

Maryia Rusak, PhD

YIG Prep Pro Junior Research Fellow

maryia.rusak@kit.edu

Karlsruhe Institute of Technology

Professorship Architecture Theory

Institute for Architectural Design, Art and Theory

Prototyping Development from the South: Manuals of HRDU, Nairobi

In May 2023, during my two-week research stay in Nairobi, Kenya, through generous collegial introductions at the University of Nairobi, I was passed along—as it usually happens—from one person to another until I found myself at the School of Architecture in the office of Architect Professor T. J. C. Anyamba. After several chats about my interest in the Nordic architecture of foreign aid, I was led to a true chest of treasures hidden on the school's ground floor, marked by an inconspicuous paper sign “Documentation Centre.” Barred behind metal doors, several artificially lit rooms housed endless cupboards of dusty folios, documents, investigations, studies, white papers, reports, manuals, recommendations and publications touching on all possible aspects of low-cost construction, self-help housing and urbanism in the context of “development.”

Having spent just a couple of hours there, I emerged not with one but hundreds of grey papers, reports, manuals and guidelines produced over several decades by the Housing Research and Development Unit, a unique in-house research institution at the Faculty of Architecture. Founded in 1967, the Unit brought together efforts of local and international researchers working with all aspects of low-cost construction, local and regional planning in post-independence Kenya. The Unit specifically focused on projects and conditions in East Africa and worked with various Ministries and state institutions to turn theoretical investigations into applied projects. Today, despite the impressive scale of the Unit's operations, few people know about it or its unique archive. This panel topic provided a unique opportunity to address not only one document or a building manual produced by the Unit but also the broader institutional history of the Unit. Through a close investigation of a Unit's prototype for a low-cost housing project and its accompanying report, this contribution explores the unique international amalgamation of ideas behind the Unit's approach to architecture in the context of development. By tracing the evolving research of

the Unit, this paper will explore how visions of development initially imported from the North were rethought, challenged and subverted by the on-the-ground realities of East African planning and changing institutional dynamics in post-independence Kenya.

Action-Oriented Architecture

How can architecture effectively address issues of development? This was the main task ahead of the practitioners set to re-design the educational curriculum at the Faculty of Art and Architecture at the University College of Nairobi in the years following the Kenyan independence of 1963. Before this, the faculty was run by British expats, enrolling a “few dozen” African and Indian-African students each year to bring the best practices of post-war British architecture into a post-colonial setting.¹ In the early 1960s, the school established a close working relationship with the Liverpool University School of Architecture, whose director, Robert Gardner-Medwin, would play a crucial role in shaping the new program in Nairobi. Post-independence Kenya faced many urban and social challenges but lacked local planners and architects to address them.² The Gardner-Medwin Report Group was tasked to assess the situation and propose a way forward. Following the Group’s suggestions, new Kenyan architectural education was to be action-oriented, delivering practical solutions to pressing material problems.³ To do so, architecture has to be reshaped as a technical, almost vocational discipline, where students would learn rigorous research techniques to address practical issues in their immediate environs.

To bring the school in line with recent developments, Gardner-Medwin recruited David Oakley, a graduate of the Architectural Association and a specialist in tropical housing with extensive experience in British colonial administration. Oakley was not only to lend his expertise to the new program but, as the new director of studies, he worked with Kenyan

¹ Rockefeller Foundation Archives, Tarrytown, N.Y., RF/RG 1.2 series 475, box 2, folder 13, Robert W. July Trip Diary, Apr. 1961, 22. See further elaborate information on the institutional history of design education at the University College of Nairobi in Daniel Magaziner, “The Foundation,” in *Comparative Studies in Society and History* 60, No. 3 (July 2018): 599-628, 608.

² “Housing Research,” in KY/17/8. In 1966, among the six architects employed at the Ministry of Works, none were Kenyan. D. M. Mutiso—the head of the Ministry—by some accounts, was the only Kenyan foreign-educated architect at the time.

³ Robert Gardner-Medwin, “Problems of the Nairobi Department,” 30 October, 1964, University of Nairobi Archives, Nairobi, Kenya. PUEA/11/1–14/file 1,5–6. “Minutes of the Gardner-Medwin Report Group,” 22 December 1964, University of Nairobi, PUEA/11/1–14, 1. All in Magaziner, 609.

