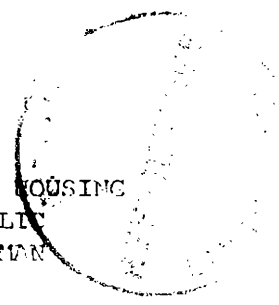


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SEMINAR ON, "THE IMPACT OF SELF-HELP AND HOUSING
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TITLE OF
PAPER: MATERIALS PROCUREMENT AND CONSTRUCTION
MANAGEMENT OF SELF-HELP HOUSING PROJECTS.

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AUTHOR'S NOTE: THE VIEWS EXPRESSED IN THIS PAPER ARE
THOSE OF THE AUTHOR AND NOT NECESSARILY
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MATERIALS PROCUREMENT AND CONSTRUCTION MANAGEMENT OF
SELF-HELP HOUSING PROJECTS

1. This paper is organized in four sections. The first section, the introduction, gives an overview of the subject matter of the paper. The second section deals with materials procurement whilst construction management is covered in the third section. The fourth and last comprises a summary and conclusions.

2. Introduction

Self-help, housing projects have over the past ten years or so become a major feature of the urban housing scene in many developing countries. The emergence of these projects has primarily come about as a result of the realization by many Governments that conventional, contractor built projects cannot effectively address the urban housing problem. Given the limited housing budgets that are available to most developing countries, conventional projects do not permit the optimal use of public-sector resources, in that they benefit only a small proportion of the urban population. In other words, they are not cost-effective. Equally important is the fact that the majority of the urban population is too poor to afford conventional houses.

Self-help housing projects, by definition, minimize resource inputs from the public sector and maximize the use of labour and management inputs from the private sector. At the same time, such projects allow incremental house construction by the plot owner. This is an important characteristic because it makes it possible for the self-help builder to match the pace of construction with the availability of resources.

It is pertinent to point out that only in a few instances do plot owners directly take part in house construction. In Kenya, for instance, a survey ^{1/} of past site and services programmes revealed that plot owners generally resort to the use of private artisans. The underlying reason is that, more often than not, plot owners do not possess the requisite construction skills and, therefore, prefer to engage in their gainful employment. This observation appears to run counter to the popular theory that plot owners will invariably participate directly in house construction. It is probable, however, that the absence of a strong community development support programme in Kenya's site and service projects has inhibited the growth of self-help in the classical sense. It has not been possible to establish the prevalence of "indirect" self-help in other countries.

To be sure, the mode of self-help has implications for materials procurement and construction management. Whilst an attempt has been made to explore such implications, this paper draws more heavily on the "indirect" form of self-help, than on any other.

The paper examines the process involved in the procurement of building materials and the management of construction activity in self-help, housing projects. Attention has been given to the roles of the various actors involved in the process, the problems encountered and potential solutions. As much as possible, reference has been made to experience derived from actual projects.

1/ Housing Research and Development Unit, University of Nairobi. Evaluation of the Site and Services Programme in Kenya, 1979 page 95.

It should be noted that the scope of the paper is limited to urban housing. This caveat, notwithstanding, much of the analysis should apply to modern-sector, rural housing.

In concluding this introduction it may be useful to outline the main distinguishing features of self-help and conventional construction projects in as far as materials procurement and construction management are concerned. These features are outlined below.

	<u>Conventional construction</u>	<u>Self-help Construction</u>
A. <u>Building Materials Procurement</u>	<ul style="list-style-type: none">- Building materials procured through well established institutions.- Orders for delivery usually in bulk and well in advance of placement on site.- Purchases on credit are a normal feature.- Storage costs can be high.- Rigid procurement procedures are normally adhered to.	<ul style="list-style-type: none">- Building materials procured through a mix of institutional and individual arrangements.- Materials normally ordered in small amounts as and when required.- Upfront cash payments normally required.- Storage costs are low.- Flexible procedures devised by the individual from time to time as appropriate
B. <u>Construction Management</u>	<ul style="list-style-type: none">- Formal management practice adopted. For instance clearly laid out Design and contractual procedures.- Bureaucratic- Sophisticated management methods aimed at achieving efficiency employed.- Projects normally implemented in a continuous process.	<ul style="list-style-type: none">- Individual enterprise and informal procedure prevail. Generally no written contracts between plot owner (client) and artisan.- Non-bureaucratic- Basic and informal management methods employed - efficient, nevertheless.- Projects normally implemented in an incremental manner.

