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ECONOMIC COMMISSION FOR AFRICA  
Meeting of Experts on House-Building Costs  
Addis Ababa, 23-29 April 1968

## WORKING PAPER BY THE SECRETARIAT

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M68-402

## MEETING OF EXPERTS ON HOUSE-BUILDING COSTS

(Addis Ababa, 23-29 April 1968)

## I. INTRODUCTION

A. The background

1. African co-operation for solving problems related to house-building costs was included in the recommendations made by the Eighth session of the ECA (E/CN.14/393) under the provision of Project 113 of the ECA Work Programme calling for collection, analysis and compilation of information in the field of housing, building and physical planning, on a country-by-country basis for the whole continent. Data collected and assembled will include inter alia cost of construction and services, functional requirements and standardization.

Accordingly, the ECA Secretariat through its Housing Section attempts to organize a permanent co-operation between African countries - Sub-region by sub-region - for exchange of information on house-building costs. The Meeting of Experts on House Building Costs in Addis Ababa, 23-29 April 1968 is the first action for the permanent co-operation in the field within the East African sub-region.

2. There are two important studies made by the United Nations in the field of House-building costs, one by the ECE and one for ECLA (by Alvaro Ortega).

3. The ECE study Housing Costs in European Countries (ST/ECE/HOU/8) was published in Geneva 1963. It gives a full picture of all factors influencing the construction cost of dwellings in Europe. The dwellings presented are selected from blocks of flats common in European towns. Dwellings and costs in Europe are different from dwellings and costs in Africa, but methods developed in Europe for the analysis of house-building costs may be used also in Africa.

4. The ECLA study Proposal for a Study of the Construction Costs of Housing in the Central American Isthmus (E/CN.12/CCE/SC.4/26) was published in New York 15 October 1966. It proposes a simplified way of presenting the construction costs for one housing unit (one-family house) in the range of 50 m<sup>2</sup> "habitable area".

5. For the terminology and classification involved in the presentation of building construction cost reference is made to Building Classification Practices (CIB Report No. 6) published in Rotterdam 1966. CIB, the International Council for Building Research Studies and Documentation, is the International Organization recognized by the United Nations (consultant Status A) for the subject field in question. For practical use the "SfB-System" recommended by CIB may be illustrated by product index presented in the Jubilee Yearbook 1963 published for the East Africa Institute of Architects, by "Guides and Handbooks of Africa Publishing Company" in Nairobi, March 1963.

The British Standard Phraseology for Bills of Quantities<sup>1/</sup> has been regularly followed when not in conflict with international recommendations.

B. The problem

6. It is a well-known fact that housing in East Africa, as well as in other rapidly developing areas of the world, is dangerously lagging behind requirements. The cost of housing is important, because the argument mostly used to explain the lack of house-production is: "We cannot afford to invest in houses". In all cultures and all times up till now people have built their own houses and every family has had its shelter. No doubt there are materials available in every country suitable for house-building. And there is no shortage of labour. What seems to be missing is the link between traditional housing and modern housing. Modern housing is based on monetary combination of highly specialized activities whereas traditional housing in Africa was based on non-monetary self-supply. In the first period of transission from subsistence to monetary economy the difficulty arises how to make people work for their own benefit. Later, when this problem is overcome, there is the problem of reducing man-hours in each activity to a minimum. We may express this by saying that early development is characterized by the problem of starting production whereas advanced development is characterized by the problem of productivity.

<sup>1/</sup> Fletcher and Moore: Standard Phraseology for Bills of Quantities (George Godwin Limited, 2-4 Catherine Street, London W.C.2).

7. This difference between early and advanced development also characterizes building. Hundreds of thousands of men go idle in Africa because they do not know how to work for their own benefit. They may not have any house for themselves and their families. They may be prepared to work in order to have a house, but they find no place where they can settle with security and they find no materials to use for the building.

8. It is generally agreed that the supply of materials and components for housing cannot be covered by import since the foreign currency, which is usually in short supply, is urgently needed for industrialization.

