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TRAINING PROGRAMS FOR LOW-COST HOUSING

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Other documents available from the Experimental Low Cost Construction Unit include:

Publication #1: Energy Efficient Technologies and Methodologies for Low Income Rural Housing, 1978.

Publication #2: Training Program in Low Cost Energy Efficient Technology, 1979.

Publication #3: Construction Training Program for the Kurtunwaare Pilot Housing Project, Kurtunwaare, Somalia, 1981.

Publication #4: Construction Training Manual for the Pilot Housing Project, Kurtunwaare, Somalia, 1981.

Publication #5: Investigation of Alternative Roofing Systems Available for Use in the Kurtunwaare Pilot Housing Project, 1981.

Publication #6: Design of Alternative Housing Units for the Kurtunwaare Pilot Housing Project, 1981.

## ABSTRACT

Site and Services housing projects in less developed countries rely on a substantial input of self-help labor to realize the project goals. It is reasoned that linkage of well designed training programs can increase the value of self-help labor investment. An example of a training program executed in the Kurtunwaare Settlement of Somalia, East Africa is given.

### Introduction

With the general acceptance of site and services projects as the most sensible strategy for the delivery of an adequate supply of low-cost shelter comes the attendant faith that the project beneficiaries will construct adequate housing on the site. As experience in squatter settlements has proven, there is no limit to the resourcefulness of individuals when challenged with the task of providing shelter. However, if the site and services projects are to evolve into stable communities, the temporary constructions of the squatter settlement must at some point give way to more substantial and permanent housing.

The resources invested in shelter represent a substantial percentage of a poor family's income, and as much value as possible should be derived from this investment. One vehicle which assists in the creation of maximum value is the linkage of well designed and managed training programs to site and services projects. As a well laid block costs as much as one poorly placed, it follows that a new owner can derive more value if he or those building for him employ quality construction practices from the onset. This is particularly important in the initial stages of home building as the first construction often serves as a core to later additions.

Training programs can serve community purposes, providing a vehicle for establishment of social cohesiveness and enforcement of building standards. Additionally, some individuals once trained become skilled craftsmen capable of employment, enhancing the multiplier linkages of housing investment to other sectors of the economy.

The aspects of training programs considered here are only those at the project level and are directly related to the activities of the owner in the process of constructing shelter. Many other levels of training are integral to the success of a site and services project, including ones which build or strengthen the governmental or business institutions responsible for planning and implementing housing policy. As site and services is a relatively new strategy quite different from traditional housing programs, the sympathy of senior-level policy makers as well as competence at all levels of management is a prerequisite for success.

### Site and Services

The worldwide demand for housing is staggering, vastly beyond the supply capability of traditional housing industries. The consequence of unmet demand is the growth of squatter settlements in and around rapidly growing cities of the developing countries. With an elastic supply of migrants from rural areas adding to the natural growth of the urban population, the shortage of shelter can only grow worse, a virtual social time bomb. The unofficial, uncontrolled squatter settlements house people whose incomes will never allow them without subsidy to afford housing of traditional governmental standards. The housing policy problem faced, therefore, is a choice between housing a few in units of high standard or to provide basic shelter to many by an acceptance of lower standards and expectations. In this sense, shelter means something other than a roof overhead. Adequate shelter consists of access to a range of services-- clean water, sanitation, power, community services, privacy, etc.--which result in a healthy environment.<sup>1</sup>

Studies indicate that shelter so defined is accessible to all but the poorest of the poor if it is realistically delivered in replicable programs which recover costs from the project beneficiaries.<sup>1</sup> The site and services strategy provides land, public utilities and community facilities to low-income families. The size of land and level of service is designed to be affordable to the family generally without subsidy, with the actual construction of a house the responsibility of the owner. A vital aspect of site and services is the security of tenure to the land providing a real incentive for investment by the family.

There is a spectrum of types of site and services projects which imply differing responsibilities to the recipient<sup>2</sup>:

- Upgrading of existing squatter settlements
- Basic site and services
- Site and services with sanitary core
- Site and services and supports
- Site and services with sanitary core and minimal living area
- Site and services with fully developed dwelling

Recent studies indicate that poorer families need a more completed unit than do those with relatively more income.<sup>3</sup> This is somewhat counter-intuitive, but results from the difficulties of the poorest to commit resources to complete their housing. Families with more money and skills are better able to organize and execute a self building project without as much help.