3. The procurement of Building Materials

The procurement of building materials in self-help housing projects is a process that is influenced by a number of factors, the most important of which are:

- Institutional arrangements for procurement.
- The type of material.
- Prices of materials.
- Transportation costs.
- Availability of materials in the market.
- Availability of finance.

The above factors will be examined in turn.

3.1 Institutional Arrangements for Procurement

Broadly speaking, a number of procurement methods have been tried by project implementation agencies with varying degrees of success. The main methods are:

- a) The project implementation agency procures materials for onward sale to plot owners.
- b) The project implementation agency supplies materials procurement vouchers to plot owners for purposes of procuring materials from suppliers.
- c) The project implementation agency disburses retroactive cash payments to plot owners, in respect of materials already used in construction.

Before we examine the advantages and disadvantages of the above methods, it should be pointed out that the materials supplied to the plot owner, either in cash or in kind, are normally restricted to essential materials. In other words, the plot owner procures a whole range of additional materials on his own. This limitation on the materials loans is primarily imposed by considerations of affordability and the need to spread available resources among as many beneficiaries as possible.

We shall now examine the procurement methods outlined above in greater detail.

3.1.1 Procurement of Materials by Implementation Agency

Under this arrangement, the implementation agency procures essential materials in bulk for direct or indirect sale to plot owners. Potential drawbacks are the bureaucratic procedures that are characteristic of most public agencies and the fact that a large staff may be required to administer materials purchases, inventory and cost control, accounting etc. One major advantage, however, is that the implementation agency is better placed to purchase materials in remote urban centres or procure key materials e.g. cement, which are occasionally in short supply.

3.1.2 The Materials Voucher Method

Under this method, the implementing agency supplies the plot owner with materials vouchers for purposes of procuring building materials from suppliers. The following extract explains how this method works:

"In order to ensure that the materials loan is actually used for the construction of the house, the loan will be made available to the plot-holder in the form of 5 vouchers. Each voucher will have a different colour and consist of a number of coupons. The amounts of the various vouchers and their colour will be as follows:

1st voucher	- KShs. 500,	colour	White
2nd voucher	- KShs. 900,	colour	red
3rd voucher	- KShs. 1,500	colour	blue
4th voucher	- KShs. 1,500	colour	green
5th voucher	- remaining part of materials loan,	colour	yellow

The 1st voucher will be released as soon as the construction of the house starts. The deposit will be used as a security in case this 1st voucher is not being used in the proper way. Only one voucher will be given at a time. A new voucher is released as soon as the building supervisor has checked and signed that the materials bought with the previous voucher have been used in the right way.

The voucher will have four coupons each of which will carry the voucher number. The value of the coupon will be written on it by the supplier as soon as the plotholder buys materials. The plotholder will sign as soon as he receives the materials and the supplier will sign the coupon as soon as he is paid the value of the coupon by the Council. The remainder of the voucher will always show how much of the total value of the voucher is already spent**

The above procurement method works satisfactorily. Its effectiveness may, however, be limited in remote urban centres where a few or no vendors of building materials exist. Contrariwise, materials suppliers will find it profitable to locate in the vicinity of large projects in major urban centres**.

3.1.3 Retrospective Cash Payments

Yet another method used by implementation agencies is the issuing of retrospective cash payments to plot owners. Such payments are based on the valuation of work already carried out by the plot owner. This ensures that all financial disbursements to the plot owner are reasonably secured. This method has been applied successfully in the Dandora Community Development Project in Nairobi***.