9. The problem of house-building in early development, therefore, seems to be concentrated in four questions.

- (a) How to plan, administrate and finance house-building?
- (b) Where and how to develop land for house-building?
- (c) How to find and utilize materials for house-building?
- (d) How to make people work for house-building?

These four questions have been taken as symbols defining four major sectors to be analysed.

10. It is of interest to know the division - principally equal to manpower division - of building costs on the different sectors involved. First it may be noted that the cost for maintenance over a lifetime of a modern building may be of the same magnitude as the original construction cost. This may not significantly influence building costs in early development, but has to be considered when development advances.

11. That half of the investment, which is needed to produce the building, may be very roughly estimated to include in early development:

- 20% for planning, administration and management in all sectors.
- 20% for land and land development.
- 40% for the manufacture and distribution of building products, tools and machines.
- 20% for building construction works (net cost of labour)
- 100% building

The cost which may be influenced by rationalization on site in construction is only some 20 per cent of half the total building costs. The main cost factors have to be looked for elsewhere.

12. The first steps towards a better knowledge of the costs constituting the prices of houses may include a certain number of agreement by this meeting on:

Basic terminology in presentation of house-building costs.

Classification of cost factors.

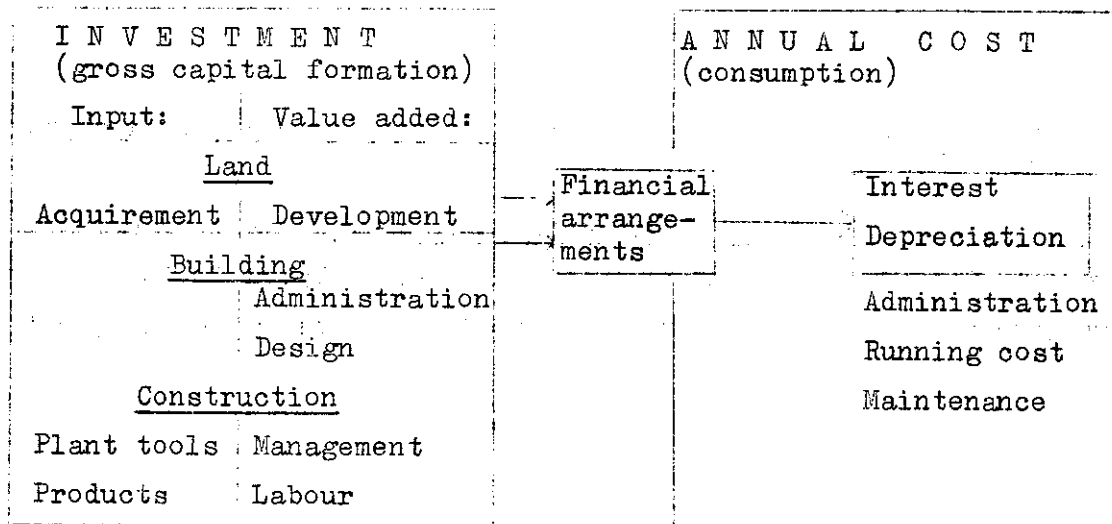
Standard forms for information sheets in house-building costs.

Building-up background information for cost estimates.

## II. BASIC TERMINOLOGY IN PRESENTATION OF HOUSE-BUILDING COSTS

13. Building is the continuous supply and maintenance of buildings, including all kinds of construction works. Housing may be considered as one part (approximately one-third) of all building.
14. Construction is proposed to mean activities on site (contractor's work, including responsibility and related management but not preparatory works such as design and owner's administration.
15. Design is taken to include all kinds of studies (research, standardization, legislation) on which the actual design is based. Preparation of contract documents (specifications, bills of quantities and priced bills) are included. The Architect's supervision of works and the Quantity Surveyor's progress certification are also included.
16. Administration is the word proposed for the owner's activities related to building.
17. Management is the word proposed for the contractor's preparatory and supervisory activities related to construction. Management is divided into management on site and management off site. Contractor's profit is included in management off site.
18. Building cost is proposed to refer primarily to annual cost of which the investment and the financial arrangements are important constituents, together with costs for maintenance, annual administration and relevant running costs.

