

PILOTING PARTICIPATORY REHOUSING TO TRIGGER SUSTAINABLE SCALABLE URBAN RENEWAL IN KIGALI

PROECCO'S contribution to City of Kigali Mpazi Catchment Urban Upgrading and possibility for its scale-up and replication in other parts of the City.

PROJECT BRIEF



Mpazi Rehousing Project
City of Kigali

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 Schweizerische Eidgenossenschaft
Confédération suisse
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Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC



skat Swiss Resource Centre and
Consultancies for Development

BACKGROUND

PARTNERSHIP-DRIVEN TRANSFORMATION OF UNPLANNED SETTLEMENTS IN RWANDA

In 2013, the Swiss Agency for Development and Cooperation (SDC) entrusted Skat Consulting Ltd with the implementation of the PROECCO Project (Promoting Employment through Climate-responsive Construction). In Rwanda, the project is implemented in partnership with the Ministry of Infrastructure (MININFRA) based on the bilateral MoU between the Republic of Rwanda and the Swiss Confederation. In September 2020 an additional MoU between SKAT and the City of Kigali (CoK) was signed to support neighbourhood upgrading in Kigali using a participatory Rehousing Strategy within unplanned settlements in the Mpazi sub-catchment area and other neighborhoods in Kigali.

Since 2021, in the framework of the PSUP program, UNHABITAT has supported PROECCO and the City of Kigali in a process structured around participatory building and neighborhood planning and design.

Not only have these partnership facilitated the planning, design, and the implementation of the Mpazi Neighborhood Transformation Pilot Project, they have succeeded in establishing a scalable rehousing process supported by green, strong and affordable construction materials and efficient participatory design. Furthermore, the pilot phase confirmed that the model is properly configured for large-scale replication with the support of public and private investment channels.



(RE)INTRODUCING THE ROWLOCK BOND TECHNOLOGY

MODERN BRICKS ARE SEMI-INDUSTRIAL BRICKS PRODUCED BY RWANDAN SMEs

Construction costs in Rwanda are higher than in most other countries in Africa. This is mainly due to its land-locked geographic position and the resulting high transportation costs of imported material, namely of steel and cement. However, Rwanda's abundant clay deposits are of excellent quality and the massive demand of the country's fast-growing cities are fertile grounds for the construction industry to produce and build with Modern Brick Technologies. For several years Rwandan SME's, with the support of the Swiss Agency for Development and Cooperation, have started to produce machine-shaped and kiln-fired Modern Bricks that allow for the construction of smart and cost-effective buildings. Modern Bricks applying the Rowlock Bond construction technology and cost-effective urban housing designs have been promoted by PROECCO for their potential to make urban housing and construction affordable and to bring tens of thousands of jobs back to Rwanda that were lost to the foreign cement industry. The below image shows the cost difference between different types of walling systems (one sqm of wall), and the competitiveness of Rowlock Bond construction technology with Modern Bricks.