3.1.4 Associated with most self-help projects, is the requirement that plot owners should pay deposits. The rationale behind this is that the payment of deposits demonstrates interest in the plot while at the same time providing security for the initial instalment of materials loans. A problem does, however, often emerge because very poor households may find it difficult to raise the required deposit. This may in turn impede the construction process. Finally, it is pertinent to also point out that in projects where contractor-built, one-roomed 'cores' are not provided, plot owners occasionally find it necessary to procure building materials for the construction of temporary houses.

* National Housing Corporation, Kenya. Site and Service Schemes. Guidelines for an Administrative Procedure. 1976, page 7.

** See for example, Soni P.N., On Self-Help in a Site and Services Project in Kenya. Unpublished masters thesis, MIT, 1980, page 39.

*** This is a site and service project consisting of 6,000 plots and implemented with World Bank assistance.

3.2 Other Factors that Influence the Procurement Process

Earlier on we saw that a number of factors influence the procurement of building materials. The first of these, the institutional arrangement for procurement, was outlined at some length in the preceding paragraphs. This factor is considered to be the most important in that it establishes the administrative framework for procurement. Herebelow, we shall now examine the other factors that influence the procurement process i.e. the type of material, prices, transportation costs, availability of materials and finance. These factors are best examined en bloc since individually they do not decisively affect the procurement process. It is their interplay that does so.

The range of building materials used in construction is wide. Some of these can be fashioned out of raw materials available in the vicinity of the construction site e.g. bricks or quarry stone whilst others must be procured from vendors e.g. sanitary ware, corrugated iron sheets, cement etc. At the same time, some materials are substitutes e.g. concrete blocks and quarry stone. Associated with each type of material are the variables of price, transportation costs, and supply.

It is after considering the effects of these factors in their totality and the availability of funds, that the self-help builder decides on what materials to buy, how much and where from. The stage of construction and the building standards set by the implementing agency are other factors that also come into play. For instance, the use of a readily available material e.g. mud bricks may be proscribed by the implementing agency.

4. Construction Management

4.1 Our interest here is to examine construction management as it relates to self-help housing projects. The first point to note is that since construction management is a relatively new discipline there is a dearth of source material*. This is in fact much more so for self-help housing projects than for conventional projects.

This subject will be approached in the following manner. Firstly, we shall start by defining construction management in relation to conventional projects and thereby modify this definition to suit the circumstances prevailing in self-help projects. In doing this, we shall have recourse to the characteristic features of the two types of construction that were outlined in the introduction. Secondly, we shall draw heavily on experience drawn from the implementation of self-help projects in Kenya with the hope of outlining general principles of wider application.

4.2 According to the International Labour Organization, "the definitions of construction management (and project management) are many and confusing, partly as a result of differences in national practices"**. The ILO continues,

"..... construction management will be taken to cover responsibility for the complete construction process from the initial decision to build to setting up and implementing maintenance procedures. construction management will be taken to embrace two categories of management:- (a) project management, i.e. management with responsibility for the site and the project in all its aspects) and (b) site management, i.e. management with responsibility for the site but not for all aspects of the project.

* ILO, Management Training for the Construction Industry in Developing Countries, Geneva, 1963, page 2.

** ILO, op. cit., page 3.

A definition of project management put forward by a working party on project management in building is the over-all planning, control and co-ordination of a project from inception to completion aimed at meeting a client's requirements and ensuring completion on time, within cost and to required quality standards**.

Whilst construction management of conventional projects is the province of formally constituted organizations i.e. client groups, design teams, contractors etc. it assumes a fundamentally different complexion in self-help projects as was noted in the introduction. In the latter projects, the plot owner, either individually or as a member of a group assumes the responsibility for overseeing the construction process.

Seni identifies the problems that face the self-help builder as the following:

"Soon after realising the role required of the allottee in constructing his own dwelling, he faces a new set of situations identifying resources to construct the dwelling, the construction process, general costs and conformity with the standards set by the DCDD***.