### Building costs include:



### III. THE BREAKDOWN OF HOUSE-BUILDING COSTS

19. Investment cost for housing is composed of three cost elements.  
A+L+C.

A = Owner's administration, design and supervision.

L = Land and land development.

C = Building construction.

It may be suitable to analyse cost factors per housing unit. This unit may be one  $m^2$ , one  $m^3$ , one room or one dwelling. Traditionally in Europe and Latin America the dwelling and the  $m^2$  of "gross floor area" or "useful floor space" or "habitable Area" are chosen as housing units. Because of the specific features of "low-cost housing" in most African Countries it is recommended that in Africa each room for living (living room or bedroom) is taken to be one unit.

All costs, consequently will ultimately be referred to as cost per room. The number of dwellings per project will be called m and the average number of rooms per dwelling will be called n.

20. The cost of owner's administration, design and supervision, A: should include all costs for preparation of the project and the owner's supervision of the execution. Architects' and consultants' fees are included. The headings proposed are:

Salaries and office expenditures

Consultant fees

Other

A, total

A : is the cost per room for the owner's administration design and supervision.  
m.n

21. The cost of land and land development, L, is often not included in the cost for housing projects, although, evidently, this is a necessary investment for the development of the housing area in question.

22. Normally all costs for land and land development should be paid with the price of the plot. If this price is paid annually, there should be a valuation of the plot in relation to the annual rent. If the price for the plot does not cover the costs for land and land development this should, if possible, be indicated by a footnote.

23. In many cases housing schemes will cover big virgin areas. In such cases the cost of land and land development will be well known. This cost may be accounted for under the following headings:

Land supply	m <sup>2</sup>
Traffic space	m <sup>2</sup>
Parks and open spaces	m <sup>2</sup>
Sewage system	
Water supply	
Electricity supply	
Other	
Community land	m <sup>2</sup>
Plots	m <sup>2</sup>
Price of plots per m <sup>2</sup> :	.....
Price of all housing plots:	.....

L : is the cost of land and land development per room of the housing m.n scheme. (The town planners fee will be included in A).

24. When calculating cost for roads and services all costs for works outside private plots should be included. Works inside the private plots normally will be included in the construction of the building and accounted for as site works S.

25. The building construction cost normally will be accounted for as:

Main contract

Sub-contracts, such as sanitary installations, electrical installations (and other sub-contracts).



26. Each contract may be divided into three main groups:

M = Management and unspecified works.

S = Elements on site (net cost).

B = Building elements (net cost).

27. Management and unspecified works, M, in each contract should include all such expenditures which cannot be included in the net cost for a specified element on the site or in the building. Several cost items will come under discussion. Therefore, it may be advisable to list those costs which in the present co-operation between African experts are considered as M-costs, e.g.

Off-site management and overheads generally;

On-site management;

Plant, scaffolding, tools and machines (rent);

Transport not related to delivery of building products or daily transport of labour;

Payment for materials not to be built-in;

Payments for general services such as transport on site, cleaning, guarding, etc.

These M-costs may be accounted for under the headings:

Off-site management

On-site management

Plant, tools and machines

Unspecified materials and services

M, total

The M-costs from the main contract and the sub-contracts are presented as "Cost per room for contractors' management and unspecified works",  $\frac{M}{m.n.}$ .

28. Elements on site, S, is the heading for the levelling of the site, roads and gardens, drainage, sewer arrangements within the private plot, piping and wiring from the outer wall of the building to service connection at the border of the private plot, fencing and other similar arrangements not part of the building as such. The following headings may be used.