### Housing Delivery Systems

Most site and services projects are predicated on a concept of owner-building or self-help. The self-help concept is the key to reduction of initial cost and therefore affordability. In the final accounting, self-help can save in the order of 30% of the cost of the finished house; more importantly, it allows a family to commit resources as it can afford to do so.<sup>4</sup> Once the sponsoring agency is finished with the installation of basic services, infrastructure and initial construction, the family is on its own to provide or complete the housing unit. In site and services projects, varying degrees of assistance are available to the owner, such as material and labor loans. These loans are in addition to the mortgage or fee which amortizes the site and services investment. It is at this stage where the investment of the owner-builder is his own responsibility that the well-conceived training and technical advice programs are most important and valuable. It is true that an owner can erect shelter of some sort, but it is also true that serious mistakes and waste are likely to occur if he is not skilled with the materials at hand. Training is crucial to deriving the maximum value from the owner-builder's investment of money and time.

There exists a range of methods by which an owner-builder can realize the goal of house construction:

- Self-help: Investment of sweat equity and the individual's personal resources.
- Aided self-help: Self-help with assistance in the form of skill training or financial assistance for the purchase of materials.
- Mutual help: Cooperative construction in concert with neighbors to construct each other's houses. Mutual help can also be used to build community buildings or basic infrastructure.
- Self-contracted paid labor: As discussed later, it is sometimes in the interest of the builder to hire some labor, particularly for critical tasks.
- Contracting to a small builder: If the resources are available, small contracting firms may be hired to build the unit or sections thereof.

## The Delivery of Training Services

The cost of training services should be included as a part of the basic site and services investment amortized by the owner's mortgage payment, and it is therefore important to him that the delivery be by a cost-effective method. As each project is unique with different potentials and problems, no single training method is universally correct.

Perhaps the most straightforward vehicle for training is the employment of construction advisors whose responsibility it is to provide direct assistance to the owner-builder. The ideal ratio of advisors to builders is 1:50; however, programs have been successfully operated at ratios of 1:150 or higher.<sup>3,4</sup> The construction advisor is usually employed by the implementing agency and, therefore, can assume authority for enforcement of standards, thus being considered a building inspector.

The construction advisor's role is essentially people-to-people, and, as such, it is sensible that he be a member of the community or at least fluent in the language. Given the number of advisors required and the essential closeness to the community, it is not reasonable to use expatriate advisors in this position, either contract or volunteer. Most communities have individuals with existing skills which may be enhanced by experts to meet the required level.

In addition to the personal service of the construction advisor, training may take place in large groups and with more formal methods. Community organizations that are formed for the general development of social cohesiveness may be used and in fact strengthened to disseminate information about construction. The facilities for community activities themselves provide an ideal vehicle for the group training of basic construction skills.

Community groups can form cooperatives which can provide means for collective purchase of tools and materials in addition to access to training services. Training materials and methods such as comic books, films, demonstration structures and popular theater all lend themselves to organized community activities.

In many projects, not all the work is done by the owner-builders themselves. The decision to spend time building or working is one of value. If an individual can earn more extending his present employment than he could derive value from self-help construction, it makes sense for him to do so.<sup>1</sup> A craftsman can potentially do work more quickly and with greater skill than the amateur owner-builder. This phenomenon is obviously not applicable to those who are unemployed or marginally employed. However, in developing countries where the umbrella of

social welfare is relatively small, very few people are truly unemployed.

Local craftsmen or contractors, many of whom have been trained by the project, may find employment opportunities working for their neighbors. This can be viewed as self-help in the community sense. Project organization can encourage this activity by providing advanced training to increase the skill levels of those interested and generally assisting the small community contractor as well as by providing loans for labor in addition to materials. Training at this level can be very organized and intensive. Apprenticeship or formal skill training programs are appropriate for this type of training. As the community grows and becomes more economically active, it is logical that greater specialization of work will occur. These groups are the insurance for the long-range preservation of high quality construction practices.

Separate from, but related to, the on-site construction is the small-scale manufacture of construction materials within the community. These activities are many times informal and suffer from a poor quality product. There is a great deal to be gained from providing technical assistance and training to small-scale material manufacturers to increase the quality of the products and the efficiency of their operations.

#### The Benefits of Training

The training of self-help or unexperienced labor in site and services projects has a number of benefits, some of which are not intuitively obvious. Perhaps the most important benefit is to the owner of the house and is related to the increased value of the unit achieved by using good construction practices. Simple techniques such as inclusion of a damp course, avoiding retempering of mortar, avoiding movement of blocks once set, proper pointing of mortar joints, and using proper mixtures can mean the difference between permanent housing and a crumbling shack. The use of standard details which prevent leaks also adds value without additional cost. The concept of life cycle costing may seem inappropriate to a very simple housing unit; however, it should be considered that the owner is not likely to be drastically richer five or ten years in the future. If his house needs constant maintenance or replacement in the near future, he has in effect wasted money.

