

EVALUATION OF POSSIBILITIES OF  
URBAN AIDED SELF-HELP HOUSING  
FOR INDONESIA



by

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June, 1958

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"Submitted to the Department of City and Regional  
Planning at Massachusetts Institute of Technology  
on June 23, 1958, in partial fulfillment of the  
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Master in City Planning"

ABSTRACT OF THE THESIS

**PURPOSE:** After 10 years of occupation, war, and domestic upheavals Indonesia became sovereign on December 27, 1949. Indonesian cities have since grown in population. As a result of the housing shortage, congestion of dwellings, overcrowding of dwellers, and housing of squatters in the cities cause slums and serious social, economic and political problems. Given the meager economic resources of Indonesia at this time, urban aided self-help housing is examined as a possible means of helping to relieve the strains.

**BASIC HYPOTHESIS:** Aided self-help housing is suited to Indonesian cultural conditions and can make an important contribution to help supply the housing need in the urban areas.

**OUTLINE:** Part One deals with the problem and the hypothesis; Part Two contains a treatment of the Indonesian Five-Year Development Plans in relation to urban aided self-help housing; Part Three discusses the socio-economic potentialities; Part Four contains a discussion of the potentialities in building materials, besides a survey of the existing financial institutions for housing developments; Part Five discusses the aided self-help housing principle in general and its application in Indonesian cities; and in Part Six the author comes to the conclusion that the urban aided self-help housing policy of the Indonesian government is a sound policy, after which the implications and the prospects are treated.

APPROACH: The approach consists of first, formulation of problems and the basic hypothesis, secondly, collecting and analyzing data on Indonesia in relation with Indonesia's economic conditions, the people's social aptitude, and potentialities in building materials, thirdly, critically evaluating experiences in aided self-help housing in general, and fourthly, recommendations in adapting urban aided self-help housing in Indonesia, and an examination of the implications and prospects.

Thesis Supervisor, Lloyd Rodwin, Ph.D. ....  
Associate Professor of City and Regional Planning

LETTER OF TRANSMITTAL

21 Flagg Street  
Cambridge 38, Massachusetts

June 23, 1958

Professor John T. Howard  
Head  
Department of City and Regional Planning  
School of Architecture and Planning  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

Dear Professor Howard:

I hereby submit my thesis entitled EVALUATION OF  
POSSIBILITIES OF URBAN AIDED SELF-HELP HOUSING FOR INDONESIA,  
in partial fulfillment of the requirements for the degree of  
Master in City Planning.

Respectfully yours,

Puspo Harsono

## ACKNOWLEDGMENTS

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The author also wishes to acknowledge the contribution made by Miss Kay Evans and Miss Jean MacDonald who did the typing work of the thesis.

**LETTER FROM THE MAYOR  
OF DJAKARTA RAJA,  
INDONESIA**, wishing  
success with the  
author's study.

The author wishes  
herewith gratefully to  
acknowledge the  
support of Mayor  
Soediro for making  
the study possible.



109  
17-3-48

Kepada  
Jth. sdr. Insp. Harsono  
96 Prescott St.  
Cambridge 38  
Mass, U. S. A.

Wali Kota  
DIJAKARTA-RAJA

Djakarta, 20-5-1957

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Jth.  
sdr. Insp. Harsono  
96 Prescott St.  
Cambridge 38  
Mass, U. S. A.

Saudara,  
Surat kepada saya sudah saya terima. Kami sangat  
gembira mendengar berita dari  
sdr. Spickur, bahwa sdr sedang  
belajar dengan penuh ke-  
tulusan. Mudah-mudahan  
akan memberi manfaat bagi  
segolongan wargakota Djkt. Rja.  
Kami harapkan success bagi  
sdr.