He goes on further to identify two forms of self-help. These are:

- a) the allottee - built form of self-help.
- b) the subcontract form of self-help.

In both forms, the plot owner may directly participate in construction either singly or as part of a building group. As was observed in the introduction, the subcontract form of self-help is the most commonly adopted construction method. The main features of construction management that were outlined in the introduction will now be examined in greater detail.

Flexibility

The construction management procedures followed in self-help projects are highly flexible. The plot-owner makes decisions on a day to day basis. These decisions mainly concern the purchase of building materials, making payments to artisans and overall management of the construction process. A schedule illustrating a diary of events relating to construction by a self-help builder is given at Annex 1. This diary provides a picture of the day to day decisions that the self-help builder makes and the accompanying activities.

Informality

Virtually without exception, informal construction management procedures would appear to predominate in self-help projects. There are generally no written contracts between plot owners and artisans, a factor that quite often works to the detriment of plot owners. Implementation agencies could, therefore, facilitate the self-help construction process by making available simple forms of contract for use by the plot owner and the artisan.

Non-continuity

Construction in self-help projects is quite often non-continuous, closely matching the irregular pattern of household income. One concomitant of this is that the plot owner inevitably engages different artisans at each construction stage. It is usual, as a result, for problems to arise anew at the commencement of each subsequent construction stage. One major advantage of this 'stop - go' approach is that it allows the plot owner to marshal adequate resources before embarking on the next construction stage.

* ILO, op. cit., page 8.

** Seni, D.N. op. cit. page 147. DCDD stands for Danjora Community Development project.

5. Summary

5.1 Self-help housing projects are a common feature in most urban centres of the developing world. They are looked upon as a cost-effective method of providing housing, particularly that for the urban poor. The procurement of materials and the construction management of these projects are processes that have unique features; these features are fundamentally different from those to be found in conventional housing projects. In the main, self-help housing are characterised by informal and flexible procurement and management methods, with the self-help builder playing a key management role, but infrequently taking part in construction. In order to tap the full potential of these projects, implementation agencies need to focus greater attention on the basic problems that are encountered by the self-help builder.

5.2 Conclusions

5.2.1 In view of the scarcity of resources in developing countries, self-help housing projects more effectively address the housing problem than do conventional projects.

5.2.2 More often than not, plot owners employ artisans to construct their houses largely because they do not possess construction skills and probably also due to the absence of effective community development support programmes.

5.2.3 The procurement of building materials is mainly influenced by the prevailing institutional arrangements for procurement as well as the type of building material, its availability, price, transportation cost, and finance.

5.2.4 Normally, implementation agencies only finance the procurement of essential materials, leaving the plot owner to purchase others from his own resources.

5.2.5 Plot-owners usually construct their houses in stages; they therefore enjoy the advantages that such an approach offers, given the irregularity of household income.

5.2.6 Construction management in self-help projects is informal and flexible. Almost without exception no formal contracts exist between plot-owners and artisans.

An Example of Various Costs for Building Materials, Equipment,
transportation and Labour in a Permanent Dwelling

