

Busibo and Namabaale Teachers' Villages: A Scalable Model for Forest-Friendly, Carbon-Smart Construction in Uganda

DRAFT CASE STUDY

In Uganda's Lwengo District, the Busibo and Namabaale Teachers' Villages stand as a pioneering example of sustainable, community-centered timber construction. With 52 residential units built using prefabricated timber frames, this project showcases how regenerative forest economies can deliver dignified housing while strengthening forest resilience, reducing carbon emissions, and building local skills.

Conceived and executed by Localworks, the project reimagines rural development through the lens of regenerative materials, efficient design, and circular practices. It is an ambitious prefabricated timber housing effort in East Africa—and a replicable model for others.



Market Fit and Use: A Prefabricated Timber System Designed for Context

The EcoPrefab system was conceived as a practical response to Uganda's housing needs—particularly for essential service workers in under-resourced regions. At Busibo and Namabaale, 52 housing units were constructed using a light-frame prefabricated timber system, manufactured off-site and rapidly assembled on-site. Materials were chosen not just for performance and sustainability, but also for market fit: lime-sawdust bricks and lime plaster provide thermal comfort, use locally available by-products, and reduce the overall carbon footprint. Large roof overhangs, natural ventilation, and breathable finishes protect the timber structure and support year-round durability in the region's hot-humid climate. Rather than importing unfamiliar technologies, Localworks intentionally relied on vernacular design sensibilities—such as shaded verandas, ventilated eaves, and daylight interiors—to ensure long-term community acceptance and ease of upkeep. The homes range from single-room to multi-room typologies, with each cluster integrating stormwater management, native landscaping, and communal space to enhance resilience and liveability.

Beyond this single development, the EcoPrefab system was designed with broader market use in mind. It is particularly suited to low-rise housing and social infrastructure—like rural clinics, teacher accommodation, or worker housing—where affordability, speed, and environmental performance are essential. Localworks designed the system around Ugandan market realities: timber availability, transport limitations, skills on site, and climate conditions. Their goal was not to reinvent construction, but to shift the baseline toward something more sustainable without overengineering the solution. By aligning the design with familiar typologies and constraints, they increased the system's applicability to both public and private markets.

While a formal market sizing study has not yet been completed, the model is already gaining traction through direct engagement with institutional clients. Localworks sees significant potential for replication in other

regions facing similar demand for climate-responsive, affordable housing—especially within the public sector, where predictable costs and rapid delivery are often critical to project viability.

Business Case: The Pathway towards Affordability

The EcoPrefab system developed by Localworks was conceived with affordability and replicability at its core. From the outset, the design team aimed to build a housing solution that could compete on price with conventional cement-based construction, while outperforming it on climate, comfort, and circularity.

In comparing their timber frame and lime-sawdust system to traditional block and mortar construction in Uganda, Localworks estimates that their units are currently ~\$5/m² cheaper, with additional savings expected as fabrication processes become more streamlined. These savings come not only from material efficiency but from reduced construction time, simplified site logistics, and lower long-term maintenance.

Importantly, the team did not treat this as a one-off innovation project; from the beginning, it was treated as a prototype for a mass-market housing solution. Designs were simplified and standardised for repeatability. Materials were selected based on local availability and reliability, and components were modularised for efficient prefabrication. These decisions were made not only to meet the budget for the first projects but to future-proof the model for wider adoption—by governments, NGOs, or developers working in similar regions.

Forests & Materials: Local Sourcing and Circularity

The structural timber for the Busibo and Namabaale developments was sourced from small-scale foresters on the local market. To ensure safety and circularity, it was treated with boron/borax rather than synthetic preservatives, avoiding forever chemicals that could harm residents or complicate end-of-life reuse. This makes the timber safe to burn as firewood or even compost after the building's lifespan. While no formal forest assessment was conducted, the supply is typical of Uganda's small-scale plantation sector, dominated by Caribbean pine (*Pinus caribaea* var. *hondurensis*) and eucalyptus. These plantations are usually established on government land through leasing schemes, with growers often working in association networks that support seed sourcing, regeneration planting, selective harvesting, fire management, and community consultation. Although certification and safeguards were not in place, Localworks actively sought timber from smallholders known to follow responsible practices. These informal networks help reduce risks such as illegal logging or overharvesting, though the lack of full traceability means risks cannot be ruled out. Strengthening certification and traceability is therefore a priority for ecosystem actors and future projects.

Material choices were guided not only by performance but also by circularity. One of the most notable innovations was the use of lime-sawdust bricks, produced by combining sawdust waste from timber milling with hydrated lime. This approach transformed what would otherwise be discarded biomass into a durable building block, lowering both material costs and waste. The lime itself is a recycled byproduct of welding gas and medical oxygen production, making it close to carbon-neutral (though a full carbon assessment is still required).

Other materials were similarly selected for their durability, availability, and ease of reuse. The timber frames were finished with breathable lime plaster, pigmented with sieved earth for longevity. Roofing relied on corrugated iron sheets, which are both durable and easily replaced. Floors combined a thin smooth-floated concrete layer with a hardcore base, forming a stone-concrete composite. Foundations used rubble stone from local quarries, with reinforced concrete beams and fair-faced upstands to support the timber walls. Together, these material strategies demonstrate a pragmatic balance: robust enough to meet durability and climatic needs, yet sourced and designed with circularity in mind.

