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LEADER TRAINING FOR
AIDED SELF-HELP HOUSING

DEPARTMENT OF STATE
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FOREWORD

This publication was prepared by Keith H. Hinchcliff, late professor of farm structures in the Department of Agricultural Engineering, College of Agriculture, at the University of Illinois. His academic training in architecture and education at Kansas State College, more than twenty years of experience in housing extension in the United States, and a two-year assignment in Indonesia under the program of the International Cooperation Administration, now called the Agency for International Development, provide a unique background for this discussion of leader training for Aided-Self-Help Housing.

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PREFACE

More than half of the world's families live in totally inadequate dwellings. This contributes to ill health, low productivity, inertia, and unrest. Good health, higher productivity, social and political stability, and plain old-fashioned self-respect all require a world-wide program of shelter improvement.

In highly industrialized countries where a home is usually built by contractor-builders and where the family pays for having the house built for them, it is found that the cost for good shelter is, for many, too high. In areas where industrialization is just beginning and where most houses are built by the families themselves the result is often an insanitary, shoddy, vermin-ridden hut. Neither of these techniques is the answer for many of the world's ill-housed.

Fortunately there is a technique which offers much promise. It is not a cure-all to solve the world's housing problems, but a good tool to be used in many places. It is called "aided self-help" and as its name implies, it is a method to use the greatest resource of all, the unused leisure time of the ill-housed families (often enforced leisure because of seasonal unemployment) and to use this with some form of aid so that the families may build better homes than they ever could, alone and unaided.

One form of aid, leadership and technical advice, is the subject of *Leader Training for Aided Self-Help Housing*. This manuscript outlines how effective leaders may be trained. The methods suggested by the author based upon considerable experience in Indonesia may, we believe, be effectively used by those who are attempting to introduce the principle of aided self-help in housing.

OSBORNE T. BOYD

*Deputy Director for Housing, Office of Human Resources & Social Development
Agency for International Development*

A COURSE OF INSTRUCTION IN AIDED SELF-HELP HOUSING

PURPOSE

Aided self-help housing is the natural way to better homes in the less industrialized areas of the world. It is a technique which may be employed for stimulating the people who live in these areas to improve their own environment.

Time, equipment, materials, space, human labor — these are important elements to this technique. Perhaps most urgent of all is initiative — the desire of people to raise their own standard of living. But the spark that starts the process is seldom easy to ignite. When it is started, it is ideally from a combination of local resources and a sincere felt need, plus outside inspiration and technical help. It is this inspiration and technical know-how which you as the trained adviser must provide.

The people and communities that stand to benefit from guidance in the technique of aided self-help housing can often be reached most effectively through trained local leaders. Therefore, it is the purpose of

this manual to present the subject in a form useful to you for conducting a well-organized course for such local leaders. The manual is also intended as a reference by your students during the course, and subsequently by the leaders they will be developing in the future.

SCOPE

The eight topics for investigation in this course appropriately follow a sequence of building, beginning with the foundation or the fundamental definition of aided self-help housing and leading on to a discussion of the various types and numerous degrees of possible aid. The second topic weighs both the advantages and disadvantages of this technique for producing homes. Topic three includes examples and case studies demonstrating how aided projects have been successfully carried out by others.

The fourth part features general discussion of various planning principles affecting aided self-help housing, but limits the scope to the special needs of your students and their communities.

The development of skills in construction techniques which may be used in building low-cost houses

is featured in the fifth phase of the course. Resources — material, labor, and financial — are studied in the sixth topic together with a chart by which your students may quickly itemize and estimate available housing resources.

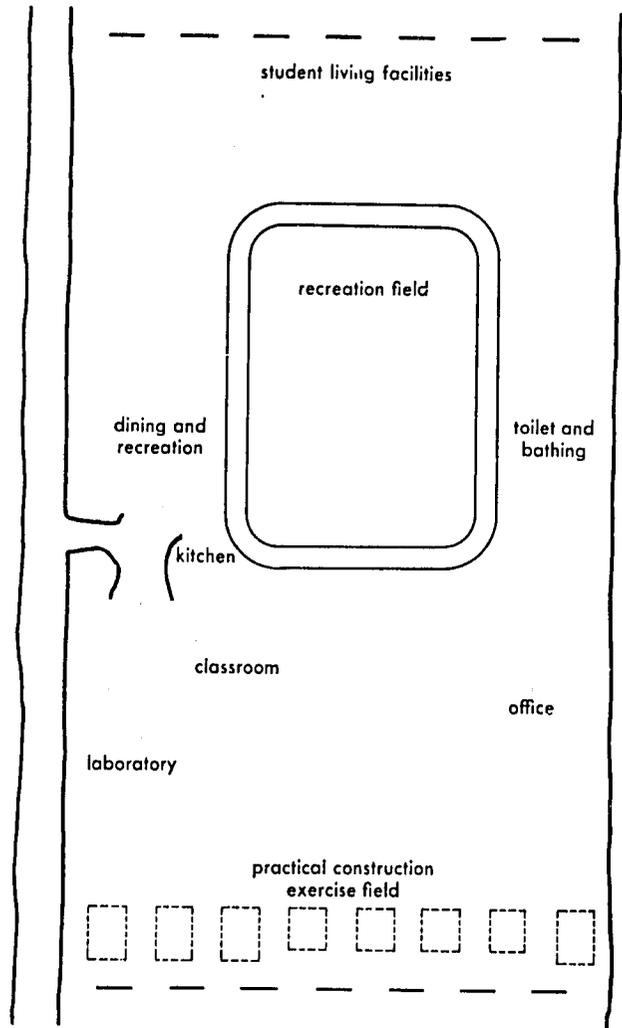
Section seven is concerned with problems of communicating ideas which, of course, is vital to the success of your program. Several techniques are advanced, each is reviewed with its values as well as its limitations. The final topic deals with definite and valuable proposals for initiating an aided self-help housing program.

Such an energetic course as this naturally calls for both formal instruction in the classroom — about two hours a day — and supplementary experience exercises involving actual housing problems. The proposed schedule is for sixty to ninety days, depending largely on how much practice experience can be included. The work may be coordinated with more intensive instruction in such related fields as governmental housing and techniques of organized savings cooperatives. Study of these special problems is highly desirable for outstanding local leaders who are in a position to influence general policies. For most leaders, of course, these broader fields would not be necessary.

PHYSICAL FACILITIES

Before you initiate your program, there are many things you should know and an equal number of needs you should anticipate. What physical facilities are available for your instruction and practice exercises? What types of equipment are needed? What preparatory information should you have as a part of your teaching duties? You will need to arrange for the physical facilities well in advance of actual instruction. In some countries the "next step" may depend upon getting demonstration equipment from the outside; it would take too much time to build such equipment locally.

A list of the very minimum facilities would include a room adequate for holding the class and a shelter for materials and equipment necessary in carrying on practical construction exercises. Enough space near these shelters for the erection of practice houses is also desirable. Where students will be with you for a long term, facilities for housing and board-



1. An arrangement of physical facilities for a training center.

ing students are also needed; these may be dormitories, apartments, or individual houses, depending upon the marital status of your students.

EQUIPMENT

Since the field education and demonstration phase of aided self-help housing is a major consideration, it is important to have and use many types of visual aids. In addition to a blackboard, projection equipment is desirable. Slides and motion picture films are effective both in the inspirational stages of launching a program and later in explaining techniques to the participating builders. In some cases a

portable electric generator would be necessary in order to operate such equipment.

This course expects little from the leader training groups in the way of drafting skills, so no investment in instruments is necessary other than perhaps a few triangles to be used with graph paper.

The production of visual aids for field demonstrations is important. House models and construction details can be produced by your students with hand tools alone; however, a small band saw or jig saw is useful for this purpose.

Equipment for obtaining construction-experience exercises depends on the types of construction to be introduced. Improved types of conventional hand tools such as carpenter squares, hand drills, and the like can be advantageous in introducing "next step" techniques. Wheelbarrows and garden hoses are examples of acceptable "next step" advances of this kind. Hand operated machines such as compressed-soil block makers and concrete mixers introduce a further step.

LIBRARY

There are many good references on aided self-help housing which should be acquired early in the planning stages of a training course. The United States Housing and Home Finance Agency offers several such references. Others are available from the United Nations, for example, a step-by-step self-help outline *Bulletin #6, Housing in the Tropics*. A list of reference readings for your use is found at the end of some topical discussions in this manual. From these and the accompanying list of publications, you could prepare the beginning of an aided self-help housing library.

SELECTING LEADERS

Your course in housing instruction can turn out more effective graduates if recruits are selected to meet minimum standards as to basic education, natural aptitude, experience, and leadership. A likely prospect will have enough education to understand written instructions and references. He will be naturally inclined toward building things. He should reveal some natural influence as a leader but without association as an agitator. His past participation in other types of self-help, such as community improvements, would indicate likely fitness as a housing leader. In



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customarily maintains field information centers with communication equipment. Aided self-help housing might reasonably be included, and for rural people it might be coordinated with an existing organization such as the agricultural extension service. These, too, are often relatively well established in many countries. The initial programs are generally more concerned with agricultural production than with family living improvements, but their experience in reaching and motivating people is valuable.

4. *Promotion of conditions favorable to aided self-help housing.* This could include legislation providing for reliable land rights for home sites. It might encourage establishment of a revolving fund accessible to qualifying participants to cover their unsubscribed cash costs. It might procure materials in volume to reduce costs and establish uniform quality and conduct research programs. Such an agency might also seek arrangements whereby construction equipment not locally available could be provided on a loan or rental basis.
5. *Continuation of the aided self-help training center.* This will be needed not only for expanding the number of trained leaders, but for providing advanced instruction to those who have been in the field. The center should serve also as a clearing house for problems arising on the job. In some cases a counselling staff which can go to the field and work with leaders in solving special problems will be expedient. These counsellors would preferably be drawn from the ranks of those with field experience.

Investigation Topic No. 1

DEFINING "AID" FOR SELF-HELP HOUSING

Self-help is not an unfamiliar system of producing houses for people in less industrialized areas. In fact, in many cases it is the only program open. But, the evolution of better home design and construction is exceedingly slow by this method without some source of outside assistance.

"As the name implies, aided self-help is a method to utilize the many man-hours that are available in most areas in the form of unused leisure time — and to use this enormous reserve of manpower together with some form of aid from the community, or others, so that man may, through his own efforts, using his own spare time, improve his shelter to an extent that he never could — alone and unaided."¹

"The something added to self-help — the aid — which makes it possible for man to improve his shelter to a greater extent than he could unaided, comes from many sources and takes almost every imaginable form."² In some cases self-help is merely a desirable policy that is expounded for the best interests of most people; the aid, which you may supply, takes the form of guidance and organization for the peoples of less industrialized areas so that they may program their own course of action, practical for their own modes of living. At the other extreme, the aid that may be added to self-help may include everything necessary to produce a house except the unskilled labor.

However, most situations lie somewhere in between: aid may include technical advice on building materials and assistance during construction; financial aid and credit terms; skilled labor to assist during the difficult phases on construction; and/or land, or some form of secure land tenure. The following are some common examples of aid presented in approximate ascending order of cost and responsibility that a sponsoring agency might assume.

ENCOURAGEMENT OF AN AIDED SELF-HELP AS A POLICY

The least expensive program is simply a policy of encouraging people to evaluate their housing needs and wants, stimulate their desires, and encourage some form of positive action. Local community leaders who are responsive to this policy can influence a receptive attitude within the community. Once the interest and enthusiasm is evident, the leader may prepare a workable program — tailor-made for the community — appraising available resources and charting out an orderly plan of action.

This encouragement policy can be used when

¹ *Aided Self-Help in Housing Improvement.* (Ideas and Methods Exchange No. 18), Washington, D.C., U.S.A.: Housing and Home Finance Agency, p. 7.

² *Ibid.*, p. 16.

no resources or technical aid is available. However, its value is often difficult to measure. Without being coupled with economic inducements or an educational program, improvement can expectedly be slow. Nevertheless, this encouragement policy is a better approach than none, or one which minimizes individual efforts to improve the lot of people.

TECHNICAL AID

Technical aid is an educational device which is relatively inexpensive and has been successfully time-tested. New uses for old materials, improvements in commonly-used materials, technical advice that saves time, money, and effort, these may be appropriately called technical aid. The results obtained by the Agricultural Extension Services in the United States in providing many kinds of guidance, including housing, affords an outstanding example of how technical aid alone can contribute to self-help programs.

Because this type of aid is readily fitted into the relatively low-cost mass communication devices, it can bring the greatest return for the money spent, even without additional and sometimes costly equipment. The newest techniques in building procedures, or the technical know-how of modern practical home building can readily be explained through blueprint plans, publications, films, charts, and radio programs. Technical help can go even farther by providing trained personnel to exhibit and demonstrate improved home building techniques locally.

CREDIT INDUCEMENTS

A third effective type of aid is extension of financial credit to participants for their home building. Credit can be used to cover the cash costs of such items as land sites, building materials, equipment, and skilled labor which must be brought in from the outside. To adequately meet the needs in most situations, long repayment periods should be arranged.

Facility for keeping records and establishment of a revolving fund are needed for this type of aid. The revolving funds may originally be built up from individuals, communities, private industry, foundations, philanthropists, and governments. Under Investigation Topic No. 6, you will find a section on possibilities for financing housing costs from local sources.

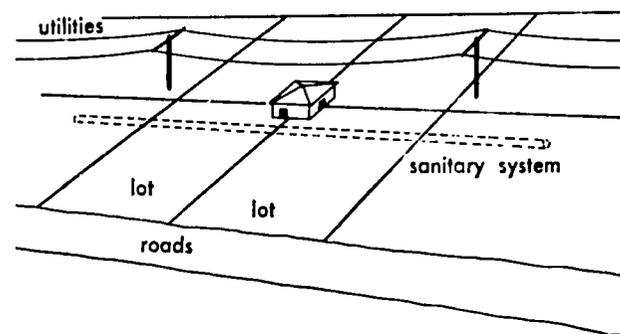
SUBSIDY STIMULI FOR AIDED SELF-HELP HOUSING

There may be situations in which encouragement, technical aid, and credit are still not enough to stimulate the desired activity. Additional assistance — often called *subsidy* — may provide for building sites, site development, construction equipment loan or rental, building materials, and skilled labor — or it may include just one of them.

