

**CONSTRUCTION TRAINING PROGRAM FOR  
THE KURTUNWAARE PILOT HOUSING PROJECT  
KURTUNWAARE, SOMALIA  
APRIL 1981**

**EXPERIMENTAL LOW-COST CONSTRUCTION UNIT**

FLORIDA A&M UNIVERSITY  
P.O. BOX 597, TALLAHASSEE, FL 32307

SCHOOL OF  
ARCHITECTURE

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 Instructor of Masonry - - - - - Millard M. Wright  
 Instructor of Carpentry - - - - - David Tod Hollister  
 Administrative Coordinator - - - - - Lawrence E. Birch

FUNDING AGENCIES:

USAID, East African Mission  
 Washington, DC, USA

Government of Somalia  
 Mogadishu, Somalia, East Africa

SUB-CONTRACTOR

Florida A&M University, School of Architecture  
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Work performed in support of the Low Cost Housing Project for  
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# CONSTRUCTION TRAINING PROGRAM FOR THE KURTUNWAARE PILOT/HOUSING PROJECT

## CONTENTS:

EXECUTIVE SUMMARY - - - - -	1
EXPERIMENTAL LOW COST CONSTRUCTION UNIT - - - - -	6
FLORIDA A&M UNIVERSITY TECHNICAL ASSISTANCE TEAM - - - - -	8
INTRODUCTION - - - - -	10
Project Background - - - - -	10
Project Description - - - - -	13
TRAINING PROGRAM - GENERAL DESCRIPTION - - - - -	18
Summary - - - - -	18
Training Program Goals - - - - -	19
Detailed Description of Training Components - - - - -	21
Unskilled Labor Experience - - - - -	21
Crafts Training Components - General - - - - -	22
Foundations - - - - -	25
Masonry - - - - -	28
Carpentry - - - - -	30
Leadership - - - - -	32
School Staff Training - - - - -	34
STAFF ORGANIZATION - - - - -	36
Summary - - - - -	36
Florida A&M University Technical Assistance Team - - - - -	36
Team Responsibilities - - - - -	36
Additional Services - - - - -	38
Somali Staff - - - - -	40
TRAINEES - - - - -	47
Summary - - - - -	47
Organization of Trainee/Craftsman Selection System - - - - -	47

Selection and Recruitment - - - - -	50
Documentation - - - - -	51
Evaluation Process - - - - -	51
Absenteeism - - - - -	53
Incentives - - - - -	54
Trainee Data - - - - -	55
SCHEDULES - - - - -	58
Summary - - - - -	58
Typical Daily Schedule - - - - -	58
Typical Weekly Schedule - - - - -	59
Typical Training Cycle - - - - -	60
Schedule Of Events As They Occurred From July To December - -	61
FACILITIES, EQUIPMENT, TOOLS, AND MATERIALS - - - - -	62
EVALUATION AND RECOMMENDATIONS - - - - -	65
School Staff - - - - -	65
Program Curriculum - - - - -	65
Trainees - - - - -	69

**EXECUTIVE SUMMARY**

PROJECT SUMMARY  
continued

Kurtunwaare - The village of Kurtunwaare was founded in 1975 with 4000 nomad families. The primary crops produced by the village are rice and corn. 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 the village's economic base, farming and its infrastructure. There was little opportunity to upgrade the temporary housing and infrastructure, which were all quickly set up when the village was established. The housing built consisted of mud and wattle agals or munduuls with open pit type latrines and with little attention paid to site drainage.

Project Description - Because of these problems, the SDA aided by the local USAID mission developed a prototype house unit and developed a site plan that calls for 4000 new houses with appropriate site infrastructure which includes 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 (400 houses) of the complete project. The houses were constructed using the following systems:

Concrete grade beam foundations.

Masonry walls of hand-made cinva-ram brick and cement mortar.

Conventional wood frame roof structures.

Coconut palm leaf thatched roof membrane improved with tar paper.

CRAFTS TRAINING  
PROGRAM SUMMARY

Crafts Training Program - The workforce that was to build the project was to consist of Kurtunwaare settlers. This required that a crafts training program be set up for their training. The primary objective of the training program was to train the approximately 100 skilled laborers that it was estimated would be required for the project. In addition, leadership training, was provided to produce the necessary crew chiefs and foremen.

The Florida A&M Team was responsible for organizing and setting into motion the Crafts Training Program and the training of the School Staff of Somalis to whom the day-to-day management would be gradually turned over. This was done by the Team between June and December 1980.

CONSTRUCTION TRAINING PROGRAM FOR THE  
KURTUNWAARE PILOT HOUSING PROJECT  
KURTUNWAARE, SOMALIA

PROJECT TEAM All team members were provided by the School of Architecture, Experimental Low Cost Construction Unit, Florida A&M University.

TEAM MEMBERS School Superintendent James Blakely Bruce  
Instructor of Masonry Millard M. Wright  
Instructor of Carpentry David Tod Hollister  
Administrative Coordinator Lawrence E. Birch

FUNDING AGENCIES USAID, East African Mission  
Washington, DC, USA  
Government of Somalia  
Mogadishu, Somalia

PRIME CONTRACTOR Louis Berger International Inc.  
100 Halsted Street, East Orange, NJ, USA

SUB-CONTRACTOR Florida A&M University, School of Architecture  
Experimental Low Cost Construction Unit  
P.O. Box 597, Tallahassee, FL, USA

TRAINING PROGRAM BUDGET \$99,183.00

APPROXIMATE PROJECT BUDGET \$4,000,000.00

PROJECT SUMMARY Background - Somalia was one of the many African nations affected by the 1973-1975 drought. In response to the thousands of refugee nomads produced by the drought, the Somali government set up 21 temporary relief camps in the drought-stricken areas, most of which are still in use today.

In an effort to provide the nomads an opportunity to rebuild their lives based on an alternative life style, the government's Settlement Development Agency (SDA) set up six permanent villages that were to have an economic base in agriculture or fishing. One of those villages, Kurtunwaare, located on the Shebelli River, was established as an agricultural village.

RESULTS  
continued

Training Program Curriculum - A curriculum was developed and documented in a manual for use by the school staff.

60 Apprentice Craftsmen Trained - These apprentice craftsmen (including about 20% women) were trained and promoted to the production crews. Additionally, about 40 trainees were still in the program to be replaced by new trainees once they were promoted.

Construction of 13 Houses - 25%, or 13, of the total of 50 houses started by December 1980 had been started by crafts trainees in the training program. Of the 13, 7 were completed.

Establishment of a School Site with Facilities and Equipment - In December, the second school site was established with the layout of its first foundation.

ADDITIONAL  
SERVICES

Construction Supervision - Each team member provided general construction supervision to aid in project mobilization.

Set Up and Daily Operation of Cinva-ram Block Plant

House Unit Design - Eleven alternative house units were designed and built.

Roofing System Investigation - Investigation and limited testing of alternative roofing systems was carried out.

SCHEDULE OF  
EVENTS

The chart on the following page shows the schedule of events as they occurred in the training program from July to December 1980.

CRAFTS TRAINING  
PROGRAM SUMMARY  
continued

Organization of the Crafts Training Program - The program was divided into the following instructional divisions:

Unskilled Labor Experience  
Crafts Training Components  
    Foundations  
    Masonry  
    Carpentry  
Leadership

The Crafts Training Components -- Foundations, Masonry, and Carpentry, represented the backbone of the program by producing the skilled labor crew. The unskilled labor experience provided each trainee with a minimum one month weeding out, introductory period that lead to promotion to the Training Program. The Leadership Training was provided for likely candidates that had completed the Crafts Training Program and at least two months of experience with the production crews.

Training Method - The method of training was based on providing the trainee with highly supervised, on-the-job construction experience by constructing houses from the ground up that were identical to houses being built by the production crews. This method avoided wasting time and materials on practice structures and provided the trainees with the most realistic experience possible. This basic training concept was applied not only to crafts trainees but also to leadership trainees. They were trained by assigning them a crew of trainees, a plot to build on, and by giving them decision-making responsibility.

School Site - The training was conducted at the school site which consisted of one of the sites of ten houses (called a Xubin). The Florida A&M Team established the site which included the training houses, an administrative office, storage for materials, and a large equipment operation and storage area. Once all the plots were used, the program was to be relocated on the next Xubin.

RESULTS

By the time the Florida A&M Team left Kurtunwaare in December 1980, the following results had been achieved:

School Staff - A staff consisting of a School Superintendent, Instructors of Foundations, Masonry, and Carpentry, a general Labor Foremen, and assistants for each (10 personnel) had been trained to operate the program. This was the most important task because it insured the continuation of the program.

	JULY			AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				MONTH																																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	WEEK																																
SITE CONSTRUCTION SEQUENCE:	Project Mobilization			Training Program Mobilization				Training Program				Establish School Site @ Xubin A-2				Xubin B-2																																											
TRAINING PROGRAM												A-2 #1				A-2 #2 (Office)				A-2 #3				A-2 #4				A-2 #5				A-2 #10				A-2 #9				A-2 #8				A-2 #7				A-2 #6				B-2 #1							
				Training of Personnel				Cinva-Ram Block Plant Set Up and Daily Operation								Block Plant Management Assistance Provided as required																																											
CRAFTS TRAINING PROGRAM								Crafts Training																				Leadership Training																															
TRAINEE GROUPS:								G1-M				G1-C								G2-F*				(promoted but retained to work on school site fnds)				G2-M								G3-M				G3-C								G4-F				G4-M				G4-C			
FLORIDA A&M TEAM:																																																											
SCHOOL SUPERINTENDENT	Staff Compound Completion			Training Program Mobilization				Operation of Masonry Component				School Administration				Prepare School Staff Training				Training Manual																																							
INSTRUCTOR OF MASONRY	Staff Compound Completion			Set Up, Organization, and Daily Operation of Cinva-Ram Block Plant								Operation of Masonry Component																																															
INSTRUCTOR OF CARPENTRY	Staff Compound Completion			Leave of Absence				Operate Carpentry Component				Operation of Foundations Component																																															
ADMINISTRATIVE COORDINATOR				Roofing System Investigation				Site Visit																				Site Visit																															
SOMALI SCHOOL STAFF:																																																											
School Superintendent												School Superintendent																																															
Assistant																																Assistant																											
Labor Forman																																				Labor Forman																							
Instructor of Foundations																Instructor of Foundations																																											
Assistant																																				Assistant																							
Instructor of Masonry												Instructor of Masonry																																															
Assistant #1																																				Assistant #1																							
Assistant #2																																								Assistant #2																			
Instructor of Carpentry												Instructor of Carpentry (first)								Instructor of Carpentry (replacement)																																							
Assistant																																								Assistant																			

SCHEDULE OF EVENTS AS THEY OCCURED FROM JULY TO DECEMBER 1980

NOTES:

- A-2 #3 = Xubin or Site number A-2, house plot number 3
- G1-M = Group number 1 - Masonry trainees (see Trainee Data in CRAFTS TRAINEES section of this report)

**EXPERIMENTAL LOW COST  
CONSTRUCTION UNIT**

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## EXPERIMENTAL LOW COST CONSTRUCTION UNIT

The Experimental Low Cost Construction Unit is a Master of Architecture program at the School of Architecture at Florida A&M University in Tallahassee, Florida. The Experimental Low Cost Construction program is dedicated to two goals: 1) to assist the students enrolled in the program to develop the judgment, ingenuity, experience and factual knowledge to deal effectively with the process and problems of low cost architecture, and 2) to undertake research and contract projects which advance the state-of-the-art or provide a relevant professional experience to the faculty and students of the program.

The educational program of the Experimental Low Cost Construction Unit is designed to enable future architects:

To understand the economic, political, social and cultural influences which form the context of low cost construction.

To acquire the skills and abilities necessary to solve problems of low cost construction at both the policy and technical levels.

To be aware of the state-of-the-art solutions in settlement design, low cost housing, and building construction.

To understand the operation and resources of the institutional framework which supports low cost construction projects.

The Experimental Low Cost Construction Unit emphasizes "hands-on" experimental methods as a fundamental aspect of its educational and research efforts. Utilizing a well equipped experimental workshop laboratory, ideas that look promising on paper are tested full scale in the lab. Personnel for this training program were themselves trained prior to their departure for Somalia by constructing full scale components of the housing units on the Experimental Low Cost Construction Unit grounds.

The research interests of the Experimental Low Cost Construction Unit include:

Design and implementation of training programs.

Investigations in building with sulphur and other by-product materials.

Low cost sanitation.

Low cost roofing.

Low cost energy technology including solar and wood burning.

In the past four years, the Experimental Low Cost Construction Unit has

administered funded projects totaling more than \$215,000. In addition to the Kurtunwaare Training Project, the Unit has designed a Training Program in Energy Efficient Technology for the State of Florida, Office of Manpower Planning CETA Program, designed Low Cost Energy Efficient Technology for Rural North Florida, and investigated the application of on-site composting sanitation systems for North Florida.

To achieve its educational and research goals, the Experimental Low Cost Construction Unit is in a position to take advantage of the following resources:

The Experimental Low Cost Construction Workshop - The program operates out of a fully equipped workshop which allows full scale mockup and testing.

Sub-Tropical Climate - The local climate is similar to conditions in areas where the world's most severe building problems exist. This fact allows for on-site testing of proposed solutions.

Washington, DC Center - The School of Architecture maintains a center in Washington, DC for both undergraduate and graduate programs. The Center is establishing contacts with the World Bank, the U.S. Agency for International Development, government agencies, local consultants, and other resources. Qualified students are eligible to study in residence at the Washington Center.

The New School of Architecture Building - A new building is scheduled for completion by Fall 1982. The new facility will have an expanded Low Cost Laboratory/Workshop facility, as well as new laboratories for environmental technology, building technology and computer aided design. The building will also house a wind tunnel, a heliodon, an expanded architectural library and an audio visual center.

Strong Research Program - The Experimental Low Cost Construction Unit has been involved in research from its inception and strives to integrate on-going projects into the curriculum.

International Visiting Faculty - As a supplement to the resident faculty, experts from many parts of the world are periodically invited to carry on research, test designs and instruct students in their field of expertise.

The School of Architecture - Other facilities in the School of Architecture available to the Experimental Low Cost Construction Program include: an environmental laboratory, in-house computer facilities with interactive graphics, a structural testing laboratory, and faculty expertise in a variety of related areas.

**FLORIDA A&M UNIVERSITY  
TECHNICAL ASSISTANCE  
TEAM**

## FLORIDA A&M UNIVERSITY TECHNICAL ASSISTANCE TEAM

The Florida A&M Team consisted of members of the Experimental Low Cost Construction Unit which is a part of the School of Architecture at Florida A&M University, Tallahassee, Florida. The team was made up of the following three Field Personnel and one U.S. based Administrative Coordinator.

SCHOOL SUPERINTENDENT- - - - - James Blakeley Bruce

CRAFTS INSTRUCTOR FOR MASONRY- - - - Millard M. Wright

CRAFTS INSTRUCTOR FOR CARPENTRY- - - David Tod Hollister

ADMINISTRATIVE COORDINATOR - - - - - Lawrence E. Birch

In summary, the Florida A&M Team was responsible for setting up and operating a crafts training school that would produce the workforce required for the construction of a pilot housing project in Kurtunwaare, Somalia. This included: establishment of a curriculum for on-the-job training of all skilled labor such as masonry, carpentry, foundations, and a leadership training program; procurement of equipment, tools, materials and teaching facilities; selection and recruitment of trainees coordinated with the Settlement Development Agency (SDA) and the Kurtunwaare District Authorities; organization and training of the Somali instructional staff; and continuous monitoring, documentation, evaluation, and modification of the training program. A detailed description of the organization and operation of the Florida A&M Team itself, along with a listing of their contractual job responsibilities may be found in the Staff Organization section of this report.

Additional Services - The Florida A&M Team performed the following services in addition to their contractually outlined responsibilities.

Provision of general construction supervision to aid in the mobilization of the project in the early stages (first 2 months).

Temporarily filled the Superintendent of Carpentry position (first 4 months).

Set up and daily operation of the Cinva-ram Block Plant.

Design of eleven (11) alternative house units that were built to aid the SDA in deciding on a suitable design.

Investigation and limited testing of alternative roof systems that could be used in place of thatch.

The above services were provided above and beyond the duties outlined in the project contract. (See Staff Organization section of this report for a more detailed description of the additional services.)

The Experimental Low Cost Construction Unit will soon publish or has already published the following documents that specifically pertain to their involvement with the Kurtunwaare Pilot Housing Project.

-Design Of Housing Unit Alternatives For The Kurtunwaare Pilot Housing Project

-Training Manual For The Instructional Staff Of The Kurtunwaare Pilot Housing Project Crafts Training Program

-Preliminary Study Of Alternative Roofing Systems Available For Use In The Kurtunwaare Pilot Housing Project

-An Appropriate Low Cost Roofing System For Application With The Housing Unit Developed For The Kurtunwaare Settlement Project

# **INTRODUCTION**

Project Background

Project Description

## INTRODUCTION

### Project Background

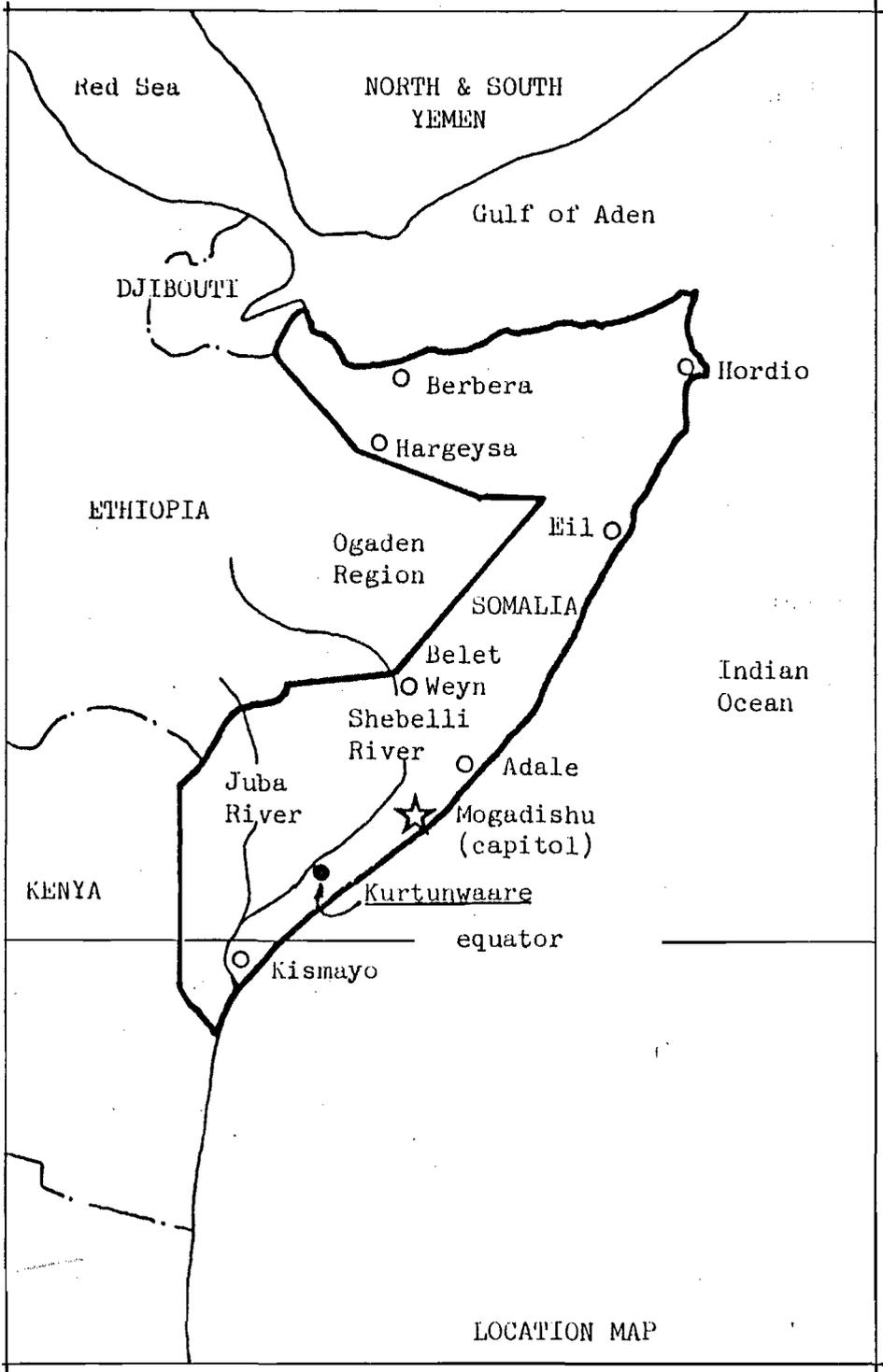
Somalia is one of the many nations affected by the devastating drought that has ravaged Africa since 1973. Although it has diminished in force, the effects of the drought are still evident today. In December 1980, the riverbeds of Somalia's two rivers were prematurely dry. There was no relief in sight for months.