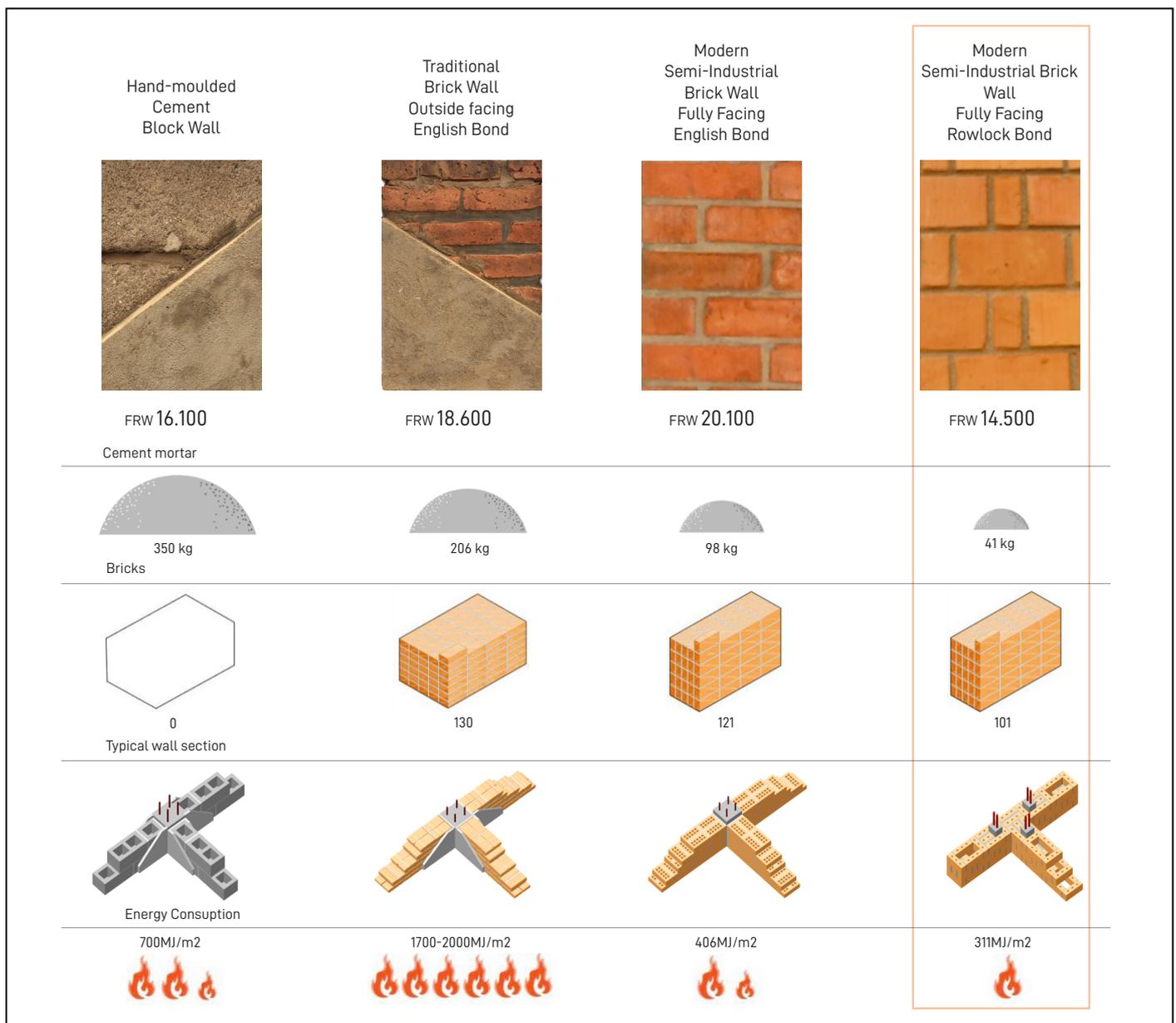


Figure 1 : PROECCO Catalogue of Affordable Solutions Made in Rwanda 2021

THE ROW LOCK BOND TECHNOLOGY AND ITS APPLICATIONS

ROWLOCK BOND CONSTRUCTION ALLOWS DENSIFICATION AND FLEXIBILITY IN DESIGN

Rowlock Bond wall. Modern brick walls are more cost-effective than traditional brick or cement block walls as they require a lower amount of cement and bricks, due to the specific configuration in which they are laid. As Figure 1 shows, it is apparent that combining the Rwanda-made modern Brick with the RLB significantly reduce costs, even when compared with traditional bricks.

Flexible design. The Rowlock Bond technology is suitable for the design of dwelling units that are customisable to owner and tenant needs according to a household's financial capacity. With load-bearing external walls (up to G+2), interior wooden partitioning can be moved and adapted to evolving needs or transformed into brick walls in the future. Timber slabs, where present, can also be modified to allow a different spatial configuration of the units. Timber slabs can also be upgraded to extruded clay slabs (Maxpan) over time.

Structural design and para-seismic features. When used for the construction of storied buildings, the Rowlock Bond Construction System is a «strong box,» held together by concrete reinforcement (tie beams). The result is a structural frame within which flooring, and walling elements can be adjusted and modified at will without modification to the structural box. The strong structural performance of the system has been proven: buildings constructed with the Rowlock Bond walling systems withstood the 2015 earthquake in Kathmandu. The following year, the technology was officially endorsed and recommended by the Nepalese government for reconstruction of low-rise buildings.

Low-cost densification. Due to its cost effectiveness, Modern brick duplexes and triplexes using Rowlock Bond walling cost less than single-storied houses with the same floor area. This construction technology and building typology are particularly attractive for landlords who dream of a modern urban house and want to offer their middle-income tenants a modern and affordable house, apartment, or studio. Depending on the specific configuration, an average plot of just 600 sqm developed with this system, can accommodate between 12 to 28 dwelling units with size ranging from as low as 11 sqm up to 60 sqm and costing between 220.000 and 250.000 RWF per sqm depending on the finishing and other factors.