Wassalam,

## PREFACE

A comparison of an Indonesian city scene before World War II and to-day will make the impression upon the observer that the urban population has grown tremendously. More people are walking along the streets, and more vehicles are running along the roads. There are many houses in the city, which do not meet the requirements of the existing housing occupancy regulations, and still others which are below the requirements of the building codes. Furthermore, there are squatters in many of the cities. What can the authorities do about the bad housing situation in the cities? Economic instability of course is one of the main causes of this situation. If the Indonesian Five-Year Plans will meet success, new, healthy houses will be built. But building decent houses with the conventional method of construction to substitute for the existing urban houses which are in bad condition, would entail large amounts of money beyond the capacity of the people and of the government. This thesis is an attempt to show how a radical change in method of housing supply, i.e. by adapting the aided self-help method in cities over the entire area of the Indonesian archipelago, can provide healthy houses for the low-income group of the urban population.

When the draft was half finished, a document on the housing policy of the Indonesian government came into the author's hands. This document is a report of the Indonesian Delegation submitted to the United Nations E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30 - August 6, 1956, on: The Housing Situation in Indonesia. As the government's policy on urban housing supply for the low-income group is by the aided self-help method, the author's idea is the same in principle. Because the urban housing policy in the document is stated in general outline only, the author decided, with the consent of Prof. Lloyd Rodwin, the thesis adviser, to continue with the same thesis topic.

In relation to the existing urban housing policy of the Indonesian government, this thesis has become a defence of the principle of urban aided self-help housing in Indonesia.



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EVALUATION OF POSSIBILITIES OF URBAN AIDED  
SELF-HELP HOUSING FOR INDONESIA

PART ONE

THE PROBLEM AND THE BASIC HYPOTHESIS



## CHAPTER I

### THE PROBLEM

Since 1950 the influx of migrants from the countryside into the cities in Indonesia has exacerbated its housing problem. The country's economic situation is precarious and the resources available for housing are woefully inadequate. Housing shortage breeds serious problems of health, social relations, economic difficulties and general discontent. The situation requires drastic action.

#### I. URBANIZATION

After President Soekarno and Prime Minister Mchammad Hatta had moved from Jogjakarta in southern Central Java to Djakarta on the north-western tip of the same island in the latter half of 1949, civil administrators, army personnel as well as private businessmen moved into Djakarta. People from smaller cities and towns are also moving into Jogjakarta. These are two examples of urbanization, but this trend occurs in every Indonesian city. Most probably it can be expected to continue in the near future. Catherine Bauer says,

The pull to these cities (in general, not only Indonesian cities)<sup>1</sup> is exerted not only by their industrialization but is more often occasioned by the fact that the rural villages no longer can give the people a livelihood; and although their earnings in the city are greater than in these rural villages, they are not enough to buy a better standard of living. This wave of expansion is just beginning. The implications are that the insanitary conditions now in the fast growing cities will increase proportionately.<sup>2</sup>

There are different reasons to migrate into the cities. For Djakarta these are mostly economic reasons.<sup>3</sup> When sovereignty was transferred from the Dutch to the Indonesians on December 27, 1949, the need for administratively experienced Indonesian personnel caused the number of government employees to grow to a total of 1,727,548 in 1953 or three times the 1940 number.<sup>4</sup> It is obvious that this too was caused by people moving from rural areas to smaller cities, and from smaller cities to larger cities.

## II. EXISTING BAD HOUSING SITUATION IN CITIES

Assuming a present population of between 50 and 55 million people in Java and the popularly accepted annual rate of increase of 1.7 per cent,<sup>5</sup> the annual population increase

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<sup>1</sup> Author's insert.

<sup>2</sup> Catherine Bauer, "Economic Development and Urban Living Conditions: An Argument for Regional Planning to Guide Community Growth," *Tropical Housing and Planning Monthly Bulletin* No. 5, February 29, 1956 (Cambridge, Mass.: Compiled for Private Circulation by Prof. J. Tyrwhitt), p.1.

<sup>3</sup> Lembaga Penyelidikan Ekonomi dan Masyarakat, Fakultas Ekonomi, Universitas Indonesia, Djakarta, "Urbanisasi Djakarta," *Ekonomi dan Keuangan Indonesia* (Martet 1955), p.122.