As was mentioned previously, the operation of a training program can be used to promote or enforce building standards. It should be noted here that standards are one of the fundamental issues governing the success of a site and services project. Unrealistically high and unaffordable standards strangle the dynamic potential of a project and

retard the eventual development of the community. Affordable standards can, however, prevent unsound and unsafe practices that could endanger the owner or his neighbors. At the enforcement level, sensitive judgement must be used by the advisor or inspector to be sure enforcement is sensible and not legalistic. This implies that the advisor or inspector himself be well trained and sympathetic to the overall goals of the project.

Owner-builders who are trained in proper practices are in a better position to maintain their houses when it is required. An individual who is moved into a completed unit and is without skills is very likely to allow more significant deterioration to occur before maintenance is performed and is less capable of making long-lasting repairs. Without maintenance any house, regardless of original quality and price, will become a slum.

Training programs create employment. In a World Bank funded project in El Salvador, only thirty-six per cent of the money spent each month for housing was for the mortgage payment. Thirty-one per cent went for materials purchases and twenty-five per cent for hired labor.<sup>3</sup> This means that industries and enterprising individuals who are otherwise unemployed or underemployed have a ready market for their labor if they have the skills. The key to affordability of housing is not only reducing standards, but also increasing income. If the employment and income generated by the project stays within the project, the benefit of housing investment is multiplied. This is also true with the production of building materials.

Another benefit related to employment is the opportunity of trained craftsmen to find employment for very high wages outside the country. This phenomenon is very apparent in the Middle East where the draw of high-paying jobs in the oil-exporting countries is irresistible. Although there is some disadvantage in that the people who were trained to work on the project are no longer available, it is often the case that much of the money earned is sent to the family back home or brought back with the worker's return.

The construction of houses is linked to the economy of a country in ways other than employment. Construction of a house represents a product and can be considered as contributing to the GNP. The value of self-help labor used to construct a house may be shadow-priced and a value set to it. The value of skilled labor is greater than the value of unskilled labor, and this greater value is realized in the greater quality and longer lifespan of the well-crafted house. The owner can realize this value when the house is sold; the country can consider it a part of its asset base.

Poor people often possess a deep-seated distrust for government or institutions of any kind. Regardless of motivation, training programs offer a positive vehicle for easing relations between government authority and the recipient. This can be particularly effective if the person responsible for training is also responsible for or at least aware of other community issues. As a generalist community worker, this individual can be the unbureaucratic link between the people and their government, easing some of the frustration and fears caused by poor communication and compartmentalized authority.<sup>4</sup>

Training programs allow an opportunity for community leaders to develop themselves and be identified. People who show interest and aptitude can be further trained to contribute to the government or management of the community. It makes sense to recruit project staff from the ranks of promising trainees.

Finally, training programs can be a rallying point for overall community cohesiveness, for establishing early on a reason for people to communicate and cooperate. As opposed to the collection of rent or the enforcement of rules or laws, the process of community education is an activity which is universally seen as necessary and positive. In the early stages of a site and services project when the construction of a shelter is a high priority to everyone, training is an activity which can bring people together.

#### Training Program for the Pilot Housing Project Kurtunwaare, Somalia

In December, 1980, the Experimental Low Cost Construction Unit of the School of Architecture at Florida A&M University completed a training program in the Kurtunwaare Settlement in the East African country of Somalia. The training program was in support of a housing program in the village coordinated by Louis Berger International of East Orange, New Jersey under contract to the Settlement Development Agency of the government of Somalia and funded by the United States Agency for International Development (USAID). Portions of the following description are excerpted from the final report of the project written by the author with David Hollister.

This project is perhaps unique in that the recipients were nomads resettled into a completely new lifestyle; the construction of permanent housing was alien to them. In this project, it was decided to foster a building industry rather than to rely on self-help construction.

## Background

Somalia was one of the many African nations affected by the 1973-75 drought. In response to the thousands of refugee nomads produced by the drought, the Somali government set up twenty-one temporary relief camps in the drought-stricken areas. In an effort to provide the nomads an opportunity to rebuild their lives, the government's Settlement Development Agency (SDA) set up six permanent villages that were to be economically based in agriculture or fishing. One of those villages, Kurtunwaare, located on the Shebelli River, was established as an agricultural community.