Figure 2 : Affordable housing block-Mpazi block A

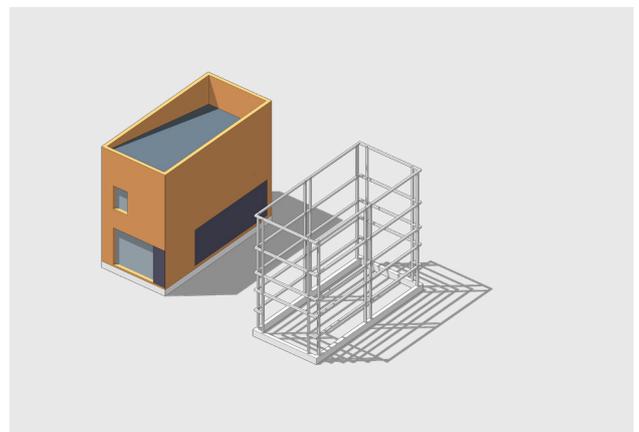


Figure 3 : Structural frame reinforcement

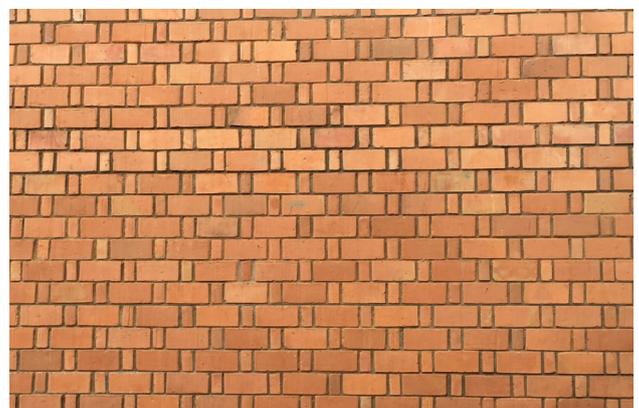


Figure 4 : the Rowlock Bond Wall pattern, double-side facing and with low maintenance costs



Figure 5 : Interior kids bedroom with both timber slab and timber partition wall

CAPTURING THE MODEL'S POTENTIAL

PROECCO SUPPORTS THE ECONOMIC AND URBAN TRANSFORMATION

Demand for urban buildings and modern bricks . It is estimated that rapid urban growth in Rwandan cities will require 200 urban buildings to be constructed every day, equivalent to 1 billion bricks per year. However existing formal building material industry can satisfy only 10% of current demand, while the remaining 90% is supplied with substandard material like traditional bricks and high-priced cement materials. This massive demand for modern bricks represents a profitable business opportunity for industrialists artisanal entrepreneurs alike to invest in Modern Brick Production facilities. In addition, the establishment of new brickyards will require firms specialised in kiln construction, locally-made small brick machines or medium-sized machines or imported production lines are necessary, each one requiring weekly maintenance by skilled mechanics and machine parts manufacturers. In order to enable the construction industry to supply the annually required affordable and durable urban dwellings build-to-code and meeting masterplan requirements, new jobs shall need to be created all along the supply chain.

Reduction of CO2 emission. Research conducted by the PROECCO program confirms that Rwanda's laterite-covered hills generate a nearly inexhaustible high-quality clay deposits, meaning that the country's entire urban demand for walling material - which amounts to nearly 1 billion bricks and blocks per year to feed Rwanda's rapidly growing cities - could feasibly be met with modern Rwanda-made clay Products. These bricks, fired in energy-efficient kiln using biowaste, have many proven advantages, including an important contribution to the reduction of CO2 emission as compared to cement blocks and traditional bricks which require tons of firewood, use child labour in harsh working conditions, and keep women in lower occupational and social status.

However, by 2040, the country needs 15 times more modern brick houses per year and 15 times more brick factories in order to substitute substandard building material made of brick and clay. For this reason the project is now promoting a more effective industrialisation process centered around the idea of low-carbon clusters as depicted in Figure 8.