Treasury officials to acquire funding for establishing a new action-oriented research entity—the Housing Research and Development Unit. The Unit was to function as an extra-academic centre dedicated to advanced research in physical planning and environmental design, acting as a pilot for two new graduate departments at the Faculty of Architecture, Design and Development.

Practically, the Unit was expected to “build up a body of knowledge in preparation for advanced training in the fields of physical planning of communities and housing design and construction, emphasising the urgent problems in the urban and rural areas of East Africa.”⁴ To do so, the Unit’s researchers had to systematically assemble “broad and solid” knowledge from the international conferences, workshops and publications dealing specifically with housing conditions in East Africa.⁵ To augment the information collection, the Unit’s researchers conducted surveys of existing building techniques, housing and village types in Kenya.⁶ This “repository” approach was similar to the UN’s strategy of collecting international planning information. However, while the UN did not implement building projects in practice, the Unit was to test its amassed theoretical expertise by developing construction prototypes which could be replicated in other parts of the region.

This Unit’s research was indebted to the tradition of “environmental” planning introduced by the Unit’s first-generation researchers like Steven Szokolay. A Hungarian-born architect, Szokolay worked with UN planner and pioneer of tropical architecture Otto Koenigsberger on environmental aspects of architectural design and led the Environmental Studies Group within the Unit.⁷ This environmental design philosophy situated human actors within a broader ecological system, and thus, housing problems were considered among the comprehensive host of other factors impacting urban development. The term “environment” included not only climatic control and aspects of health and comfort but also studies of materials, building production and management.⁸ Oakley termed it a “developmental approach,” a de-facto potpourri of planning strategies popular at the time,

⁴ “Housing Paper I. Housing Research and Development Unit. Explanatory Note expanding the objectives of the Unit as they are described in the Draft Basis of Agreement. December 1965,” in KY/17/8.

⁵ “Draft application to the Nuffield Foundation,” Document E (Draft), Statement of Framework of Social Research within the Housing Research Unit. In KY/17/8.

⁶ “Document B. Draft for Overall Programme for the Housing Research and Development Unit,” in KY/17/8.

⁷ “Year Two Design. Housing. Week One. University College, Nairobi,” November 28, 1966, Department of Architecture, in KY/17/8.

⁸ “Draft of Basis of Agreement between the Central Housing Board of Kenya and the University College, Nairobi,” December 12, 1965, in KY/17/8.

including the Ekistics methodology developed by a group of people around the Greek planner Constantinos Doxiadis.⁹ This theoretical formulation reveals that although the Unit aimed to focus on the everyday realities of Kenyan planning, it did so through a research lens imported from abroad.

Finally, the Unit's main goal was establishing a "marriage of action to thought."¹⁰ All theoretical investigations were to materialise in real-life prototypes, as the Unit was to "produce prototype designs, test building systems and construct [...] experimental housing projects and community facilities." The Unit worked with pilot self-help and low-cost housing projects and developed typological designs for villages, towns, and communities of different sizes and functions.¹¹ The prototypes were to be flexible and adapt to regional, local, and individual demands. The projects were sourced from partnerships with state Ministries and institutions, like the Central Housing Board and the National Housing Corporation, while the Unit operated as a para-statal consultancy for all new housing initiatives. Ultimately, HRDU was to provide practical recommendations for a range of construction actors in the development context, from planners and architects to entrepreneurs, local builders and cooperatives. Given the undefined audience, the Unit's publications occupied a middle ground between a white paper, a report and a building manual.¹² However, deriving applied recommendations from the Unit's research was more complex in practice than initially imagined.

Testing Timbers

Among the Unit's first prototypes was the Kariobangi experimental housing scheme. The project's concept first emerged during the "Urbanisation and Timber Housing" symposium at Nairobi's City Hall in December 1968. Initiated by the City Engineer and the City Council—and influenced by a range of foreign interests—the conference suggested that timber was the only material capable of effectively meeting the demand for affordable construction. The Ministry of Housing then commissioned several institutions to create prototype designs in

⁹ A paper by Professor David Oakley, in "Minutes of the Fifth Meeting of the Gardner-Medwin Report Committee," p. 17-19, in KY/17/8.