<sup>4</sup> Benjamin H. Higgins, A Summary of the Indonesian Five Year Plan, July 1957, p.29.

<sup>5</sup> N. Keyfitz, The Population of Indonesia, September 24, 1953, p.5.

of Java is close to 1 million people. Considering the very limited possibility of increased agricultural production of the efficient, traditional way of rice cultivation in Java, and the very high cost of transmigrating people to alleviate population pressure in Java, it is very likely that the existing influx into the cities in Java will continue in the near future. Existing conditions illustrate the sorrowful housing situation in the cities. Where there are empty freight-cars in the railroad yards in Java, they are used for shelter by the homeless people; others make their homes under bridges; at the end of 1956 Djakarta was preparing a new water supply system, and the supervisor was surprised one morning to find people sleeping in the 30-inch pipes laid along the streets. In other cities like Surabaya (Java), Bandung (Java), Medan (Sumatra), Balikpapan (Kalimantan), Menado (Sulawesi), Makassar (Sulawesi) and Amboina (Moluccas)<sup>6</sup> shacks are being built on open lots. If the owner gets more money, he substitutes the thatched roofing with roof tiles. Later on he buys bricks and builds brick walls, sometimes only until 3 feet 3 inches above the ground, other times the whole height of the walls. These substandard houses built without a license, mostly on government-owned land, and on many places even on trottoirs and river dikes, are the squatters houses. The fact that these conditions did not show up in the

For places on Java the author knows these conditions by own observations, while for places on the other islands an interview was made with Max Makagiansar, Secretary-General, Indonesian Council of Sciences, on May 27, 1958.

cities before World War II, gives evidence that housing construction is not keeping pace with immigration.

### III. LIMITED RESOURCES AND THEIR ALLOCATION

The solution of the housing problem must be developed within the framework of the national economic, social, and political institutions of Indonesia. Perhaps the most serious constraint is the limited resources, primarily of capital, and secondary of technicians, administrative experience, and data.

Indonesia's money income depends on exports of a narrow range of raw materials, principally rubber, oil, tin, and copra.<sup>7</sup> Changing world prices have made the economy unstable. Since 1950 the different succeeding governments were forced to give priority to short-run stabilization measures.

Statistics available at the time of writing show that the 1951 and 1952 per capita income is lower than that in 1938.

---

<sup>7</sup> 1951-1955 export items are in Table V of Benjamin M. Higgins' book: "Indonesia's Economic Stabilization and Development," p. 155.

(FIGURES IN MILLIONS EXCEPT FOR INCOME PER CAPITA)<sup>8</sup>

	1938	1951	1952
Net National Income at current prices	Rp.2,700.0	Rp.70,015.4	Rp.81,204.0
Net National Income at 1938 prices	Rp.2,700.0	Rp. 2,593.0	Rp. 2,707.0
Population	68.4	77.4	78.6
Income per capita at current prices	Rp. 39.0	Rp. 905.0	Rp. 1,033.0
Income per capita at 1938 prices	Rp. 39.0	Rp. 33.5	Rp. 34.4

Source: National Planning Bureau

Also since 1950, after ten years of occupation, war and domestic upheavals, the government's attention has been concentrated on reconstruction, unification, organization of basic government services, and political and economic stabilization.

The existing situation is such that the private building industry does not build houses for the low-income group. Encouragement in this direction would not have much effect, because private enterprise operates on a commercial basis. Based upon a survey of 13 urban areas, the author estimates that yearly production of urban houses by private builders was around 50,000 dwelling units in the period between 1951 and 1955; and this does not cover those for the low-income group. Construction of rural housing is mostly with the self-help system, although most of these rural

houses are of temporary materials. This is the reason why the author assumes that responsibility for low-cost housing, should this be built with the conventional method, ought to be necessarily with the government.

The entire budget for 1956 is around Rp.20,000,000,000.-,<sup>9</sup> and this is about constant around that year.