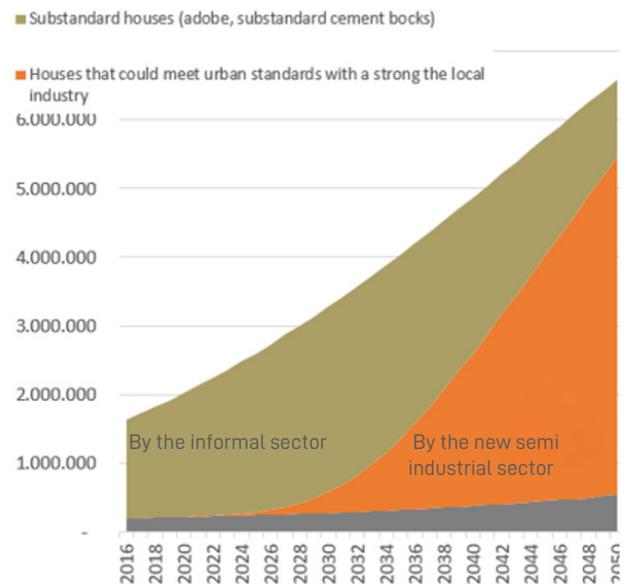


Figure 6 : Housing stock



Figure 7 : Mini hoffman brick kiln

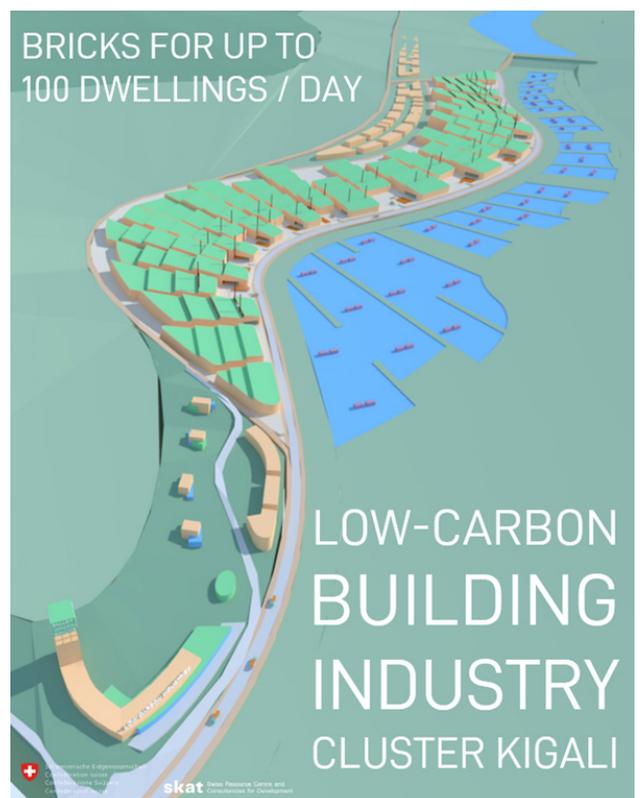


Figure 8 : The design of a new Green Industrial Zone in Kigali

OPPORTUNITIES FOR LARGE-SCALE URBAN UPGRADING IN RWANDA

REHOUSING SCHEME PROMOTING DENSIFICATION IS POSSIBLE WITHOUT LAND EXPROPRIATION

Urban transformation. The transformation of Kigali and the Satellite and Secondary cities into economically viable poles of growth, is central to the Government of Rwanda's economic and urban development strategy. Densifying existing unplanned neighbourhoods, to accommodate an increased amount of population with different income levels in well-planned, safe, and affordable homes, remains a key priority in the national agenda as set forth in Vision 2050.

Participatory rehousing scheme. The expropriation/compensation model proved inefficient in achieving the required financial sustainability of large-scale upgrading projects and often generated negative impacts on the residents affected by the intervention (e.g., long-distance relocation, loss of social and economic networks and faster gentrification processes). Today, the government still struggled to meet the financial obligations of such costly urban interventions.

A participatory re-housing scheme like the one being experimented in Mpazi, Kigali on the contrary, would leverage existing land values and ownership to promote an in-situ upgrading process, preventing the displacement of the resident population by substantially limiting capital investment, expropriation costs and risks associated with a brownfield redevelopment project.

The approach is based on the voluntary transfer of the property from each owner to the City which, in turn, will develop and provide the owners with a more compact, modern, and safe unit of the same value, but without compromising living space. The key advantages of the process lay in the densification that is intrinsic in this approach: extensive simulations and real-life applications in several development and re-housing projects have clearly demonstrated that the same number of units and residents will require less than a half of the land previously occupied, even availing a surplus of units within the same land.