The worst part of the drought came to a close in 1975, but by this time there had been a staggering loss of life and property. Of the many thousands of nomads who did manage to survive, most had lost all of their livestock, and with it, their only means of livelihood. In response to this disaster, the Somali government established twenty-one (21) temporary relief camps. They were set up in areas most affected by the drought, in the interior and along the Somali-Ethiopian border. Although most of these camps remain today due to continuing drought and war, they were looked upon at the time as temporary measures to be dismantled at the end of the drought. Because of their location and temporary nature, they were ill-prepared to provide the nomads with a means of re-establishing their livelihood.

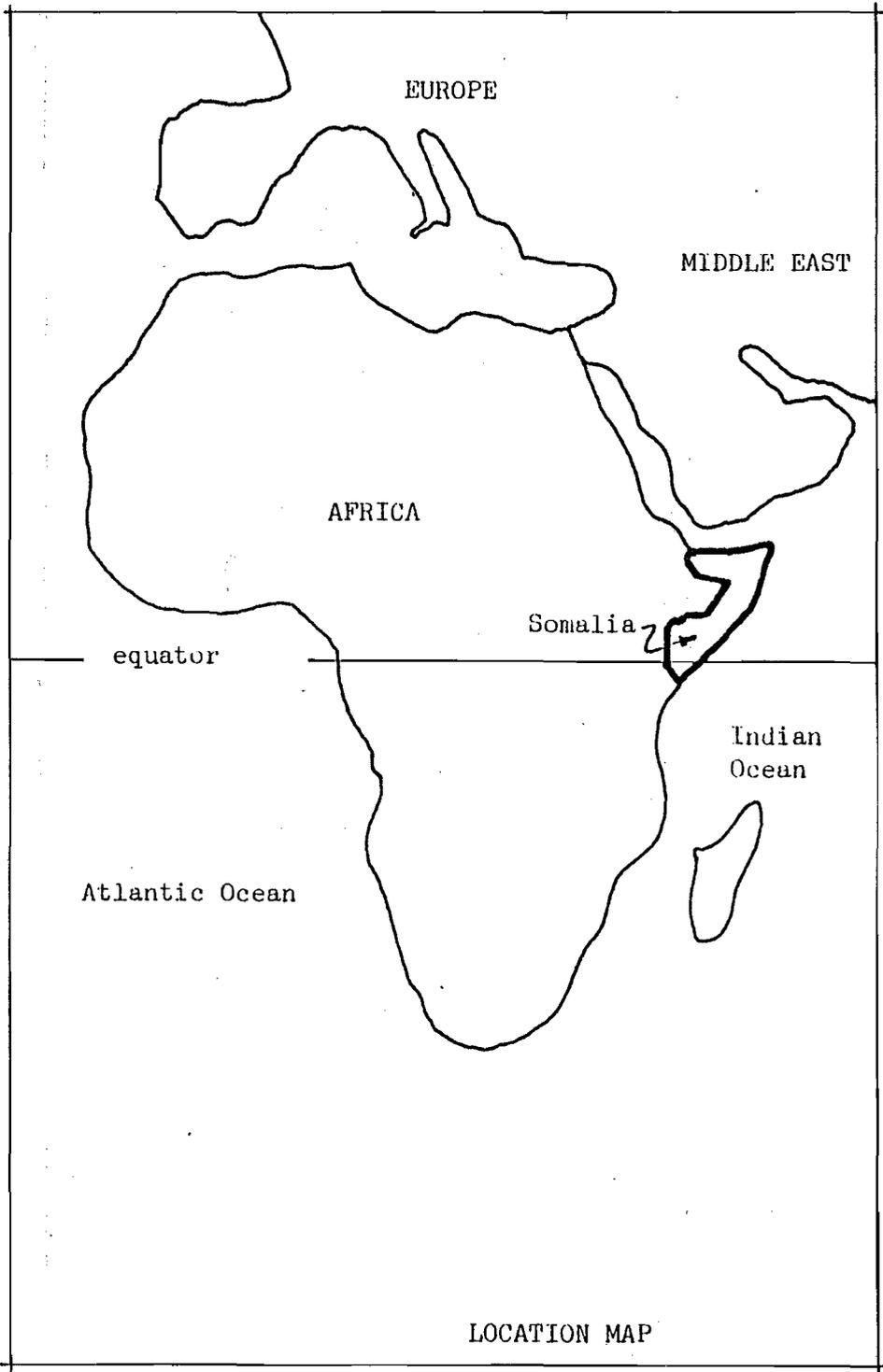
The Somali government has a long-term policy of development that calls for the re-culturalization of nomads to a sedentary way of life. In part, the government's goal is to divert the efforts of some of the nomads from the raising of livestock to the development of other areas of the country's economic base such as agriculture and fishing. These goals combined with the plight of the nomads in the temporary relief camps provided the Somali government with the opportunity to implement the resettlement of the nomads.

Aided by the U.S.S.R., the Somali government's newly formed Settlement Development Agency (SDA) set up six permanent villages. Three villages were to have an economic base in agriculture. Three more were to have an economic base in fishing. The fishing villages were established along the Indian Ocean and the agricultural villages were located along the Shebelli and Tuba Rivers. The establishment of these villages offered the nomads an opportunity to rebuild their lives based on an alternative sedentary life style. It offered the Somali government the opportunity to redirect the efforts of almost 100,000 nomads to the development of the country's economic base in their agriculture and fishing industries. It was hoped that these efforts would result first in village self-sufficiency for the production of food followed ultimately by the production of a surplus of food that could be exported or sold in the country.

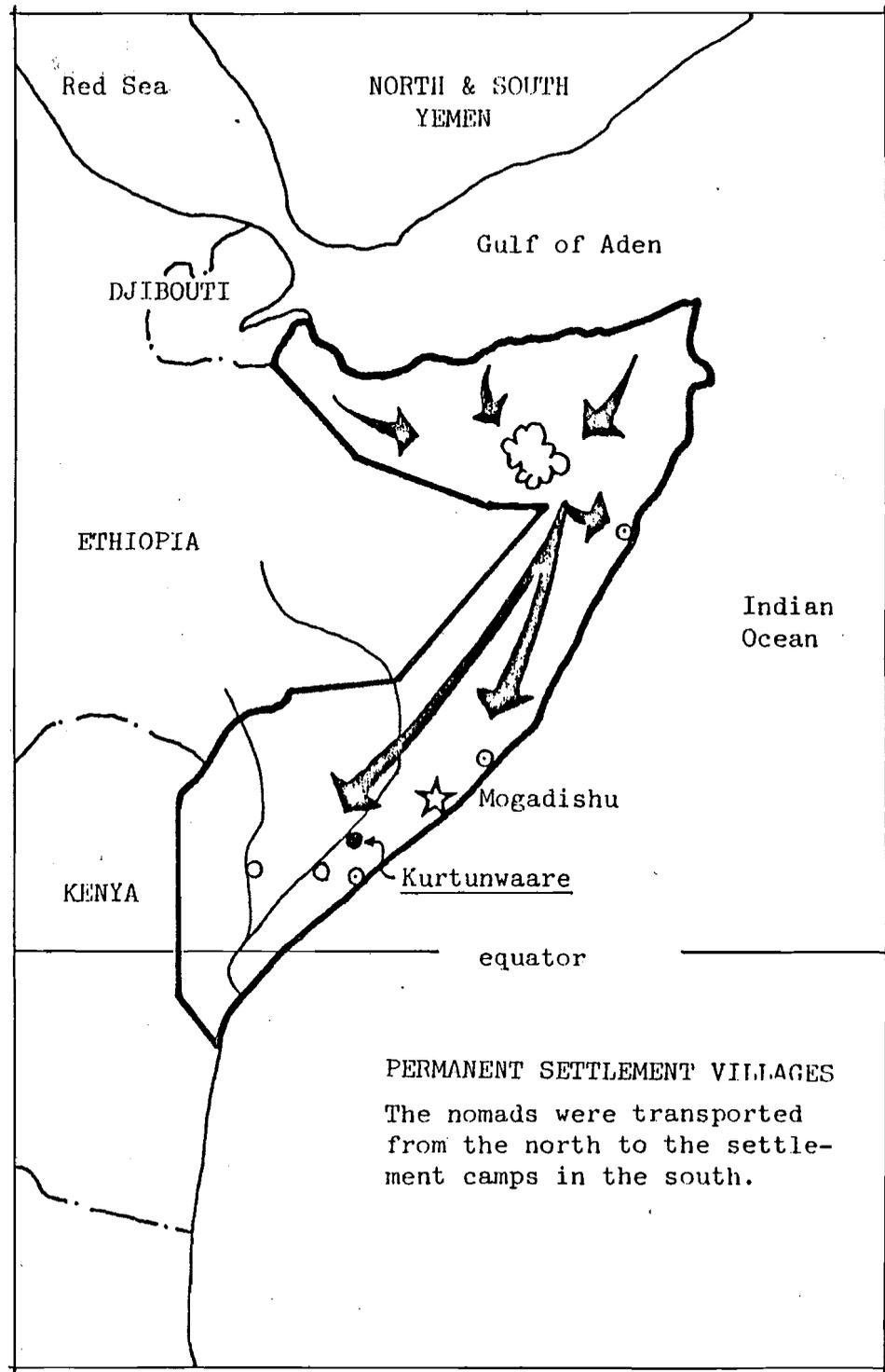
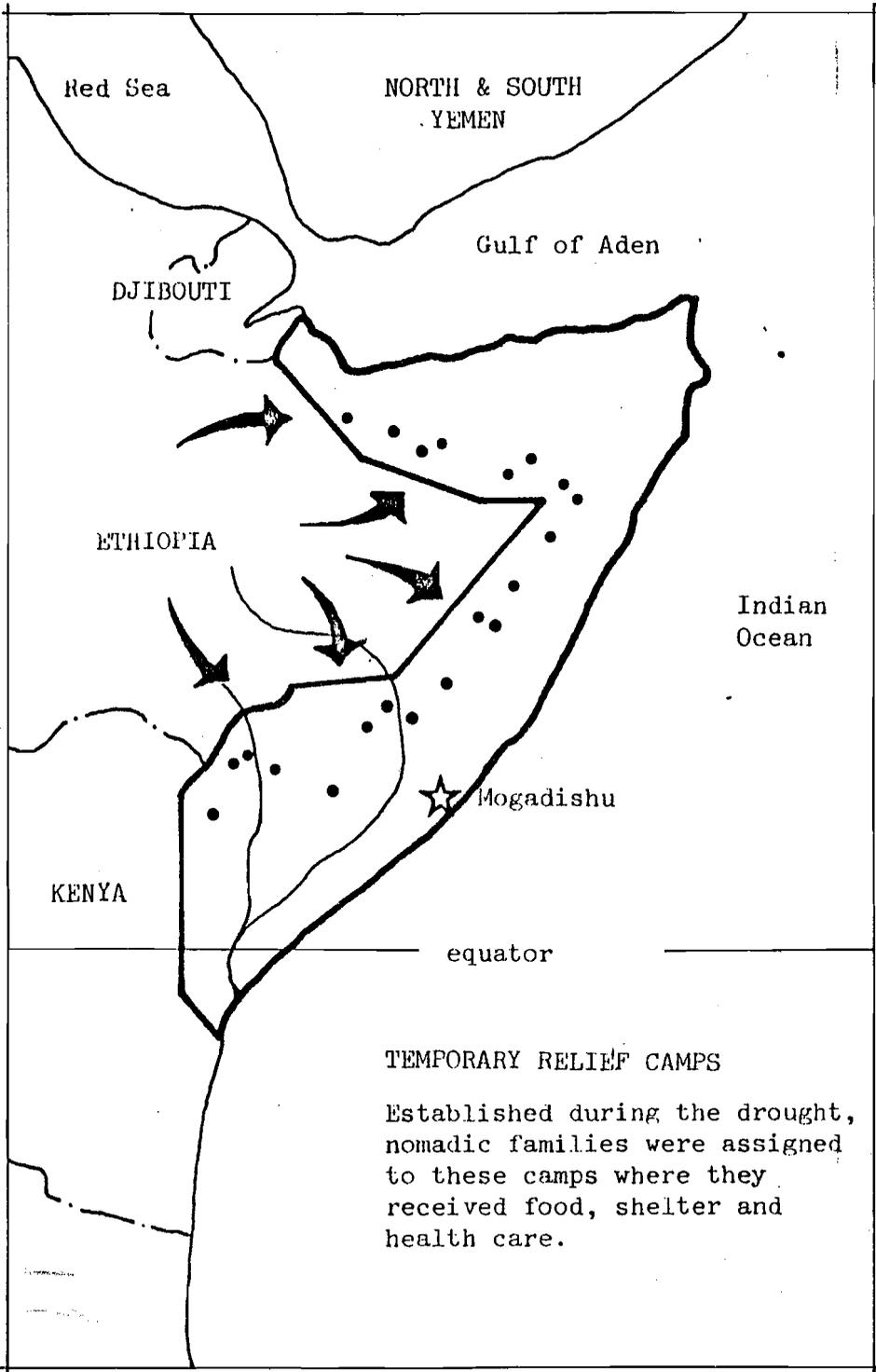
Kurtunwaare was one of the three agricultural villages set up by the SDA. It was founded with 4000 families or approximately 26,000 people. The primary crops produced by the village are rice and corn which are grown on cropland irrigated with water from the Shebelli River or rain-fed croplands.



LOCATION MAP



LOCATION MAP



The work required to operate the farming village is provided by the settlers who, in return for their services, are provided with a food ration, clothing, education, health care, 2 shillings (13¢) a day, and housing. Since its founding, great effort has been invested in the development of the village. To date, most of this effort has been directed primarily at farming and its infrastructure, followed by health, education, social, and governmental facilities. Unfortunately, there has been little opportunity to improve the housing and its infrastructure leaving this area of village development less complete.

When the village was initially founded, traditional nomadic agals were temporarily set up. These structures are dome shaped houses that range from 5 to 8 feet in diameter, are covered with animal skins, and have a mud floor. Most of these were quickly replaced by the construction of munduuls. The munduul is a more "permanent" structure traditionally used by Somali farmers. It is round in plan, ranges in diameter from 8 to 14 feet, has a cone-shaped thatched roof, a dirt floor, and wattle (stick) walls often plastered with a mixture of mud and animal dung. These houses have a short life in comparison to the environmental damage caused by gathering enough materials for their construction. The materials come from the sparse and already endangered vegetation that is slowly giving way to desertification. Many of these houses have already deteriorated to a point where they don't offer adequate protection from the elements making them uninhabitable.

The physical infrastructure for the housing consists of minimal sanitation and water facilities. Site drainage for the houses is practically non-existent. The sanitation system consists of open pit latrines scattered throughout the village. This is a major problem when it rains since dangerous contamination from the latrines is easily spread through the village by the deluges of water during the rainy season. Water facilities consist of several main wells from which water is carried by village inhabitants to their houses.

The Somali government and the SDA believe that the Kurtunwaare settlers must be convinced that their new life style is an improvement over a nomadic life. Indeed, many settlers have left the village to attempt to re-establish their livestock herds. The present population of Kurtunwaare is 16,000, of which approximately 70% are women and children. The government feels that housing conditions in the village have made a significant contribution to the exodus of its inhabitants. These problems were addressed by a joint USAID/SDA project aimed at the development and testing of an appropriate housing project for Kurtunwaare.

### Project Description

There is an obvious need for appropriate housing and its infrastructure in Kurtunwaare based on the existing physical conditions in the village. This is reinforced by the need to convince the settlers that the village

is moving forward towards an improvement in living conditions and a greater degree of permanency. In the beginning, in order to establish a firm footing, much of the development effort in Kurtunwaare was directed at agricultural projects. It normally takes many years for agricultural projects to show successful results. This makes it difficult for the re-settled nomads, who lack an inherent understanding of agricultural processes, to see this aspect of village development as having a direct bearing on the improvement of their living conditions. A housing project can be completed in a shorter time and everyone can easily understand the benefits and use.

The major goals of the design of the project were as follows:

Maximize the use of local materials.

Produce a house of longer lasting, more permanent materials.

Minimize use of materials that would have a negative environmental impact.

Design a house suited to the needs of the settlers.

Provide an improved system of sanitation, drainage, and water supply.

Construct the project using local village labor and a Somali Supervisory staff.