Carbon & Climate: Emission Reduction and Storage

According to preliminary assessments using the EDGE tool, the project delivers a 75% reduction in total carbon emissions per unit compared to conventional brick-and-cement housing.

Key carbon metrics:

- Embodied carbon: ~108 kgCO₂e/m²

- Carbon stored in timber structure: ~1.5 tonnes of carbon per unit
- Operational energy demand: Significantly reduced through passive ventilation, shading, skylights, and non-toxic, light-colored finishes, as well as toilets connected to a bio-digester

Carbon benefits are also tied to forest regrowth: harvested biomass is expected to be regrown and reabsorbed within 7–11 years, assuming effective plantation management and minimal disturbance. Said another way, the wood used to build each housing unit at Busibo Teacher's Village could be regrown in ~6-7 days in Uganda's commercial plantations¹. As the building is designed for a life of 50 years, this approximates to 5 cycles of biomass harvests and regrowths.²

Regulation and Approval

The Ugandan building code does not yet include explicit regulations for prefabricated timber structures—but this did not prevent the Busibo or Namabaale projects from being approved or constructed. Localworks has worked closely with local authorities and district engineers to demonstrate compliance with existing safety and planning standards, using structural calculations and fire safety strategies to fill gaps in the code.

In practice, the lack of codified standards introduces delays and risk aversion—particularly when working with more formal or centralised government bodies. However, at the local level, the team has found pragmatic partnerships with open-minded officials willing to approve projects based on technical merit. Looking ahead, scaling the EcoPrefab model will require some form of regulatory recognition or pre-approval—especially if it is to be mainstreamed into national housing programs or government procurement.

Social Impacts: Community and Resident

The Busibo Teachers' Village was built by and for Ugandans. Localworks trained dozens of carpenters, masons, and general labourers, many of whom had never worked with prefabrication or timber framing before, in joinery, assembly, moisture protection, and finishing techniques. Using familiar materials while introducing new methods, the project generated employment, transferred valuable skills, and fostered local pride. Although these jobs are short-term by nature, workers from Busibo were rehired in Namabaale and are now leading parts of construction with greater autonomy, showing that the training has lasting value. If scaled, the EcoPrefab model could stimulate demand for timber artisans, lime plasterers, and site coordinators, though this will require complementary investments in vocational training, certification, and SME support to ensure long-term employment. Without these, the risk is that skilled workers will cycle in and out of short-term projects without long-term security.

Teachers, the primary beneficiaries, have historically been underserved in rural housing programs. The 52 new units provide stable, well-ventilated, and dignified homes, supporting retention and strengthening community presence around schools. Residents report improved comfort, health, and sense of dignity. While a formal post-occupancy evaluation is pending, early feedback indicates that the homes perform well, with minimal maintenance needs and strong community ownership. Robust materials and details, such as pigmented lime plaster that does not require repainting, durable roofing, and modular timber frames that can be extended, repaired, or disassembled, all contribute to a projected 50-year lifespan without high maintenance burdens.

The project also reinforced community and ecological resilience: site design integrated native landscaping, stormwater management, and shared spaces that foster belonging. By intentionally avoiding toxic or hard-to-repair materials—and limiting concrete to foundations and flooring—Localworks combined durability with low embodied carbon. The result is not just dignified housing for teachers, but a demonstration of how

¹ This assumes: an average of the pine and eucalyptus grown rates, 60% of the harvested tree is converted into usable construction material, and harvested areas are replanted and well-managed. It reflects potential regrowth across Uganda's commercial plantations as a whole, not the specific forests that supplied this project, and should therefore be considered as an indicative estimate.

² These figures are estimates based on expected plantation behaviour and assume ongoing responsible management. Full traceability and certification would strengthen confidence in these benefits.

localized prefabrication can deliver high-quality employment, skill transfer, and climate-responsive design in rural Uganda.

Scalability: A Model Worth Watching

Localworks has always seen EcoPrefab as a platform—not just a building system. But scaling it beyond pilot projects will require both institutional shifts and infrastructure investment. Among the biggest current barriers are: inconsistent access to well-dried timber, a limited prefabrication ecosystem, lack of clear standards for timber-based systems, and a still-nascent market understanding of climate-smart construction.

The team is actively exploring ways to overcome these challenges: standardising components for multiple typologies, developing training materials for contractors, and testing transport solutions that reduce costs for remote sites. They also highlighted the need for policy and financing tools to make timber construction bankable, particularly in the affordable housing sector.

For the team, affordability must remain the north star. Innovations that perform well but are out of financial reach for most clients won't deliver climate or forest benefits at scale. That's why Localworks continues to refine the system for cost-efficiency without sacrificing quality—believing that scale will come not from high-tech breakthroughs, but from grounded, replicable systems that deliver real value to users.

The Busibo Teachers' Village demonstrates how well-designed timber construction can serve multiple goals at once: improving housing, storing carbon, building local economies, and supporting responsible forestry. It is a model that deserves to be studied, adapted, and scaled — and a clear signal that Africa's timber construction future is already taking shape.