for sustainable, long-term revenue generation in Nigeria's dynamic real estate ecosystem.

Related Literature

Real estate is like a catalyst that not only serves as an engine that energizes every other sector of the economy but gives impetus to the development rating of any environment (Obodoh, 2017). To the Estate Surveyor, buildings can hardly be separated from land as his definition of real estate includes lands and building on them, (Saheed, 2022). Investment in real estate is one of the options for the investment of household savings (Prizzon, and Cullino, 2019). Sustainable development is inconceivable without healthy real estate market that provides facilities for all human activities while improving the public spaces in cities and towns, it basically means that priorities are given to mixed use of buildings, social diversity of people, high quality projects and sustainable buildings (Trinkūnas *et al*., 2018).

Sustainability principles can also be used to create new business models, strategies, and processes that promote sustainable practices. Sustainability principles become more popular in design, assessment, construction, exploitation and demolishment of the buildings (Raslanas *et al*., 2012). Climate change, are no longer just local or regional; they pose profound challenges to global development, (Organisation for Economic Co-Operation and Development [OECD], 2017). There is need to take investment in real estate seriously, there must be conscious effort aimed at sustainability of same because; Real estate investment has been observed to require huge initial capital outlay which can be obtained from various sources, (Saheed, 2022). Real estate investment is the purchase of building with the aim of maximizing profit which may not necessarily be financial but can be social, political and other, (Saheed, 2022). The unevenly growth distribution, and concentration of citizens in major urban hubs, while rural and peri-urban areas remain underdeveloped, has created population growth in urban areas. (Ayoola and Bello, 2023).

Key Challenges Facing Developers

Rising Operational Costs: Inflation and exchange rate volatility have increased the cost of building materials and labour. Furthermore, developers often must factor in independent water supply

systems (boreholes, tankers) and power generation (generators, solar), adding layers of operational expense.

Unreliable Utility Infrastructure: In many Nigerian cities, water access remains intermittent or altogether absent. Developers are frequently forced to invest in private water sourcing and waste disposal mechanisms, which adds both cost and complexity to project execution.

Land Use and Regulatory Hurdles: Navigating Nigeria's land ownership laws. Particularly involves the Land Use Act of 1978, it is a complex and time-consuming process. Approvals for new developments often face bureaucratic delays, impacting timelines and increasing holding costs.

Environmental Vulnerabilities, such as urban flooding, erosion, and poor drainage have made many sites risky or costly to develop. With climate change intensifying rainfall variability, water-related issues are becoming even more central to the real estate conversation.

Investor Expectations and Market Shifts are possible in modern real estate investors are increasingly looking beyond traditional metrics such as location and price. There is growing emphasis on sustainability, utility resilience, and cost efficiency. Properties that can guarantee lower maintenance costs and predictable service delivery especially in water and energy tend to command premium valuations. Moreover, Environmental, Social, and Governance (ESG) criteria are now influencing both local and foreign investment decisions. Projects that demonstrate alignment with climate resilience and sustainable development goals are more likely to attract funding and government support.

Water sustainability, however, remains an under-explored frontier. Agua Gut Technology by offering a means to harvest, purify, and redistribute rainwater or wastewater within properties presents a compelling innovation with both financial and environmental returns. By integrating such systems into the real estate development process, builders can significantly reduce dependency on failing municipal systems while unlocking new revenue streams (Ayoola and Bello, 2023).

Agua Gut Technology

Agua Gut Technology refers to an integrated water management system designed to harvest, filter, store, and reuse rainwater and greywater within residential, commercial, or mixed-use developments. The term "Agua Gut" combines the Spanish word for water (agua) with gut, referencing rain gutters or water channels that serve as primary collection points in the system. This technology utilizes rooftops and drainage systems to capture rainwater, which is then filtered and stored for various non-potable uses – such as flushing toilets, irrigation, washing vehicles, or even treated for drinking in advanced setups. In some models, greywater (lightly used water from showers, sinks, and laundry) is also reclaimed, purified, and redirected for reuse.

In the context of Nigeria, where water infrastructure is often unreliable and expensive, Agua Gut Technology offers both a practical solution to water scarcity and a means of generating sustainable revenue from real estate projects.