Once a preliminary design was done, a pilot project consisting of up to 400 houses was to be built. This project was to have resulted in the final site layout and house unit design. Once completed, the first phase of the project was to lead to the construction of the final 4000 houses needed for the village

The preliminary design of the house unit as built in the pilot project and physical site infrastructure can be summarized\* as follows:

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\*A more detailed account of the actual project as designed by USAID and as it was proposed to be carried out by Louis Berger International Inc. along with Florida A&M University, School of Architecture, Experimental Low Cost Construction Unit may be found respectively in the following two documents:

USAID, Somalia Project Paper, Kurtunwaare Settlement Project  
Project Number 649-0103  
(Washington D.C.: Unpublished request for proposals, USAID)

Louis Berger International Inc. and Florida A&M University, School of Architecture, Experimental Low Cost Construction Unit, Technical Assistance for the Kurtunwaare Settlement Project, Low Cost Minimum Shelter Construction Program, Technical Proposal  
(Unpublished technical proposal)

71

### House construction system

- Concrete grade beam foundations
- Masonry walls of hand made cinva-ram brick with cement mortar
- Wood frame roof structures
- Thatched roof membrane improved with tar paper

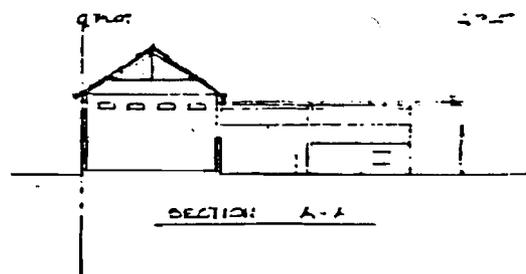
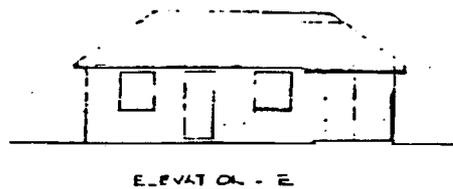
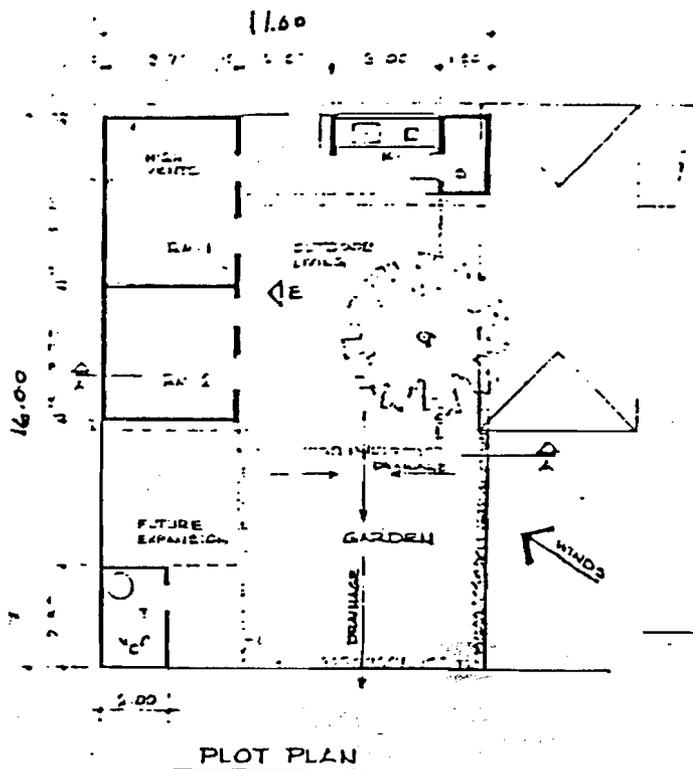
### House plan

To be further developed and modified during the pilot project construction phase

### Infrastructure

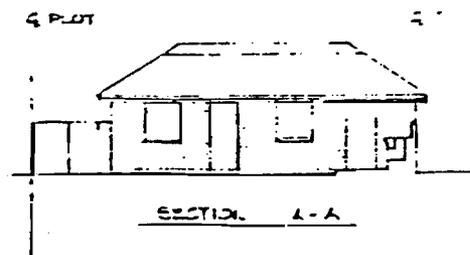
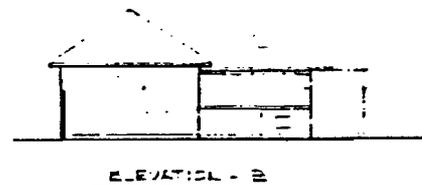
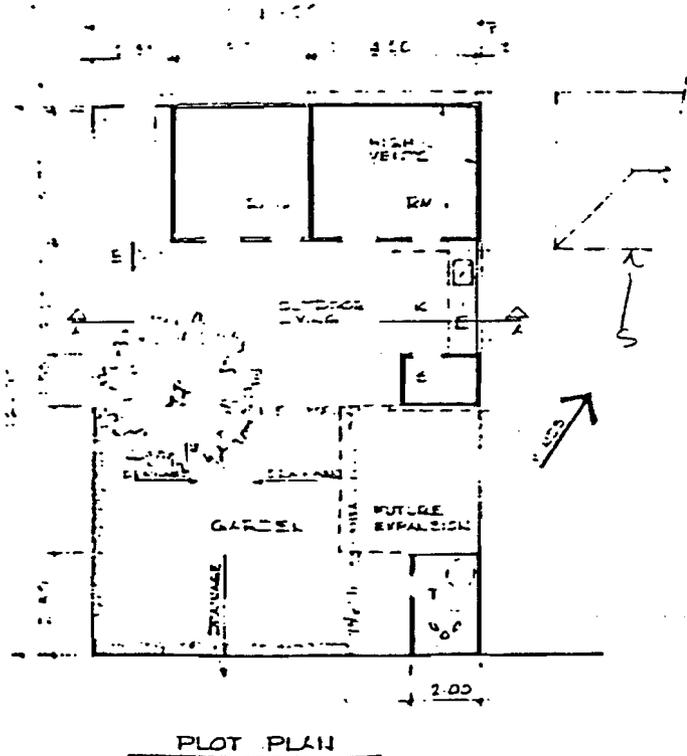
- Water standpipe with cistern for every 25 houses
- Composting toilet for each house
- Adequate site drainage

In addition, a Crafts Training School was to be established in order to train the local settlers in the skills required to build the project. The training school was to train the skilled laborers for the project and include a component for leadership training. The school was eventually to be staffed by Somali's as were other staff positions in the project. This report details the work of the Florida A&M University Technical Assistance Team which designed and implemented the crafts training program.

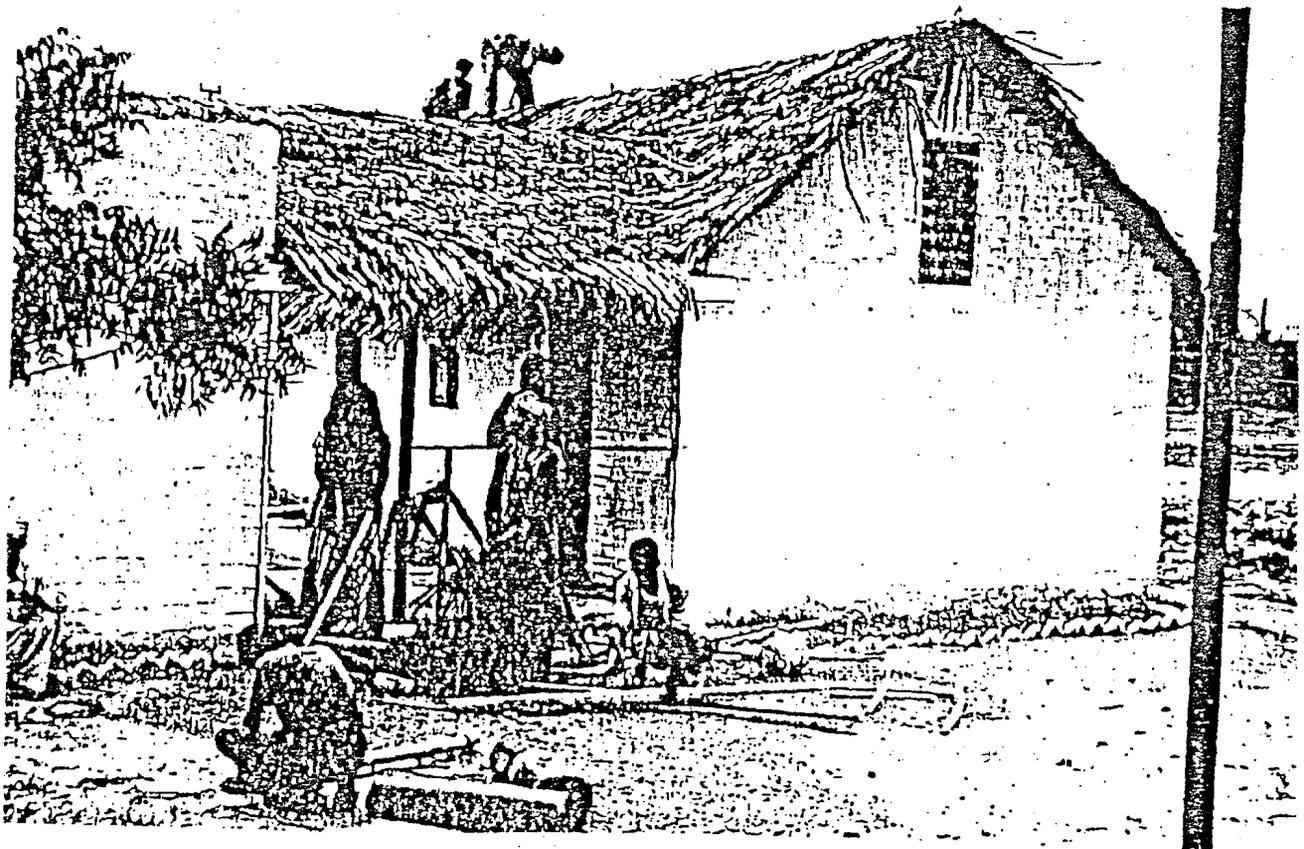
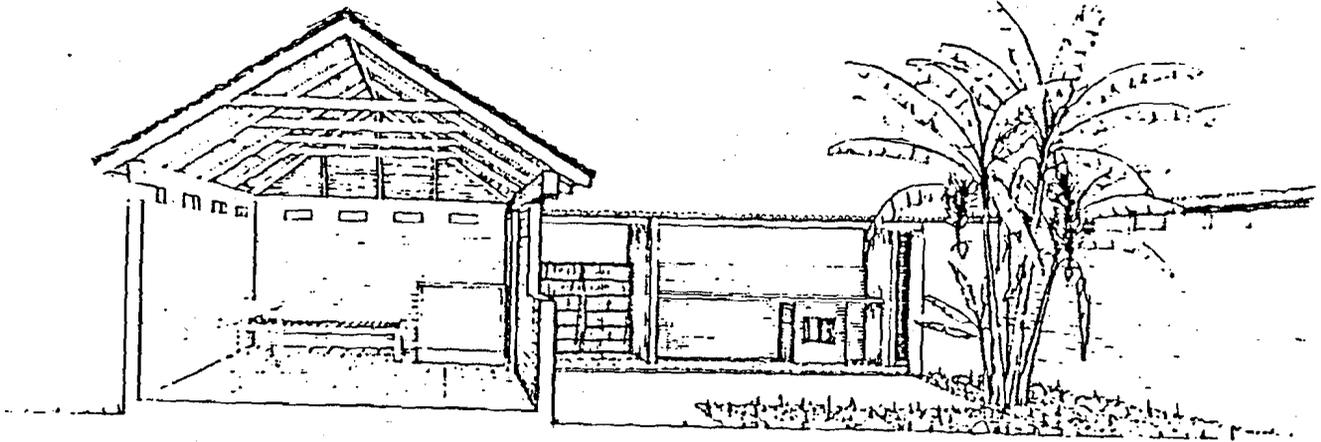


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SCALE 1/100

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SCALE 1/100



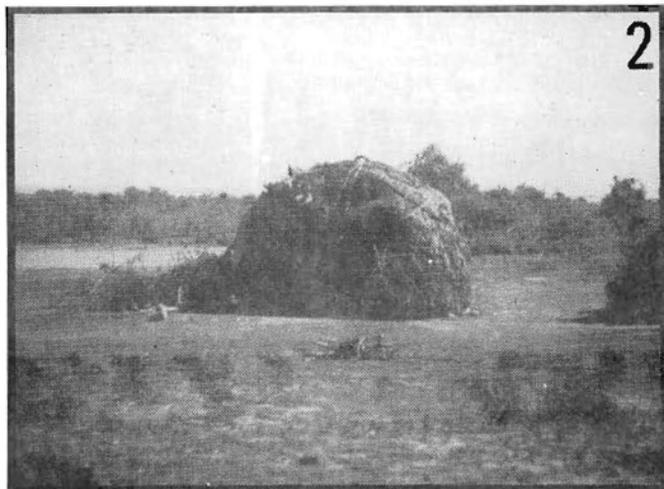
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Original U.S.A.I.D. House Prototype Illustration and Photograph  
From the Kurtunwaare Settlement Project, Project Paper