¹⁰ Oakley, in "Minutes of the Fifth Meeting of the Gardner-Medwin Report Committee," p. 13, in KY/17/8.

¹¹ "Document B," p. 5 in KY/17/8.

¹² "Draft of Basis of Agreement," in KY/17/8.

timber that could later be replicated on a larger scale. HRDU was tasked with designing four test houses—D1, D2, E1, and E2. Each house measured 45 square meters, featured a courtyard at the front or back, and offered a variety of roof lines. Internal floor plans were developed based on a modular framework derived from the size of a bed as the primary dimensional denominator, expanding to accommodate different social and family use scenarios.¹³

The project tested two building systems for low-cost construction: one based on pre-cut components and another on prefabricated timber panels. According to HRDU researchers, both systems created a “repetitive routine” which could be easily replicated by “less-skilled” workers—the common village-to-city migrants.¹⁴ The pre-cut system adapted a Swedish REGELHUS building system, developed from Swedish work studies for the most efficient on-site assembly. The system allowed three teams to work simultaneously: Gang One would assemble the cross-sectional components consisting of roof trusses and wall studding directly on the finished floor, while Gang Two tilted and installed the components at regular intervals. Gang Three would then complete the structure with roofing and external and internal insulation. The precise delineation and repetition of work would allow ten workers to complete the wall structure within three or four days.¹⁵

The Unit’s researchers recorded the prototype’s construction in a detailed grey-paper report. While not precisely a leafed manual, the report intended to instruct future building actors who might want to replicate the project in other parts of the country or the region. The researchers then provided illustrations for various aspects of construction, from different variations of a modular planning network and its consequent effects on floor plans to step-by-step illustrations of the assembly process. Photographs, drawings, and floor plans of traditional timber houses from various regions of the country accompanied the first part of the report. Dimensions of prefabricated components were presumably derived from the basic constructive types used in traditional Kenyan dwellings, borrowing the existing shapes

¹³ Following original investigations, HRDU proposed a new planning module—that of a bed—since it was the largest and often the only type of furniture. Conventional models have been designed with pre-dimensioned building components, such as standard doors or insulation materials. Without these constraints, HRDU proposed that it was reasonable to take bed dimensions as the primary spatial denominator.

¹⁴ “2nd Draft. Report on the Ministry of Housing’s Houses Built at the Timber Housing Pilot Scheme, Kariobangi,” in Folder KY/7/3 “Timber Housing,” Kenya National Archives.

¹⁵ Per Houldberg and Charles C. Bengough, “Prefabricated Timber Houses—A Guideline to Their Planning Production and Marketing in Developing Countries” (University of Nairobi: Housing Research and Development Unit, 1979). HRDU Archive, the University of Nairobi.

of walls, windows, and roofs. Based on the basic planning module, floor plans suggested various furniture and activity arrangements depending on the use—standard, under overcrowding conditions, or in service rooms. Upon closer examination, however, the proposed floor plans reflected a Western idea of domestic activities in Kenya, as the researcher’s imagination often had little to do with the reality of the Kenyan family and socialisation patterns or the actual use of the rooms. The style of illustrations—partly due to the limited technical means—resembled simple hand-drawn plans reproduced in a booklet rather than professional architectural drawings. The more informal drawing style was adopted as more “accessible” for potential users. However, it also delineated a hierarchical distinction between the planners and users.

Another hand drawing in the report schematically depicted the assembly process. The workers were illustrated as simple one-dimensional gender-less figures, assembling, tilting and installing structural frames on site. Some group members were placed directly on the roof gable, finalising the elements without any security or safety system. Other illustrations throughout the report depicted the assembly process of experimental-type houses through photographs, while more technical drawings with set dimensions described the process of standardised panel production, variations in type plans and different potential end products. The blended style of illustrations—from simplified hand drawings to copies of building specifications—reflected the report’s unclear intended audience. However, given the experiment’s shortcomings and the prefabricated elements the system relied on, there was little chance that the exact building procedure would be reproduced.