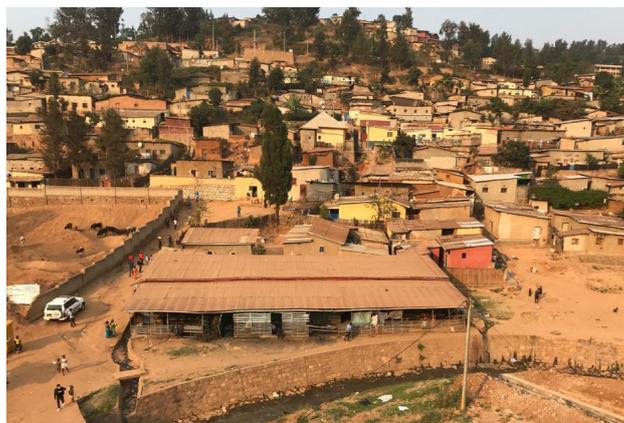


Figure 9 :Mpazi before transformation



Figure 10 :Mpazi after transformation

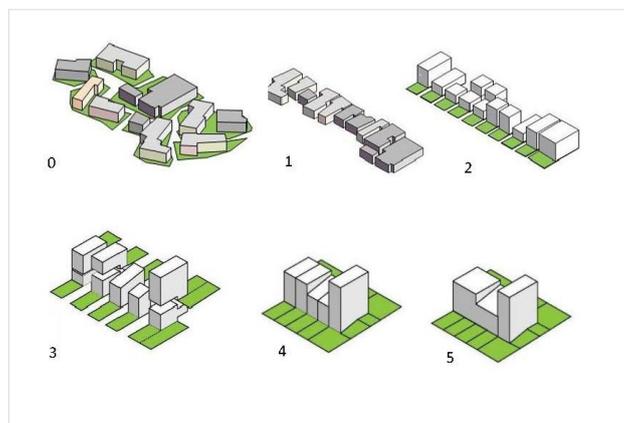


Figure 11 :Incremental urban renewals models



Figure 12 :Mpazi in transformation process

OPPORTUNITIES FOR LARGE-SCALE URBAN UPGRADING IN RWANDA

STAKEHOLDER ENGAGEMENT IS INTEGRAL TO URBAN UPGRADING

Community Participatory planning. Community engagement is fundamental to voluntary rehousing rehousing project, which is underpinned by a consensus-based approach. A series of dialogue and consultations, transparency and mutual respect are key elements in the approach and ensured throughout the process. There are three levels of community engagement: dwelling unit level, building block level, and neighborhood level. The partnership with UN-Habitat under the PSUP programme enabled PROECCO to widen the participatory process to neighbourhood-level planning with Community Working Group recognised by the local institutions. Followed by the participatory assessment and mapping which addressed the lack of public spaces, limited connectivity and safety issues, PROECCO co-designed the entire 4-ha neighbourhood with the Community Working Group integrating proposed solutions that the Group identified during the participatory assessment and planning.

Implementation arrangements for scale up. It is assumed that the Mpazi Rehousing Project in Kigali will be implemented through a Public/Private Partnership (PPP). A Special Purpose Vehicle Company (SPV) will embody the partnership. Each partner will hold shares according to their contribution.

A financial model was tested to see if there is a possibility of engaging the private sector in the rehousing process. Based on the results obtained, a 100% cross-subsidy of the Rehousing Sector is feasible through markup to the cost of the Investment Sector. This markup can necessarily generate dwelling units that are significantly more expensive in the Investment Sector, which may lead to a process of gentrification of the area. It is also possible to affirm that the objectives of 100% rehousing of the owner households and 50% of the tenant households, could be achieved by largely using a rental modality of co-housing apartments and private apartments. It also indicates that the greatest Gross Floor Area (GFA) and cost efficiency is achieved when using G+2 in the Rehousing Sector and G+5 in the Investment Sector. This scenario could generate up to 2,043 DU, representing an additional 1,472 DU for Mpazi project in Kigali (4ha), almost a fourfold increase in the housing capacity of the area.

The Internal Rate of Return (IRR) yielded by the Investment Sector (under the chosen scenario) reaches 25%, which is in line with the expectations of private investors in Kigali.



Figure 13 :Participatory neighbourhood planning



Figure 14 :Levels in participatory upgrading process



Figure 15 :Neighbourhood-level planning co-designed with the Community Working Group

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