## Kurtunwaare

The village of Kurtunwaare was founded in 1975 with 4000 formerly nomadic families. The primary crops produced by the village are rice and corn, grown in irrigated and rainfed fields surrounding the settlement. In exchange for labor in the fields or village, settlers are provided with a food ration, clothing, education, health care, 2 shillings (13¢) a day, and housing.

Most of the village development effort, until recently, has been aimed at its economic base, farming and its support. There was little opportunity to upgrade the temporary housing and infrastructure, which had been quickly set up when the village was established. The housing consisted of mud and wattle agals or munduuls with open pit type latrines. The agal and munduul are traditional Somali housing types. The agal is a dome-shaped structure constructed of bent sticks covered by animal skins, thatch or cloth. It is used by nomads and is portable. The munduul is a round structure with a conical thatched roof. It is constructed from wattle and sometimes covered with mud and animal dung daub. The munduul is the traditional housing type for villages in the inter-riverine region in the south of Somalia. The poor sanitation combined with inadequate water supply and site drainage made the shelter condition of the village inadequate.

## Project Description

Because of these problems, the SDA aided by the local USAID mission developed a prototypical house unit and a site plan that calls for 4000 new houses with appropriate site infrastructure including a water standpipe and cistern for every 25 houses, a composting toilet for each house, and adequate site drainage. The first phase of the project was the construction of a portion of the complete project (400 houses). The houses were constructed using concrete grade beam foundations, masonry walls of hand-made cinva-ram brick and cement mortar, conventional wood frame roof structures, and coconut palm leaf thatched roof membranes improved with tar paper.

## Training Program

The primary purpose of the training program was the establishment of a work force whose skills would enable them to construct the Kurtunwaare housing project. Trainees for the program were to be drawn from local settlers assigned to the project by the Kurtunwaare District Authorities. The program was organized and initiated by the Florida A&M University Technical Assistance Team, and gradually, day-to-day management of the program was turned over to a staff of Somalis who, as trained counterparts, became capable of operating the program. New recruits consisting of Kurtunwaare settlers were assimilated into the project and assigned to appropriate skill training positions. The trainees were initially accepted into the program if they met minimum criteria based on age, health, motivation and residence. A file card system was developed to keep track of a settler's progress in the program and was to be used later by the district in identifying who was trained, where he/she lived, and what his/her skills were. Each trainee was evaluated each week, and this evaluation was noted on his/her card. The evaluation criteria were based on the development of the trainees' physical and mental ability as well as motivation. A policy was developed to handle disciplinary problems such as absenteeism, and a system of incentives was developed in an attempt to positively influence the attitude of the settlers toward their work.

The basic concept of the training method relied on providing the trainee with highly supervised on-the-job construction experience. To do this, trainees worked on houses identical to those being built by the production crews. The training included all the tasks required to construct the houses from the initial foundation layout to application of the final finishes. To facilitate this method of training, the program had its own construction site, equipment, and facilities. These were separate from those of the production crew. This separation minimized the need for coordination of materials supply, equipment use, or construction sequence phasing that might have otherwise caused conflicts in interfacing the very different needs of the training and production components of the project.

The training curriculum was divided into three parts: unskilled labor experience, crafts training and leadership training. Once recruits were accepted into the training program, they were given a thorough description and tour of the project, with all aspects of the project covered in as much detail as possible. Trainees were then assigned to crews in which they indicated an interest. Once they were assigned to

a crew, it was explained that they would eventually be promoted to the training program which was to occur after they had worked for six to eight weeks on the unskilled labor crews.

The purpose of the unskilled labor experience was to provide an introduction to the project and construction process. When the recruits completed their time with the crews, they were familiar with the daily routine and what was to be expected of them in terms of conduct and work productivity. They came to understand some basic construction skills related to the area in which they had been working.

The intent of the crafts training components (Foundations, Masonry and Carpentry) was to instruct and train the settlers in one of the training areas until they were sufficiently skilled to begin working as apprentice craftsmen integrated into the production crews. The training program was designed to give the trainee the minimum skill level required to allow a contribution to the production crews. It was expected that additional skills and proficiency would be developed on the job.

Instruction was given by way of simple demonstrations and extensive practice. Each group of new trainees was first given demonstrations of the most basic tasks required by his/her trade. This was followed by a presentation of the tools they would be using, including instruction in their proper care and use. Trainees were then assigned tasks for practicing the skills demonstrated to them, marking the beginning of their on-the-job, hands-on-training. The exact nature of the task assigned depended on the stage of construction of a given house on the school site at that time. No practice or demonstration structures were employed. Each house on the training site was eventually to be part of the village. It was felt that it would be a waste of materials and effort to use demonstration structures that, serving no purpose, would be torn down. Additionally, construction of the actual houses provided a tangible product clearly illustrating to the trainees the potential fruits of their labor and giving them a sense of pride.