Shortly after the project was completed, HRDU was commissioned by the City Council to produce another report based on a post-occupancy survey. While many dwellers praised their new houses for spacious designs and generous courtyards, the buildings were perceived as temporary and make-shift due to the cultural implications of timber. Although timber might have been a material suited for quick construction and the unstable soils of Nairobi, it was associated with make-shift shanty-town housing, and most respondents would have preferred houses made from stone or concrete. The walls finished with unpainted hardboard or plywood were generally unpopular, and the use of timber in the

bathrooms was disastrous.¹⁶ In addition, while timber performed well in colder night temperatures of Eastern Nairobi, houses with low-cost timber frames with no insulation suffered from excessive heat gain.¹⁷ This, coupled with security concerns which forced the residents to shut all doors and windows at night, undermined the houses' thermal performance. Structurally, the low-grade, fast-grown plantation timber of exotic pine required extensive seasoning and treatments, often leading to significant structural defects and warping.¹⁸ As Kenyan builders were not used to working with timber, each detail had to be scheduled by designers, undermining the principles of self-help construction. Eventually, as the HRDU researchers summarised, the Kariobangi prototype scheme did not provide any conclusive evidence on the suitability of this low-cost housing scheme and its potential for replication.¹⁹ Timber construction, much advocated by the advisors from the Global North, was, in the end, hardly a solution for Kenyan realities.

South to South?

Why did a research institution dedicated to investigating Kenyan planning conditions go so amiss with its low-cost prototype? In part, this had to do with the Unit's imported expertise. Despite the proclaimed East African orientation, the Unit's first acting director, Professor Oakley, was a proponent of "tropical architecture" and brought his experience with low-cost construction within the British colonial context.²⁰ Versed in solving problems of order and hygiene, Oakley advocated for an "efficient" architecture, inevitably framed by the Western understanding of technology and architecture. Historian Daniel Magaziner provides a unique insight into the epistemological conflict between Oakley's technocratic matter-of-fact approach to post-colonial planning and a more "comprehensive" attitude of African practitioners at the school.

¹⁶ HRDU, "Kariobangi Experimental Timber Houses. User Reactions, Construction, Kitchen Design and Climatic Performance," February 1974, HRDU, p. 15-19. In KY/7/3.

¹⁷ "Kariobangi Experimental Timber Houses," p.51, in KY/7/3.

¹⁸ "Prefabricated Timber Houses—A Guideline to Their Planning," p. 115-127. HRDU Archive.

¹⁹ "Kariobangi Experimental Timber Houses," p.24, in KY/7/3

²⁰ More on Oakley's practice see Robert Home, "Knowledge networks and postcolonial careering: David Oakley (1927–2003)," *ABE Journal* 4 (2013), <http://journals.openedition.org/abe/3388>. On the problematic nature of "tropical architecture," see Hannah Le Roux, "The networks of tropical architecture," *The Journal of Architecture* 8, no. 3 (2003): 337-354.

For example, Selby Mvusi, a black South African artist and designer and his colleague Derek Morgan, who taught the Foundation Course for first-year students, were critical of the Unit's research, not only for the anecdotal "absurdity" of "reiterating the function in a title" but for its distance from the actual issues. As they saw it, HRDU was not going to research the actual problems of Nairobi but rather "deal in abstractions" manufactured by international "experts."²¹ Indeed, as the Unit's further funding came from the Danish Agency for International Development, the Danish contribution shaped its operations throughout the 1970s. Hans Mammen, an architect from the University of Copenhagen, took over Oakley as the Unit's director in 1967.²² Over time, HRDU became a research outpost for Danish and Nordic architects interested in developmental work, offering an educational analogue to the AA Tropical Architecture graduate course.²³ While there was an intention to "Africanize" the Unit, local scholars, mostly sociologists, such as Mr Mwangi or Mr Mulili, were usually hired only for fieldwork interviews, as expatriates lacked Swahili skills and could not communicate with local dwellers.²⁴

The unit's inability to produce replicable designs should also be considered within other educational experiments at the school. As part of the Foundation Course, Mvusi and Morgan taught a three-part series of analytical "man/envirom interaction" projects, where first-year students were each assigned a "typical rural homestead" to shadow their "subjects" from morning till dawn and to record their interactions with the material environments. Each student closely analysed and documented the observations in "diagrams, charts, maps, photographs, plans of rooms, plans of buildings, sketches and the like." These assignments, carried out by the first-year students, closely echoed the declared "environmental" intentions of the Unit. However, as Magaziner notes, the "man/envirom"

²¹ Daniel Magaziner, "The Foundation," 618.