Components of an Agua Gut System

A standard Agua Gut installation consists of the following elements:

Catchment Areas: Usually, rooftops or surface drains that collect rainwater. The Gutter Systems and Conveyance Channels. The system, directly collected

water into filtration units or storage tanks. Filtration and Purification Units: Remove debris, sediments, and contaminants.

Storage Tanks (Above or Below Ground): Hold treated water for future use. Pumping and Distribution Mechanism: Deliver stored water to various parts of the property for domestic or commercial use. Smart Control System (optional): Automated monitoring of water levels, quality, and usage patterns. These systems are modular and scalable, meaning they can be installed in small single-family homes or integrated into large multi-unit buildings, estates, shopping complexes, and commercial towers.

Environmental and Economic Benefits

Agua Gut Technology provides a host of benefits that make it particularly attractive to Nigerian developers. Environmental benefits include, reduced demand on municipal water systems, groundwater resources, it minimizes storm-water runoff, and it lowers the risk of urban flooding. It helps in decreasing carbon footprint by reducing the energy used in water transportation and treatment.

Other economic benefits are lowers water utility bills by replacing or supplementing public water supplies. It enables water resale to tenants or neighbouring properties during shortages. It qualifies for green building incentives, tax breaks, or preferential financing. It also Improves property valuation through sustainability certification (e.g., EDGE, LEED).

Suitability for Nigerian Conditions

Agua Gut Technology is uniquely suited to Nigeria due to: High rainfall in many regions (e.g., Lagos receives ~1,500–1,800 mm annually). Frequent water shortages, especially in urban and peri-urban areas and inadequate public infrastructure, makes it a self-sufficiency in utilities highly valuable. A growing middle class that is increasingly conscious of sustainability and utility reliability. By leveraging this technology, developers can not only solve pressing water access issues but also turn water into a value-generating asset.

Integration Agua Gut Systems into Real Estate Projects for Strategic Planning

The integration of Agua Gut Technology into real estate developments begins at the design stage. Successful implementation requires a collaborative approach involving architects, civil engineers, mechanical/plumbing experts, and sustainability consultants. For new builds, gutters, catchment slopes, and piping routes should be incorporated into architectural blueprints. For existing buildings, retrofitting is possible but must be carefully assessed to ensure structural compatibility and cost-effectiveness.

The strategic goals of integration typically include, reducing dependence on public water supply, lowering long-term operational costs, creating revenue through resale or water access services and qualifying for green building certifications.

Use Cases by Property Type Developers

1. Residential Properties

Detached Homes: Ideal for standalone tank systems and personal water recycling.

Gated Estates: Centralized Agua Gut systems can serve multiple units, with shared storage and smart distribution.

High-Rise Apartments: Roof catchment and greywater recovery can significantly reduce utility demand, especially for toilet flushing and irrigation.

2. Commercial Buildings

Office Complexes: Non-potable water from Agua Gut systems can support

washrooms, cooling towers, cleaning, and landscaping.
Shopping Malls: High water usage makes them ideal for water harvesting, especially from vast roof areas and HVAC systems.
3. Mixed-Use Developments
Combine residential and commercial benefits.
Water collected from retail areas can be reused in residential units for non-potable purposes.
4. Industrial or Institutional Facilities
Schools, hospitals, and factories can use Agua Gut systems for hygiene, sanitation, and landscaping.
Some facilities can purify harvested water for direct use in processes or cleaning.

Implementation Models

There are two major models for deploying Agua Gut systems in real estate:
A. Individual Unit-Based Systems
Each apartment, flat, or home has its own miniature system for water harvesting and usage. While easy to manage and scale, this can be more expensive per unit.
B. Centralized System
A shared collection, filtration, and distribution system serves an entire building, block, or estate. This model is cost-effective and allows for resale or metered water distribution.
Developers can charge a utility service fee for residents using water from the Agua Gut system, creating an additional income stream.
Key Design Considerations
Roof Area and Slope: The larger and steeper the roof, the more efficient the water capture.
Rainfall Patterns: Project location must be analyzed for average monthly rainfall to calculate harvest potential.
Storage Volume: Tank sizing should reflect both rainfall and usage demand.
Filtration Standards: Filtration and purification must meet health and environmental regulations.
Maintenance Access: System components must be easily accessible for cleaning and repairs.