This approach to teaching does, however, have its drawbacks. It requires very close supervision on the part of the instructors. Without this attention, an accumulation of small errors can lead to major defects in the completed house. It was crucial that mistakes be identified quickly and brought to the attention of all the trainees before they became too critical or permanent. Once a mistake was identified, a presentation was made explaining why the problem occurred, what should have been done to avoid it, the likely consequences had it gone unnoticed, and the proper method for correcting it. This method of instruction created excellent training situations which likely would not have been possible if the entire house had not been constructed by the trainees.

No sequential teaching outline was designed for the training. Instead, demonstrations were based on problems as they arose in the process of construction. The overall training goals and basic lessons were integrated into the content of the demonstrations. In the beginning, with an inexperienced crew of trainees, little if any emphasis was placed on the rate of production. Quality work, done correctly, was the goal. As the trainees became more familiar with the skills and level of quality that would be demanded of them, they were encouraged to improve their speed.

The last component of the training program set up by the Florida A&M Team was the leadership training component. At the time of the team's departure, the program had been initiated and had several candidates undergoing leadership training. The leadership training component consisted of providing a leadership candidate with work experience as a leader of a crew in the training program. The positions used for this were assistant instructor and labor foreman. The leadership trainees were assigned a crew of trainees and a specific house or complex set of tasks on which to work. The crew was modeled after the production crews and consisted of four to six crafts trainees.

It was the task of the leadership trainees to receive assignments, break them down into their components, assign sub-tasks and then see that they were properly carried out by the crew. This was done under the supervision of the School Superintendent and the appropriate instructor. Additionally, the leadership trainees were required to take part in all school staff activities and meetings, thereby creating the opportunity to observe and take part in the group decision-making process. Leadership training was intended to hone the technical skills of the individual and also to instill in him the qualities of leadership and the willingness to accept responsibility for his work and the work of those under his supervision.

#### Counterpart Staff Training

One of the most important tasks of the Florida A&M Team was the training of the counterpart Somali school staff. The staff was finally made up of ten personnel, including the School Superintendent, Instructors of Foundations, Masonry, Carpentry, a general Labor Foreman, and five Assistant Instructors. These personnel were critical to the success of the training program because it was they who would ensure the continuation of the program. Their training consisted of basic teaching skills, construction skills, leadership, personnel management, organization, planning and scheduling, and equipment operation and maintenance.

In the beginning of the training program, the actual teaching was carried out by the Florida A&M Team assisted by the School Superintendent and the Instructors of Foundations, Masonry and Carpentry. It was at this time that the school staff was

was taught the basics of construction and teaching skills. Although each candidate for the school staff positions did have some construction skills, in most cases rather lengthy re-training was required to familiarize the trainees with proper methods and procedures. The staff members were taught basic teaching skills aimed at the presentation and demonstration of construction skills in a clear, logical sequence. Careful observation of the trainees' work was encouraged in order to prevent and correct mistakes through additional instruction.

Since the Florida A&M team was being assisted by the Somali staff in the daily operation of the training program, most of their training consisted of informal discussions based on problems and instructional opportunities as they arose. This approach was beneficial in that the problems were real and applied specifically to the development of the training program.

### Conclusion

The training program in Kurtunwaare was initiated in June, 1980 and turned over to the counterpart staff with the departure of the expatriates in December, 1980. This project is an example that, through training, people can provide for themselves. People are the key to any project or endeavor. Money and materials are certainly catalysts for change, but without the motivation and know-how of individuals, the physical resources are best left in the ground. The best standards are personal standards; the best laws are beliefs. Learning to do for oneself is the first step on the road to true freedom.

## References

- 1) A. Churchill, M. Lycette, "Basic Needs in Shelter", (Draft), Urban Projects Department, World Bank, Washington, D.C. (April 1979).
- 2) P. Patel, "Site and Services Projects--Survey and Analysis of Urbanization", (Draft), Transportation and Urban Projects Divisional Report, World Bank, Washington, D.C. (August 1974).
- 3) M. Bamberger, U. Sae-Han, E. Gonzalez-Polio, "Evaluation of the First El Salvador Site and Services Project", (Draft), Development Economics Department, Urban and Regional Economics Division, World Bank, Washington, D.C., (November 1980).
- 4) Shankland Cox Partnership, "Third World Urban Housing", Building Research Establishment, Garston, Watford, England (1977).