²² A letter from Hans Mammen, HRDU, to J. N. Oluouch, Esq, Permanent Secretary, Ministry of Housing, July 14, 1967, in KY/17/8.

²³ A letter from Hans Mammen, HRDU, to J. N. Oluouch, Esq, Permanent Secretary, Ministry of Housing, May 22, 1967, in KY/17/8. Søren Emig and Zahir Ismail, "Notes on the Urban Planning of Nairobi" (PhD Diss., University of Copenhagen: 1980), in HRDU Archive.

²⁴ "Staff Positions as per May 1976," in "HRDU Progress Report, June 1975-May 1976," HRDU Archive. For example, during the research trip of the Building Research Unit in Tanzania, a research institution similarly sponsored through Nordic aid, two students from Nairobi—most likely affiliated with HRDU—accompanied the project to communicate in Swahili since "the expatriates possessed a very limited knowledge of Swahili" which significantly hindered the research. In 1968, three of the four Unit's members came from Denmark, including two architects and one economist, Mr. Jørgensen. A part-time sociologist, Mrs Menezes, was hired, and two more local specialists could join part-time—Mr. Mwangi or Mr. Mulili "or similar"—as indicated in the report's parenthesis.

project was arguably far more successful than other research initiatives at the time, radically “dispensing with all the racial, economic and other pretensions that had governed approaches to African architecture [...] in favour of the *then* and *there*.”²⁵ Mvusi and Morgan were especially against the “caricature” separation between the rural and urban societies, underscoring much of the foreign experts’ work.

As Danish funding gradually dwindled, the Unit’s research priorities changed. In the 1970s, Danish or European researchers authored most reports and evaluated housing projects from the European perspectives of building typologies and technical and financial organisation systems. In the 1980s, as the names of the Unit’s researchers became more localised, so did the Unit’s research focus. The first Swahili publications appeared in the 1980s, and more reports explored local technologies and materials, such as low-cost sanitation structures, grass and papyrus roofs, or lime mortar. Several Swahili-language reports provided hands-on recommendations for social interviews and guidelines for community development and organisation, operating between a white paper, a manual and a report. By the 1980s, most of the Unit’s researchers came from Kenya, East Africa, and Asia, as HRDU became a research hub for scholars from the Global South. As the Unit maintained an array of international partnerships, its research informed the global debates on housing and urbanisation from a more hands-on perspective, impacting not least the emergence of UN-Habitat.²⁶ In Kenya, it continued to work as a para-statal consultancy for different construction agencies within and outside the country, exporting its consultancy services to the governments of the Netherlands and Mozambique.²⁷

The Unit’s legacy today is complex and mixed. Shaped by its British origins and subsequent Danish funding in the early decade of operations, many of the Unit’s projects replicated status-quo planning paradigms of the Global North. This perspective was reflected in the Unit’s manuals and reports, whose fine print betrayed the outsiders’ view, also apparent in the hierarchical language of drawings and instructional representations. Moreover, as HRDU’s research targeted a mixed audience, its printed output often occupied a grey area between an academic report, a scientific grey paper and a building manual. Through a general catalogue, HRDU’s publications could be bought and airmailed across the

²⁵ Morgan and Mvusi, “Man /EnvironProjectTwo,” 1–3, in Magaziner, “The Foundation,” 620.

²⁶ “Other Activities,” in “HRDU Progress Report, June 1975-May 1976,” HRDU Archive.

²⁷ “Other Activities,” in “HRDU Progress Report, June 1975-May 1976,” HRDU Archive.

region and to Europe, Asia, and America. And while the Unit's printed work might not fall into the strict "building manual" category, I argue, it nevertheless provides an important insight into the work of this extra-academic global research institution aiming to produce replicable solutions to architecture problems in the context of development.