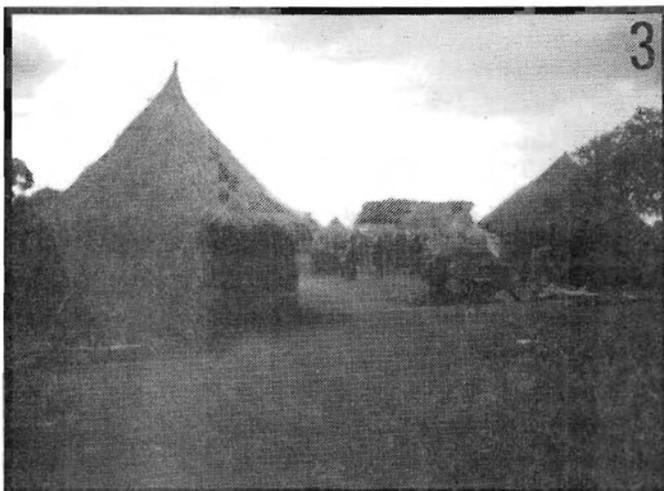
# **PHOTOGRAPHS**



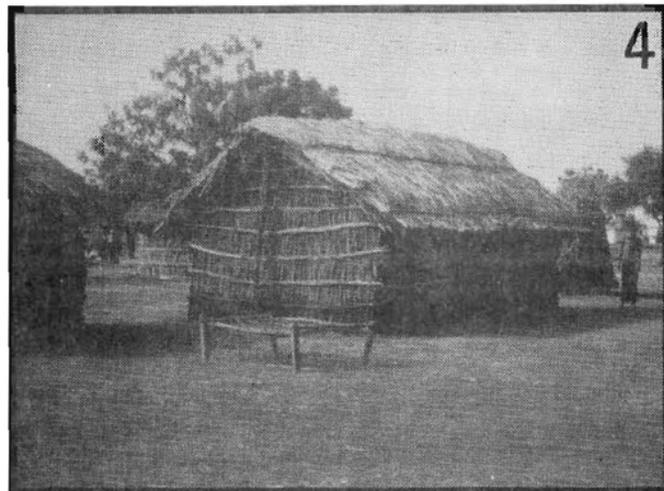
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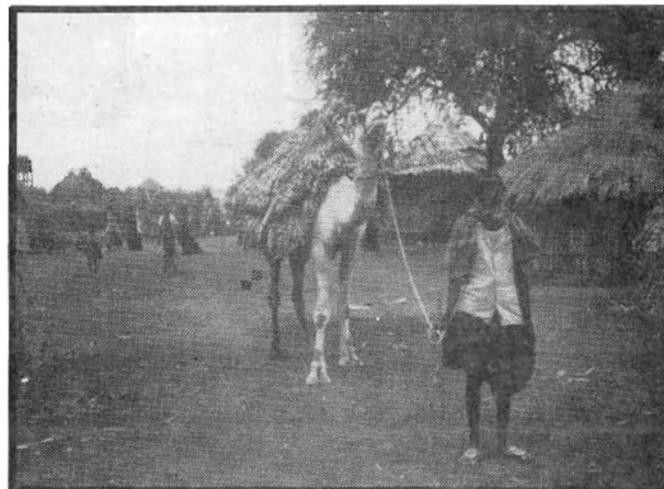
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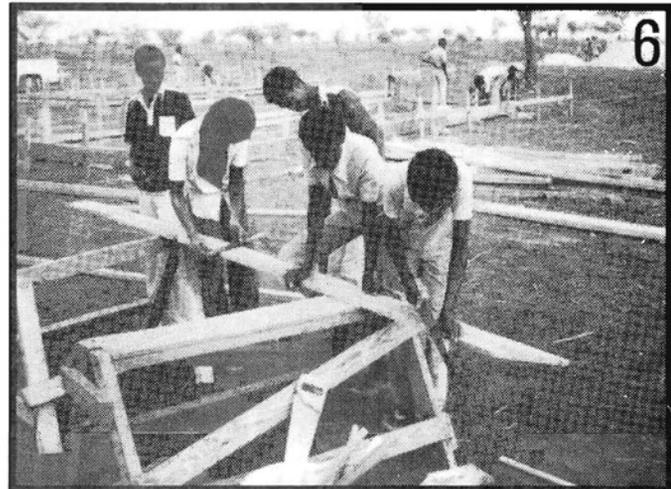
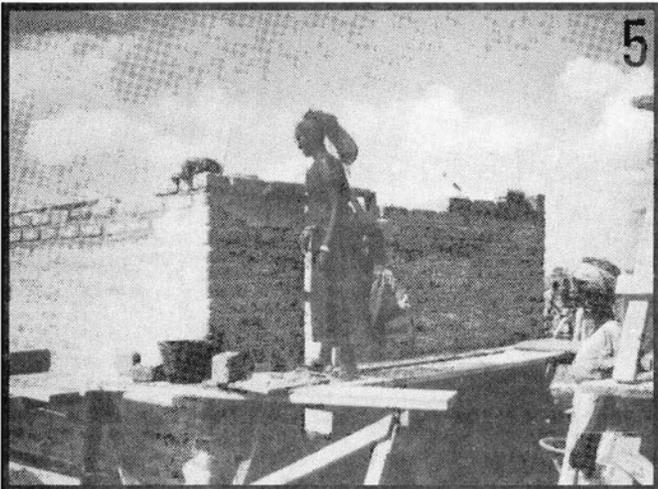
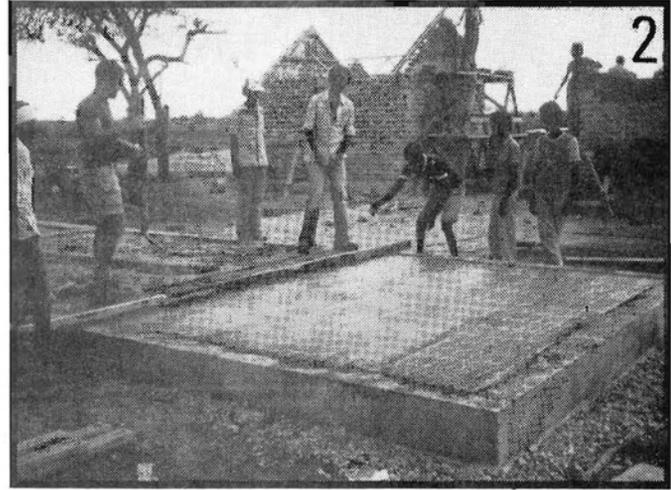
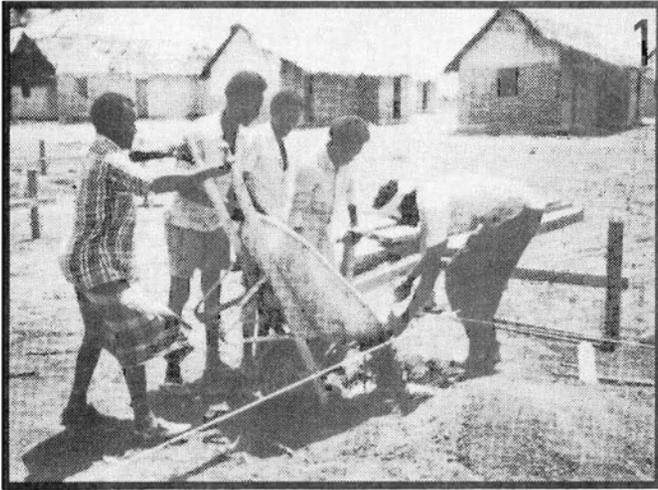
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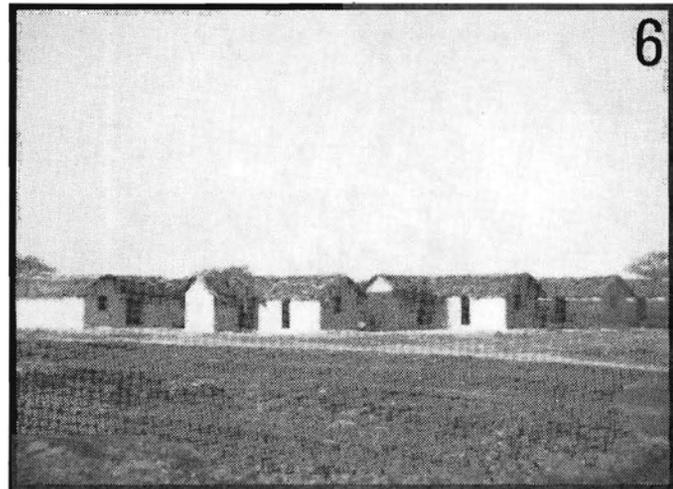
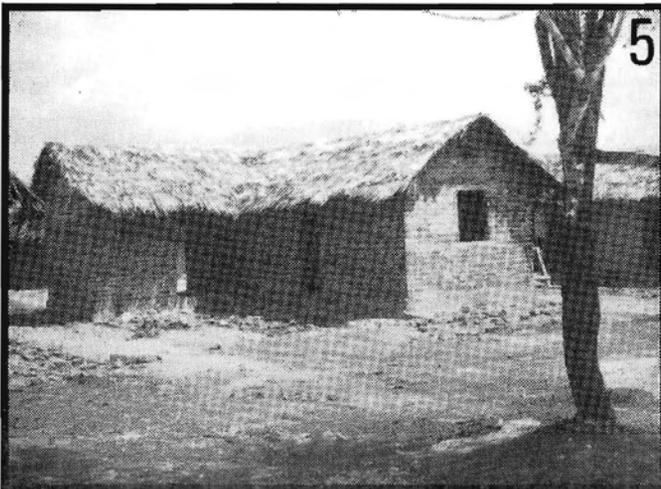
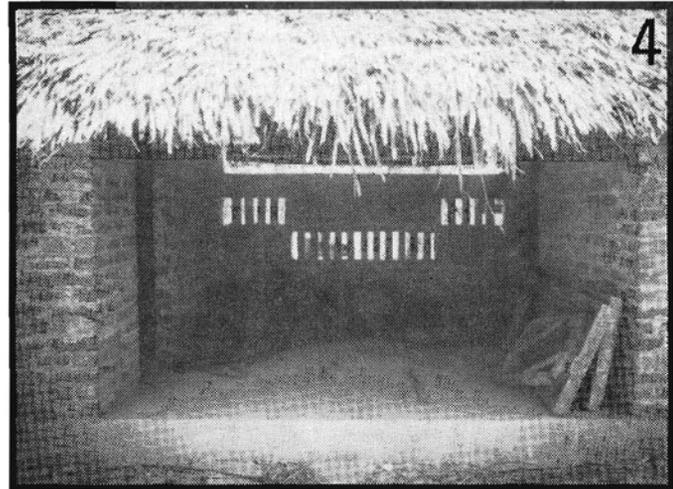
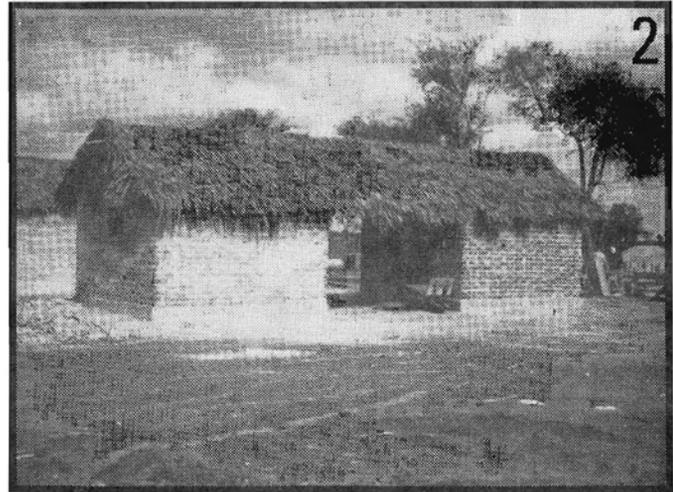
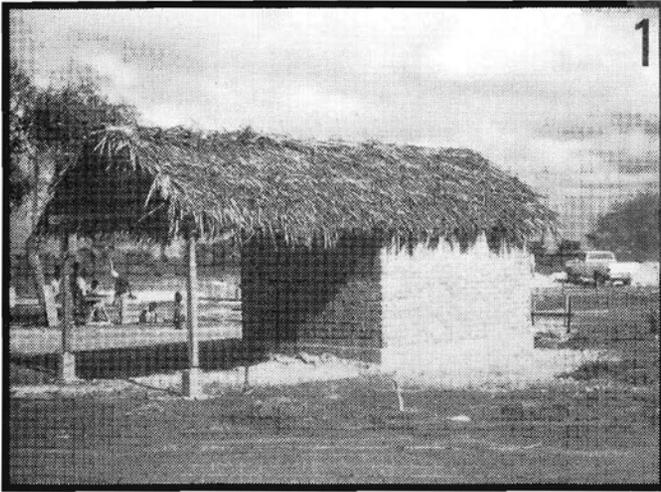


1 Nomads stop for water on the Shebelli River 2 Agal—Traditional nomadic shelter 3 Munduul—Traditional Somali farmers shelter 4 Arish—Rectangular mud, wattle, and thatch shelter 5 Monsoon downpour in Kurtunwaare 6 Village life

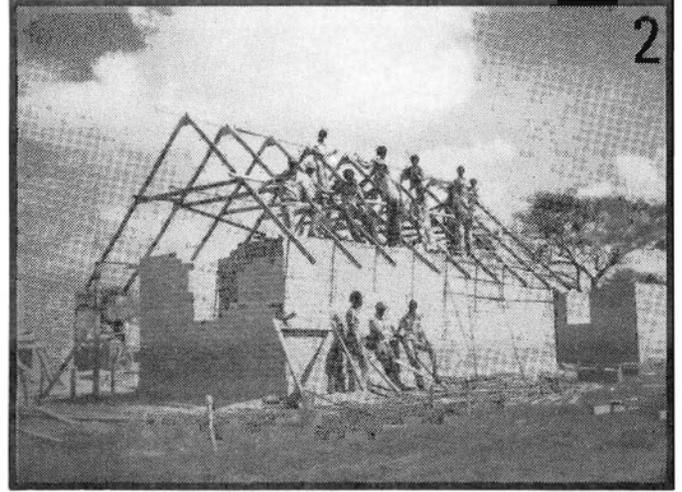
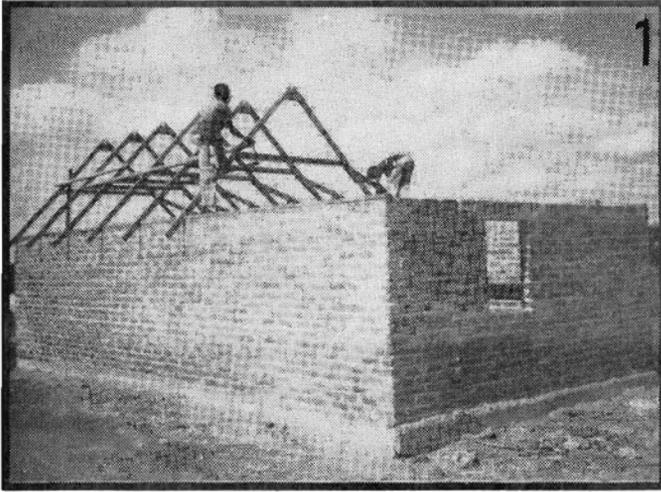


**1** Foundations trainees pour a concrete pier    **2** A new floor being poured  
**3** Masonry trainees practice building up a corner    **4** Trainees learn to lay bricks to a string line stretched between two corners  
**5** Women learned construction skills quickly and were usually among the best graduates    **6** Carpentry trainees learn the basics; how to measure, saw, and use a hammer

27



**1** Simple core house with outdoor covered cooking area, 27 square meters, Training School Site A-2, Plot #1    **2** Two room core house with outdoor covered cooking area, 40 square meters, Training School Site A-2, Plot #2    **3** Two room core house with ventilated privacy wall for cooking area on zero lot line side, Training School Site A-2, Plot #3    **4** Covered cooking area with ventilated privacy wall    **5** "L" shaped house with two rooms and a storage/cooking room connected by a small covered entrance space, 42 square meters, Site A-3, Plots 1-10    **6** Site A-3 completed



**1** Simple wood trusses are set in place   **2** Carpentry trainees rest on a new roof frame   **3** Blakeley Bruce—School Superintendent   **4** Millard Wright—Instructor of Masonry   **5** David Hollister—Instructor of Carpentry   **6** Larry Birch—Administrative Coordinator

29

# **TRAINING PROGRAM— GENERAL DESCRIPTION**

Summary

Training Program Goals

Detailed Description of Training Components

Unskilled Labor Experience

Crafts Training Components - General

Foundations

Masonry

Carpentry

Leadership

School Staff Training

30

## TRAINING PROGRAM - GENERAL DESCRIPTION

### Summary

The primary purpose of the Training Program was the establishment of a workforce 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. In the beginning, the program was organized and initiated by the Florida A&M University Technical Assistance Team. Gradually, day to day management of the program was turned over to a staff of Somalis who, with on the job training, became capable of operating the program. (See section titled STAFF ORGANIZATION.)

The school staff consisted of two parts. They were administrative and instructional. The instructional division was made up of several components.

Unskilled Labor Experience

Crafts Training

Foundations

Masonry

Leadership Training

The Unskilled Labor Experience provided an introduction to the project and a general introduction to construction processes. The Crafts Training components -- Foundations, Masonry, and Carpentry, represented the backbone of the training program. They produced the apprentice craftsmen ready to fill positions on the production crews. The Leadership component provided the continued education of craftsmen who had graduated from the training program and had worked for a time on the production crews. These personnel were trained to become foremen and crew chiefs for the various production crews.

The basic concept of the training method for crafts as well as leadership training 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 starting with 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 the production crew's. 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.

### Training Program Goals

There were four major goals set by the Florida A&M Team for the development of the training program. They were:

School Staff Development Goals

Trainee/Workforce Development Goals

School Site Facilities and Equipment Goals

Tangential Goals

School Staff Development Goals - The basic objective of staff development was the establishment of a group of Somalis with the skills, responsibility, and confidence to operate the training program essentially without outside assistance. This goal was the most important and difficult task of the Florida A&M Team. It would have been impossible to produce a workforce of the quantity and quality required by the project within the six months allotted to the Florida A&M Team. Therefore, the Somali staff would have to be sufficiently prepared to carry the training program to its conclusion.

The general aspects covered in the training of the Somali staff were as follows:

Basic Teaching Skills

Construction Skills\*

Leadership

Personnel Management

Organizational Skills

Planning and Scheduling Skills

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\*In some cases candidates presented to the Florida A&M Team for the school staff positions seemed to be selected more for their English speaking abilities rather than their knowledge of the craft to be taught.

Trainee/Workforce Development Goals - The basic objective in the development of the project workforce was the graduation of craftsmen that met the changing needs of the production crews. The apprentice craftsmen promoted to the production crews had to possess the appropriate skills and skill levels to be integrated into the production crews without causing disruption.

Specifically, the objectives of Trainee/Workforce development were as follows:

Skill Level - The craftsmen apprentices promoted to the production crews had to be skilled enough to begin work alongside the more experienced members of the crews. The term apprentice as used here implies a minimum skill level appropriate for the least skilled task required of a given crew. The craftsman apprentice had to have the basic skills to enable him or her to work up to more skilled tasks as their experience base broadened.

Skill Types - The training program had to produce graduates who possessed the appropriate skills and knowledge required for the changing needs of the production crews. This objective was a reaction to the constantly changing construction methods that were required for the final fine tuning of the project once a house design had been selected.

Quantities - Craftsmen apprentices had to be produced in the appropriate quantities required by each production trade. Overall 300 trainees were expected to be trained producing 100 to 130 craftsmen after adjustments were made for dropouts.

Leadership - The training program had to produce leaders with a general knowledge of their specific trade and the ability to work as foremen and crew chiefs.

School Site Facilities and Equipment Goals - The intent of these goals was to establish a separate school site with its own construction equipment. Specifically the acquisition of the following facilities and equipment were seen to be necessary to fulfill the aims of this goal.

School office for the administrative division of the training program.

On site facilities for the storage of equipment, materials, and tools.

Access to a vehicle for transportation of trainees, materials, etc.

Equipment such as mortar mixers and concrete mixers in order to simulate production methods.

Tangential Goals - These goals could be considered as desirable "side effects" that it was hoped would be achieved by the existence of the

program. They were as follows:

- Construct a share of the needed housing units equal in quality to the ones built by the production crews. Unlike the production crews, however, the emphasis was to be on learning rather than on the rate of production.
- Provide the Kurtunwaare District Authorities with a file system that documents the settlers that have been trained, where they may be located in the village, skill level obtained in the program, and the tools that they have in their possession. This is so that the District Authorities will eventually have a permanent record for use in identifying settlers that received training so that they may be assigned to work on future phases of the housing project or other construction projects in the village.

### Detailed Description of the Training Components

As previously discussed, there were three major areas of learning in the Training Program. They were as follows:

Unskilled Labor Experience

Crafts Training Components

Foundations

Masonry

Carpentry

Leadership Training

Trainees started with the first area of training, Unskilled Labor Experience, and had the potential of working up to a leadership position. These areas represented the pattern of increasing skill development. They were also used as a part of a selection and screening device for selecting the right person for the right position.

Unskilled Labor Experience - Once recruits were accepted into the training program they were given a thorough description and tour of the project. All aspects of the project were covered in as much detail as possible. This took most of a day. With the tour completed, trainees were assigned to the various unskilled labor crews. If the recruits had a preference, they were assigned to crews they indicated an interest in. Once they were assigned to a crew, it was explained that they would eventually be promoted to the training program. Usually this was done once 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. A recruit might be assigned to any of the following crews as an unskilled laborer:

Foundations

Masonry

Carpentry

Survey

Training School Labor

Other (special crew for a particular task)

Once a recruit was ready for promotion to the training program, the decision as to which training component in which to place the recruit was made. Usually a part of this decision was based on the type of unskilled labor experience that they had acquired.

Crafts Training Components-General - 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 skill level aimed for was the minimum required to be useful to the production crew. This meant that an apprentice craftsman must have been capable of beginning work on a production crew doing the most elementary tasks. Working "up the ladder" followed as skill levels were improved with time and practice.

Method of Training - Instruction was done through the use of simple demonstrations and extensive practice. Each group of new trainees was first given demonstrations of the most basic tasks required by his or her trade. This was followed by a presentation of the tools they would be using including instruction in their proper care and use. Settlers were then assigned tasks for practicing the skills demonstrated to them. This marked the beginning of their on-the-job, hands-on training. The exact nature of the task assigned depended on the stage of construction that a given house on the school site was in at the time. There were no practice or demonstration structures for the trainees to work on. Each house on the training site was to be eventually 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 source 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 were identified quickly after they were made 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 implications and dangers that might have been caused by it if it had gone unnoticed, and then the method for correcting it. This kind of instruction made excellent training demonstrations. Demonstrations with this quality and educational value 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 program. Instead, demonstrations were based on immediate problems as they came up in the process of building the houses with school site construction sequencing dictating the training curriculum. The overall training goals and basic lessons were integrated into the content of the demonstrations. The problems used in these presentations were usually generated by mistakes that were identified or from situations that the trainees did not understand how to approach. By the time a trainee was ready to be promoted to the production crews, a wide range of basic problems that would be confronted again and again had been encountered and overcome. This allowed a trainee to be familiar with most of the specific problems that he or she would have to confront in their production jobs. When the trainee began working on the production crews, training of a similar nature took place in the context of the work. On the production crews, this training comes in the form of overcoming more and more complex problems with continually less supervision.

The concept of learning by doing worked because of the close supervision that was provided and the fact that the emphasis was placed on learning and doing it correctly. If, for instance, the foundations trainees had to remove all the batter board stakes again and again until they were properly placed, this was fine and expected by the instructors. 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. When the trainees became more familiar with the skills and level of quality that would be demanded of them, then little by little, they were pushed to improve their speed.

Other lessons common to all the crafts trainees were covered in the following areas:

- Interface with other crews
  - What happens to the masons if the foundation is not level?
  - What do the carpenters do if the masons forget to build the truss ties into the top of the wall?
- Basic understanding of what the job entails in other crafts

- General use, care, and maintenance of tools and equipment
- Safety measures

Tools - The first lesson taught to all new trainees was the proper use and care of the tools. Each tool was presented to the trainees along with a description and demonstration of its safe use. The trainees were shown where the tools were stored, what the procedure was for checking them in and out, and the way they were to be maintained. In addition, the trainees were told the cost of each tool with the warning that they were responsible for the safe and undamaged return of checked out tools. The tools presented in each of the respective training components were as follows:

### Foundations:

#### Personal Tool Kit:

Hammer  
Tape Measure (3 meter)

#### Major Equipment:

Concrete Mixer

#### General Tools:

Transit	Wheel Barrow
Shovel	Trowel
Pick	Screed Board
Sledge Hammer	Buckets
Digging Bar	Pry Bar
Spirit Level	Wire Cutters
20 Meter Tape Measure	Crow Bar
Metal Form Clips	

### Masonry:

#### Personal Tool Kit:

Trowel  
Level

#### Major Equipment:

Mortar Mixer

#### General Tools:

Line Blocks  
Twigs  
Mortar Board  
String Line  
Story Poles  
Shovels

### Carpentry:

#### Personal Tools:

Hammer  
Tape Measure (3 meter)  
Hand Saw  
Try Square

#### General Tools:

Spirit Level  
Hand Drill w/Bits  
String Line  
Wire Cutters  
Crow Bar  
Framing Square  
Sledge Hammer  
20 Meter Tape Measure

Materials - Trainees were shown the basic materials to be used for each craft. Each material was identified and described. If it was a material that was being manufactured on site, such as is the case with cinva-ram blocks, then the manufacturing process was explained and trainees were given an opportunity to observe the process. If it was a material that was brought in from another source, then the trainees were shown where the material was stored and how it was used in the construction process. For example, carpentry trainees were shown stored lumber and the different sizes and kinds, such as 2 x 4 x 10's versus 2 x 4 x 16's versus 3/4" plywood. Materials that were a component of a final product used in the project were identified as such and the method of assembly was explained. For example, gravel was identified as a component of concrete and 2 x 4's were identified as components of trusses. It was required that all trainees learn to identify the materials of their trade by name and understand their uses in the construction process.