Roads, gardens<sup>1/</sup> and fences  
Sewer arrangements<sup>2/</sup>  
Piping and wiring<sup>2/</sup>  
Other  
S, total

29. Building elements, B, to be considered for the breakdown of building net costs (after separation of M and S), according to CIB, recommendations should be:

- (1) GROUND ELEMENTS (excavation, foundation and other ground elements).
- (2) PRIMARY ELEMENTS (walls, floors, stairs, roofs and other primary elements).
- (3) SECONDARY ELEMENTS (windows, doors, ceilings and other secondary elements)
- (4) FINISHES (including plastering, and other exterior and interior finishes, floor finishes and painting).
- (5) INSTALLATIONS (sanitation services, heating and ventilation).  
This group does not include fixed furniture such as sinks, toilets etc.
- (6) INSTALLATIONS (electrical and mechanical). Fixed furniture such as electrical stoves are not included.
- (7) FIXTURE ELEMENTS (all kinds).

1/ includes levelling

2/ if not significant this cost may be included in the cost of installations in the building.

# LOW COST HOUSING • COST BREAK DOWN ACCORDING TO CIB<sup>1/</sup> RECOMMENDATION (the SFB System)<sup>2/</sup>

COST PER HOUSE	THE SITE With utility services	THE BUILDING Without service installations	SANITARY Service installations	ELECTRICAL Service installations
SITE PRICE	DESIGN A	DESIGN A	DESIGN A	DESIGN A
ADMINISTRATION COST				
DESIGN PRICE				
WORK PRICE				
OVERHEADS				
GENERALITIES				
BUILDING NET COST				
Specification:				
(1) Site and Foundation	GENERAL B WORKS SPECIFIED: Ground works C	GENERAL B WORKS SPECIFIED: Excavation C Construction E Cast in situ F Masonry G Prefab H Steel works Hh Carpentry Hl Completion K Insulation L Membranes Mh Sheet Metal N Overlaps O Finishing P Plastering Rj Fibre boards Rk Glazing Rl Tiling S Flooring, other T Painting V	GENERAL B WORKS SPECIFIED: Pipe works I Insulation K	GENERAL B WORKS SPECIFIED: Tube works I Wiring J
(2) Building, primary elements				
(3) Building, secondary elements				
(4) Building, finishes				
(5) Installations, sanitary	GENERAL B WORKS SPECIFIED: Installations X OTHER: Misc. materials Y	GENERAL B WORKS SPECIFIED: Installations X OTHER: Misc. materials Y	GENERAL B WORKS SPECIFIED: Installations X OTHER: Misc. materials Y	GENERAL B WORKS SPECIFIED: Installations X OTHER: Misc. materials Y
(6) Installations, electrical				
(7) Installations, fixed furniture				

<sup>1/</sup> International Council for Building Research Studies and Documentation, Consultant status B with the UN

<sup>2/</sup> For details see: CIB Report No.6 Building classification practices (Price Sw. frs 15,- P.O. Box 299 Rotterdam, the Netherlands.)

IV. THE BUILDING-UP OF BACKGROUND INFORMATION FOR COST ESTIMATES

30. (a) Register relevant places and types of buildings;
- (b) list, for each relevant place and type of building:
- (i) product prices (on site), base and index
  - (ii) labour-day prices, base and index
  - (iii) labour productivity indices
  - (iv) overhead percentages for different conditions.
- (c) list relevant building works (for all places) showing:
- (i) products, quantities needed per work unit
  - (ii) labour-days, normally <sup>1/</sup> needed per work unit
  - (iii) cost of plant and tools normally needed per work unit
- (d) list relevant building elements, showing number of units of works needed for each element.

In order to make these lists easily manageable in practice the SfB-system may be applied for arrangements as follows:

List (a) No specific arrangement. Types of buildings fall into three main groups:

Residential Buildings (ev: UDC 728)

Non-residential Buildings (ev: UDC 72)

Other construction works (ev: UDC 62)

List (b) (i) Products SfB C/X

List (b) (ii) Skilled and semi-skilled labour SfB C/X

Unskilled labour -

List (b)(iii) Labour productivity SfB C/X

List (b) (iv) Overheads -

List (c) Building works SfB C/X

List (d) Building elements SfB(10) (89)

Indication of building works used SfB C/X

(e) Compile as needed for a relevant place and a relevant type of building at a relevant time:

(i) list of relevant piece work prices, (c)+(b)

(ii) list of relevant element costs, (a)+(e) (i)

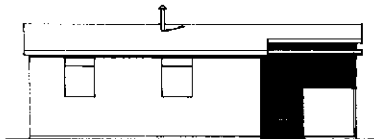
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<sup>1/</sup> labour productivity index = 100.