Building Sites. In highly populated areas, building sites may be almost impossible for individuals to acquire. Yet people could not rightly be expected to invest even their own labor in building homes on locations to which they have no legal rights. It may be enough, however, to provide sites with limited rights, such as possession with rights of usufruct.

Site Development. It may be to the interest of the sponsoring agency to grade the building site and prepare roads or streets to and within a developing project area. This is particularly true when the sponsor has idle equipment available from other activities. Other types of site development inducement include providing a piped water supply, community toilet and bathing facilities, and electric power.

Construction Equipment Loans or Rentals. Improved equipment can make possible new and better fitted techniques of construction; or it



3. *Preparing lots, adding sanitary systems and utilities, grading roads to and from a site — are examples of site development which a sponsoring agency might assume.*

can materially speed up conventional methods. Examples of such improved equipment might be wheelbarrows, soil-cement block makers, or concrete mixers. Costs of such equipment may be covered by a sponsor, or in some cases, it can be amortized by the aided self-help participants.

Building Materials. Providing building materials by a sponsor offers participants one of the most understandable incentives. These may be finished materials, but raw materials such as standing timber, sand, or gravel also have possibilities for self-help projects. With the furnishing of building materials goes a degree of control over the quality of the finished houses which the sponsor may find advantageous. Improved construction should be counted as a long-run benefit to both sponsor and participant.

Skilled Labor. There is much variation in the amount of building skill that participants or groups are able to offer. Therefore, in some cases it is to the sponsor's long-range interest to have only the unskilled jobs done by the participants, otherwise more technical supervision will be required. Since some types of construction call for more ability than others, it is important to make choices within the range of skills and supervision available.

Reading Reference:

Aided Self-Help in Housing Improvement (Ideas and Methods Exchange No. 18). Washington, D.C. (U.S.A.): Housing and Home Finance Agency, 7-8.

Motion Picture:

It Can Be Done. Washington, D.C. (U.S.A.): Housing Division, International Cooperation Administration, 25 minutes.

Investigation Topic No. 2

ADVANTAGES AND DISADVANTAGES OF AIDED SELF-HELP FOR PRODUCING HOMES

The aided self-help idea should never be "oversold." Both the advantages and disadvantages should be fully compared when explaining the system to prospective participants in a project. It is better for

the program as a whole if borderline projects are never started than to have them languish for lack of enthusiasm. The advantages are often more apparent than the disadvantages. The following are representative points to consider.

ADVANTAGES OF AIDED SELF-HELP

It makes housing possible when no other alternative is open. It opposes the philosophy of waiting. Instead, it offers a system that can immediately begin showing results.

It reduces cash outlay. As much as half the cost of homes goes for labor. All or most of the labor can be provided by the self-help participants. In most cases the participant will not have the funds he saves by doing his own building; but when he does, such savings could be used to:

- purchase a larger or better located lot,
- increase the house size,
- obtain higher quality materials,
- purchase specially desired features.

Satisfaction and greater pride of ownership come from building a house.

It increases actual wealth without encouraging inflation. The self-help system can convert spare time into wealth without competing very much with labor or materials used for industrialization.

It helps develop building skills in countries where they are needed.

It may encourage small local industries to produce building materials.

In times of emergencies such as caused by war, hurricane, or flood, the labor of homeless families, supplementing the often limited supply of regular construction labor, is used most effectively through the introduction of the aided self-help principle.

It encourages personal interest in home maintenance after completion. This latter point is

perhaps of interest to a sponsor rather than an inducement to a prospective participant, but in the long run would concern both.

DISADVANTAGES OF AIDED SELF-HELP

The system requires a "mortgage" on the participant's free time, which otherwise would be devoted to more pleasurable pursuits than unfamiliar, sometimes strenuous, construction activities.

Effort is required to maintain initial enthusiasm throughout the home building process.

Building skills must be acquired for which the participant may have no further use other than in the maintenance of his own home.

Completion of housing is sometimes slower than by the contract method; in emergencies this condition may reverse itself.

The quality of construction may be lower than that done by more skilled workers; however, a combination of technical aid properly demonstrated and personal pride in constructing one's own home can, and often does, offset the disadvantage.

Investigation Topic No. 3

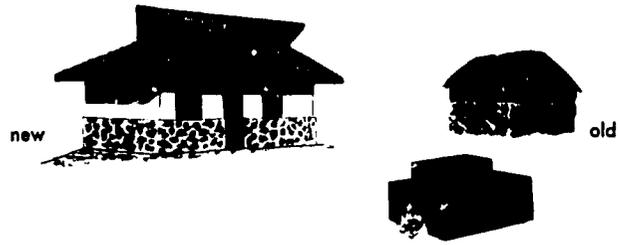
AIDED SELF-HELP HOUSING EXAMPLES

WITHOUT OUTSIDE AID

While homes produced by self-help are found in almost all parts of the world, those in the less industrialized areas will seldom evolve advances in design or construction without some outside aid. Examples of housing developed without outside aid are usually well worth studying, however, if only to find the basis for the motivation.

An outstanding case of this kind is that of the mountain *desa* (village) of Torongredjo, a small village of 500 families in East Central Java.

Before the self-help effort was started in 1951, the economic and general morale situation of the



4. *Without any outside aid, the people of Torongredjo induced their own housing program to replace bamboo and thatch type houses with homemade brick and tile structures.*

desa was poor. "People leaving the community did not like to admit they came from Torongredjo," the *Lurah* (head man) reported. Alien money lenders put a severe economic drain on the people. Rice production was not even adequate for local needs. No industries existed to provide enough cash income for the village. Housing consisted almost entirely of non-durable, fire-hazardous, unhealthful bamboo and thatched types. Water supplies and bathing facilities were both functions of the same nearby stream.

The self-help improvement effort began in 1951 with the establishment of a credit cooperative which replaced the money lenders. This was followed by production credit and seasonal credit cooperatives. At about the same time, the self-help system was applied to the problem of literacy; resulting in an increase from 10 percent literacy to about 60 percent. No outside aid was provided for this, except some printed materials from their government.

The first structural self-help improvements were of the community type. The men of the village began by building roads and a bridge, thereby opening up communications with the outside. Next, a permanent-type school building was built of home-fired brick. Then, sixteen community bathing stations were developed in a similar way, thus contributing much to the health and efficiency of life in Torongredjo.

Improvements in housing are most impressive of all. Before 1951, there were less than 50 permanent and semi-permanent type homes in the *desa*; and well over three-fourths were of temporary bamboo mat and wood construction. After three years of effort the total number of houses did not increase, but 212 new permanent houses and 142 new semi-permanent ones replaced an equal number of the

bamboo structures. It was evident that the program would soon have all the temporary houses replaced.

The cash requirements for building materials were very low. Money was needed only for cement, glass, and hardware. Bricks and roof tile were made during the slack farming season. Soil was taken from the local rice fields, molded, and burned in home-made kilns. Some cash was needed to pay an outside skilled worker to do some of the roof framing and masonry until local men learned how to do it. Even so, the cash expense for these permanent-type houses was kept to Rp.2200 (about \$200) for a 54 square meter home, including about Rp.1000 for the paid skilled labor.

The organization for producing houses by this method is unique, compared to those in communities not so thoroughly accustomed to the *gotong rojong* (mutual help) system in their daily life. The procedure used by the people of Torongredjo was to divide the participants into groups according to their wealth. Each group pooled its cash resources to buy what materials were necessary. The financially poorer groups built smaller homes so they were not required to contribute so much cash. However, these financial groups were not continued through the construction phase; instead all worked together in new groups based on a more convenient arrangement determined by locality.

No record was kept of the time each man worked, but well-established social pressures were imposed to restrain shirkers. A unique feature was the production of houses for some 30 widows. They did not participate in the construction, but supplied drinks and smokes for the workers who did.

This type of self-help organization obviously works best in closely knit, undisturbed societies and would not likely be successful for heterogeneous groups, such as result from refugees crowding into cities. On the other hand, a self-help program in a village may subsequently avert or reduce the housing problem of more populous centers. According to the *Lurah* of Torongredjo more than 100 people moved back after the village became a better place to live, even though no new employment opportunities had been established.

In evaluating the example of self-help housing at Torongredjo, its greatest significance appears to be the self-induced effort to improve living conditions, and not the technical quality of the houses them-

selves. In fact, the materials and construction left much to be desired — a fact fully realized by the people who had requested technical aid which was not available at the time. Bricks were seldom properly burned; some disintegrated from vegetative growth and weather before construction could get started. Technical advice to improve existing methods of construction or introduction of a new building procedure, such as interlocking soil-cement block making or rammed earth construction would be a reasonable application of aid to a self-help program such as this.

This kind of spontaneous self-help effort has much value as an example for stimulating initiative elsewhere, where similar conditions exist. Visual aids such as motion pictures, reports, and slides (*see* Investigation Topic No. 7) offer possibilities for stimulating a desire for self-help, and have since been introduced into the aided self-help housing program in Indonesia.

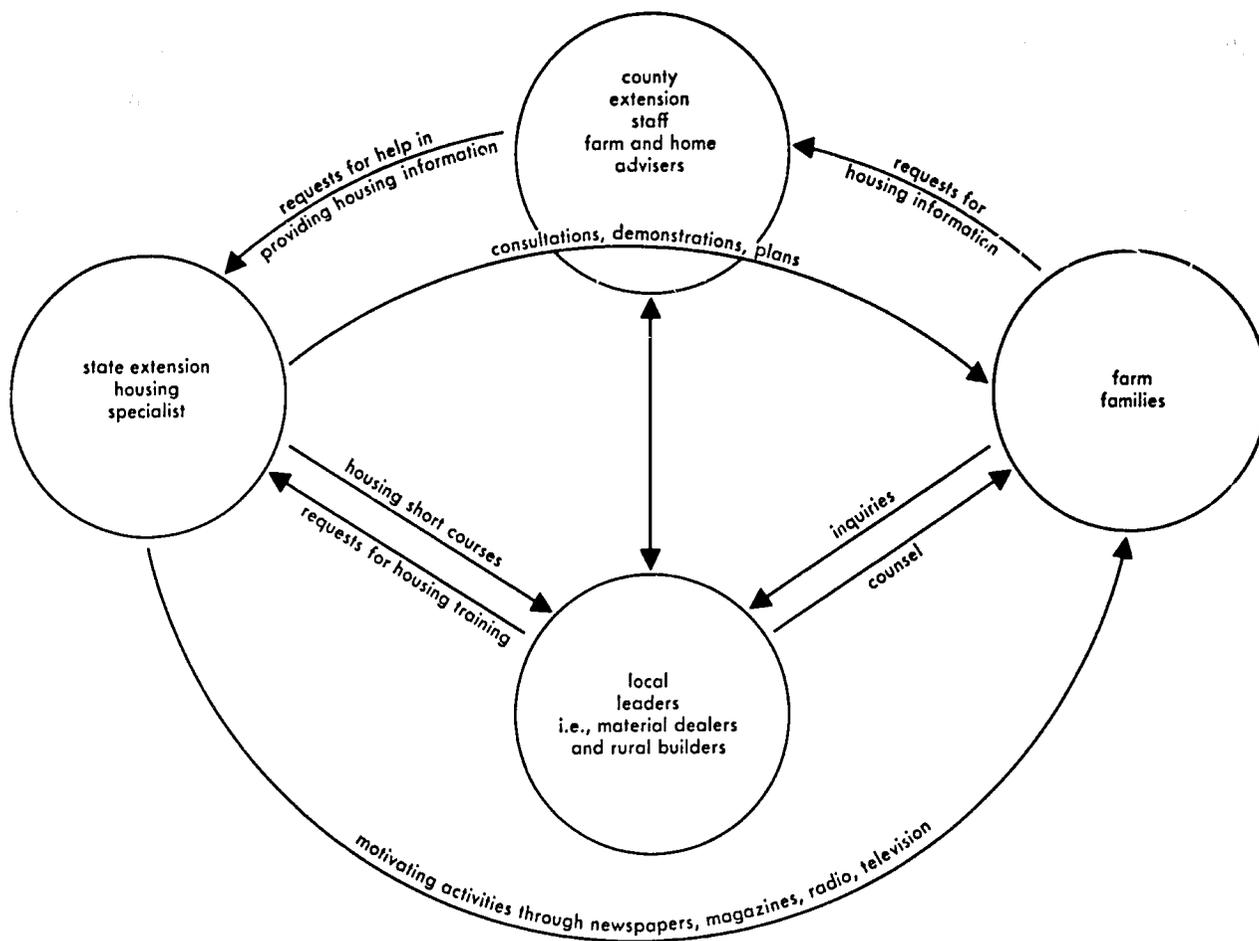
Reading Reference:

Indonesia. Djakarta (Indonesia): Ministry of Information, Vol. 1, No. 3 (1945), 12-17.

TECHNICAL AID ONLY

An outstanding example of aided self-help housing where the aid is strictly technical is that sponsored by Agricultural Extension Services in the United States. Housing is just one of several technical fields included in the comprehensive educational program devised to assist farmers.

Home building information is provided in the form of house plans, planning guides, publications, demonstrations, and individual conferences. The farmers accept help entirely without cost obligation to them. The source of technical information is primarily from state and federal experiment stations and research agencies or from industrial sources. Extension specialists are employed as staff members of state colleges of agriculture. They adapt technical information for application to local problems and relay it to farm people in two ways: through local demonstrations and by mass education techniques. When people request guidance through the local county extension service personnel, the requests are referred to the specialists who then set up local demonstrations, explain solutions to problems, and answer questions. Through mass education, employing such



5. *How the Agricultural Extension Service in the United States serves farmers.*

media as radio, television, publications, and blueprint plan services, the specialists provide additional guidance. Visual aids are especially useful in the mass education phase of a technical aid program, particularly for home improvement. Models, charts, slides, and movies are therefore used extensively. In practice the system works something like this:

Farm people decide through local committees what kind of technical aid they need and want each year. However, the recognition of their needs and wants will likely have been broadly influenced through mass education media such as radio, television, and publications.

The County Extension Service personnel consisting of a farm adviser (county agent), a home

demonstration adviser (home agent), and assistants then help plan the year's program of technical help. They determine which specialists they will need to assist them, and schedule their services accordingly.

The specialists then arrange their field schedules on the basis of requests from the county staff.

In the home improvement field, the housing specialist provides technical help.