Developer incentives and brand positioning are parts of projects process of integrating sustainable. Technologies such as Agua Gut could benefit from enhanced brand perception as eco-conscious developers and Eligibility for green financing, grants, or tax relief of higher valuation and demand, especially in urban middle-to-high-income markets and compliance with green building codes that are gaining traction in Nigerian cities. By embedding Agua Gut systems into real estate projects, developers are not just meeting a utility need they are transforming water into a revenue-generating infrastructure and a market differentiator (International Water Association 2020).

Revenue Generation Models

Agua Gut Technology is more than just an environmental solution—it is a strategic asset capable of generating consistent, additional revenue within real estate developments. In Nigeria's increasingly utility-volatile environment, developers can use water harvesting and recycling not only to reduce expenses but also to monetize water systems in a variety of ways.
Direct Revenue Streams
A. Water Resale Within the Property
Developers or facility managers can sell purified water from the Agua Gut system to residents, tenants, or businesses within the estate. The pricing model can be structured per litre, per unit, or through fixed service charges.
Example: In a gated estate with 50 homes, a developer charges ₦3,000 per month per

unit for Agua Gut water supply used for non-drinking purposes like laundry and toilet flushing resulting in ₦150,000 monthly income.

B. Community Supply or Commercial Distribution

In high-demand areas, developers can sell excess harvested water to neighbouring communities, schools, construction sites, or tankers especially during municipal shortages.

This creates a mini utility model.

Data Insight: In Lagos, water tanker prices range between ₦7,000–₦15,000 per 1,000 gallons. An estate that can harvest 500,000 liters/month has significant commercial supply potential.

C. Facility Subscription or Utility Fee

Agua Gut water systems can be monetized as part of estate utility packages. Residents subscribe to services covering water filtration, delivery, and maintenance. This creates a stable recurring revenue stream.

D. Lease-to-Own or PPP Models

Developers may partner with Agua Gut technology providers under Public-Private Partnership (PPP) models or lease-to-own agreements, minimizing upfront capital and sharing revenue over time. This is especially useful in institutional or government housing projects.

Indirect Revenue Benefits

A. Operational Cost Savings

Properties that use Agua Gut systems can cut down water utility bills by 30–70%, depending on rainfall volume and usage needs. These savings improve net operating income (NOI) and therefore property valuation.

Insight: A mid-size apartment block in Abuja reduced its water expenditure by ₦1.2 million annually after switching to rainwater harvesting and grey-water recycling.

B. Premium Property Pricing

Green-certified buildings can command up to 10–15% higher prices or rents, particularly in middle- to high-income urban areas. Prospective buyers and tenants are increasingly drawn to cost-saving, eco-conscious features.

C. Access to Green Incentives

Governments and financial institutions are beginning to offer green building incentives in the form of tax waivers, lower interest loans, and grants. Properties that incorporate sustainable technologies, like Agua Gut systems, are often first in line for such benefits.

D. Marketing Differentiation

Eco-friendly real estate projects stand out in the market. Developers can use Agua Gut integration as a branding tool appealing to both environmentally conscious buyers and institutional investors with ESG mandates (Chukwu, 2022).

A sample Project design and implementation process

Parameter	Value
No. of housing units in estate	40 units
Monthly Agua Gut service fee per unit	₦2,500
Monthly income from water system	₦100,000
Annual operating cost (maintenance)	₦600,000
Annual revenue	₦1,200,000
Net annual income	₦600,000
ROI period (on ₦2M installation cost)	3.3 years

Note: The system continues to deliver water savings and income for 10+ years, after ROI is achieved.

By combining direct sales, cost savings, and value-added positioning, Agua Gut Technology offers real estate developers in Nigeria a diversified revenue strategy that aligns with both business and sustainability goals.

Market Opportunities in Present-Day Nigeria

Nigeria presents a unique convergence of challenges and opportunities in the real

estate and water infrastructure sectors. While access to reliable water remains inconsistent in many areas, population growth and rapid urbanization are driving sustained demand for housing and commercial developments. Agua Gut Technology sits at the intersection of this problem and opportunity, offering developers a way to solve utility challenges while monetizing sustainability.