The Final Product - Trainees were also presented with a description and tour of the finished house unit. They were shown how each house was constructed of the components they had been shown. Completed houses were inspected and mistakes or flaws identified for instructional purposes. In some cases, trainees were taken into the village to look at other examples of construction. Flaws were again pointed out showing the results of; for example, weak foundations leading to cracks in masonry walls, or poor brick joints that resulted in the erosion of a wall. Good construction practices were pointed to as examples of what the trainees should aspire to.

The following pages summarize the specific skills that were taught to the trainees in the three different training components -- Foundations, Masonry, and Carpentry. A more detailed description may be found in Training Manual For The Instructional Staff Of The Kurtunwaare Pilot Housing Project Crafts Training Program, written by the School Superintendent, James Blakely Bruce, and published by the Experimental Low Cost Construction Unit, School of Architecture, Florida A&M University. This manual was developed in Somalia as a reference and guide for the Training School Instructional Staff.

Foundations - The topic areas that were covered in foundations training are:

#### Basics

- Hammering
- Measuring
- The Level
- Assistance

#### Layout

- General Location
- Batter Boards
- String Placement
- Final Location

## Piers

- Location and Spacing
- Digging the Holes
- Reinforcement Steel

## Perimeter Beam

- Location
- Forms
- Reinforcement Steel
- Partition Beam Connection
- Stripping Forms

## Concrete Mixing, Pouring, and Finishing

### Backfilling

- Tamping
- Grading

## Floor Construction

## Partition Wall Beam Construction

The Basics - The basic skills that the foundations trainees were taught were: Hammering -- a trainee had to be able to hammer nails without bending them over and be able to extract them without badly damaging the wood; Measuring -- a trainee had to be able to make measurements as instructed; Use of level -- each trainee was required to know the basics of using a spirit level; Assistance -- trainees were taught to carry out and anticipate the orders of their supervisor. It is important to point out that the trainees were exposed to and familiarized with all aspects of foundations construction. This included skills such as the use of the transit, squaring up the string lines, concrete mixing, etc. However, they were not expected to master all of these skills. The aim was to produce a trainee who could at least anticipate the next task, have a basic understanding of it, and be able to aid their supervisor and co-workers in carrying it out.

Layout - Trainees were shown how to locate the point from which each foundation was to be laid out. This simply required that the trainees recognize the appropriate corner marker. Once the corner marker was found, trainees were shown how to roughly locate the corners of the house for use in placing the batter board stakes. When the stakes had been placed, their instructor, using the transit, had them assist in marking each stake at the proper elevation so that the batter boards could be nailed in place. Trainees were shown where to nail the batter boards so that they would be in the correct positions and how to prepare the string lines and place them on the batter boards. With this done, the instructor would show them how to assist him in correctly setting the string lines so that they were square and true, and finally how to place centerline marks on the string lines over the location of each foundation pier.

Piers - The trainees were shown how to mark the exact outline of the piers in the correct position using lime to make the lines; how to dig holes for the piers using a digging bar, shovel, and pick; identification of the correct pieces of prefabricated steel reinforcement, including instruction on the correct placement of the steel in the holes; and how the steel must be held 6 cm above the bottom of the excavations while the concrete was being poured.

Perimeter Beam - Once the piers had been poured, the trainees were taught to set up the formwork for the perimeter beam. Starting with the outside pieces of formwork, they were shown how to align the formwork with the string lines and set it at the proper elevation. To do this they were given a measuring block to measure down to the formwork from the string lines. They were then shown how to set up the inside pieces using a spirit level laid between the outside and inside formwork. With the formwork sitting temporarily in the correct position and elevation, the trainees were shown where to drive in the stakes that hold the formwork, how the formwork is nailed to the stakes, how to identify the correct piece of steel reinforcement and place it properly in the formwork by hanging it from temporary supports with tie wire, and where to locate the steel ties for the partition wall beam. With this done, the perimeter beam was ready to be poured.

Concrete Mixing, Pouring, and Finishing - Each trainee was given an opportunity to operate the concrete mixer. This entailed learning the correct proportions of sand, gravel, cement, and water to use in the mixer along with the correct procedures for operating the mixer. The correct methods were demonstrated for placing the concrete using wheelbarrows. This entailed setting up ramps and runways for the wheelbarrows and proper sequencing of the pour so that the most logical and simple manner was used for each given situation. They were also shown the best methods for carrying concrete in a wheelbarrow to avoid tipping it over, how to empty the wheelbarrows of concrete without knocking the formwork out of alignment, the way concrete must be vibrated or rodded to avoid air pockets, and finally how to screed and trowel concrete to produce the required finish. Once the concrete had been cured properly by keeping it sprinkled with water, the trainees were shown the techniques used for stripping forms in order to minimize damage to the perimeter beam or the formwork.

Backfilling - Once the perimeter beam had been poured and its forms stripped, the trainees were shown how to backfill the area inside the beam. This was done with sand fill. The trainees were shown how to tamp the fill as they went in order to provide a firm base for the floor and how to attain the correct level up to which the fill should be taken.

Floor Construction - The trainees were shown the procedure for pouring the concrete floors for the houses. This included the general instructions described under Concrete Mixing, Pouring, and Finishing, and instructions that specifically pertained to construction of the floors such as how to interface this task with the construction of the partition wall beam.

Partition Wall Beam Construction - Trainees were shown how to construct the partition wall grade beams. These were poured just before or simultaneously with the floors. Trainees were shown how to tie in the steel reinforcement and set it at the correct elevation.

Masonry - The topic areas that were covered in masonry training are as follows:

Basics

Laying Out a Bed of Mortar  
Laying Bricks to a Line  
Setting the Line

Building Layout

First Course  
Squaring Up  
Leveling Up  
Straightening Up  
Door Openings

Corners

Exterior Walls

Interior Walls

Gable Walls

Door and Window Openings

Temporary Wood Frames  
Lintels

Wall Finishes

Mortar

Scaffolding

Basics - The most basic minimum skills required of the masonry trainees before they could be promoted to the production crews were as follows: The trainee had to be able to lay a proper bed of mortar that would result in a good mortar joint of the required thickness; lay bricks to a string line so that they were level and plumb; and be able to set up the string lines for the next course. These three things were required of the least skilled graduate. Once these skills were mastered the trainee could be used for the bulk of the work required of the production crews. Any skills acquired beyond this led to assignment of the trainee to tasks that required the increased skill level.

Building Layout - During the course of their experience in the training program, the trainees were given several opportunities to observe a demonstration showing how to lay out the first course of bricks. This included locating the corners, squaring the walls by measuring diagonals, setting the proper top elevation for the first course to make up for any variation in the foundation elevations, and locating the door openings in the correct position. A trainee at the minimum skill level had to be familiar enough with this process to assist someone else in doing it.

Corners - Trainees were shown how to build up the corners of the houses so that they were level, plumb, and square. This skill is very important to the quality of construction of the house as it sets the points of reference from which the infill of the main portion of the wall is built. Each trainee was given ample opportunity to learn this skill. The ones that learned well were usually assigned this task on the production crews.

Exterior Walls - The trainees were taught the important differences between the interior and exterior walls. It was pointed out that the exterior walls had to support the roof and had different "special blocks" that had to be put in the right place. The special roof tie blocks were presented to the trainees and they were shown where to locate them so that they would line up with the correct position of the roof trusses. They were also shown where to locate the special door hinge blocks.

Interior Walls - The trainees were shown that a metal wall tie was required to tie the interior partition walls into the exterior walls and where to locate them.

Gable Walls - The trainees were shown the differences between building a gable end wall and the lower walls. This included how to set their string lines by wrapping them over the end truss rather than connecting them with line blocks to build up masonry corners, how to minimize brick cutting by starting their course at the outside and working in to the middle of the wall, and how to tie the gable wall into the end truss with pencil rod.

Door and Window Openings - The method for setting up wood frames for the door and window openings so that they were square and plumb was demonstrated along with how to support them with temporary braces. Trainees were shown how to install the special door hinge blocks, when and how to set the door and window lintels, and how they are tied into the brick wall.

Wall Finishes - At the end of each day or work period, the trainees were required to go over their work, pack the joints with mortar, and smooth them out with a jointing tool. Quality workmanship was especially stressed here. All the houses were painted with a mixture of cement, lime, and water to protect the walls from wind and rain erosion and from water seepage. The trainees were taught how to make and apply the wash.

Mortar - Each trainee was taught how to mix mortar. They were shown how to measure out the exact proportions of sand, cement, lime, and water, and how to tell when the proper consistency was reached. Since there were frequent mechanical or fuel problems that kept the mortar mixers from operating, they were also shown how to mix by hand. The trainees were required to use mortar boards while working and were shown how to keep their mortar from drying out in the sun and wind.

Scaffolding - All the trainees were taught how to set up the scaffolding they needed. An emphasis was placed on safety and all scaffolding set up in an unsafe manner was taken down and set up again correctly.

Carpentry - The topic areas that were covered in the carpentry training program are as follows:

#### Basics

- Measuring
- Marking Square Lines
- Sawing
- Hammering
- The Level

#### Foundation Formwork

#### Truss Fabrication

- Layout (general)
- Pitch
- Top Cord Layout
- Ridge Plates
- Bottom Cord
- Birds Mouth
- Storage

#### Truss Erection

- Truss Spacing
- First Truss and Temporary Bracing
- Diagonal Bracing (permanent)
- Ridge Beam

#### Roofing

- Palm Stalks
- Roofing Felt
- Mackuti Preparation
- Mackuti Installation
- Ridge Finishing
- Eave Finishing

#### Door and Window Frames

Basics - All trainees graduating from the carpentry component were required to have a minimum skill level which included the following skills. Each trainee was required to know: how to use a tape measure and be able to execute measurements in their work as instructed by a supervisor; how to use a try square for marking lines perpendicular to the edge of a board; how to use a hand saw to cut a straight and true cut along a marked line; and they had to be capable of driving a nail into a board without bending it over in addition to knowing a few different techniques of nailing. Examples of which are toe-nailing and flattening the point of a nail when there is a chance of splitting the wood. Trainees were also required to know the basics of nail extraction. Finally, each trainee had to know how and when to use a spirit level. Once these minimum skills were learned, the trainee was capable of carrying out most tasks required given proper supervision.

Foundation Formwork - The trainees were given an opportunity to construct the formwork for the foundations. This was done using plywood precut to the correct width. The trainees were given the length of the piece required and the plywood pieces were nailed together with 2 x 4's until the correct length was reached.

Truss Fabrication - A demonstration showing how the truss template is laid out was presented to the trainees, however, they were not expected to know this. Once it had been laid out, the trainees were given templates of each truss component and required to make the proper quantities of each piece. Once the components were made, the trainees fabricated the trusses using the first one as a template. They were then shown how to store the trusses until they were to be used.

Truss Erection - When it was time to begin setting the trusses, the trainees were shown how to mark the top of the wall so that the trusses would be set in the correct location. They were shown how the first truss is set using a temporary brace nailed to the truss and a stake in the ground. Once this truss had been set, the others followed using temporary bracing between each one. After all the trusses had been set, the trainees were shown how to permanently brace them using diagonal bracing in the ends and the ridge beam at the peak.

Roofing - After the trusses were set in place, the purlins made from palm stalks were nailed in place. The trainees were shown how to mark the top chord of each truss with the correct spacing for the palm stalks, and how to attain a straight gable eave using a string line run between the ridge purlin and the bottom purlin. They were shown how to prepare the tar paper by cutting it to the right width, how the mackuti (thatch) shingles must be pre-wired together, how to place the mackuti and tar paper starting at the bottom of the roof and working to the top, how to make and install the special tar paper and mackuti ridge cap, and finally, how to trim the eaves for a nice appearance.

Door and Window Frames - Occasionally the carpenters were asked to replace a worn out temporary door or window frame. The trainees were given this opportunity when it presented itself.

Leadership - The last component of the training program to be set up by the Florida A&M Team before their departure was the leadership training component. At the time of the Florida A&M Team's departure, the program had been initiated and had several candidates undergoing leadership training based on the program that is outlined below. Since it was to be the first time through, this approach was not considered to be final, but a guide to be modified as required by the school staff based on their actual experiences with it. Since there were no graduates from the program at that time, it will not be possible to evaluate its success.

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

Labor Foreman

The leadership trainees were to be assigned a crew of trainees and a specific house or complex set of tasks to work on. The crew was to be modeled after the production crews. This meant a crew of from four to six crafts trainees. The tasks assigned were general in nature, such as:

Foundations Leadership Trainee - Build the foundation on plot #3

Masonry Leadership Trainee - - - Build the walls on the foundation at plot #8

Carpentry Leadership Trainee - - Build the roof for house #7

Labor Foreman- - - - - Supply all the materials for the training program

The leadership trainees were to be required to take assignments such as the ones above, break them down into their components, and carry them out. This was to be done with 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 giving them a chance to observe and take part in the group decision making process. The following is a listing of the general areas of instruction that were covered in leadership training.

Tricks of the Trade

Qualities of Leadership

Planning, Scheduling, and Organization

Problem Solving and Decision Making Processes

Equipment Operation and Maintenance

Tricks of the Trade - The leadership trainee was taken considerably farther than the crafts trainees in their formal skill development training. The crafts trainees were taught to carry out specific tasks. This was done after a certain amount of preparation by their instructor or their production crew foreman. The leadership trainees were taught the skills required to support the basic tasks required of the skilled laborers. Examples of this would be layout and setting of the corners for the first course of bricks laid for a house, layout and construction of the first truss to be used as a pattern for other trusses, use of a transit for establishing elevations, etc.

Qualities of Leadership - Leadership in the pure sense is difficult to teach, but there are some basic principles that can be discussed and explained to the leadership trainees. Some of these are:

Personal relationship with their crew

Use of incentives and disincentives

Allocation of responsibility

Example setting

Teaching

The above mentioned principles and others were discussed as they came up in daily work situations. Actions taken by other foremen were analyzed. Problems with crews and crew members were discussed and decisions made as to how to handle them. However, the best way to learn these principles was to be placed in a position where the principles had to be used and learned from successes and mistakes as they were made.

Planning, Scheduling, and Organization - Some of the most important skills that could be imparted to a leadership trainee were those involved with planning, scheduling, and organization. This was typically one of the weakest areas of any of the trainees and would require the most effort to get across. Trainees were to be taught to look ahead of the immediate tasks in hopes of identifying upcoming problems or snags. They were to be required to arrive each morning with goals and a plan for the day, and to be able to discuss their ideas about what work would be required to be prepared for key construction phases for up to a week ahead. They were also to be responsible for arranging for materials, tools, or equipment that would be needed. This could sometimes take days to arrange requiring that they foresee the needs in advance. Most of these issues were brought to light through thorough questioning of the leadership candidates. Questions were to be carefully worded and presented to the candidate to help lead them to the realization that some action must be taken based on implications and observations of work that was going on around them. It would be very important that leadership candidates become fully aware of the principle behind the phasing of construction sequencing. They were also taught to try and recognize and avoid bottlenecks that might hamper the work of others.

Problem Solving and Decision Making Processes - Leadership trainees were helped to build their problem solving and decision making abilities by putting them in the situation of doing it. The chain of command and areas of responsibilities within the project management staff were explained and trainees were encouraged to go to those responsible for help in solving problems that required cooperative efforts or simply for advice as to how someone else would solve a particular problem.

Equipment Operation and Maintenance - Each leadership trainee whose craft required the use of sophisticated machinery or equipment was to be taught not only to operate it but also what was required to maintain it.

### School Staff Training

One of the most important tasks of the Florida A&M Team was the training of the Somali school staff. The staff was finally made up of ten (10) personnel (see organizational chart in the STAFF ORGANIZATION section). These consisted of a School Superintendent, Instructors of Foundations, Masonry, Carpentry, a general Labor Foreman, and five (5) Assistant Instructors. These personnel were critical to the success of the training program because they were to ensure continuation of the program.

When the Florida A&M Team left Kurtunwaare in December, the staff positions were filled as follows:

School Superintendent - - - - Provided by the SDA  
Instructor of Masonry

Instructor of Foundations - - Provided by the Labor Office  
Instructor of Carpentry            craftsmen labor pool

Labor Foreman - - - - - - - - Provided by the District  
Assistant Instructors            Authorities - settlers

The first four positions listed were filled by Somalis that spoke English adequately. The other positions were filled by settlers who spoke only Somali. It was the first four staff members, the School Superintendent, Instructors of Foundations, Masonry, and Carpentry who were initially trained.

Their training consisted of the following general areas:

- Basic Teaching Skills
- Construction Skills
- Leadership
- Personnel Management

## Organizational Skills

### Planning and Scheduling Skills

### 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 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 retraining had to take place so that proper methods would be taught to the trainees. This generally included teaching them all aspects of the skill they were to be teaching (listed in the TRAINING PROGRAM section) and all the "tricks of the trade" taught to leadership trainees. The staff members were taught the basic teaching skills required to teach their skill which included presenting and demonstrating skills to the trainees in a clear, logical sequence and careful observation of the trainees' work in order to prevent and correct mistakes through additional instruction.

All the members of the school staff were taught the basic principles of leadership outlined in the Leadership Training section of this report which are also listed above. 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 that came up. This approach worked well since there was usually adequate opportunity during the day to discuss and solve the many problems that came up. This approach benefited also from the fact that the problems were real and applied specifically to the development of the training program. In addition to the informal teaching described above, the staff was instructed formally during the school staff meetings. After the staff meeting business was taken care of, problems that the staff and the Florida A&M Team encountered were brought up, discussed, and resolved.

# **STAFF ORGANIZATION**

Summary

Florida A&M University  
Technical Assistance Team

Somali Staff

## STAFF ORGANIZATION

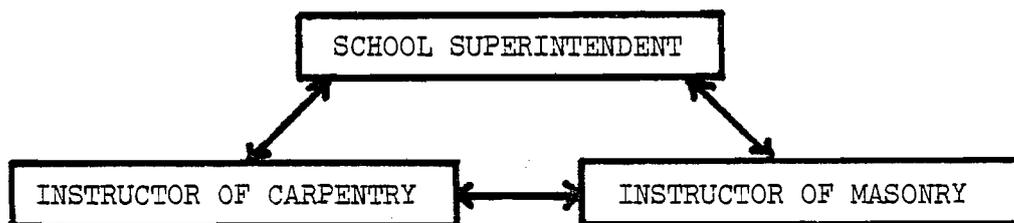
### Summary

The training school staff was divided into two main parts. They were the Florida A&M Technical Assistance Team and the Somali Staff. The basic purpose of the Florida A&M Team was to organize, develop, and set into motion the training program. The purpose of the Somali Staff was to assist the Florida A&M Team in doing this and to continue the program after they were gone.

The Somali staff consisted of a School Superintendent, Assistant to the School Superintendent, Labor Foreman, Foundations Instructor, Masonry Instructor, Carpentry Instructor, and several Assistant Instructors. Each position had a specific set of responsibilities that are set forth on the following pages. Some other positions were created by the Florida A&M Team in response to needs identified at the time.