One way in which the housing specialist can do this is to prepare special plans for a selected family on the basis that the house will serve as a local example called a "result demonstration." Such individual service is necessarily limited to cases in which



6. Housing is a part of Agricultural Extension's technical aid program.

the problems and their solutions are typical of the community.

A second procedure is to provide limited individual planning help to groups of families with similar planning problems — usually home remodeling. It is sometimes called a "home planning circle." In this activity the major need is for help in planning space re-arrangement rather than structural details. By working with a group of six to eight families, ideas are exchanged among the members as well as with the housing specialist.

Subsequently, when construction is underway or finished, demonstrations provide the basis for another type of extension activity — the "home improvement tour." Influence of the original planning effort is thus extended to neighbors and friends who are invited to hear and see successful results of home improvement; the primary purpose is to give them the confidence and inspiration to initiate improvements of their own.

A home improvement program of this type is continuous — expanding or decreasing according to economic or other conditions that affect the extent of rural home improvement. Application of such a strictly technical aid program is most feasible in areas where material aid is not a necessary inducement. While such conditions are not common in the less industrialized areas, there are good examples of successful agricultural extension programs in many parts of the world. For example, the Philippine Agricultural Extension Service program includes a home improvement project that resembles the United States' system, but deals primarily with local problems.

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Kilsey and Hearne. *Cooperative Extension Work*. Ithaca (New York, U.S.A.): Comstock Publishing Associates (1955), "The Organization," 41-56; "Specialists Role," 146-7; "Demonstrations and Group Methods," 342-54.

Motion Pictures:

Revival of a 100 Year Old Farmhouse. Olympia (Washington, U.S.A.): Douglas Fir Plywood Association (1953), 20 minutes.

The County Agent. New York City (U.S.A.): United World Films, Castle Films Department, 20 minutes.

TECHNICAL, FINANCIAL, AND BUILDING SITE AID

The Social Programs Administration in Puerto Rico affords an outstanding example of well-organized technical, financial, and building site aid for self-help housing. The program was sponsored by the Puerto Rican Department of Agriculture's Social Programs Administration. It was instituted primarily to help landless laborers in rural areas obtain homes on plots with lifetime leases.

In this program much was made of assuring participants that democratic steps would prevail — from selecting participating communities to scheduling details of construction work groups. To do this, a step-by-step orderly procedure was developed which is, perhaps, the most useful aspect of the program for study elsewhere. Here is an outline of essential steps for establishing and carrying out this kind of aided self-help program.

1. *Communities are selected on the basis that they must have:*

- Inadequate present housing
- Interest in participation
- Available self-help labor
- Adequate roads for transporting materials
- Proximity of local construction materials



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- Have good working reputation.
- Be physically and mentally healthy.
- Have an open mind on learning new building methods.
- Have a desire to improve living standards through own effort.
- Have enough prospective financial resources to pay housing debt incurred.
- Be trustworthy — since no written contracts are required.
- Agree to raze their present house when the new house is completed.
- Agree to work on days stipulated.
- Agree to pay the first half of down payment when construction begins and the other half when roof is on.
- Be willing to abide by rules of program.
- Agree to take care of loaned equipment and materials.
- Agree to attend all meetings of project — or have wife attend.

4. *Prospective candidates are investigated* by a representative of the SPA. Each family is visited in the home and a written report is made.
5. *Final selection of participants* is made by a committee of the SPA.
6. *Self-help housing work groups are organized.* Participants are called together by the SPA officer and working relations are established. Workers choose among themselves who will make up the various working teams; they also decide the work schedule, determining the week day and week-end minimums.
7. *Final meeting is held* to recapitulate regulations. The participants decide on a date to build a shelter for equipment. They elect a permanent committee, which will act as a board of directors, to serve until the end of the project.
8. *House building phase is started.*

Building materials are bought and delivered by the SPA.

Demonstrations are held on foundation and wall construction techniques.

Weekly reports are made accounting for materials used and materials left on hand.

When sufficient materials are available, a meeting is held to decide the order of house building.

Supervisor from SPA comes to help select and stake out house sites.

Building materials are issued to each participant.

The foreman of SPA supervises foundations and floor construction. He stays in the community until roofs are on all houses.

Teams work together on regular agreed upon schedules.

Demonstration on roof construction is held by SPA technician when all groups are ready.

Roof construction is the final phase of the group activity. Participants and families then work individually to do the partitioning, kitchen additions — from salvaged materials — porch construction, plastering, painting, and landscaping.

When all houses are completed, friends and neighbors are invited in for a celebration. This completes one cycle.

In addition to the organizational help outlined above, other aspects of the program deserve attention. First of all, in the Puerto Rican program, building sites averaging about 1000 square meters were provided in "life usufruct" to landless farm laborers. (Such security of land tenure is considered an essential basis on which to initiate an aided self-help housing program, since participants could not be expected to invest their effort on property for which they had no legal rights.)

The material for the houses cost \$340 each. Applied to this was a \$20 down payment. An agreement was reached to the effect that the balance was to be paid off in equal monthly installments, without interest, over a period of ten years. In cases of extreme hardship, unpaid balances were — at times — written off, thus resulting in a grant.

Certain equipment such as concrete forms and

mixers was provided by the SPA, but its expense was absorbed by the participants so that the cost of each piece could be amortized in the construction of 100 houses.

The houses were designed to be permanent. (They have concrete walls, floor, and roof to resist the hurricanes which prevail in the Caribbean area. House area is 324 square feet and includes a living room, two bedrooms, and porch.) The kitchen was added later in frame construction; being built of materials salvaged from the old house.

The completed homes have been appraised at more than three times the cash cost involved.

Reading References:

Aided Self-Help Housing Abroad. Washington, D.C. (U.S.A.): Housing and Home Finance Agency, "Co-operative Action in Aided Self-Help Housing in Puerto Rico," 9-13.

Aided Self-Help Housing Seminar Workshop Summary of Proceedings. San Juan (Puerto Rico): International Cooperation Administration (1953), 25-34.

Aided Self-Help in Housing Improvements (Ideas and Methods Exchange No. 18). Washington, D.C. (U.S.A.): Housing and Home Finance Agency, "The Puerto Rico Experience," 31-33.

Housing and Town and Country Planning (United Nations Bulletin No. 6). Lake Success (New York, U.S.A.): United Nations' (1951), "Puerto Rico: Programs of Suburban and Rural Aided Self Help Housing," 57-60.

Ideas and Methods Exchange No. 5. Washington, D.C., (U.S.A.): Housing and Home Finance Agency, "Puerto Rican Experience and Procedures in Aided Self-Help," "New and Expanded Use of Aided Self-Help in Puerto Rico."

AID ACCOUNTING FOR ALL BUILDING COSTS EXCEPT LABOR

The advantage of having employees live in their own homes was enough for the Stanvac Oil Company at Lirik, Sumatra, to justify providing major aid inducements. It was also considered undesirable for employees to be in debt to the employer for their homes, as this would reduce their feeling of independence.

Previous to turning to aided self-help, other systems for providing housing had been tried with little success. Employees considered it no privilege to occupy employer-owned houses; and it was most unsatisfactory for the company because the employees felt little responsibility for the maintenance

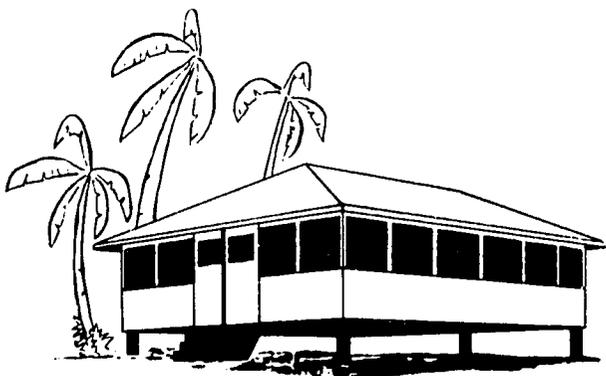
of these homes. The need for family housing beyond the employees' periods of employment added to the difficulty.

Several pre-fabricated houses were imported after 1947 and erected to help improve employer-employee relations, but these did not satisfy the needs of the workers, so many were not occupied or were occupied reluctantly. This occurred even though the new designs were improvements, in the Western sense, over prevailing local standards.

There were no sources of commercial loans; and with higher postwar salaries and wages, income was just sufficient to provide an austere living even under the company rationing system. Therefore, the employer would either have to provide a home loan arrangement — which it did not favor — or it would have to work out a different system. There were no other employment opportunities at Lirik, so housing aid of some kind by the employer was imperative. Aided self-help offered a likely solution.

The procedure was started by reviewing the problem in conjunction with the workers, the local labor union, and government officials primarily to ascertain basic housing desires of the employees. The discussions indicated that employees would be satisfied to live in houses of lower quality if they were not too different from the types they were accustomed to, and if they were located close together. The employees agreed to contribute the building labor necessary to produce their own homes.

An outline of responsibilities of employer and employee was set up on the following basis.



8. In Sumatra, the employer provided all the aid necessary to build houses; the employees supplied the unskilled labor.

THE EMPLOYER

Helped employees form an association to operate the new village of Lirik. Only members of the association were eligible to participate.

Provided ground for building sites.

Built one "example" house as a model for employees to follow.

Provided each employee family with enough materials to build a basic home. Additions or adjustments to the basic model house were the responsibility of the employee.

Provided water, electricity, sanitary facilities, and services.

THE EMPLOYEES

Supplied all labor for building the house.

Formed a credit union to provide loans to members to cover extra costs incurred by additions or variations from the basic model.

TENURE RIGHTS

The participating employee could occupy the house as long as he remained a member of the association. In case of his death, his family could continue to occupy the house. In no case would a house be rented, the house being built for the occupancy of employees and/or their families only.

TECHNICAL AID

The model house was suggested for technical guidance, since prevailing local construction techniques were used.

OBSERVATION AND EVALUATION

Where as much aid as this is provided, it would appear to be relatively easy to encourage new and improved construction and design techniques. However, it was not the goal of the employer to initiate an educational program in home improvement. Instead, it was simply to satisfy the needs of his employees. A government offering similar inducements

might be expected to emphasize technical aid in the form of demonstrations and supervision and to introduce acceptable "next step" structural and design improvements.

Reading Reference:

Ideas and Methods Exchange No. 12. Washington, D.C. (U.S.A.): Housing and Home Finance Agency, 4.

LOCAL EXAMPLES OF SELF-HELP HOUSING

There may be examples of self-help housing in your locality that should be investigated by your students and compared with the cases presented in this topic and elsewhere. The value is that such indigenous examples may offer insight into a workable self-help housing program on a broader basis. This is especially true if the self-help activity is mostly self-induced.

To evaluate such an activity it is necessary to find out such facts as the following:

What were the conditions before the self-help effort was initiated?

- What was the economic situation?
- What was the social background?
- What was the type and condition of prevailing houses?
- How extensive were community facilities?

What was the reason for the self-help effort?

- Was there economic improvement?
- Was there new leadership?
- Was there a social change?
- What natural resources were involved?

What has been the extent of housing and community improvement since the self-help effort was started?

- Has the improvement been integrated into an over-all community plan or is it limited to replacement of existing houses on the same sites?
- How many community facilities have been added or improved?
- How many houses have been built?
- How many old houses have been removed?

How was the self-help work organized?

What is the step-by-step procedure for a complete cycle of housing improvement?

What improvements do the new houses offer over prevailing types, or those replaced?

- What structural advances were made?
- What space or livability improvements were realized?
- How are the new houses more healthful?

What were the construction costs?

- What was the cash outlay per house and per square foot?
- How many man-days of labor were spent per house?
- How much of the labor was self-help?
- What outside aid was provided?

What were the major problems encountered in initiating the program?

What technical, economic, or organizational aid has been most desirable?

What are the chief satisfactions as expressed by the people who participated?

What do the sponsors, if any, think about the results?

What has been the influence of this effort on neighboring communities or associated groups?

What publicity has this activity already received?

From the above information it should be possible to estimate which phases of the effort might be expanded into a broader program. Aspects such as kind of work organization, construction methods, and plan arrangements should be kept in mind during the subsequent phases of the course. These will provide a practical situation to which applications can be visualized as new techniques are learned.

Investigation Topic No. 4

PLANNING PRINCIPLES FOR SELF-HELP HOUSING

The purpose of including planning in a course of training for self-help housing leaders is to prepare them for selecting and modifying basic house plans to meet local and individual needs; not that they will be expected to develop original house plans. For the latter a central planning facility should be used.

To adapt plans effectively, leaders will need to apply basic principles of community planning to aided self-help developments as a whole; they should be familiar with the elements of good home design concerning health, safety, livability, convenience, and comfort. The planning principles presented in this manual, however, are not limited to aided self-help situations, but are equally applicable to any housing development where good practices are to be introduced.

COMMUNITY PLANNING

Aided self-help housing units are often built in groups, for convenience in using special equipment and for ease in providing technical aid and supervision. Whether such housing groups are located in rural or urban areas, they should be planned in relationship to community facilities.

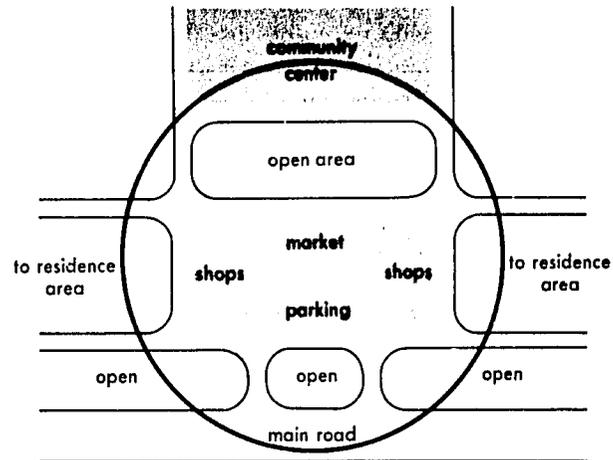
While community planning infers broad economic and social considerations as well as physical relationships of public and private facilities, the scope of this course is focused on the latter as it applies to village-sized units.

THE MAIN ROAD TO THE VILLAGE

Whether the village is isolated in a rural area or located as a part of an urban community, the chief contact with the outside world is usually by means of a main road.

While villages should be adequately served by this road, it is important that the village community itself be by-passed rather than transversed, especially since motor traffic is likely to become increasingly heavy.

The main road should be at least one hundred feet from the hub of the village, with access village roads kept to a minimum number and laid out to enter at a safe angle.