<u>Date</u>	<u>Materials, Equipment Transportation and Labour</u>	<u>Cost (KSh.)</u>
1/4/77	Wheel barrow	210
1/4/77	Two spades	50
1/4/77	50ft. water hose pipe	100
6/4/77	Sand, two lorries of stones each (including transportation cost)	600
6/4/77	Foundation stone, (9" X 9"), 1 lorry	350
7/4/77	Ballast 1 lorry (including transportation cost)	210
9/4/77	Cement 15 bags, (including transportation cost)	402
9/4/77	Digging foundation trenches	150
9/4/77	Site measuring pegs: wooden	35
11/4/77	Hardcore, 3 lorries (including transportation cost)	220
11/4/77	1 bundle steel straps	20
12/4/77	3 lorries of blocks, 9" X 6", 750 blocks, (including transportation cost)	1,685
13/4/77	Hardcore, 1 lorry (including transportation cost)	120
13/4/77	Foundation stone, 1 lorry, 9" X 9", (including transportation cost)	350
15/4/77	Expenses on transport to get some materials which were not available	50
16/4/77	Cement, 10 bags	293
19/4/77	Paid "fundu" and helper	45
20/4/77	Paid Mr. Munene, another fundu	200
20/4/77	5 bags of cement (including transportation cost)	140
20/4/77	2 three-eighth inch steel rod	70
20/4/77	Expenses for food and bus	10
21/4/77	Paid "fundu"	200
21/4/77	10 bags of cement (including transportation cost)	280
21/4/77	Personal expenses	15
23/4/77	Iron sheets, gauge 26, 26 sheets (including transportation cost)	1,604
23/4/77	Roofing nails, 2 Kc	10
23/4/77	Personal expenses	15
23/4/77	Paid "fundu"	300
25/4/77	Fitted 5 door frames @ 50/- each	250
25/4/77	Nails, 2 Kc	10
25/4/77	Plumbing in the kitchen, paid for labour	10
25/4/77	Personal expenses	10
26/4/77	2 iron sheets, gauge 28	58
26/4/77	Fascia boards, 70 ft run	77
26/4/77	Personal expenses	10
27/4/77	5 T&G Doors (including transportation cost)	500
27/7/77	5 bags cement (including transportation cost)	140
27/4/77	Personal expenses	10
28/4/77	Window frames (including transportation cost)	500
28/4/77	Paint	40
28/4/77	Paid "Fundu"	305

Date	Materials, equipment, transportation and labour	Cost (KSh.)
28/4/77	Personal expenses	10
29/4/77	5 bags of cement (including transportation cost)	140
29/4/77	Red Oxide, 5 kg	36
29/4/77	Paid "fundi"	60
30/4/77	Personal expenses	10
30/4/77	5 mortice locks, each @ 35/ -	125
30/4/77	Window locks	66
30/4/77	Personal expenses	10
3/5/77	Paid "fundi"	200
3/5/77	Nails, 2 kg	10
3/5/77	5 bags cement (including transportation cost)	140
4/5/77	Paid "fundi"	60
4/5/77	Cigarettes for the helpers	5
4/5/77	2 iron bolts	15
4/5/77	Redox	30
4/5/77	Personal expenses	7
6/5/77	1 lorry sand, 7 tons	350
7/5/77	Paid "fundi"	300
10/5/77	5 bags of cement	140
12/5/77	11 ft of fascia board	17
13/5/77	Paid "fundi"	100
14/5/77	Ventilation block	5
14/5/77	Assigned a mason and a helper	40
17/5/77	Kitchen plastering	56
17/5/77	2 bags cement	56
19/5/77	Red Oxide	27
22/5/77	Paid "fundi"	20
22/5/77	Kitchen water fittings	330
22/5/77	Paid for carrying unwanted soil	50
23/5/77	Yellow oxide for spraying	100
25/5/77	Spraying charges	55
26/5/77	Glasses for window fittings	110
26/5/77	Labour for fitting window glasses	40
30/5/77	Outside pavement preparation	30
30/5/77	Completing store	30
30/5/77	Completing pavement	60
31/5/77	Paint	300
31/5/77	Labour for painting	100
2/6/77	Construction of the chimney, labour and material	250

Note:

- (a) Building material and labour costs during April and May 1977.
 (b) Prices for two rooms and a kitchen/store.

Source: Soni, P.N. op. cit., pages 98 and 99 as extracted from the diary of a self-help builder.

Additional notes

1. "Fundi" is the swahili word for 'artisan'.
2. T & G is short for 'tongue and grooved'.
3. KSh. 1.00 in 1983 = US\$ 0.08 (The exchange rate in 1977 was, however, approximately KSh. 1.00 = U.S.\$.13).