### The Florida A&M University Technical Assistance Team

Team Responsibilities - The Florida A&M University Technical Assistance Team was responsible for initiating the Crafts Training Program. The team consisted of three Field Personnel and one Administrative Coordinator based in the USA. The team members are all part of the Experimental Low Cost Construction Unit which is a part of the School of Architecture at Florida A&M University in Tallahassee, Florida, USA. The field personnel organization was as follows:



The Florida A&M Team was dedicated to a group decision-making process. Each problem encountered by the team was analyzed and discussed until a decision was reached. Once this decision was reached, action was taken by the appropriate team member(s). The team member who carried out the action was usually determined by agreement and based on his contractually defined responsibilities. These responsibilities are listed below:

SCHOOL SUPERINTENDENT - James Blakeley Bruce

Length of Assignment - 6 months

Responsibilities:

Establish, organize and set up crafts training school, provision of equipment and spaces, identification and organization of teaching personnel and trainee labor classes.

Establish trainee selection criteria with SDA.

Determine, with Technical Assistance Team and SDA officials, the work force required and the division into construction crews.

Establish, with the Assistant Superintendent, a curriculum for crafts training.

Assist in the initiation of an on-the-job training plan.

Establish and organize a leadership training program.

Monitor and evaluate all training activities.

Refine on a periodic basis all training activities.

Supervise craft instructors.

Train counterpart and local instructors.

INSTRUCTOR OF MASONRY - Millard M. Wright

Length of Assignment - 6 months

Responsibilities:

Assist in establishing and operating a crafts training school.

Procure instructional equipment, tools and materials.

Organize training program for block workers, stoneworkers and masons.

Teach basic masonry skills: blockwork, brickwork, stonework, mortar mixing and concreting.

Assist in establishing on-the-job training for masonry personnel.

Train counterpart instructor.

INSTRUCTOR OF CARPENTRY - David Tod Hollister

Length of Assignment - 6 months

Responsibilities:

Assist in establishing and operating a crafts training school.

Procure instructional equipment tools and materials.

Organize training program for carpenters.

Teach basic carpentry skills: rough carpentry, form carpentry, roof structure, joinery and finished carpentry.

Assist in establishing on-the-job training for carpentry personnel.

Train counterpart instructor.

Additional Services - The Florida A&M Team performed the following services in addition to their contractually outlined responsibilities.

Provision of general construction supervision to aid in the mobilization of the project in the early stages (first 2 months).

Temporarily filled the Superintendent of Carpentry position (first 4 months).

Set up, organization, and daily operation of the Cinva-ram Block Plant.

Design of eleven (11) alternative house units that were built to aid the SDA in deciding on a suitable design.

Investigation and limited testing of alternative roof systems that could be used in place of thatch.

Provision of Construction Supervision - At the beginning of the project, each member of the Florida A&M Team directed the majority of their time towards the supervision of the construction of all or major parts of the following projects:

Completion of the staff living compound.

Construction of the staff living compound generator building and carpentry workshop.

Construction of the Cinva-ram Block Plant.

In general, the supervision provided was in the form of foundations, masonry, and carpentry supervision.

Superintendent of Carpentry - This position was temporarily filled by the Instructor of Carpentry, David Tod Hollister. (See original project proposal for required job responsibilities.) In addition to the organization, training, and daily operation of the carpentry crew, this opportunity was taken to begin training the first group of settlers by assigning them as apprentices to work with the original skilled carpenters. This apprenticeship, along with their formal instruction, made up the beginning of the carpentry training curriculum.

Cinva-ram Block Plant - The cinva-ram block plant was organized, and set up by the Instructor of Masonry, Millard M. Wright. This work included the following:

- Procurement and organization of plant personnel.

- Design and modification of the production process.

- Identification and procurement of special block materials such as clay.

- Procurement of all other materials.

- Daily operation of the plant.

- Instruction and training of plant personnel.

- Instruction and training of plant management personnel.

Alternative House Unit Design - The Florida A&M Team developed the design of a range (eleven) of alternative house unit designs. They were built on two different sites. The first was designed for Xubin A-3 and was used on all ten plots in order to show its effect on a complete site. It consisted of two rooms, a small cooking room, and a breeze-way/sitting space that connected the kitchen to the two rooms. Two variations on the construction of the roof were tested when the houses were built. They were a gable roof version and a hip roof version.

The other ten units were built on the school site, Xubin A-2. There were three basic alternative design concepts. From these three design concepts came ten variations; three to four alternatives per basic concept (see school site plan in the Facilities, Equipment, Tools, and Materials section of this report or Design of Housing Unit Alternatives For The Kurtunwaare Pilot Housing Project, published by the Experimental Low Cost Construction Unit, School of Architecture, Florida A&M University, for additional information on the units that were designed.)

Investigation of Alternative Roof Systems - The investigation of alternatives to a thatch roof membrane was taken on by the Florida A&M Team and primarily carried out by the Administrative Coordinator, Lawrence E. Birch. This investigation consisted of a literature search and some actual testing of several ideas at the site. It resulted in a report titled, Preliminary Study Of Alternative Roofing Systems Available For Use In The Kurtunwaare Pilot Housing Project.

## Somali Staff

In addition to the Florida A&M Team, the Settlement Development Agency (SDA) provided Somali counterparts whose initial purpose was to assist the Florida A&M Team in setting up and carrying out the first phases of the training program. An important part of this assistance was language translation. Eventually the Somalis were to take over the day-to-day operation of the program themselves. In the original project conception, the counterparts were to replace in title and responsibility, man for man, the Florida A&M Team. However, the resulting School Staff organization represents a slightly different organization than the one first visualized. There were three main differences. They are the addition of:

1. An Instructor of Foundations
2. A Labor Foreman
3. Assistants for each of the School Staff

The Training School organization is represented by the chart on the following page.

Originally the SDA supplied three counterparts for the three contractually defined positions of School Superintendent, Instructor of Masonry, and Instructor of Carpentry. Of the original three candidates, one remained, filling the position of Instructor of Masonry. The School Superintendent position was filled through the recruiting efforts of the Project Superintendent and the SDA. The Instructor of Carpentry and Instructor of Foundations positions were filled from the government labor office skilled labor pool. Use of skilled laborers from the labor office was requested by the SDA in order to mobilize the production crew at the beginning of the project. All the other staff positions are filled by the most promising Kurtunwaare settlers.

A listing of the positions filled by Somalis provided by the SDA and the local District Officials follows:

School Superintendent

Assistant to the Superintendent

Labor Foreman

Instructors

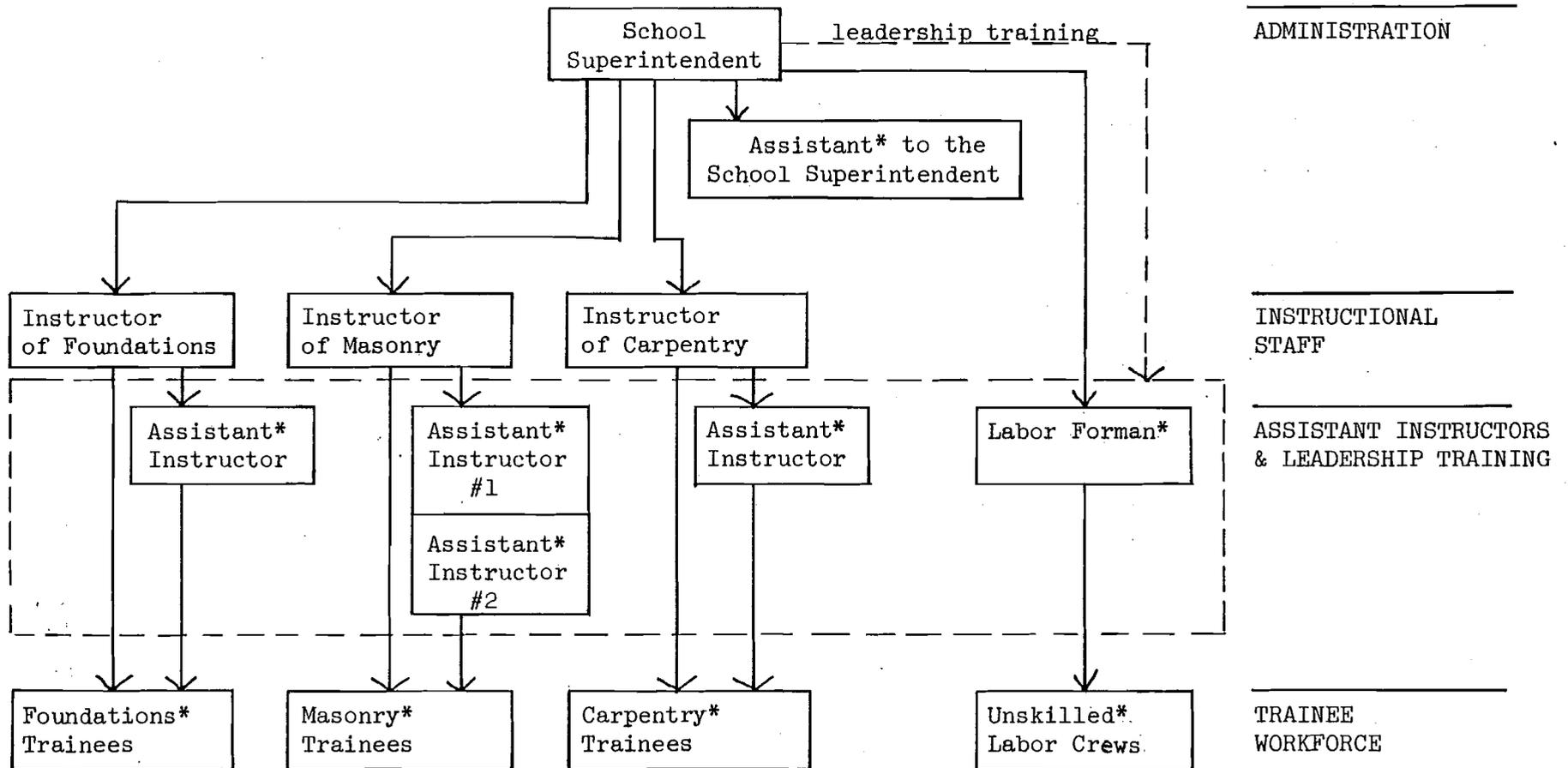
Foundations

Masonry

Carpentry

Assistant Instructors

Each of the above listed personnel had specific duties and responsibilities assigned to them. These duties and responsibilities along with the



\*Indicates local Kurtunwaare settlers

ORGANIZATION OF CRAFTS TRAINING SCHOOL

41

rationale for creating the position (if applicable) follow.

School Superintendent - The School Superintendent was comprehensively responsible for all school activities, successes, and failures. He answered directly to the Project Superintendent and was identified as a separate line in the chain of command. The school and the School Superintendent were completely separate from the production crews. The job responsibilities of the School Superintendent are listed below.

Job Responsibilities:

Organize and operate the daily, weekly, and monthly functions of the training program.

Record, monitor, and evaluate training program activities.

Establish and maintain a formal operational relationship with the District Authorities.

Determine and establish the number of trainees needed by the production crew.

Determine and establish the rate of graduation that is feasible under the given conditions.

Establish and upgrade criteria for candidate selection.

Adjust the training activities so they conform to the work being done by the production crews.

Work with the leadership training candidates to train them to become new instructors, foremen, and crew chiefs.

Recommend additional school staff be hired or that existing staff be dismissed as required.

Request new trainees from the district.

Organize and lead staff meetings.

Request tool and material purchases as needed by the program.

Assistant to the School Superintendent - This position was created so that some of the routine administrative load could be shifted from the School Superintendent. The major function of the Assistant was the checking in and out of tools and equipment and taking care of a portion of the record keeping required. The assistant was stationed in the school office so that someone was there at all times to take messages in the absence of the School Superintendent.

Labor Foreman - The Labor Foreman, along with his crew, represented an arm of the School Superintendent. He was responsible for carrying out physical organizational tasks required for the smooth operation of the school. The job required the organization and management of an unskilled labor crew and the scheduling of events such as the provision of materials for the training components. The position of Labor Foreman was created for two reasons. First, it offered a good opportunity for use as a leadership training position (described in detail elsewhere). Second, it was necessary to create a crew of laborers to carry out tasks around the school site that were of minimum educational value, such as cement, water, lumber, and bricks. In addition to this, the laborers could be used to do difficult but repetitious work, such as excavation for foundations. Laborers were also used to pitch in and help the training crews when it was necessary to adjust the pace of the work of some crew in order to keep the phases of construction in sequence. The job responsibilities of the Labor Foreman were as follows:

Job Responsibilities:

Supervision of the labor crew.

Acquisition of personnel for the crew when required.

Issue and collect tools used on a daily basis.

Train laborers in the proper use and care of the tools.

Maintain and operate, when required, (with the assistance of the labor crew) the concrete and mortar mixers.

Organize the provision of materials and equipment as needed by the training crews.

Cleaning and maintenance of the site in general so that it was a clean and safe place to work.

Foundations Instructor - It was found that the training of foundations crews would be required. Although many of the foundations crew members necessary needed only to be unskilled laborers, it became apparent that a great deal of training was required for the skilled portions of the work. Therefore, the foundations component of the training program was formed, and along with it an Instructor of Foundations.

The Foundations Instructor job was difficult. The instructor had to balance the requirements of training with those of production. If construction of the foundation lagged behind, the entire program could be held up. For this reason it was critical that the foundations instructor maintained a rigorous schedule of construction in order to remain ahead of the masonry and carpentry crews. Additionally, the work required to build foundations was the most physically demanding of the three training components. Foundation excavation, set up of formwork, and pouring concrete were all very labor intensive tasks. The job responsibilities of the Foundations Instructor were as follows:

#### Job Responsibilities:

Determine special criteria for candidate selection specific to foundation work.

Formalize and modify construction techniques with the Superintendent of Foundations so that trainees are using the same techniques as production crews.

Establish a training schedule that would ensure that the construction of foundations would stay ahead of the need for foundations by the masonry and carpentry crews.

Issue and collect tools used for training on a daily basis.

Instruct trainees according to the technical steps described in the Instruction/Training manual.

Establish appropriate skill evaluation criteria.

Determine if additional staff would be needed to assist in the Foundations Training Component and request if necessary.

Evaluate all foundations trainees each week.

Recommend trainees for promotion to the Production crews as they became ready.

Request additional trainees for the foundations crew as required.

Masonry Instructor - The Masonry Instructor was responsible for operating the training component that produced the bulk of the graduates. More masons were needed in this project than any other skill. This required that the size of the training crew be larger, requiring closer attention or more instructors. Unlike the other two training components, the accumulation of a number of very small mistakes could lead to serious problems that were difficult to correct. The Instructor had to carefully watch all trainees and be constantly on the lookout for mistakes. The job responsibilities of the masonry instructor are listed below.

#### Job Responsibilities:

Determine special criteria necessary for candidate selection specific to masonry construction.

Formalize construction techniques with the Superintendent of Masonry.

Establish a training schedule which would promote trainees to the production crews at a rate necessary to achieve the goals of the masonry production crews.

Issue and collect tools used on a daily basis.

Instruct the trainees according to the technical steps described in the Manual of Instruction.

Determine if additional staff was needed to assist in the instruction of masonry skills.

Establish appropriate skill evaluation criteria.

Evaluate trainees each week.

Recommend trainees for promotion to training programs as they are ready.

Request additional trainees from the School Superintendent as they were required.

Carpentry Instructor - The Carpentry Instructor had to be able to teach only the simplest and most straight-forward aspects of the trade. The carpentry training program was built around teaching rough carpentry, formwork, fabrication, and roof framing. Like the masonry program, the carpentry training program offered a skill that was marketable outside the settlement. This fact presented a problem when trying to keep trainees and tools in the program. The responsibilities of the Carpentry Instructor were as follows:

Determine special criteria required for trainee selection specific to the tasks required of a carpenter.

Formalize construction techniques with the Superintendent of Carpentry.

Establish a training schedule responsive to the need for carpenters in the production crew.

Issue and collect tools used.

Determine if additional staff was needed to assist in the carpentry training component.

Instruct trainees according to the technical steps described in the Manual of Instruction.

Establish appropriate skill evaluation criteria.

Evaluate trainees every week.

Recommend trainees for promotion to the production crew.

Request additional trainees as required.

Assistant Instructors - It had long been recognized that when the time came for the Florida A&M Team to return home, the effective training staff would be reduced. In order to help fill this gap and provide additional positions for leadership training, the Assistant Instructor positions were created. At least one assistant was assigned to each instructor, and in the case of the masonry instructor, two were assigned, as the number of trainees in the masonry component was greater than the others. The assistants were looked upon as potential future instructors or leadership trainees. In addition, they provided extra eyes and ears for the instructors. Their task was to assist the instructors with the training program by taking responsibility for a small crew of trainees. This also provided the necessary position for leadership training. Their job responsibilities were the same as those of the instructors except modified by the role of assistant.

# **TRAINEES**

Summary

Organization of Trainee/Craftsmen  
Selection System

Selection and Recruitment

Documentation

Evaluation Process

Promotion/Graduation

Absenteeism

Incentives/Disincentives

Trainee Data

## TRAINEES

### Summary

New recruits consisting of Kurtunwaare settlers were assimilated into the project and directed to the most appropriate position or weeded out by a selection system set up for this purpose. The selection system was a part of the training program curriculum. 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 they lived, and what their skills were. Each trainee was evaluated each week, and this evaluation was noted on their card. The evaluation criteria was based on the development of the trainees physical and mental abilities, and their motivation. A policy was developed to handle disciplinary problems, such as absenteeism and a system of incentives and disincentives was developed in an attempt to positively influence the attitude of the settlers towards their work. A number of groups of trainees were trained and promoted before the Florida A&M Team left and data was collected about those groups.

### Organization of Trainee/Craftsmen Selection System

Fresh Kurtunwaare recruits were synthesized into the project by a complex system of indoctrination. This started with a settler who was completely unfamiliar with construction processes and could lead the settler ultimately to the possibility of becoming a part of the key supervisory staff. As previously mentioned, there were three distinct phases of this process of selection which were:

Unskilled Labor Experience

Crafts Training Components

Leadership Training

These phases led to the screening out of candidates that were unsuited for work on the project. It also helped identify those that were suitable, including the identification of supervisory personnel. Hopefully, it also provided a sort of incentive system based on the status associated with promotions to positions requiring greater skill or responsibility. A flow chart of the major aspects of this process is presented on the following page.

The critical points for screening and selection that led to placement in the appropriate portion of the project are as follows:



Recruitment and Initial Selection

Unskilled Labor Experience

Leadership Candidate Search Process

Crafts Training Program

Production Crew Experience

Leadership Training

Instructional Staff Training

Recruitment and initial selection was the first of the screening processes. Based on minimum selection criteria (see Crafts Trainees - Selection and Recruitment) new recruits were accepted or rejected for induction into the program. Once accepted, the recruits were placed in the unskilled labor pool. This provided their first exposure to the construction processes of the project and was a test of their desire to remain with the project. At this point, recruits replaced trainees that were being transferred into the training program who, in turn, replaced craftsmen apprentices being promoted out of the training program into the production crews. Recruits were told that they would be given an opportunity for crafts training once they had completed a period of time working as unskilled laborers. This resulted in more enthusiastic unskilled laborers, minimized fruitless training efforts on trainees that became drop outs, and provided a good introduction to the construction processes so that trainees were familiar with the project methods.