9. A village hub should be designed to accommodate the various activities of the people; it should include market places, parking areas, shops, community buildings, open areas, and public facilities.

THE HUB LAYOUT

The hub of the village includes a marketplace and space for parking vehicles. Some extra open space is important for expansion on the side away from the main road.

As the village grows, nearby space will be needed for such facilities as a school, community building, police station, post office, administration building, shops, and banks.

A community building serves a wide variety of public needs. A typical one might consist of a meeting hall, stage, library, latrines, and a committee room which could double as an office for a visiting physician. The building should be located next to the main recreation area of the village when possible.

Markets, placed next to the vehicle parking area, are usually arranged as rows of covered stalls. The ground surface should be paved and drained to promote sanitation. Tree shade is highly desirable and should be left if already existing. Shops can be grouped around the market for convenience of shoppers. Small village industries can also be located in the market area where wares can be more readily offered for sale to visitors.

Police and post offices should be near the main road to the village, with ample space allowed for future growth.

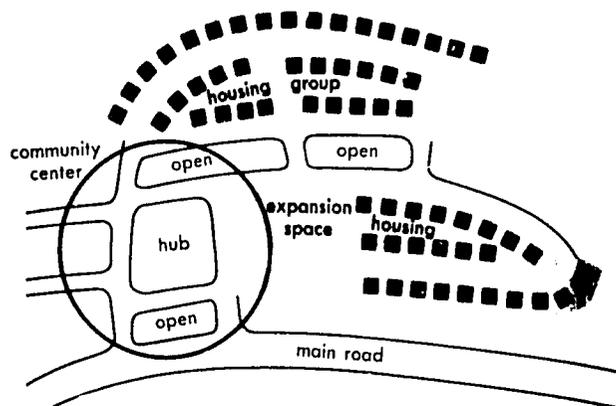
Regardless of the size of the resulting hub, it

needs to be readily accessible from the residential area. Children's play grounds, schools and churches, while easily accessible to the residential area, are best located away from the main road.

BUFFER SPACE

The buffer space separating these central facilities from the main road can be a grassed area serving useful purposes as well as a shield from traffic. It could be a park, a cemetery, or even a recreation area for adults if a barrier strip is left next to the road. However, nothing should be added to this area that would limit visibility at the junction of access roads to the main road.

Parking for vehicles should be located nearest the main road to minimize traffic in the village. Beyond this parking space can be a market area which should have ample room because it is a busy place and sometimes odorous. Open space also reduces fire hazards. Expansion of the hub is best made in a direction parallel with the main road, rather than at right angles to it, so that space can be kept open for future community facilities.



10. Residential housing groups should be accessible to the village hub, but separated from its busy atmosphere and traffic by open areas and buffer zones.

HOUSING GROUP LAYOUT

Groups of houses or neighborhood units should be located so as to be about equidistant from common services and facilities and on a side away from the main road. The layout of housing units is influenced

by the lay of the land with particular attention being given to undulating sites in an effort to minimize erosion.

ROADS

Roads which follow the land contours avoid erosion and are easier to use. Such roads facilitate terracing of house sites with the resulting economies of foundation construction and generally improved appearance.

Roads and paths within the housing area may be thought of as branches of a tree with the trunk representing the main road. In smaller villages motor traffic will be confined to the "trunk" at the hub of the village. Like twigs supporting leaves, appropriate sized roads or paths are planned to serve the housing units.

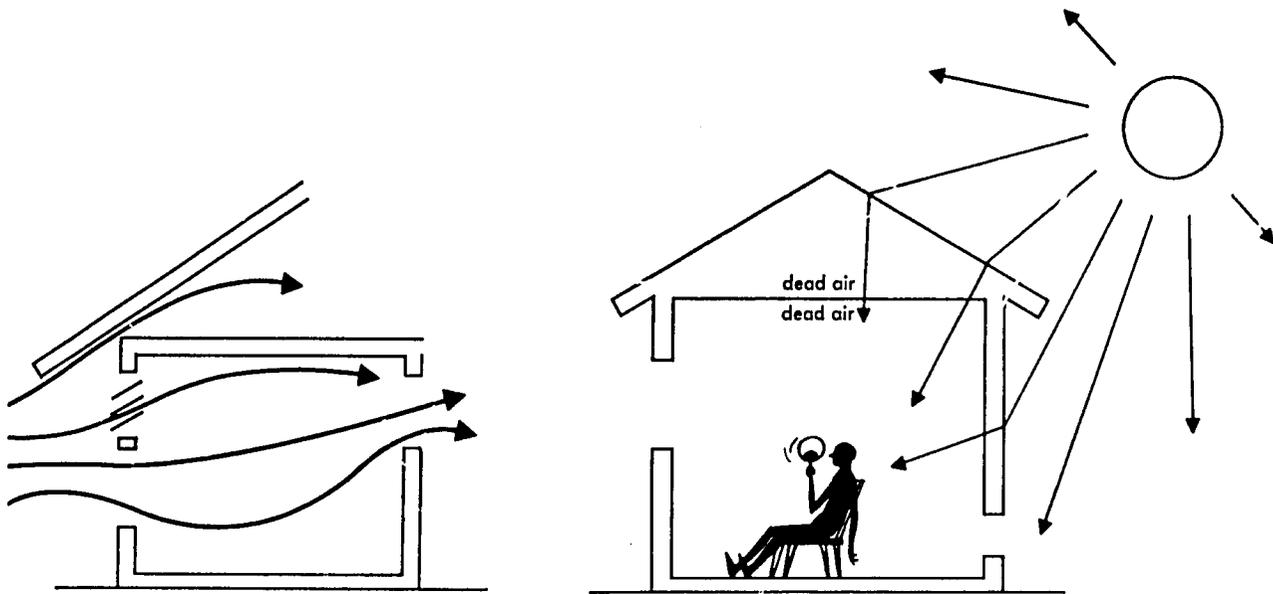
Facilities such as children's play areas can usually be located within housing groups so that few roads, if any, need to be crossed in reaching them from the houses. These play areas will be more uniformly accessible if planned in strip or belt shape than if in compact form.

Other facilities to be located within easy reach of houses are laundry places, latrines, gardens, possibly small markets and elementary schools.

PLANNING HOUSES FOR HEALTH, SAFETY, AND COMFORT

Homes designed to further healthful living have a strong natural attraction to people beset with frequent illnesses. Comfort will be improved if a house is designed to maintain more pleasant temperatures. Improved insulation and ventilation can make houses generally more comfortable as well as healthful. These are considerations of special importance in tropical areas where much aided self-help housing is needed.

Good ventilation really begins with the selection of the site, which should be chosen to catch prevailing breezes, but preferably not on the leeward side of the village where the air is likely to be foul. For good room ventilation, openings for air movement must be such that air will be drawn across the room, especially next to the ceiling where it helps cool the surface. Large windows are usually best located on the side of the room facing the breeze, with an outlet on the opposite wall somewhat smaller and higher so as not to create drafts. Instead of windows, louvers can

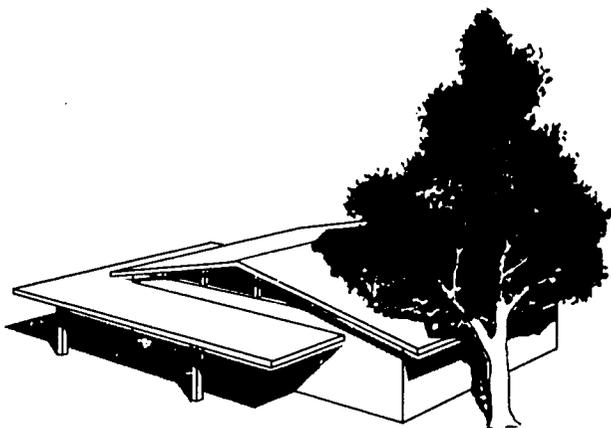


11. Cross-ventilation and air movement next to the ceiling surface contribute to comfort and healthfulness without increasing building costs.

High ceilings with low vents, however, raise the inside temperature and humidity, and should be avoided.

be often used to ventilate, especially above or below the eye line where outside views will not be cut off. Louvers resist the entrance of rain while providing ventilation. Wide roof overhangs also give weather protection when located over large, open ventilator openings.

High ceilings with low wall ventilators should be avoided as they reduce comfort by allowing hot air to accumulate next to the surface, thus raising the ceil-



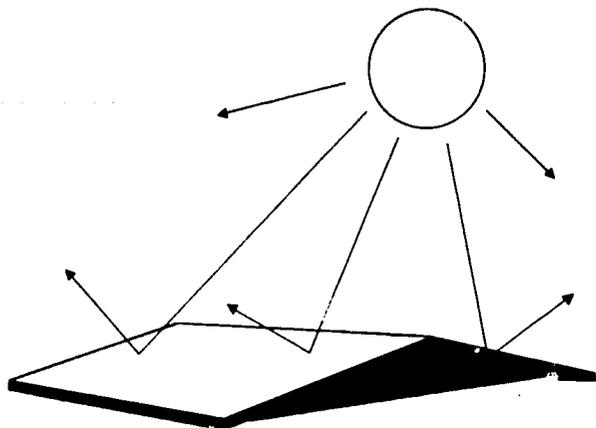
12. Verandas, overhangs, and trees provide roof and wall shade thus lowering temperatures inside.

ing temperature and causing a radiant heating effect on the space below. High ceilings are mistakenly thought to improve comfort, but heights above eight feet only increase the construction cost without increasing comfort.

Both wall and ceiling surfaces should be planned so they are kept as cool as possible when it is hot outside. An effective way to hold temperatures down is to provide shade wherever heat might be conducted through from the outside. Outside walls shaded from the morning sun and especially the mid-afternoon sun by an overhang, veranda, or tree will have a cooler inside surface. Attics in houses should be ventilated to help lower the ceiling temperature.

Another way to reduce heat passage is to use wall and roof surfaces that reflect heat such as aluminum or light-colored paint. Overheating can be reduced further by avoiding reflected sun heat from bare ground or paved areas on the hot side of the house. Grass-covered yards reflect relatively little heat, and trees that give good shade without hampering air flow will also help.

In hot dry climates where temperature differences between day and night are great, surface materials are needed that will store sun heat during the



13. Light-colored or shiny roof surfaces reduce heat penetration by reflection.

day and release it to the inside at night. By using dampened surfaces such as wet blinds made of absorbent materials that allow air passage, cooling by evaporation can take place, thereby cooling the surfaces during the hottest part of the day and delaying the heat from reaching the interior until the night.

Health conditions will also be improved by construction that reduces places in which disease-carrying rodents and vermin can hide. Roofs of untreated thatch become musty and infested with insects in a short time, and danger of destruction by fire is a serious hazard. But, effective insect and fire proofing procedures can be applied. It may be, however, that treating would increase the cost of such roofs to the point where naturally fire-resistant and insect-resistant materials such as metal, gypsum, or asbestos-cement should be considered.

Smooth surfaces, especially for floors, are important for ease in cleaning. Loose or splintery floor boards are particularly perilous. Damp earth floors are a health hazard that can sometimes be avoided by a simple earth fill to keep surface water out of the house. Better yet, but more costly, would be the addition of soil stabilizers or the use of more impervious materials such as masonry or concrete.

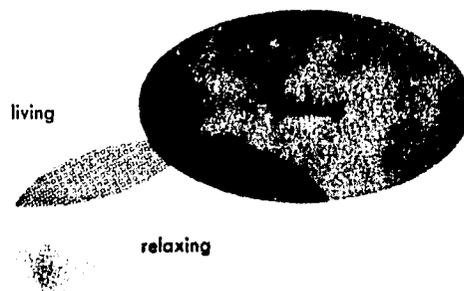
Natural or artificial light sufficient for effective vision in the home is important for reducing the accidents that are often caused by dim lighting. Screens

or mosquito bar over outside openings is vital to family health in areas where malarial mosquitoes or houseflies are prevalent.

Planning windows for admitting ample, direct sunlight to toilet and bathing areas will contribute to control of some infections. Although proper toilet facilities convenient to or within the house are important to healthful living, economy of construction may require the use of more distant group facilities in lowest cost projects.

PLANNING HOUSES FOR LIVABILITY AND CONVENIENCE

Livability and convenience are perhaps matters of lesser attraction value to prospective housing participants than those of health and comfort—especially under conditions where almost any kind of shelter would be an improvement. However, since livability and convenience can often be improved without adding cost, some basic principles should be understood.



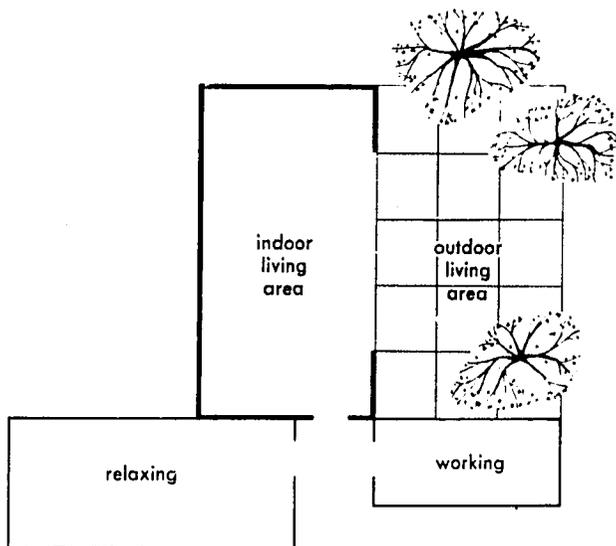
14. Even the smallest house can benefit from space zoned according to use.