Urbanization and Population Growth

Nigeria is Africa's most populous nation, with over 220 million people and an urban growth rate of 4.2% annually (UN Habitat). By 2050, over 60% of the population is expected to reside in cities. Key implications for real estate, with increasing pressure on urban infrastructure, particularly water supply and drainage. Growing demand for medium to high-density housing, estates, and commercial hubs. There is an Urgency for self-sufficient building utilities that don't rely solely on strained public systems. Opportunity are available in Urban areas, in cities like Lagos, Abuja, Port Harcourt, and Ibadan is creating new real estate frontiers where Agua Gut systems can be built in from the ground up (Nubi, et al., 2019).

Regional Water Scarcity and Infrastructure Deficits: While some Nigerian regions receive substantial rainfall, water distribution remains a major issue. Aging infrastructure, illegal connections, and low investment in water treatment result in frequent shortages, even in coastal cities.

Water Supply Context:

Only 10% of households in Nigeria have access to piped water on premises (World Bank, 2023).

Over 60% rely on boreholes, wells, or water vendors.

Urban flooding from poor drainage is a seasonal crisis, especially in Lagos and Port Harcourt.

Opportunity: Agua Gut systems can reduce pressure on boreholes and reduce flood risk by capturing runoff.

Environmental and Climate Pressures

Nigeria is increasingly vulnerable to climate risks including with Erratic rainfall patterns, Prolonged dry spells and Severe flooding in urban areas. There is need to Incorporating rainwater harvesting and grey-water recycling reduces environmental impact, makes buildings more climate-resilient, and aligns with the country's National Adaptation Strategy under the Paris Climate Agreement (Obateru, 2020).

Opportunity: Projects that incorporate sustainable water practices will be better positioned for climate adaptation funding and green certifications.

Evolving Policy and ESG Landscape

While water and building regulations in Nigeria are still evolving, there is a growing policy shift toward encouraging sustainable practices. Introduction of green building guidelines in Lagos and Abuja master-plans (Federal Ministry of Water Resources, 2021).

Discussions around water efficiency codes by state water corporations.

Interest in ESG-compliant developments by institutional investors and banks.

Incentive trends include:

Tax reliefs or duty exemptions on green tech imports.

Access to concessional loans from development banks or climate funds. Favourable ratings under Nigeria's Green Building Council (NGBC) and international systems like EDGE or LEED.

Opportunity: Early adopters of Agua Gut systems will be well positioned for

funding, compliance advantages, and first-mover market branding (Oyelowo and Fagbohun, 2022).

Demographic and Lifestyle Shifts.

There's a rising class of Nigerian home buyers and tenants—especially among millennial and upwardly mobile professionals.

value:

i. Eco-conscious living

ii. Lower utility bills

iii. Technological integration in housing

These preferences are driving demand for smart, sustainable real estate that aligns with global trends.

Opportunity: Marketing Agua Gut-enabled properties as "smart water-secure homes" offers a compelling sales advantage (Ogunleye and Yusuf, 2021).

Challenges and Risk Factors

Agua Gut Technology presents a compelling case for sustainable revenue generation and utility independence, developers must be aware of potential challenges that could impact system performance, adoption, or profitability. Understanding these factors helps mitigate risk and ensures long-term success.

Technical and Installation Challenges

Initial Capital Investment

The upfront cost of installing Agua Gut system, especially in a high-capacity, centralized models can be a barrier, particularly for small-scale developers. While long-term returns are strong, cash flow constraints may deter immediate adoption.

Mitigation: Explore phased installation, leasing models, or green financing partnerships to reduce capital burden. Agua Gut systems require periodic maintenance (e.g., cleaning filters, checking pumps, managing storage hygiene). Lack of local expertise may affect long-term system efficiency.

Mitigation: Developers should train facility managers or contract local service providers with technical experience in water systems.

C. Urban Pollution

In heavily polluted environments (e.g., industrial zones), rooftop runoff may contain contaminants (oil, dust, heavy metals) that complicate water treatment.

Mitigation: Include sediment traps, first-flush diverters, and appropriate filtration to ensure harvested water meets safety standards (United Nations Human Settlements Program, 2021).

Step 2: Cost-Benefit Analysis

Estimate capital investment (materials, installation, engineering).

Project utility savings and potential revenue from resale or service fees.

Calculate expected ROI period (typically 3 – 4 years).

Step 3: Stakeholder Alignment

Engage architects, MEP engineers, and sustainability consultants, Secure buy-in from investors or joint venture partners. Then Introduce the concept to community stakeholders (e.g., residents or estate managers).