The leadership candidate search process was an ongoing affair in which all production and training staff members took part. They were continually on the lookout for the most outstanding workers on their crews. Once spotted, their names are referred to the Production Superintendents for referral to the School Superintendent. The candidate was then reviewed and monitored for future acceptance into the leadership training program.

Screening in the Crafts Training Program consisted of the identification of candidates for teaching positions and leadership positions, evaluation of trainee skill development for promotion to production crews, and retraining or rejection, in addition to the usual amount of drop outs. After the trainees were promoted to the production crews, they were given a one or two week trial period. They were either accepted into the crews or returned for retraining. Again, in the production crews, those with potential leadership skills were sought out for training. Most apprentice craftsmen, however, remained in the production crews where their skills continually improved with practice and appropriate supervision.

Leadership Training and the training of Instructional staff worked less as screening systems and more as selection and improvement of the final product of the screenings.

## Selection and Recruitment

Settlers for the training program were provided by the Kurtunwaare District Authorities. The need for new recruits had to be anticipated by the School Superintendent at least a week before they were required. This allowed time for the School Superintendent to prepare a formal request for recruits and time for the District Authorities to gather recruits from the various village sectors. Along with the request went a description of the minimum requirements necessary for trainee success in the program. They were:

- Age - - - - - 18 - 30 years old
- Health - - - - Good general condition; no physical disabilities.
- Motivation- - - Candidates should want to learn a skill.
- Residence - - - Candidates must live in the Kurtunwaare main village.

The rationale behind the above criteria was developed as a result of experiences gained while operating the program. They were as follows:

Age - The 18 - 30 year old age group was specified to the District Authorities with an emphasis on younger recruits in the given age group. From experience with recruits younger than 18, it was determined that there was a high drop out rate due to conflicts with required village education or the fact that many simply graduated, received their tools and left for higher paying jobs elsewhere. This was not altogether bad, but it was also not conducive to the building of a workforce for the project. Older settlers, it was found, could be difficult to train. Frequently they were not committed to the settlement, found it difficult to learn from younger teachers, and could be victims of the "you can't teach an old dog new tricks" syndrome. Although some of the best trainees were older settlers, the above generalities tended to prove true for the majority.

The rationale for Health and Motivation is obvious. The Residence requirement resulted from a transportation problem due to the fuel shortage experienced. Occasionally recruits were assigned to the program that lived in distant villages in the Kurtunwaare District. Since project personnel are provided transportation to and from the site, it became not only a fuel problem, but also a problem of logistics. Therefore, only recruits from the main village were accepted into the program.

It was found that the sex of the individual had no bearing on either the ability to learn or the skill level the trainee was capable of reaching. Male and female graduates were equal in abilities and productivity. The only problem encountered in training women was their traditional dress. The long wraps tended to flap in the wind, getting in the way of their work, and this was sometimes dangerous. This fact made little difference with masonry or foundations trainees, but was significant to carpentry trainees, especially while climbing on the roof frames under construction.

## Documentation

A simple system for keeping track of the trainees was developed for the program using file cards. All pertinent information regarding the trainees while in the training program was kept on these cards. The information stored fell under the following overall headings:

- Personal Information
- Craft Skill and Tools
- Salary Information
- Weekly Review and Final Evaluation

The purpose of the card file system was twofold. The information made up the core of the data kept by the Training Program on the trainees. In addition, the cards were to become a part of the records of the District Authorities for their reference when trying to identify personnel for a village construction job other than the housing project or for future phases of the housing project. These cards were organized into three (3) main headings:

- Trainees
- Graduates
- Rejects/Drop Outs

The card is illustrated on the following page.

## Evaluation Process

Each trainee was evaluated regularly using the following general criteria.

- Physical Ability
- Mental Understanding
- Motivation

These three areas of development were seen to be the key areas for evaluation irrespective of the craft training component of which the trainee was a part. A definition of each follows.

Physical Ability - The work performed by new recruits at first seemed awkward and went slowly. As their experience increased, they became more accustomed to their work and tools. This was manifested by an improvement in a trainee's physical comfort and confidence resulting in improved work

TRAINEE EVALUATION CARDS

front

NAME: \_\_\_\_\_

LOCATION: \_\_\_\_\_ BIRTH DATE: \_\_\_\_\_

SEX: \_\_\_\_\_ STUDENT: \_\_\_\_\_ WORKER: \_\_\_\_\_

TRAINING PROGRAM ENTERED: \_\_\_\_\_

DATE ENTERED: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

TOOLS ISSUED: \_\_\_\_\_

LEADERSHIP ABILITIES?: \_\_\_\_\_

SALARY RECEIVED & DATE:

2 \_\_\_\_\_ 4 \_\_\_\_\_ 6 \_\_\_\_\_ 8 \_\_\_\_\_ 10 \_\_\_\_\_ 12 \_\_\_\_\_

SALARY REQUESTED & DATE:

2 \_\_\_\_\_ 4 \_\_\_\_\_ 6 \_\_\_\_\_ 8 \_\_\_\_\_ 10 \_\_\_\_\_ 12 \_\_\_\_\_

rear

WEEKLY WORK REVIEW:

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

6 \_\_\_\_\_

7 \_\_\_\_\_

8 \_\_\_\_\_

9 \_\_\_\_\_

10 \_\_\_\_\_

11 \_\_\_\_\_

12 \_\_\_\_\_

FINAL SUMMARY STATEMENT: \_\_\_\_\_

\_\_\_\_\_

quality and speed. This was to be noted by the Crafts Instructor for use in evaluating the trainee.

Mental Understanding - New recruits usually had little or no understanding of the rudimentary reasons for performing a set of tasks in the specific order and way they were shown. At this point, they simply imitated exactly what they thought they were shown. As they gained experience and instruction, they began to understand the reasons for what they did. This could be evaluated by instructors through observation and questioning of the trainees.

Motivation - The work and training was difficult and physically exhausting for new recruits unused to their tasks. This, combined with incentive problems, could lead to a real lack of concern about their work. However, once a trainee's physical and mental abilities improved and they began to see their training leading to a skill that could increase their income either in the project or outside the village, motivation became greatly improved.

In general, the development of all these abilities led to a dramatic improvement in the quality of work and the speed at which it was done.

The evaluation of each trainee took place daily by each instructor by the making of mental notes or actual record keeping depending on the preference of the instructor. Then, at the end of each week, there was a staff meeting during which the evaluation of each trainee took place. The final decision rested with the Instructor of a given craft and the School Superintendent. The result of the decision was recorded on the information cards previously described along with a summary evaluation and a recommendation in regard to the trainee's leadership potential.

From past experience with the training program it had been noted that the usual time required for promotion to the production crews was about eight weeks. However, this process could be as short as three weeks and take as long as twelve. Since one of the goals of the training program was to achieve a minimum skill level, trainees were graduated when this level was reached.

### Absenteeism

One of the most difficult problems that had to be dealt with was that of absenteeism. Most of the time the percentage of total attendance that could be counted on was approximately 75-80%. However, it was not unusual at times to have no more than 25% of a given training crew show up. This could cause a great deal of difficulty for the instructors when trying to plan the amount of work, materials, etc., required for a days instruction. In an attempt to discourage unexcused absenteeism, the following policy was developed.

Any unexcused absence was reported to the District Authorities.

The District Authorities were advised not to pay the trainees for days absent without an excuse.

An unexcused absence was defined as an absence for any reason other than health. Absences due to health were to be verified by a written note from the district doctor.

After 5 consecutive unexcused absences a trainee was dismissed from the program. The District Authorities were notified and encouraged to take whatever disciplinary action they felt necessary.

Trainees with 3 consecutive unexcused absences were demoted to an unskilled labor crew. The District Authorities were notified and encouraged to take whatever disciplinary action they felt necessary.

Trainees with consistently bad attendance records, but not meeting the above 2 criteria, might be subject to demotion to the unskilled labor crews depending upon the judgment of the School Superintendent.

### Incentives

One of the problems identified in the original project proposal and then confirmed through experience with the project was the difficulty in setting up systems of work incentives. It goes against the social and economic practices of the Somali government to provide anything other than minor monetary incentives. However, it was feasible to attempt to set up other types of incentive systems. The incentive systems set up for the training program fell into three major categories which were:

- A) Self Concept Enhancement
- B) Material Gains
- C) Monetary Gains

The specific incentive systems that were set up and the category(s) under which each one fell are listed below.

	A	B	C
-The perception of most settlers seems to be that skilled construction work is more desirable and provides greater status than farm labor. This perception was constantly reinforced in the training program.	X		
-The craft skills taught in the program seem to be perceived by the settlers as skills that could lead to high paying jobs. This was reinforced.	X		

	A	B	C
-A promotion system was set up allowing promotions as skills increased.	X		
-Minimal increases of pay with a promotion were negotiated for and agreed to by the District Authorities.*			X
-A set of tools was issued to each settler promoted into a production crew.	X	X	
-A tea house was requested and set up by the District Authorities providing free tea and bread for breaktime in addition to the food allotment.			X
-Transportation: All settlers were transported to and from the site in personnel transport trucks rather than the farm wagons used for the farm laborers.	X		

In addition to the above, it was also recommended to the SDA and the District Authorities at every opportunity that all settlers who worked on the project through to the end be promised one of the houses. This promise could also be tied to a minimum production rate that could increase work productivity on the project.

It must be recognized also that along with the incentives came disincentives which were used to define the lower limits of acceptable behavior. Although disincentives were rarely required except in the case of absenteeism, they ranged from rejection from the program, to demotion, to sending settlers to the District Authorities for disciplinary actions. These actions could, at times, be as severe as jail depending on the policy of the authorities. Actions as harsh as jail were not encouraged by the Florida A&M Team or the school staff. However, the sovereignty of the District Authorities was recognized and the few cases calling for disciplinary action (other than in the cases of demotion or dismissal) were referred to them.

### Trainee Data

On the following page is a listing of training groups including the time they started, the time they were promoted to the production crews, and what happened to those that were not promoted.

\*These had not actually been implemented before the Florida A&M Team left.

GROUP AND COMPONENT			TIME STARTED		TIME PROMOTED		STATUS**				
ABREV.	GROUP	COMPONENT	DATE	WEEK	DATE	WEEK	1	2	3	4	5
G1-M	1	Masonry	09/07	10	10/30	18	14	5	8	1	0
					11/11	19	--	4	1	-	-
					11/18	20	--	3	-	0	-
					TOTALS		14	12	-	1	0
G1-C	1	Carpentry	09/07	20	20/30	18	21	15	9	1	0
G1-M	1	Masons	10/18	15	11/18	19	6	5	0	1	0
G2-F	2	Foundations	11/01	18	11/29	22	7	6*	0	0	1
G2-M	2	Masonry	11/01	18	11/27	22	9	8	0	0	1
G3-M	3	Masonry	11/16	20	12/18	24	10	5	4	1	0
					12/25	25	--	4	-	-	0
					TOTALS		10	9	-	1	0
G3-C	3	Carpentry	11/16	20	12/04	22	10	2	8	0	0
					12/11	23	--	1	3	4	0
					12/18	24	--	3	-	-	0
					TOTALS		10	6	-	4	0
G4-F	4	Foundations	12/20	25	-----	--	8	0	8	0	0
G4-M	4	Masonry	12/20	25	-----	--	18	0	18	0	0
G4-C	4	Carpentry	12/20	25	-----	--	6	0	6	0	0

\*Promoted but retained in the training program to continue building foundations.

\*\*STATUS

- 1) Number of trainees started in training component.
- 2) Number of trainees promoted to craftsmen apprentices on production crews.
- 3) Retained in training component for additional training to be promoted later.
- 4) Explained absence from program (i.e. bad health) or dropped from program.
- 5) Unexplained absence from program of 5 days or more (i.e. disappeared).

To summarize the previous chart, the following has been presented:

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<u>COMPONENT</u>	<u>TOTAL TRAINEES PROMOTED</u>
Foundations	6
Masonry	34
Carpentry	21
<hr/>	
TOTAL	61 (as of 12/18/80)

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In order not to be misleading, it must be pointed out that of the 61 craftsmen apprentices, all did not necessarily stay with the production crews after they were promoted. Records pertaining to the settlers attendance were not kept after they left the training program so there is no hard data to use in showing the actual losses. However, it was generally agreed upon by the Florida A&M Team that of the first group (G-1) of trainees promoted, only about one third (33%) remained with the project. This verified the drop out or loss rate predicted in the original project paper. Upon closer inspection, it was determined that this loss rate was partly due to the fact that many of the early Group 1 (G-1) trainees were of school age. This meant that they had to return to school after a time thereby leaving the project. Another factor in the loss rate was the fact that the Unskilled Labor Experience component of the training program had not yet been initiated. Both of these factors were identified as problems in retaining the settlers in the project and were addressed in two ways. First, with the trainee selection criteria that was developed, and second with the "weeding out" effect of the Unskilled Labor Experience.

# **SCHEDULES**

Summary

Typical Daily Schedule

Typical Weekly Schedule

Typical Training Cycle

Schedule Of Events As They Occurred  
From July To December 1980

## SCHEDULES

### Summary

On the following pages are the typical daily and weekly schedules. They are presented here so that the reader may visualize the time frame set up around the organizational structure of the training program. A schedule of events as they occurred over the time period lasting from July to December is also presented.

### Typical Daily Schedule

- 6:00 a.m. - 6:30 a.m. Transport trainees and staff from village to school site.
- 6:30 a.m. - 6:45 a.m. Take class rolls, organize work, check out tools, and assign training tasks.
- 6:45 a.m. - 9:00 a.m. Instruction and supervision of trainees.
- 9:00 a.m. - 9:30 a.m. Breakfast break.
- 9:30 a.m. - 9:40 a.m. Check class rolls.
- 9:40 a.m. - 12:45 p.m. Instruction and supervision of trainees.
- 12:45 p.m. - 1:00 p.m. Clean up and check in tools.
- 1:00 p.m. - 1:30 p.m. Transport trainees and staff from school site to village.

## Typical Weekly Schedule

Day 1	Saturday	6:00 a.m. - 1:00 p.m.	Instruction and supervision of trainees. Weekly clean up as required. Introduction of new trainees, if any. Promotion of new apprentice craftsmen to production crews, if any.
Day 2	Sunday	6:00 a.m. - 1:00 p.m.	Instruction and supervision of trainees.
Day 3	Monday	6:00 a.m. - 1:00 p.m.	Instruction and supervision of trainees.
Day 4	Tuesday	6:00 a.m. - 1:00 p.m.	Instruction and supervision of trainees.
Day 5	Wednesday	6:00 a.m. - 1:00 p.m.	Instruction and supervision of trainees.
Day 6	Thursday	6:00 a.m. - 11:00 a.m.	Instruction and supervision of trainees.

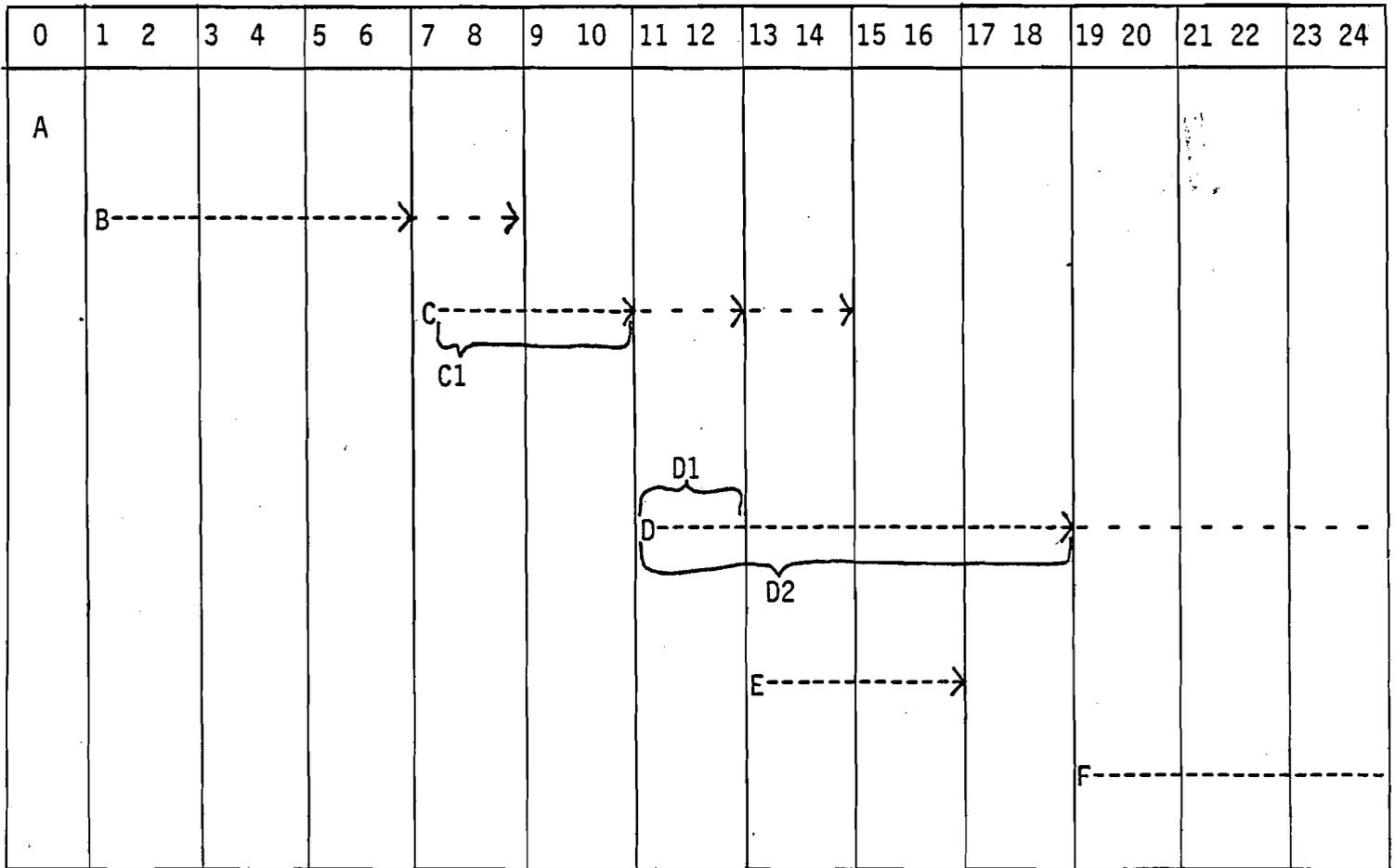
Staff meeting:

Evaluation of trainees.  
Decision on promotions, if any.