Zoning of house space into living, working, and relaxation areas is a common approach in house planning. Of course, in the minimum house—one room—there would seem to be little opportunity to apply improved planning, yet even here the windows and door locations can be planned to make the best use of traffic lines, open space, and furniture placement. In larger houses, kitchens and sleeping rooms can be separated from living space to gain both privacy and livability. While convenience usually favors locating bath and toilet facilities in the sleeping zone, in tropical areas they are probably more functional if

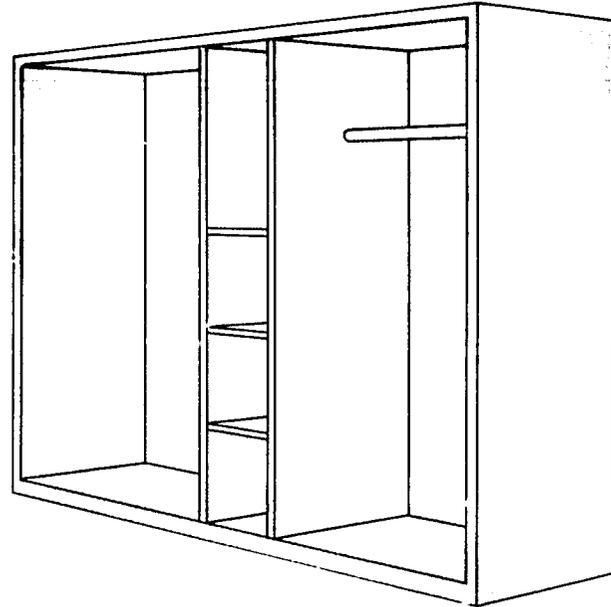
placed near the kitchen and made accessible from the outside. This is economical and more convenient with the year-round outdoor living that prevails in warm climates.

Livability can usually be increased by planning indoor and outdoor space together — even for the near minimum house. The outdoor living area is usually best located next to the living room on the private side of the house. However, as desirable as this arrangement would seem, it is recognized that custom has long favored a relationship of living space with the street side of the house, and it may not be easy or entirely desirable to make a change. A roof over the outside living area increases its usefulness throughout the year. Trees and shrubs, well planned around the outside living area, add much to appearance from inside the house and improve the livability outside.

Built-in storage closets are features often left out of low-cost houses, although their contribution to convenience in housekeeping — and to sanitation and health as well — may be considerable. Built-in units are easier to clean since no trash can gather above, behind, or under them — as may happen with detached storage cabinets. The cost of built-in storage need not be more than an equivalent cabinet storage unit, and in fact, would likely cost less since cheaper materials and labor can be used.



15. In warmer climates, the total living area of a minimum house can be increased by planning indoor and outdoor spaces together.



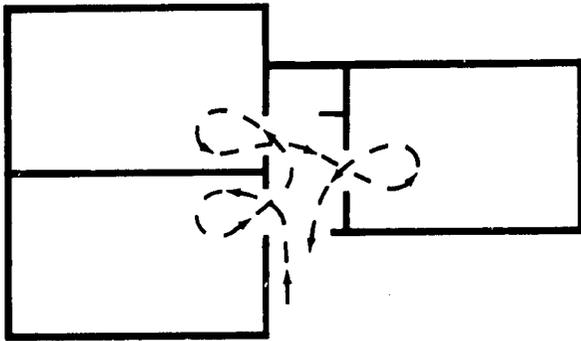
16. Built-in storage contributes to convenience and sanitation.

Planning the “traffic” through a house is helpful. Even if each of the basic areas for living, relaxing, and working is individually well planned, it might not fit efficiently with the other areas. If possible, each room should be accessible without passing through another room. This usually means that the doorways should meet near a centrally located point, such as a hall or entry room. In the minimum house, instead of providing hall spaces, the door locations should be such that only one end of rooms would be used for passage.

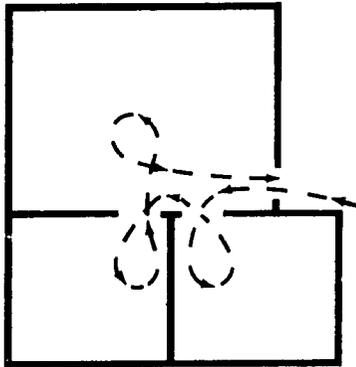
A plan can readily be evaluated for traffic by making a “travel pattern.” This is done simply by drawing lines from each doorway to the next and to points of major living activity. A plan with excessive travel pattern lines crossing rooms should be rejected or modified.

Since each unit of space costs something, it is important to evaluate the relative sizes of rooms, eliminating space from oversized rooms and adding extra space to undersized rooms where it is really needed. For example, when a bedroom is larger than necessary, other bedrooms, the living area, or the work area must be penalized for space — if lowest possible costs are to be maintained.

The best choice of plan is one providing a suitable balance of space, an arrangement for minimum



traffic pattern with hall



traffic pattern without hall

17. Even in the minimum house, planned traffic patterns through the house can greatly improve convenience.

traffic, and features that promote convenient, healthful, and safe living throughout.

EXERCISES IN COMMUNITY AND HOUSE PLAN EVALUATION

In the following topics you will find exercises for students to do. By completing these, your students will better understand the principles of planning.

1. Sketch your home village layout locating the main road, markets, community buildings, open areas, and housing groups. Redraw the plan, adjusting it to meet recommendations for safety, erosion control, expansion, convenience, etc.

2. Work out a community plan for a proposed

group of aided self-help houses in an accessible nearby village. Observe the influence of topography on site arrangement and rules of road intersection. Show the relation of housing groups to such needed facilities as an elementary school, a recreation area, markets, and a community building.

3. Select some house plans representing prevailing designs used in your community, and evaluate them for cross ventilation of sleeping areas. Study how they would best be orientated to utilize prevailing breeze.

Study roof overhang and veranda locations for their shading effect on walls facing the afternoon sun. See what changes can be made to make the house more comfortable in its best orientation.

4. Sketch a house plan with which you are familiar and overlay a "travel pattern" representing the more commonly repeated traffic routes through the house. Show how you could relocate doors to improve traffic.

5. Using a typical house plan, evaluate the relative amount of space used for each room. Are some rooms too large? Is there built-in storage space provided at the proper places? Where can improvements be made? Sketch a revised plan including improvements.

Reference Readings:

Carter and Hinchcliff. *Family Housing*. New York City (U.S.A.): John Wiley & Sons, Inc. (1949), "Approach to House Planning," 44-56; "Living and Sleeping Areas," 75-89; "General Planning Problems," 9-106.

Drew, Fry, and Ford. *Village Housing in the Tropics*. London (Great Britain): Lund Humphries (1947).

Lee. *Physiological Objectives in Hot Weather Housing*. Washington, D.C. (U.S.A.): Housing and Home Finance Agency, 4.

Suggested Land Subdivision Regulations. Washington, D.C. (U.S.A.): Housing and Home Finance Agency.

Investigation Topic No. 5

CONSTRUCTION METHODS ADAPTED TO AIDED SELF-HELP HOUSING

Many types of construction can be used, but generally the choice should be made favoring methods that save cash outlay by substituting unskilled

labor. Use of local building materials is common practice where utmost economy is needed. However, some type of treatment or process can usually be introduced to make available materials more durable, firesafe, and conducive to health. Introduction of "next step" techniques will likely be acceptable in aided self-help housing whereas entirely unfamiliar techniques would not, particularly if the project were not aided materially from outside.

The housing leader will need to be familiar with a wide variety of improved construction techniques in order to help participants choose methods best adapted to local conditions. He will need to know such requirements as the amount of skill necessary for each method of construction, in order to estimate the amount of local training or supervision required; the availability of materials, special tools, or equipment necessary; and the days of labor each method might require of the participants. Personal construction experience is indispensable for the leader. There is no substitute for learning each technique by actually doing each step of the process. A minimum of such first-hand experience should include the completion of construction exercises demonstrating basic characteristics of each of several building techniques. Ideally, of course, students should have experience in building houses of various construction types, preferably as apprentices working under trained and experienced craftsmen.

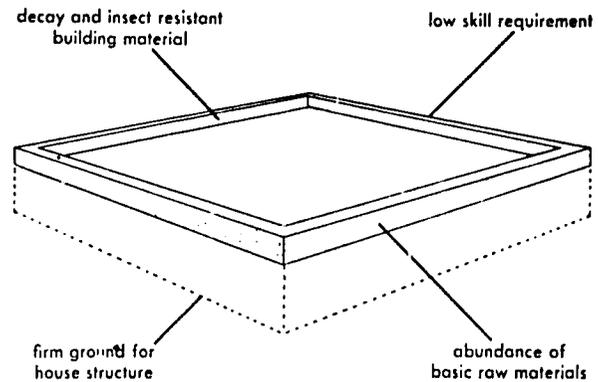
Construction techniques which best apply to the area should be selected for these practical experience exercises. The building methods outlined briefly below illustrate a range of possibilities for developing this phase of the course.

FOUNDATIONS

SOIL

For lightweight houses in arid regions not subject to wind erosion, unprepared soil can be used as a minimum-cost foundation material. Ramming the soil gives it extra bearing strength. Adobe bricks made with a minimum of fiber might also be used. Sand can be mixed with clay-like soil and rammed to make a firm footing.

For damp conditions a stabilizer is necessary. This might be high grade lime, sodium silicate, cement, or asphalt emulsion. The most widely available



18. Basic needs of a foundation.

of these stabilizers are lime and natural hydraulic cement.

One advantage of this method is that little skill and no unusual equipment is needed for ramming. However, in producing the stabilizer materials greater skills and equipment investments are required.

STONE

Stone, especially when dimensioned into blocks, can make a firm foundation even when laid without mortar. It is usually improved, however, if even a medium quality mortar is used. Gypsum or lime mortars are widely available and quite satisfactory under moderately severe conditions.

Only moderate skill is called for in laying stone for foundations, but production of mortar materials requires much more skill, and special processing equipment is needed.

BRICK

Next to concrete, burned clay brick is one of the most satisfactory foundation materials, and is almost universally available. Quality varies greatly depending upon skill and equipment for production; but for foundations, the low grades requiring the simplest of equipment are generally usable. No great laying skill is needed. Special laying equipment can be used, however, to simplify and expedite the procedure.

CONCRETE

The general shortage of cement is the chief reason for avoiding use of concrete in foundations for

aided self-help housing in certain areas. In some cases, suitable aggregates are also difficult to obtain. It is better to use available cement in mortars for brick or stone, or for capping foundation walls made of more abundant local materials than to make a poured foundation. In areas where trass and natural lime are available, their mixture may substitute for concrete where a slow developing strength is permissible.

WOOD

A few species of wood have natural resistance to decay and termite attack and would be practical to use without treatment. But most lumber used for home construction is not durable for foundations in tropical areas unless treated with preservatives. Properly preserved, most species of wood can be expected to serve for foundations from 25 to 50 years even under unfavorable conditions.

The most effective treatments require an investment in pressure-treating equipment and the expense of preservatives plus employment of skilled operators.

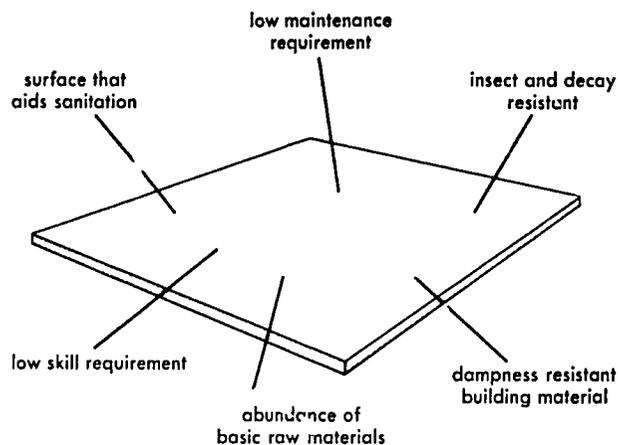
However, a method which housing participants could most likely apply is the hot and cold bath treatment using coal tar creosote and petroleum oils which have had pentachlorophenol or copper naphthenate added. Only moderate skill and equipment investment is required.

Some species of wood when well seasoned can be benefited by cold soaking in preservatives. While this is a simpler treating process, results are much less dependable than the hot and cold process. Least effective of all are brushed-on applications.

FLOORS

EARTH

Soil at grade level is the prevailing floor surface of many low-cost homes. Improvements can be made at no cost simply by raising the floor level by at least four inches with tamped layers of earth. A further improvement would be to use a mixture of up to 75 percent sand with the soil moistened just enough to allow packing. At some extra cost the addition of from 2 to 10 percent of cement to soil and sand without gravel will provide a more durable floor with a surface that is easier to keep sanitary. Instead of cement, a cut-back asphalt or road oil mix can be used as the binder for the top course. In this case, a



19. Basic needs of a floor.

primer coat of the same oil should be applied on the base cover and again over the finished floor.

STONE

Large flat stones make satisfactory home floors, particularly if they can be fitted together closely, or if mortars are available for filling joints. Floor stones without mortar can be laid effectively in a bed of sand, which also helps keep the surface dry.

Stone floors require from slight to moderate skill to lay and very little equipment is needed.

BRICK AND TILE

Either brick or tile laid over a sand bed make a good house floor. Housekeeping is facilitated if joints are filled with mortar.

Ordinary burned brick can be produced with only moderate skill and a fairly low investment. Brick made of lime or cement and sand require more skill and greater capital investment for manufacturing. Only slight skill is necessary for laying brick floors; efficiency can be increased by using special brick-laying equipment.

CONCRETE

Concrete is widely acceptable for medium-cost floors. They can be made warmer to the touch if concrete is foamed or if an insulating aggregate is used instead of gravel. However, this would increase the cost, while a matting floor cover would gain the same results at small cost. Concrete made without

fine aggregate is well suited for such floor construction because of its improved insulation and moisture resistance value over regular concrete. Available hydraulic cements will usually be adequate in strength for low-cost home floors laid on a coil or gravel base.

WOOD AND WOODY PLANTS

Because of attacks by insects and decay, wood is not a widely used material for low-cost housing floors in tropical or semi-tropical areas. Where readily available, bamboo is more widely used, either in the round or plaited form.

When a bamboo floor is laid directly on the ground, the surface should be raised with an earth fill, preferably clay, and sloped enough to drain off surface water. Plaited bamboo placed upon such a fill and compacted afterward will stabilize the floor surface.

Better yet, raise the floor above the ground high enough to produce usable space below. The added ventilation will also help preserve the floor. Only low to medium skills are required for constructing wood floors. Simple preservative treatments described for foundations can be used for wood or bamboo to improve resistance to damage. The extra cash outlay for preservatives will need to be accounted for.

WALLS AND PARTITIONS

EARTH

Earth, the most completely ubiquitous building material, is used in a wide variety of ways for walls. Two increasingly popular techniques are rammed earth and compressed interlocking soil blocks. A soil with a sand content of up to 75 percent is necessary

for either method. Usually a binder such as cement in amounts from 2 to 10 percent is necessary for outside walls. The amount depends on the climate and the degree of weather protection given to the wall.