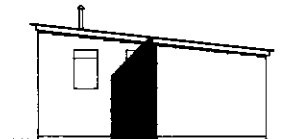
HOUSE BUILDING COST

Project: Kolfe Pilot Housing, Addis Ababa

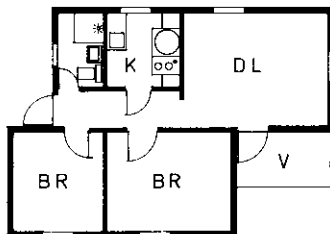
Source: Ethio-Swedish Institute of Building Technology, Ethiopia



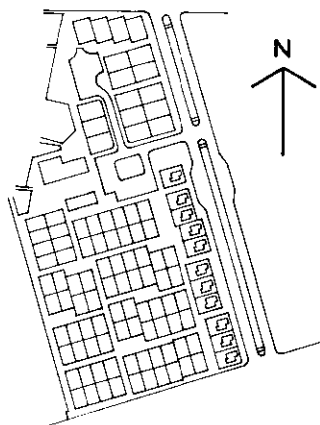
FRONT ELEVATION  
SCALE 1:200



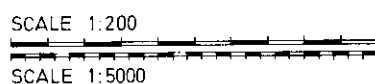
SIDE ELEVATION



FLOOR PLAN TYPE C2  
SCALE 1:200



SITE PLAN  
SCALE 1:5000



SCALE 1:200  
SCALE 1:5000

SUMMARY		
Size:		
n	number of dwellings	11
m	average number of rooms	3
m/n	number of rooms	11
Area:		
	m <sup>2</sup> per room	ratio
Total Land	-	-
Plots	59	6.1
Net floor <sup>1/</sup>	13	1.4
Living area <sup>2/</sup>	9.1	1
Kitchen, toilet, shower etc. <sup>2/</sup>	3.7	0.4
Verandah	1.3	0.1
Facilities:		
100% kitchen, toilet, shower and verandah		
Costs:		
1. Investment, A+L+C		\$ per room
A	Owner's administration	45
L	Design and supervision	unknown
C	Building Construction	670
A+L+C	Investment	715 + L
2. Building construction, C		\$ per room
M	Management and general expenditures	95
S	Site elements (netcost)	-
B	Building elements (netcost)	580
M+S+B	Building construction C	675
3. Building elements, B		\$ per room
(1)	Ground elements	145
(2)	Primary elements	155
(3)	Secondary elements	140
(4)	Finishes	45
(5)	Installations (Sanitation services and ventilation)	5
(6)	Installations (Electrical and Mechanical)	5
(7)	Fixture elements	25
		580
<sup>1/</sup> Area measured to internal surfaces of external walls. <sup>2/</sup> Area measured to internal surfaces of walls and partitions, (living room and bedrooms)		

UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA  
HOUSING, BUILDING AND PLANNING INFORMATION SHEETS

MALAWI 5

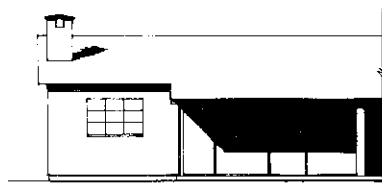
Table: C5

Date: Mar. 1968

HOUSE BUILDING COST

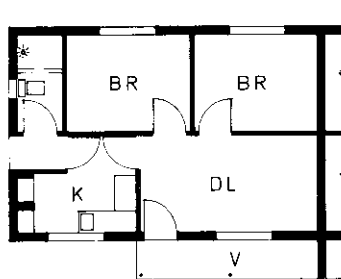
Project: 79 Low Cost Houses, Blantyre

Source: Commissioner for Works and Supplies, Malawi



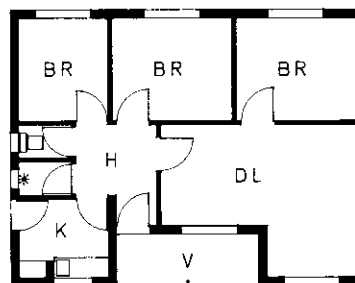
FRONT ELEVATIONS

SCALE 1:200

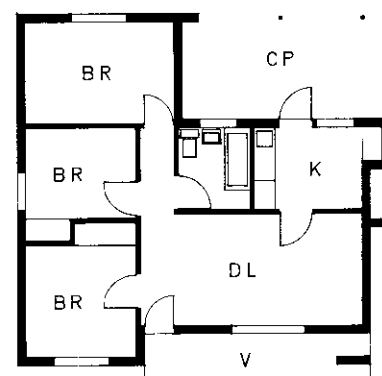


FLOOR PLANS TYPE A

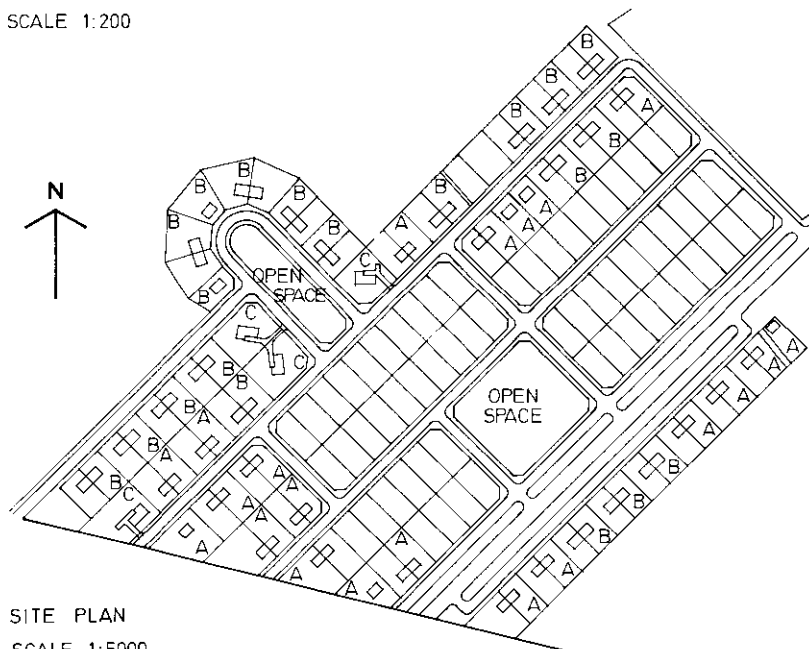
SCALE 1:200



TYPE B



TYPE C



SITE PLAN

SCALE 1:5000

SCALE 1:200

SCALE 1:5000

SUMMARY		
<u>Size:</u>		
n	number of dwellings	79
m	average number of rooms	3.54
m.n	number of rooms	279
<u>Area:</u>		
	m <sup>2</sup> per room	ratio
Total land	284	28.4
Plots	143	14.3
Net floor <sup>1/</sup>	14	1.4
Living area <sup>2/</sup>	10	1
Kitchen, toilet, shower etc. <sup>2/</sup>	4	0.4
Verandah	1.8	0.2
<u>Facilities:</u>		
100% kitchen, toilet, shower and verandah 5.7% bathroom and carport		
<u>Costs:</u>		
1. Investment, A+L+C		\$ per room
A Owner's administration design and supervision		40
L Land and land development		162
C Building Construction		731
A+L+C Investment		933
2. Building construction, C		\$ per room
M Management and general expenditures		156
S Site elements (net cost)		-
B Building elements (net cost)		575
M+S+B Building Construction, C		731
3. Building elements, B		\$ per room
(1) Ground elements		58
(2) Primary elements		266
(3) Secondary elements		99
(4) Finishes		84
(5) Installations (Sanitation services and ventilation)		14
(6) Installations (Electrical and Mechanical)		28
(7) Fixture elements		26
		575
<sup>1/</sup> Area measured to internal surfaces of external walls.		
<sup>2/</sup> Area measured to internal surfaces of walls and partitions, (living room and bedrooms).		