Phase 2: System Design and Approvals

Step 4: System Specification

Choose between centralized vs. unit-based models based on property type.

Design system components: catchment area, filtration, storage, distribution, controls.

Select vendors with local experience in water infrastructure.

Step 5: Regulatory Compliance

Submit plans to local development control agencies.

Register water systems with local or state water authorities (e.g., LSWRC).

Conduct an Environmental Impact Assessment (EIA) if applicable.
According to (WHO, 2022) water reuse standards and Nigeria's National Environmental
Regulations for best-practice alignment.
Phase 3: Installation and Commissioning
Step 6: Procurement and Construction
Procure equipment from certified suppliers to ensure reliability and warranty coverage, then install system during main construction phase to minimize retrofit costs.
Test water flows, filtration efficiency, and system integrity before occupancy.
Step 7: Staff Training and Maintenance Planning
Train facility or estate management teams on daily operations and safety protocols.
Create a maintenance schedule for filters, pumps, tanks, and controls. Implement a monitoring system (manual or smart) to track water usage and performance.
Phase 4: Monetization and Value Capture
Step 8: Utility Pricing and Billing
Set service fees or water tariffs for residents or tenants and integrate it with estate service charges or smart metering solutions, then offer transparent communication on water quality and system reliability.
Step 9: Access Green Funding and Certification
Apply for EDGE, LEED, or NGBC green certifications to boost market appeal.
Explore concessional loans or grants from institutions like DBN, BOI, or the Green Bond Programme.
Step 10: Marketing and Brand Positioning
Market the development as a "Water-Smart" or "Green-Estate".
Highlight water independence, cost savings, and climate resilience in sales materials.
Use Agua Gut integration as a differentiator in a competitive real estate market.
10.5 Strategic Partnerships to Consider
Partner Type Role
Water Tech Suppliers is design, install, and maintain in Agua Gut systems for Sustainability.
The Consultant Certification must align with ESG standards. The funding applications includes Financial Institutions, such as Green loans, mortgages, or infrastructure funding and Government Agencies which prepares the Planning approvals, water permits, tax incentives. The Facility Management Firms is responsible for Long-term system maintenance and user education.
Sample Implementation Timeline

Phase	Estimated Duration
Feasibility & Planning	2–4 weeks
Design & Approval	4–6 weeks
Procurement & Installation	6–10 weeks
Testing & Commissioning	1–2 weeks
Monetization & Operations	Ongoing post-handover

DISCUSSION AND FINDINGS

The combination of demographic pressure, water infrastructure failure, climate risks, and investor appetite for ESG-aligned projects makes Nigeria ripe for the widespread integration of Agua Gut Technology in real estate.

A Case Studies and Simulations, was use to illustrates how Agua Gut Technology can work in practice for Nigerian real estate developments:
Case Study and Simulations

To bridge the gap between concept and execution, this section presents both a realistic hypothetical scenario and a summary of similar projects where water harvesting systems have proven effective. These examples are designed to help Nigerian developers visualize the

application, financial impact, and scalability of Agua Gut Technology in local contexts. Incorporating Agua Gut Technology is not a theoretical solution, it is a tested and adaptable investment that offers measurable environmental and financial return. Challenges and Risk Factors, providing a balanced and realistic view of potential obstacles to implementing Agua
Gut Technology in Nigerian real estate:

Agua Gut Technology should not be treated as an afterthought or compliance item it is a strategic utility infrastructure that delivers long-term operational, financial, and environmental value.
By following this road-map, Nigerian developers could create an accelerated returns on investment.
By following these projects at the forefront of green innovation and drive the shift toward self-sustaining, and be future-ready real estate investment.

CONCLUSION

As Nigeria's real estate sector faces increasing pressures from urbanization, infrastructure deficits, climate variability, and rising operational costs, the need for sustainable and innovative revenue models has never been more urgent. Agua Gut Technology presents a strategic, adaptable solution one that aligns environmental stewardship with financial return. The challenges and inefficiencies of Nigeria's water infrastructure in Agua Gut Technology works. Nigerian presents a better environment for practical integration strategies across various property types and it will create multiple avenues for revenue generation from cost savings to resale models. There should be policy and regulatory context supporting the implementation and a detailed road-map for deployment, from design to monetization of this model.

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