An important element in each method is pressure which is applied for making the material hard and durable. For rammed earth, pressure is applied to the soil in place with a special ramming tool. It is a rather slow, laborious process. A heavy movable form is also necessary for confining the soil while it is being compacted.

Compressed soil blocks are made in a special machine -- preferably hand operated, for most self-help projects. The machine allows pressures up to 1,500 pounds per square inch to be applied by a team of two operators. The result is a firm, durable building unit, if allowed to cure properly.

Such blocks can be formed in shapes that allow interlocking of units requiring only "stacking" to make a wall. This method has an advantage for tropical areas in that the part of the construction which must be done in the sun does not take very long. The blocks themselves can be formed in the shade. Special care must be given to making a level laying bed.

The disadvantage of compressed soil blocks over rammed earth is that cash outlay is required to purchase block making equipment, rammed earth forms can be built by the workers themselves.

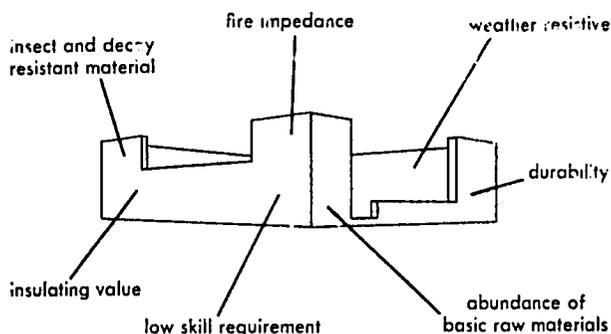
Unless special precautions are taken, earth construction is not generally considered suitable for use in areas subject to earthquake.

STONE

Stone suitable for walls is not widely found. Rubble stone requires excessive amounts of mortar which raises costs considerably unless other than portland cement mortars are available. Thin flat stones also require a relatively large volume of mortar. For dressed stone, too much highly skilled labor is necessary. The fact that usable stone usually has to be transported appreciable distances -- from where it occurs to where it is to be used -- adds to the effort or expense.

BRICK AND TILE

Clays for brick and tile, being extensively distributed, make products highly suitable for self-help



20. Basic needs of a wall.

housing. While brick that is burned in stacks without kilns is likely to be non-durable, it can be used for walls if protected from seepage and weather by moisture barriers and waterproof coatings. Brick of this type takes little skill to make. Tile is enough more difficult to produce than brick that it should be ruled out for minimum-cost projects. Sand and lime brick requires a higher investment in materials and equipment and greater skill to make, but could possibly be justified where raw materials are readily available. Brick can be laid in walls without great skill by using modern laying equipment.

CONCRETE

Concrete is adaptable to a wide variety of wall construction techniques applicable to aided self-help projects. However, such use is limited to areas where adequate cement is available, and there is money to buy it. Availability of good aggregates is also a limiting factor.

Cast-in-place concrete walls are practical for self-help housing only when forms can be readily dismantled and passed around expediently among participants. An outside agency might provide the forms, or participants might pool their resources to produce them — a procedure that would usually require organizational and technical help from outside.

Concrete wall construction may have to be varied to meet performance needs. To gain insulation value, a porous concrete can be produced by using light-weight aggregates — aggregates without the fine particles included — or by a concrete foaming process.

Forms are not required for some systems. Concrete walls can be formed on the ground and then tilted into position, or concrete can be spread or blown onto a framework. All of these procedures take relatively high skill and special equipment which limits their use in low-cost projects.

Concrete shaped into block-sized units is another technique for eliminating forms. However, for efficient production, an investment is necessary for a block making machine. For small groups, the simple hand-operated light-weight machines are usually the best choice. If the cost can be spread over several nearby projects, the purchase of a small power-operated block maker can usually be justified.

Whatever the construction procedure, serviceable concrete requires special attention at critical

stages. Experience is necessary in order to maintain a minimum of mixing water. Over-wet mixes must be avoided. Another necessary measure is to avoid aggregates that contain too many fine particles. The value of slow, moist curing is too often overlooked as a method of increasing strength and durability of concrete at no extra cost.

WOOD AND WOODY PLANTS

Walls of logs or poles are one of the most primitive constructions and most wasteful of material. Whether or not such waste can be tolerated depends on the abundance and market value of the timber in a given area.

Great advances have been made in using timber efficiently, as for example, the use of small framing members with covering layers of boards or woven plant fiber. More recently, wood construction has been adapted for prefabricated panels. This has possibilities for aided self-help housing. It allows participants to specialize — increasing their efficiency. No special equipment is necessary over conventional constructions, although power tools increase efficiency and might well be justified for large developments. Prefabrication procedure requires a project having closely located building sites in order to avoid transportation problems. Panels of a size easily movable by two men are best.

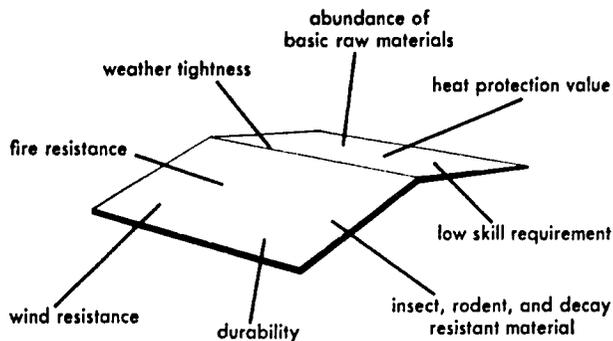
Many tropical species of timber are not durable unless treated against decay and insect damage. Because of the cost, however, it is often expedient to limit use of treated lumber to the most vulnerable locations — particularly the sills and in some cases the floor joists.

ROOFS

A good, durable, low-cost roof would no doubt fill the greatest housing need in many areas. It is needed in wet climates to help keep occupants healthy. In hot dry climates it is necessary for comfort. Roof surfaces are subjected to the most severe forces of nature — heat, wind, rain, and sometimes snow loads. It is also the part of the house most vulnerable to fire damage. Resistance to these influences requires many special properties in the materials used.

EARTH

Earth is used for roofs because of its insulating



21. Basic needs of a roof.

value over a wood framework. This application is limited to arid areas unless special waterproofing measures are taken.

Earth mixed with slaked lime, rammed in several layers to a thickness of from 8 to 18 inches, and sloped to drain gives reasonably good service. Soil-cement mixes from 4 to 6 inches fitted over a treated bamboo framework and covered with paraffin have been observed to give fairly good service for three years in a humid, tropical climate. Rammed earth and dried brick have been used for arched or dome-roofed houses in semi-arid climates.

Arched roofs have been built by ramming earth between heavy wooden plank forms similar to those used for walls. A protective weather coating of cement and soil plaster is advisable, whether or not a binder has been used in the soil. Technical advice as to proportions of the arch is necessary.

Grass or palm leaf roofing materials may be replaced by handmade clay roof tiles. Tile possesses fire-resistant properties, adding to the safety of the entire house. The attic space under tile roofs of this type is generally well ventilated, adding to personal health and comfort. Tile is best used in areas where the climate is generally favorable and where blowing rains are infrequent. During moderate rains, tile breakage — with its resulting leaks — is troublesome; however, replacements are made easily.

Better-fitting clay tiles can be made with special hand-operated tile forming machines. By adding cement as a binder and then curing, good tiles can be made without the use of a kiln. Of course, by this method, the cash outlay is increased due to the cement requirement, but the expenses of fuel and a kiln in the burning process are eliminated.

CONCRETE

Concrete roofs can be justified only if there is an adequate cement supply or if local conditions make them necessary, such as in hurricane or earthquake country which require them for safety. A reinforced, poured-in-place, concrete roof takes more cement than can be financially justified in most low-cost situations. But pre-cast concrete beams to support a cheaper roof surface may be appropriate where adequate wood beam members are scarce. Higher skills are required for the construction of reinforced concrete roof slabs or beams than for most any other phase of construction. Technical help and supervision thus become indispensable factors.

WOOD AND WOODY PLANTS

Wherever it is available, wood is the most commonly used material for framing low-cost houses. Conventional framing methods are generally well known. A more recent improvement is the use of wood in light trusses. This requires stronger connections of the wood members than for conventional construction; either well-designed, nailed joints or metal connectors with or without waterproof glue can be used. The advantages are that less timber is normally used and wider roof spans are possible, eliminating the need for interior supporting walls. Greater flexibility in space planning is also achieved. Costs may be reduced through use of cheaper lightweight partitions.

Wood can also be made into laminated arches or ribs. These ribs may provide framing for the walls as well as for the roofs. For such construction, openings are generally best confined to the ends of the house.

No great skill is required for either truss or laminated rib construction, but help may be needed for setting up a jig or pattern. Metal connectors for light truss construction would increase cash cost, of course. The combined use of nails and waterproof glue is perhaps the most practical procedure for some areas where reliable glues are available locally. If not, well-designed, nailed trusses are suitable over reasonable spans.

CEMENT-ASBESTOS ROOFING

Corrugated cement-asbestos board is durable attractive material for homes in tropical areas, but its

cost is often too high for low-cost projects. Both its ingredients are scarce in most less industrialized areas.

ASPHALT ROOFING

Built-up bituminous roofs do not withstand the strong hot rays of the tropical sun very well. Light-colored or reflective coatings, however, improve their effectiveness by deflecting some of the heat and light.

A cheap, rather short-lived and low-cost asphalt roofing material has been developed in the form of a corrugated fiber based sheet. With a layer of aluminum foil on the top side, it can reflect much of the heat from the sun. It is light, requires a minimum framework, and can be applied by unskilled workers.

ESTIMATING CONSTRUCTION COSTS

The housing leader needs to be able to estimate both materials and labor for various methods of house construction. Estimates are needed for determining the material resources necessary for a project; and prospective participants should be informed as to the amount of their time that will be required for building their houses. Experience in estimating should be gained along with experience in construction techniques, because the established rules for estimating are often unreliable in the local situation and must be modified. Labor requirements with self-help may be greater at first because of the confusion of inexperience although careful design may do much to eliminate this. Only through practice in estimating materials and labor plus experience with suitable construction techniques can the leader learn to prepare adequate estimates.

EXERCISES IN CONSTRUCTION TECHNIQUES

1. Exercises in home construction techniques should be developed to the fullest possible extent, preferably with an apprentice arrangement with previously trained leaders. This phase of the training can be extended indefinitely, but should be at least adequate to give leaders ample confidence in their ability to demonstrate the techniques themselves. Where apprentice training is not possible, experience must be gained through planned exercises. In developing skills, students should first be given method demonstrations on the essential elements of construction technique. After this, the students will need to repeat

them, then gain experience in applying the techniques in constructing a complete house.

2. To gain experience in making estimates students should practice observing and recording quantities of materials used and the man-hours required in producing units of construction of various types. They will thus be able to evaluate the effectiveness of labor-saving equipment such as the wheelbarrow, concrete mixer, conveyer, and garden hose when applied to local conditions. A summation of these estimating observations should be made as a reference for future use in the field.

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Williams. *Farm Buildings from Home-Grown Timber* (Farmers' Bulletin No. 1975). Washington, D.C. (U.S.A.): Superintendent of Documents, U. S. Government Printing Office.

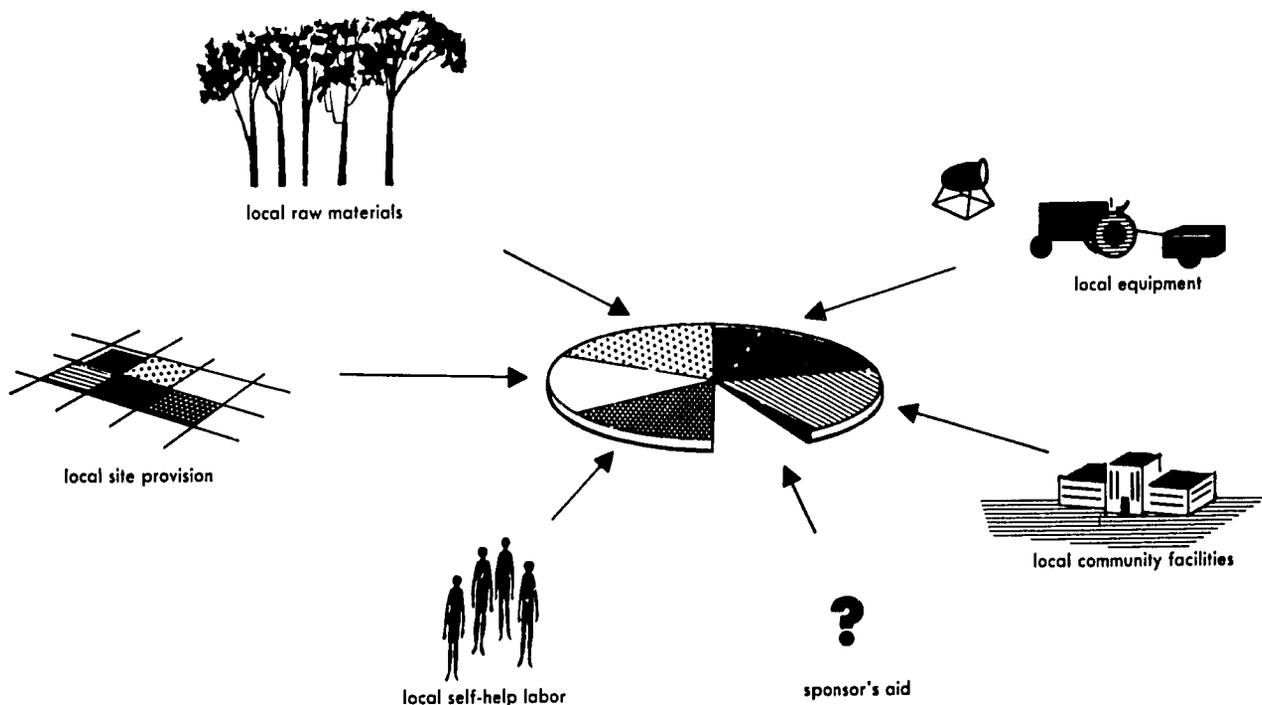
A fee may be charged for some of these publications.

Investigation Topic No. 6

EVALUATING RESOURCES FOR AIDED SELF-HELP HOUSING PROJECTS

The organization of local resources for aided self-help housing is undoubtedly the most vital link in the chain of efforts necessary for a successful project. Resources include such components as building sites, materials, equipment, cash, credit, labor, and building supervision. The leader needs insight to recognize resources within the local area which otherwise might remain unnoticed; enough resources may already be available within a community or an organized group thus requiring only organizational help from outside to initiate an effective housing program.