Day 7 Friday      D a y      O f f

# Typical Training Cycle

WEEKS



- A. Recruitment
- B. Unskilled Labor Experience
- C. Training Program
  - C1. One month minimum required before graduation (typical duration)
- D. Promotion to Production Crews (typical craftsman continues on with project)
  - D1. 2 week trail period
  - D2. 8 weeks experience required before entering leadership training program
- E. Retraining as required, if craftsman rejected after 2 week trail period
- F. Leadership Training Program (length of time as required)

	JULY			AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				MONTH																															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	WEEK																												
<b>SITE CONSTRUCTION SEQUENCE:</b>	Project Mobilization			Training Program Mobilization				Training Program				Establish School Site @ Xubin A-2				Xubin B-2																																							
<b>TRAINING PROGRAM</b>				Training of Personnel				Cinva-Ram Block Plant Set Up and Daily Operation				A-2 #1				A-2 #2 (Office)				A-2 #3				A-2 #4				A-2 #5				A-2 #10				A-2 #9				A-2 #8				A-2 #7				A-2 #6				B-2 #1			
<b>CRAFTS TRAINING PROGRAM</b>								Crafts Training																Leadership Training																															
<b>FLORIDA A&amp;M TEAM:</b>																																																							
<b>SCHOOL SUPERINTENDENT</b>	Staff Compound Completion			Training Program Mobilization				Operation of Masonry Component				School Administration				Prepare School Staff Training Training Manual																																							
<b>INSTRUCTOR OF MASONRY</b>	Staff Compound Completion			Set Up, Organization, and Daily Operation of Cinva-Ram Block Plant								Operation of Masonry Component																																											
<b>INSTRUCTOR OF CARPENTRY</b>	Staff Compound Completion			Leave of Absence				Operate Carpentry Component				Operation of Foundations Component																																											
<b>ADMINISTRATIVE COORDINATOR</b>				Roofing System Investigation				Site Visit												Site Visit																																			
<b>SMALL SCHOOL STAFF:</b>												School Superintendent								Assistant																																			
<b>Labor Forman</b>																								Labor Forman																															
<b>Instructor of Foundations</b>												Instructor of Foundations												Assistant																															
<b>Assistant</b>																								Assistant #1																															
<b>Assistant #1</b>																								Assistant #2																															
<b>Assistant #2</b>																								Assistant																															
<b>Instructor of Carpentry</b>								Instructor of Carpentry (first)								Instructor of Carpentry (replacement)																																							
<b>Assistant</b>																								Assistant																															

**SCHEDULE OF EVENTS AS THEY OCCURED FROM JULY TO DECEMBER 1980**

**NOTES:**

- A-2 #3 = Xubin or Site number A-2, house plot number 3
- G1-M = Group number 1 - Masonry trainees (see Trainee Data in CRAFTS TRAINEES section of this report)

**FACILITIES, EQUIPMENT,  
TOOLS, AND MATERIALS**

## FACILITIES, EQUIPMENT, TOOLS, AND MATERIALS

All the basic crafts training took place on the school site. The school site was separate from the production sites so that the different needs of the two operations would not conflict. In the early stages of the project, when the bugs were still being worked out of the construction process and the final house unit had not yet been determined, training took place along side production. This led to a variety of conflicts including competition for tools and materials, scheduling and construction sequencing conflicts, and friction between the production crews and trainees. The result of this was the establishment of a school site for the Training Program.

Before the school site was established, the construction site office and two houses on the first Xubin (site of ten houses) A-1 were used as training structures. The first formal training site was established at Xubin A-2 (see drawings). The second school site was established at Xubin B-2. Until the establishment of the school site, the program had consisted only of the masonry and carpentry components. The establishment of the separate school site resulted in the founding of the foundations component because a foundations training component was seen to be necessary and foundations were needed for the other components of the training program.

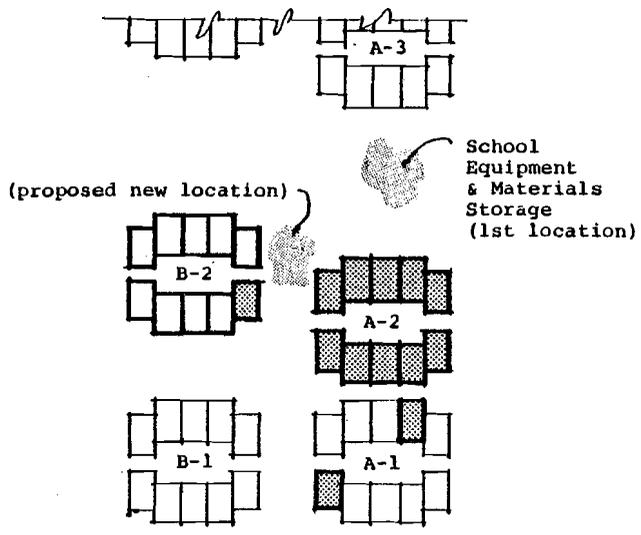
In theory, the houses built at the training school site were to be identical to those being built by the production crews. Indeed, the houses that were to be built at the new school site Xubin B-2 were to be the same. However, at the time the first school site at Xubin A-2 was set up, there had not yet been a decision made as to the final design of the house unit. Since the project aim at that time was to build a series of alternative house unit designs, it was decided to build ten different plan configurations (see drawings). In order to simplify this for the trainees, each house was to have the same width but was to vary in length. This resulted in the standardization of enough different elements that, for all practical purposes, it was as though the trainees were building the same house over and over. Other than the plans, most other aspects of the house in regards to materials and methods of construction remained the same.

Once several houses were completed, one was selected for modification. One of the two rooms was modified to be used as an administrative office while the other room was to be used as a storage room. The modifications consisted of adding lockable wood doors and windows. The administrative office was used by the School Superintendent and his assistant. Here all the records were kept, letters written, etc. In addition, this office served as the staff meeting place. The storage room housed all the small equipment, hand tools, and miscellaneous materials. From the store room, all the tools were checked out by the Assistant to the School Superintendent to the trainees each day.

Located on the northwest portion of the site was the area that was used for storing the large equipment (mortar mixer and concrete mixer) and where lime, sand, and aggregate was stockpiled. It was planned to be

moved to a location half way between Xubin A-2 and the new school site at Xubin B-2. This would provide a central location for these materials as site A-2 came to completion and work on site B-2 increased. A similar plan was to be followed once the program needed a new site.

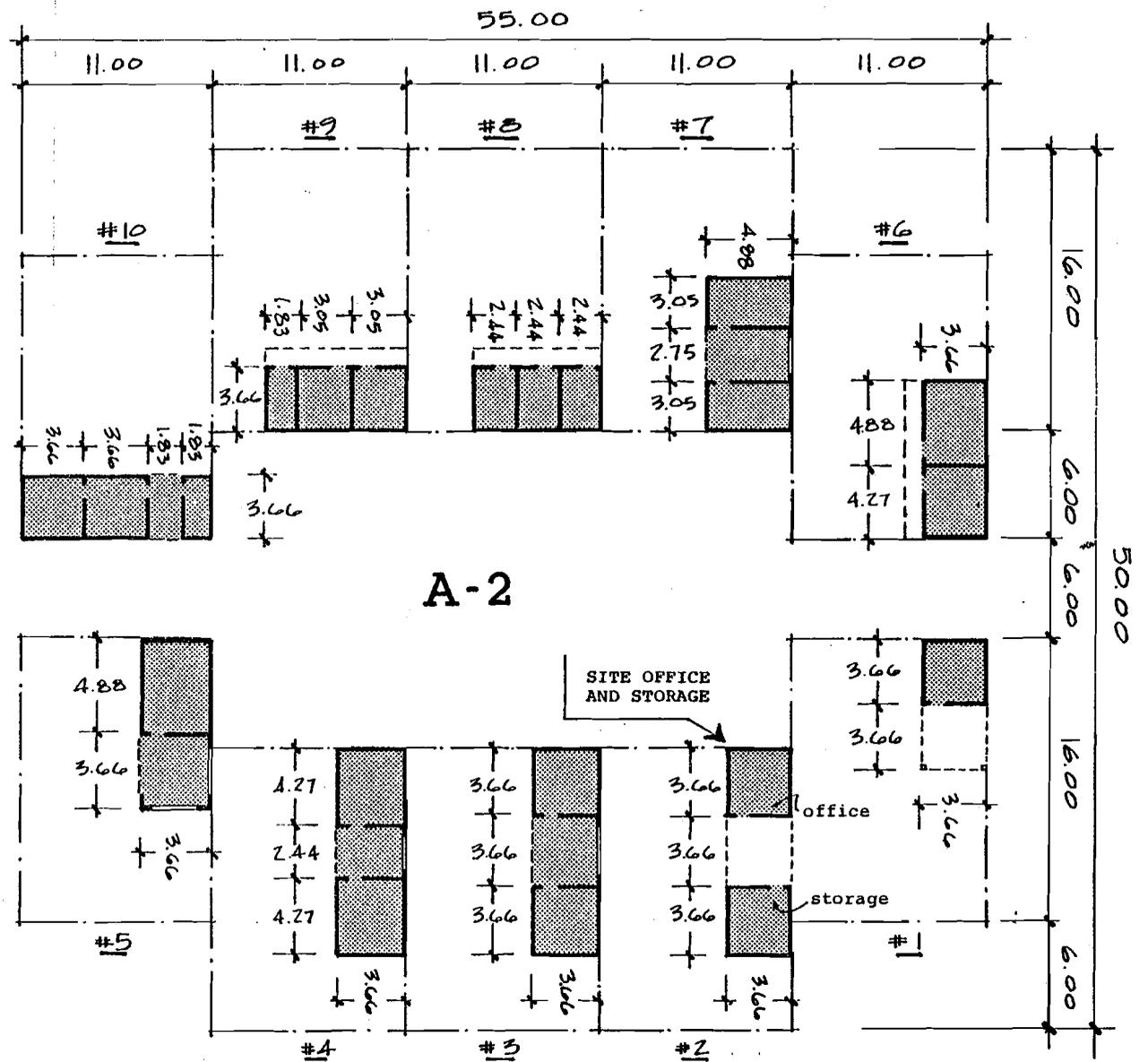
Transportation of trainees, tools, materials, and equipment to and from the school site was crucial to the success of the program. While the Florida A&M Team was on site, the transportation problem was provided by the use of the Chevrolet pickup truck that was assigned to the team. However, upon completion of their contract, this truck was to be reassigned to others on the project. The Florida A&M Team recommended that either 1) the truck be assigned, with a driver, for use by the school or 2) the school be allowed to use the personnel transport trucks. The result was that the school was allowed access to the transport trucks while not in use. Although assignment of a truck to the program would have been the ideal solution, it was felt that the shared access to the personnel transport truck was the most practical solution.



**SCHEMATIC SITE PLAN**

NO SCALE (PARTIAL PLAN)

- Training school house plots with started or completed houses
- Future training school house plots (after December 1980)
- Production crew house plots



**XUBIN A-2 SITE PLAN**

1:250



# **EVALUATION AND RECOMMENDATIONS**

School Staff

Program Curriculum

Trainees

## EVALUATIONS AND RECOMMENDATIONS

### School Staff

School Staff Experience and Background - The most important and critical aspect of setting up the training program was the training of the school staff. This is because the school staff was to be depended upon to carry the training program to completion. This task was jeopardized by the lack of construction experience and skills possessed by most of the candidates recommended by the SDA for the school staff positions. For those candidates not rejected, the Florida A&M Team had to provide extensive remedial training to bring them up to a point where they understood and could teach the basics of the craft skills and manage the program from day to day. The continuation and success of the training program could not have been assured otherwise. Two factors that may have lead to the selection of candidates lacking in experience were, 1) an over emphasis on the ability to speak English and, 2) the acceptance of a construction background consisting of only technical/vocational school training rather than actual construction experience. Two other program instructors were selected by the Florida A&M Team from the craftsmen provided by the government labor office. These instructors did not speak English well and did not have any vocational school training. They did, however, have actual construction experience and were more easily trained to teach their craft than the candidates with no construction background. Because of the above reasons, it is highly recommended that instructors for similar training programs be required to have a sound practical background in the craft or trade they will be teaching.

Counterparts - In the project contract, the Florida A&M Team positions were defined as follows: School Superintendent, Instructor of Carpentry, and Instructor of Masonry. Each of these positions was to have a Somali counterpart who was to gradually be given responsibility for this position. Conceptually, this approach was good. However, in practice it was limited in the flexibility it allowed for modification of the training program. Had its implied organizational pattern been followed, there would only be a carpentry and masonry program. It is recommended that, in the future, counterpart systems such as this be set up in a way that reinforces the notion that one member of a technical assistance team might need and train more than one counterpart as was the case in the Crafts Training Program. This approach would encourage a more creative and customized development of a counterpart team.

### Program Curriculum

Curriculum Content - The training program consisted of the Unskilled Labor Experience, the Crafts Training Components - Foundations, Masonry, and Carpentry, and Leadership Training. It seems that the curriculum content,

once the Unskilled Labor Experience and the Foundations component were added, was appropriate. There were a few attempts to develop other training areas, such as steel fixing or special block manufacturing, but in the final analysis it appeared that these areas did not actually require much training, only a short exposure to practice. Because of this, experimental components were not made a part of the training program. However, the training staff was still encouraged to add to or modify the training program as might be required by unforeseen changes that might occur in the method of construction, new materials used, etc.

Crafts Training Goals - The goals aspired to for the Crafts Training Components were to produce craftsmen apprentices (graduates) that had, 1) the appropriate skill levels, 2) the appropriate types of skills, and 3) the correct quantities of graduates. The aim of skill levels development was to present and impart all the basic skills that would be necessary for a graduate of the program to carry out his or her minimum job responsibilities. Based on feedback from the production crews once trainees had been promoted, this goal was achieved and surpassed. Most of the trainees promoted were able to carry out even the most complex tasks required of them and the quality of the work produced was at least equal to that of experienced local craftsmen already on the production crews. The only difference, in some cases, was the speed at which the new graduates were able to work. Even this difference, given a short time to practice, was eliminated. All the program graduates were able to do any necessary job required of them upon joining a production crew indicating that they were trained for the appropriate skill types. By December, the training program had produced a total of sixty one (61) graduates of which about half (30) were still working on the production crews. This represented approximately one third of the required work force of one hundred (100) craftsmen called for by the original project paper. The rest of the necessary workforce was undergoing training or still to be recruited.

Teaching Method - The method of teaching the trainees was based on actual hands-on construction experience with very close supervision. The work was done on houses that were the same as those being built by the production crews. In addition to close supervision, formal instruction was given using mistakes or problems encountered while building the houses as the vehicle for presentation of the basic instruction required. This approach was seen to be very successful by the Florida A&M Team. It resulted in the production of graduates with the desired qualities and some of the houses necessary for completion of the project. No materials were wasted on temporary teaching structures and the trainees were given a clear idea of what they were to be building. In summary, the teaching method used was seen to be the best possible approach and it is recommended for use on other similar projects.

Leadership Training - The leadership training program had only just been implemented at the beginning of December. It is, therefore, difficult to make an evaluation of its success at this time.

## Trainees

Kurtunwaare Settlers - Use of the Kurtunwaare settlers as the workforce for the project seems to be very appropriate and feasible. The settlers are suited to the work given proper instruction. Their complete lack of experience with advanced construction methods proved actually to be an advantage rather than a disadvantage. Experience with the local "skilled craftsmen" proved this because of their incurable and bad construction habits. It was much easier to train the settlers who had no preconceived ideas about construction methods and were happy to do their work the way they were shown.

Availability of Trainees - Problems in obtaining trainees from the District Authorities in Kurtunwaare were encountered frequently during the project. Although most trainees requested before December were finally received, there were many delays that caused a good deal of difficulty in planning for the program. This problem was viewed by expatriates familiar with Kurtunwaare as being linked to a labor shortage in the village. The World Bank has since verified that there is indeed a labor shortage in Kurtunwaare. At that time though, there was ample evidence. Such evidence came in the form of delays, references to labor shortages by villagers working on other projects in the village, and the fact that the village population has been in decline since its founding, leaving mostly women and children (making up 70% of the village population). Because of this shortage, it seemed to the Florida A&M Team that it would be prudent to call for an increased use of women for the workforce. Use of women on the workforce met with some prejudice but little real resistance. The women that had completed training proved to be equally as efficient and skillfull, if not more so, than the men. Another factor in favor of women laborers was that they are less likely to leave the village for social and cultural reasons. In comparison, men that could do so seemed to prefer to leave the village in order to rebuild their herds of livestock.

Another important resource of labor is the village youth. Young men women who had spent the greater portion of their lives in the village are not only more likely to remain in the village, but when given an opportunity to enter the training program, proved to be the most responsive and eager to learn the skills. In addition to this, they had usually received a good deal of formal education giving them a background in reading, mathematics, and basic science, all of which were very useful in construction and necessary for any leadership position. Therefore, it is recommended that a greater emphasis be placed on the use of women and village youth for the workforce.

Drop Outs - As previously mentioned, the original drop out rate predicted in the project paper was about two thirds (66%). That is, of 300 recruits, 100 would actually remain with the project. This proved to be true at the beginning of the training program, but was reduced towards the end to about one half (50%). Factors that seemed to contribute to this drop out rate were as follows:

Difficulty in establishing a system of incentives designed to encourage the settlers to stay with the program.

Not enough emphasis placed on the use of women and youth as the workforce.

The lure of high paying jobs for carpenters and masons in Mogadishu or other areas.

The last problem was not altogether bad and possibly indicated a degree of success for the training program. Typically in this case, a trainee would graduate and be promoted to the production crews. When this was done, the trainee was presented with a set of hand tools necessary for his work. Once the tools were obtained the trainee would then disappear in search of a job as a carpenter or mason. While this phenomenon helped in building a general force of skilled craftsmen for the country it was not conducive to the development of a workforce for the project.

It is recommended that a more attractive system of incentives be set up as discussed in the TRAINEES section under Incentives, and that a greater emphasis be placed on the use of youth and women in the project. If the incentive system could be improved by the inclusion of monetary or material incentives, such as the promise of one of the houses that is being built, the loss of trained craftsmen who leave in search of other jobs would also be reduced.

Use Of Trained Personnel Rather Than Local Skilled Craftsmen - When the project was first begun, skilled carpenters, masons, and general construction laborers were hired by the SDA to help mobilize the project workforce until the training program began to produce craftsmen. While some of these personnel were excellent craftsmen, many were only slightly familiar with their craft before working on the Kurtunwaare project. Indeed, much effort was exerted by the Production Supervisors as well as the Florida A&M Team towards the training of these "skilled" craftsmen. These personnel were paid from 25 to 35 shillings per day in comparison to the 2 shillings per day paid to the settlers. Despite the fact that the settlers are provided with food, shelter, clothing, health, and education, it was difficult for them to understand the great difference in pay. This was complicated by the fact that the skilled mobilization crews felt and acted superior to the settlers. Once the training program had promoted a significant number of trainees, the Project Management attempted to lay off an equal number of the least skilled hired laborers. This attempt was rejected by the SDA. It is recommended that the SDA allow these hired laborers to be laid off and replaced by trainees promoted from the Training Program as it was originally planned. In light of the problems mentioned above, this would increase the desired dependence on local village labor and work as a vote of confidence for the settlers while reducing a source of friction.