The purpose of aid in self-help is to supplement the resources of participants in order to stimulate more construction with better design. From the long-range viewpoint there are advantages in holding outside aid to the minimum necessary to attract participants. Anything more than minimum may impose such a burden on the sponsor that the program could not be sustained on a broad basis. What the partici-



22. Evaluate and organize all local resources before seeking outside aid.

plants lack in their own resources should first be sought locally since the community as a whole benefits from the efforts of participants to gain better housing.

Some communities needing housing projects will have more to offer in resources than others. It is expedient in the beginning, therefore, to analyze several prospects to determine which would be the more likely to succeed.

BASIS FOR SELECTING COMMUNITIES OR ORGANIZED GROUPS

First of all, there must be a strong felt need for better housing in the community or organized group. This need may be recognized, however, only after an effective educational program is presented to extoll the rewards of better housing and the possibilities for improvement.

A community survey to determine the size and condition of current housing, along with an estimate of present and future housing needs would be useful. A forecast of the general economic future of the community or organized group should also be made when possible. Account should be taken of the community's past experience with self-help systems in attaining improvements such as schools, roads, and bridges.

After this, the physical resources that could be contributed to a housing project must be analyzed. Among these, the number of prospective participants who are productively at work and have available leisure time is of prime significance. Working time may be seasonal, or it may be limited to spare hours each day or week. It will usually be safe to assume that the self-help participants' chief contribution will be common labor. Any additional resources they might be able to provide would be determined later as individual participants are investigated.

Sites, materials, equipment, tools, financial help, and technical guidance are elements more likely to be contributed either by local or outside sponsors rather than by participants.

In the initial stage, everything depends upon the availability of building sites. Unless participants can be given assurance of land rights on which to build their houses, they cannot be expected to have much enthusiasm for the program. The housing leader should therefore value highly any contribution of land for building. At this point in the community evaluation, it is wise to present the sponsors with

several plans for houses along with reasonable estimates of materials and labor. The local resources may meet the material, labor, and equipment requirements better for certain types of house construction than for others. The trained housing leader will be particularly useful in guiding plan selections at this point.

Examples of material resources which a community might contribute include:

- land for building sites
- timber for lumber production
- construction equipment
- supervisory help
- school facilities
- roads to the site
- site development, utilities, etc.

The labor portion of many of the community improvements might well be subscribed by the aided housing participants since they would have the most to gain from the over-all project.

BASIS FOR SELECTING INDIVIDUAL PARTICIPANTS

Within a given community or organized group, some individuals are better prospects than others for including in an aided self-help housing project. The pressure of poor housing alone should be a strong motive for such participation, but in addition, personal qualifications and resources should be carefully evaluated. Among the more important of these are:

The principal employment or occupation of the candidate should be stable. Basic living needs will have to be met during the process of building a house.

He must have adequate work time available to devote to home construction. The amount of time for building a house by self-help methods is often underestimated. Also, if regular employment is exhausting, time on houses will be cut accordingly.

The candidate must be in good health if he is to pull his share of the work load. Consideration must also be given to the labor contribution of the whole family since many building jobs can be done by women and older children.

SAMPLE OUTLINE FOR SURVEYING SELF-HELP HOUSING CANDIDATES

Name John Doe

Address 1411 Maple

Age 27 Marital status Married

Family 4 boys, 2 girls

Home now occupied:

Size (floor area): 420 sq. ft.

Owned: No Rented: Yes

Monthly Rent: ϕ*15

How long lived there: 8 years

Employer's Name: People's Oil Company

How long worked for present employer: 3 years position: Clerk

Occupation, if self-employed: _____

Present income (per month): ϕ 100 (per year): ϕ 1000

Does candidate own a house: no or a building site: yes

Amount of cash available for home construction: ϕ 200

Amount of monthy payment candidate thinks he could afford to pay for adequate housing: ϕ 25

Hours of work per week candidate is willing to contribute to aided self-help home building (including labor of other family members): 25

* ϕ is a fictitious monetary unit.

Where financial credit is to be extended to cover all or part of the cost, the candidate's cash income must be evaluated to determine how a loan can be repaid.

Family savings available for housing will reduce the size of loans necessary to cover expenditures and should therefore be considered in choosing a participant.

The candidate may already own a building site. The value of such a contribution depends somewhat on its location relative to other sites in the operation. A remote location would hamper cooperative aspects of construction.

A candidate who has basic construction skills can be valuable in a housing project. He may save a large share of the hired or donated supervision otherwise necessary, and this becomes an economic asset to the whole group.

A candidate who has a home with salvagable materials may reduce otherwise needed cash loans for material. If he owns construction tools which would otherwise have to be purchased, rented, or donated by the sponsor, this should also be credited in his favor.

An intangible contribution of a prospective participant would be any previous experience he may have had with other organized self-help activities. Such experience would allow him to better appreciate the need to "give and take" during the course of the project.

FINANCING CASH HOUSING COSTS FROM LOCAL SOURCES

Housing of improved design usually requires some cash to buy materials such as hardware, cement, or preservatives. Cash may have to be paid for the rental of equipment.

It is costs of such things as these that sponsoring agencies might contribute — either as a subsidy or as a loan. However, self-help groups should not look to sponsors as the only source of cash; they should consider the possibilities of their own financing systems — limited as they might be.

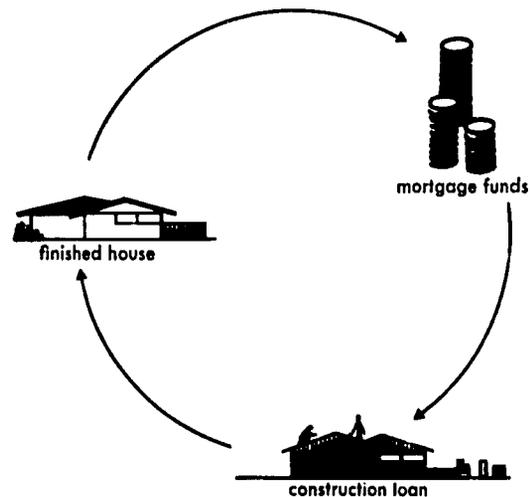
Savings or convertible property of the partici-

pants is the first source to investigate. The amount of rent paid over the past five to ten years could be used as an indication of the amount the participants might reasonably contribute, under a pay back plan. This would necessitate an initial fund; savings associations are one method of establishing such a fund.

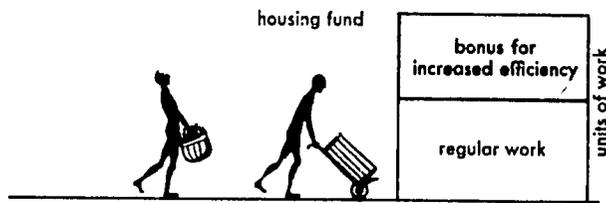
A "savings plan" was developed as a result of the efforts of study-savings groups organized by the Hurricane Housing Organization of Jamaica. The plan took advantage of regularly scheduled weekly study meetings, and attempted to encourage the thrift habit among its members. Each member decided how much he could save in the periods between meetings. Group savings were banked within two days after collection, and members were given pass books in which they could record their savings.

Study-savings meetings continued until members understood the construction and organizational steps necessary to accomplish their objective — and had enough group savings available to start building.

In some areas it is reasonable for participants to mortgage their completed homes for as much as their whole cash outlay. This would cover the advance from the building fund, and the mortgage loan could be paid off over a convenient period of time. The fund thereby gains enough each time a house is completed to finance another one.



23. *The revolving fund system used to perpetuate the financing of aided self-help houses from an initial fund.*



24. Employers give bonus payments to the housing fund when their employees work more efficiently.

There are other ways to establish the initial loan fund from local sources. A poll tax system might be used for community and home improvement, particularly where underemployment is common. Able-bodied men and unmarried women pay their assessments either in labor or cash. The labor contribution is then directed into building roads, schools, community buildings, or sanitary systems. The cash payments go for materials which must be purchased.

Another technique for establishing home building loan funds has been used effectively by employees whose standards of work output can be determined on a unit basis. An employer agrees to pay for increased productivity of his employees by contributing to a housing fund in proportion to their increased efficiency. For example, a shipping company in Formosa contributes appropriately to its dock workers' fund when unloadings are made faster than an established schedule. As stated, this system is practical only for occupations with rates of work output that can be determined on a unit basis.

Where it is impossible to raise enough cash for a project, it may be possible to reduce the margin between cash costs and funds available by substituting more home-produced materials for those that require cash. For example, home-produced lime might be substituted for cement if the lime is used with pulverized tile and brick to form slow setting cements. In other cases, a small investment in equipment for producing building material might reduce the over-all cash outlay for materials. For example, a concrete roof-tile machine could repay its cost after a few houses were built if comparable roofing materials would have to be paid for from cash funds.

In saving cash, however, it is important not to eliminate features that represent advances in design.

HOW TO USE THE SAMPLE OUTLINE FOR SUMMARIZING ALL AVAILABLE RESOURCES

The sample outline for summarizing available resources for aided self-help housing (pages 32-33) is suggested as a method of tabulating resources so they can be readily appraised and compared. Not only factors involved in home construction are shown, but also the necessary supplementary community development (A), and site development (B), are accounted for. The estimates for community development and site development would necessarily be quite rough at this stage. The cost records from developments in other communities using similar procedures would be most helpful. Also the outline accounts for the cost of using necessary special construction equipment, (C). The list of building materials (D) is to be estimated for a proposed number of housing units of a selected plan. This will make it possible to find out how much of the materials might be underwritten locally. Some materials might also be processed from local raw materials by the housing participants. Then, the value of the participants' labor is accounted for in the outline—to their credit. Technical guidance (E) is logically an outside contribution, at least to the extent of providing plans and giving demonstrations. These have a value that can only be estimated roughly, perhaps on the basis of time at professional rates, plus a share of the overhead expense of the educational program.

House construction labor (F) would be expected to be the major contribution of participants, although certain skilled labor might reasonably be an outside contribution. The labor of the participants should be given a full fair cash value, since it will show prospective sponsors the extent to which the participants themselves will be contributing. Such an evaluation requires an estimate of the hours or days of labor to be supplied based on a reasonable unit wage rate. The housing participants, being the prime beneficiaries in the housing program, might be expected to contribute labor to any or all of the supplementary improvements. They might own tools and equipment that could be used and credited to them at a fair rate.

After the resources from the participants themselves have been fully assessed, other local sources of aid should be investigated. These might include an employer, local governing unit, or special interest

SAMPLE OUTLINE FOR SUMMARIZING ALL AVAILABLE

Fictitious case study

A. COMMUNITY DEVELOPMENT

ITEMS OF COST	AMOUNT NEEDED	ESTIMATED COST OR VALUE				CONTRIBUTIONS	
		UNIT	LABOR	NON LAB.	TOTAL VALUE	CASH	LABOR
ROADS TO SITE	1	Km	φ 300	φ 100	φ 400	φ 100	φ 200
SCHOOL	100	m ²	φ 1000	φ 2000	φ 3000		φ 500
COMMUNITY HOUSE	150	m ²	φ 900	φ 1600	φ 2500		400
OTHER (see extension sheet)					~~~~		
TOTALS (A)					10000	φ 100	φ 2000

B. SITE DEVELOPMENT

LAND (SITES)	2	ha.			φ 600		
ROADS OR STREETS	300	m.	φ 100	φ 20	φ 120		φ 100
WATER SUPPLY	1	System	φ 500	φ 500	φ 1000		φ 500
SEWAGE DISPOSAL	1	System	φ 500	φ 1000	φ 1500		φ 500
OTHER (see extension sheet)					~~~~		~~~~
TOTALS (B)					φ 3600		φ 1300

C. EQUIPMENT (HOUSE BUILDING)

	AMOUNT NEEDED	UNIT	USAGE RATE OR VALUE		TOTAL VALUE	CASH	LABOR
Block maker	150	Tool-days	1.00	per day	φ 150		
Concrete mixer	150	Tool-days	.50	per day	φ 75		
Hand tools (see extension sheet)						φ 100	
USE EXTENSION SHEETS					~~~~		
TOTALS (C)					φ 400		

D. MATERIALS (HOUSE BUILDING)

	AMOUNT NEEDED	UNIT	VALUE OF		TOTAL VALUE	CASH	LABOR
			PROCESSING LABOR	MATERIALS			
Cement	2000	bags		φ 2000	φ 2000		
Sand	500	m ³		φ 500	φ 500		
Framing lumber	20	m ³	φ 200	φ 200	φ 400		φ 200
Cover lumber	25	m ³	φ 200	φ 300	φ 500		φ 200
Shingles	1500	m ²	φ 400	φ 400	φ 800		φ 400
Nails	600	Kg.		φ 120	φ 120	φ 120	
Bolts	200	ea.		φ 40	φ 40	φ 40	
Door hinges	120	pr.		φ 60	φ 60	φ 60	
See extension sheet							
USE EXTENSION SHEETS					~~~~	~~~~	~~~~
TOTALS (D)					φ 7000	φ 300	φ 1000

E. TECHNICAL HELP AND SUPERVISION

PLANS					φ 300		
DEMONSTRATIONS					φ 600		
SUPERVISION					φ 1000		
OTHER					φ 100		
TOTALS (E)					φ 2000		

F. LABOR (HOUSE CONSTRUCTION)

	AMOUNT NEEDED	UNIT	LOCAL UNIT RATE		TOTAL VALUE	CASH	LABOR
UNSKILLED	2000	mandays	φ 2.00	/ day	φ 4000		φ 4000
SKILLED	1000	mandays	φ 3.00	/ day	φ 3000		φ 2000
OTHER							
TOTALS (F)					φ 7000		φ 6000
TOTALS (C, D, E & F)					φ 16400	φ 300	φ 7000
GRAND TOTALS					φ 30000	φ 400	φ 10300

RESOURCES FOR AIDED SELF-HELP HOUSING

PROJECT NAME Peoples Self-Help Housing Club LOCATION New Hope, Anywhere

DATE _____

FROM PARTICIPANTS			CONTRIBUTIONS FROM OTHER LOCAL SOURCES				CONTRIBUTIONS FROM CENTRAL GOVERNMENT	NOTES
EQUIPMENT	MATERIALS	TOTAL VALUE	EMPLOYER	LOCAL GOVERNMENT	LABOR UNION	OTHER		
		φ 300		φ 100				
	φ 100	φ 600		φ 1400			φ 1000	
		φ 400			φ 2100			
	~~~~~	~~~~~			~~~~~			
	φ 300	φ 2400		φ 2600	φ 4000		φ 1000	

				φ 600				
		φ 100	φ 20					
		φ 500	φ 500					
		φ 500	φ 1000					
		~~~~~	~~~~~	~~~~~				
		φ 1300	φ 1500	φ 800				

							φ 150	
			φ 75					
φ 100								
		~~~~~	~~~~~	~~~~~				
φ 100		φ 100	φ 100	φ 50			φ 150	

HOUSE PLAN IDENTIFICATION 42-A NUMBER OF UNITS 30

			φ 2000					
	φ 200	φ 200		φ 300				
		φ 200		φ 200				
		φ 200		φ 300				
		φ 400		φ 400				
		φ 120						
		φ 40						
		φ 60						
		~~~~~		~~~~~		~~~~~		
	φ 200	φ 1500	φ 2000	φ 1500		φ 2000		*local merchant

							φ 300	
							φ 600	
			φ 500				φ 500	
						φ 100		
			φ 500			φ 100	φ 1400	

		φ 4000						
		φ 2000	φ 1000					
		φ 6000	φ 1000					
φ 100	φ 200	φ 7600	φ 3600	φ 1550	0	φ 2100	φ 1550	
φ 100	φ 500	φ 11300	φ 5100	φ 4950	φ 4000	φ 2100	φ 2550	

groups such as a labor union or religious organization. After all local possibilities have been probed, the left-over needs will have to be supplied by an outside agency — in most cases the central government — if the project is to get started.

The total for each contributing source can be recorded either for the housing part alone (totals C, D, and F) or for the development as a whole, including site and community development. In some cases percentages of the total subscribed by each group or agency would be useful.

SUGGESTED CLASSROOM EXERCISES IN EVALUATING RESOURCES

1. Select an accessible community or organized group in which to survey individual participants. Then, in teams of two, interview each participant as to his housing needs and evaluate his resources useful to a housing project. Study your survey findings and recommend individuals whom you think would make successful teams.

2. Compare a number of communities, represented by students in the class, as to potential resources for establishing an aided self-help housing project. Study all available information as to housing needs and economic conditions, then evaluate potential resources such as building sites, materials, labor, and construction equipment that might be available. Use the sample resources survey outline or develop a new outline to keep records in order. Then, compare various communities as to their relative capacity to sustain a program.

Investigation Topic No. 7

TECHNIQUES FOR COMMUNICATING SELF-HELP HOUSING IDEAS

Often housing participants may be illiterate. Even those who are literate will better understand technical guidance if it is presented by effective visual methods. There are many types of visual aids that can be used to present information; some are especially effective.

A full-sized demonstration house provides the clearest conception of design and construction. Its disadvantages are that it is expensive as a visual aid; its educational value is largely restricted to the vicin-

ity where it is built, and it takes a relatively long time to produce.

For these reasons scale models are often better fitted to an educational program. In general, house models should be the largest size that is conveniently portable. Full-sized structural details can usually be handled satisfactorily. But house models are most useful when built at from 1/10 to 1/20 actual size. This scale can be seen well by groups of up to 100 people, and models can be transported in a jeep, light truck, or a passenger car trunk compartment. Obviously, such models should be sturdily built, using strong glue for joints as well as metal fastenings.

Small scale mass-produced models can sometimes be very useful — especially for use before small groups. Cardboard fold-up types are cheap, easy to carry, and effective for presenting appearance characteristics. Patterns for such models can be reproduced in various ways including blueprinting. Blueprints can be cemented to cardboard, cut out, and folded to form an effective model.

Next to an actual house or a natural-looking model, a photograph is one of the good ways to represent home building ideas realistically. Photography can be used in a number of ways. Mounted photographs are useful and demand no special apparatus or power supply in the field. For this use, they must be greatly enlarged, which of course requires enlarging equipment. Photographs are more difficult to transport than projected pictures, but the fact that they can be used in the daytime without a darkened room is an advantage in most areas.

Motion pictures are unexcelled for attracting attention at an initial meeting and for explaining detailed construction features later on. Movies have a number of limitations, however, the most important being that they must represent conditions reasonably similar to those of the viewers. The production of good local films takes equipment and skills not readily available in so many areas. Motion picture showings are also limited by the need for projection equipment and a lack of power facilities in many areas where housing projects are the most needed. When available, mobile visual aid trucks will serve the purpose very well.

Slides and filmstrips offer a cheap, quick, and widely usable visual aid. Equipment is relatively inexpensive and great skill is not needed for making adequate slides. Both filmstrips and slides are easy

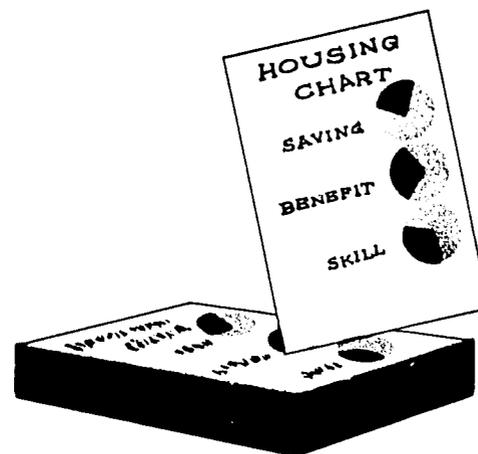
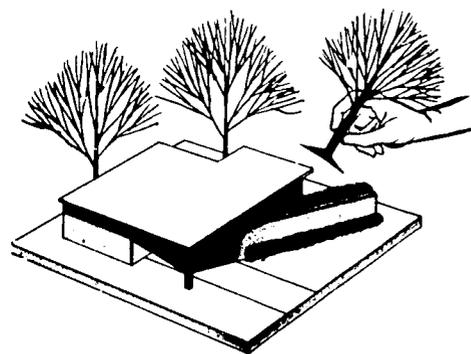
to transport. Projection facilities, however, may be hampered by lack of power facilities.

There are several types of effective visual aids adaptable to housing which require no unusual equipment at all; neither do they need special facilities for showing. Instead, the emphasis is put on the skill of the leader presenting the information. The chart is one example. It may either present completed ideas, or several charts may develop a series of steps. An example of the step-by-step visual aid is the chalk talk technique which has a universal appeal and requires no great ability. The advantage of the chalk talk is that the leader develops his points, step by step, in a highly pictorial form. Housing is particularly suited to this media since most people are fascinated by seeing an architectural form take shape. An example of chalk talk adapted to the field housing might be the drawing of a prevailing local house type, pointing out its inherent deficiencies and good features — then redrawing an improved version on tracing paper over the old sketch maintaining the good features of the original. This procedure maintains a familiar element for people who may be skeptical of new ideas in home design.

Equipment for the chalk talk aid is inexpensive and it is not difficult to transport. No special lighting is necessary as with projected pictures. The flannelgraph might be used as a simplified form of the chalk talk. It takes less artistic skill to use, but maintains the interest-holding character of building up an idea bit-by-bit. It has the advantage in that parts can also be removed and replaced at will. Flannelgraphs are particularly useful in outlining steps of procedure — for example, the stages in organizing a home

building project. Flannel, as commonly used for infant blankets, plus a textured surface to which the flannel will adhere are the only materials necessary. And flannel can be rolled into a small package for easy transportation.

While chalk talks and flannelgraphs are best used by a demonstrator, charts are useful by themselves. Since they can be mass produced, they are of particular value in reaching large groups of people, especially in areas where media such as television, radio, or even newspapers are unavailable. Charts serve a housing program in two major ways. First, they can advertise a public meeting; secondly, they can perform an educational function by depicting needed house improvements. The latter should feature simple, basic ideas such as floor construction for improved sanitation, ventilating and insulating techniques for better comfort, or construction features that improve fire safety or durability. Charts



25. House models, charts, motion pictures, photographs, demonstrations — are all effective visual aids which make communication easy.

can be mass produced by techniques adaptable to any areas. Blueprinted charts are quickly and simply produced but they are not durable under strong light conditions. The silk screen process is one of the best methods since the variety of colors which can be used is also more permanent.

A point should also be made for the leaflet which can often be a chart reduced down to hand-holding size and printed by offset or other inexpensive means. These can be produced cheaply enough to justify wide distribution to prospective participants. Information on the chart can be supplemented with further explanation printed on the back of the leaflet.

At a fairly early stage in an aided self-help housing program, participants should be shown plans and specifications for the homes they expect to build. They may be unfamiliar with working drawings, so plans should be prepared in a simple, pictorial style rather than by the conventional techniques used by experienced contractors. Plans should be larger than the customary scale, and the drawings arranged in a chronological construction sequence.

Unusual construction features need to be presented in a pictorial form, making extensive use of isometric and perspective drawings. Conventional broken-wall section details are confusing and should be substituted with complete sections drawn at large scale. In some cases even full-sized patterns are desirable. The expense is reduced if they can be used repeatedly. How detailed and self-explanatory the plans should be will depend partly on how much construction supervision will be provided. It is reasonable to assume that after the first self-help houses are built, other people will be influenced to adopt the improved design features without the stimulus of outside material help. However, limited outside technical aid in the form of self-explanatory building plans could probably be justified in most broad home improvement programs.

The visual aids mentioned are only a few examples that are adaptable to housing improvement projects. Experience in Agricultural Extension Service programs in the United States shows that people adopt practices only after exposure to them in a variety of ways. Housing is greatly influenced by custom, so it needs as wide an educational contact as possible if it is to attract and serve housing participants on a broad scale.

Reading References:

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- Carter and Hincheliff. *Family Housing*. New York City (U.S.A.): John Wiley & Sons, Inc. (1949), "Resources for Planning."
- Dale. *Audio-Visual Methods*. New York City (U.S.A.): The Dryden Press, Inc.
- Housing in the Tropics* (United Nation's Bulletin, No. 6). Lake Success (New York, U.S.A.): United Nations (1951), 75-9.
- Kelsey and Hearne. *Cooperative Extension Work*. Ithaca (New York, U.S.A.): Comstock Publishing Associates (1955), "Visual Aids," 325-41.
- The Multiplier*. Washington, D.C. (U.S.A.): International Cooperation Administration, all issues.

Motion Picture:

- Rumah Gotong Rojong* (Houses by Self-Help): Djakarta (Indonesia): Ministry of Information, 20 minutes.

EXERCISES TO DEVELOP STUDENTS' PRESENTATION SKILLS

1. Develop an outline for a motion picture, including sketches of characteristic shots and with accompanying commentary. Collaborate with available visual aid services in an effort to develop a usable film for an aided self-help housing program.
2. Make and demonstrate before the class a flannelgraph featuring appropriate "steps" for launching a housing project.
3. Prepare chart ideas in rough forms to emphasize the home construction aspects of home building. Hold a contest and judge best efforts.
4. On thin tracing tissue over an isometric grid, practice sketching simple details that would help explain home construction features to unskilled builders. An example might be an interlocking soil-cement block wall.
5. In a similar manner use a perspective grid to practice freehand sketching of house exteriors in blocked out form — especially to show alterations to standard plans.
6. Plan and produce wood or cardboard house models (or details of unusual construction features) of recommended house plans.
7. Practice demonstrating your completed visual aids before interested groups.

Investigation Topic No. 8

INITIATING A LOCAL AIDED SELF-HELP HOUSING PROJECT

A graduate of the aided self-help housing course will need a strong backstopping agency behind him such as outlined in the introductory investigation. Without technical backstopping, and possibly some tentative commitments of material incentives, the leader will likely be ineffective in the field.

The graduate should gain experience as an assistant in a successful housing program for at least one cycle of home building before initiating a project of his own. Such experience may not be possible in the beginning; the graduate may be required to proceed with what experience he has gained from the course and no apprenticeship at all.

While each new situation will have important variations, the following steps may serve as a general guide for the new leader:

1. Make contacts with local leaders who are in a position to advise on housing resources such as raw materials, equipment, financial help and building skills. These leaders may represent local enterprises, government agencies, and religious or occupational organizations. These contacts will have been facilitated if the self-help backstopping agency has previously made contact with higher level representatives of the enterprises, agencies, or organizations involved.

From such preliminary consultations, the housing leader should be able to judge the probable success of a project — providing that there develops an adequately felt need by the people to be aided.

2. If the preliminary investigation is favorable, and if the leaders of the community are behind the proposal, the next step is to acquaint the prospective participants with the program. Here is where visual aid techniques — particularly appropriate motion pictures, charts, and pamphlets — will be valuable. At this point the leader should enlist the cooperation of local representatives from established educational services, remembering that a better selection of participants can be made from a large group of prospects than from a small group.

The public presentations will help determine the actual interest. They may also awaken latent interest

beyond what the originally contacted leaders anticipated — or it may be less. It is important that as accurate and straight-forward a picture as possible is presented — pointing out the disadvantages as well as advantages of the proposed self-help housing system. The necessity for following through once the work is underway must be emphasized.

3. If adequate general interest is indicated by the prospective participants, the next step is to make a formal survey of the candidates to determine both their individual housing needs and their available resources. Help for making such a survey might be obtained from some of the more enthusiastic candidates.

4. A summary of the survey will help the leader in the next stage of the project — getting firm commitments on resources from the local contributors contacted at the beginning. This is one of the most vital phases of the project; the survey results will determine the amount and kind of outside help needed, if any. The chart on pages 32-33 will be helpful.

5. It may be necessary to go back to the participants with a plan for raising cash. In this case, organizational help may be needed in planning a saving system and establishing a schedule for paying back borrowed money. Adjustments in the original construction planning may be necessary.

6. When all necessary resources have been accounted for, the housing leader then will be concerned with selecting the best participants from among the applicants and organizing their schedule for work and use of equipment.

7. Educational aspects of the program are involved again at this point and in greater detail. Demonstrations of unfamiliar construction techniques will be necessary at suitable stages during the construction. Local construction skills must also be recognized early and employed to the best interests of the project.

The housing leader should arrange to keep accurate records of material and labor, and take photographs that record progress throughout the project. These will help in presenting the program to future participants. With such information and experience, projects that follow should benefit greatly, and the housing leader's job will be correspondingly easier.