Construction cost of an urban brick house, comprising 2 bedrooms, 1 living room, 1 bathroom, 1 kitchen and 1 store room is about Rp.50,000.-, and that of a rural brick house of a smaller size is about Rp.35,000.-. So if Rp.40,000.- is taken as an average for the cost of a brick house for the average family, then the entire budget would only provide 500,000 units a year, that is about what the annual need for houses is in Indonesia. This shows that the conventional method of house construction cannot be carried out in Indonesia to meet the annual need for low-cost housing.

Recognizing the importance of housing in the up-building of the country, the government founded the People's Housing Department in the Ministry of Public Works and Power in 1951, and gave the new department the task of solving aspects of the people's housing problem. In 1953 the People's Housing Department adopted its general program. It seems that it was later revised, and that by 1956 it was decided that the

necessary rural and semi-urban housing which is nearly 95 per cent of the total need of low-cost housing, will be met with the aided self-help method,<sup>11</sup> not in the least because of the large savings in expenditure if compared with the other methods.

The annual rate of increase of national income per capita is about 1.3 per cent in 1955, and four series of five-year plans are intended to raise the annual rate of increase of national income per capita to 3 per cent in 1975. The Indonesian government is of the opinion that to raise the standard of living of the Indonesian people, first priority in budget allocations goes to projects which result in foreign exchange earnings and savings. Recent developments show that political instability can hamper, and even prevent execution of the five-year economic development plans. Although economic and political instabilities are intertwined, a discussion on the nature of these subjects is beyond the scope of this thesis.

The government policy in 1953 on low-cost housing was that rural housing should be approached with the aided self-help method, while urban housing ought to be solved through housing cooperatives. However, in 1956 the Indonesian Delegation submitted a report to the United Nations E.C.A.F.E. Fourth Meeting in Bangkok, Thailand in which is stated that

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## II

Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-August 6, 1956, The Housing Situation in Indonesia.

the aided self-help method will be used in the rural as well as semi-urban areas, while the population of these areas comprise 95 per cent of the total. As elsewhere low-cost housing by private enterprise is not important in Indonesia.



## CHAPTER II

### THE HYPOTHESIS AND THE APPROACH

The People's Housing Department of the Ministry of Public Works and Power has a program which will start in 1961, to build 400,000 units of healthy houses in Indonesia annually during 40 years or about one and one-half generations, not counting houses built by private enterprise. Of the goal set by the People's Housing Department, 85 per cent or 340,000 units in rural areas are to be approached with the aided self-help method, 10 per cent or 40,000 units in (semi-) urban areas for the urban people of the low-income group to be constructed also with the aided self-help method, and 5 per cent or 20,000 units in urban areas for the urban people of the middle-income group to be built by housing cooperatives.<sup>1</sup> In the year of 2,000 this housing program can be reviewed.

#### I. URBAN AIDED SELF-HELP HOUSING

This thesis discusses urban aided self-help housing for the people of the low-income group, excluding urban (aided) self-help housing by cooperatives, which will supply 40,000 dwelling units yearly starting by 1961 over a period of 40 years.

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1

Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30 - August 6, 1956, The Housing Situation in Indonesia.

It is called urban aided self-help housing, because first, the program is carried out within the municipal boundaries of the cities and in the built-up areas of the towns,<sup>2</sup> secondly, the government gives aid in several forms, among which may be directing the program, supplying building materials at half of the cost on the site, supplying interest free long-range loans, and giving tax exemption during the amortization period of the loans, and thirdly, the construction of the houses is done mainly by the people who will ultimately become the occupant-owners.

Between 1951 and the beginning of 1956 approximately Rp. 80 million were provided by the People's Housing Department as loans to housing cooperatives of the autonomous areas which include regencies and municipalities. In 1952 the cities had begun to make housing schemes. By the end of 1955 the 104 cooperatives which had been established in nearly 50 per cent of the number of autonomous areas, had built 6,689 houses. However, it is not yet possible for the people of the low-income group who have a monthly income of Rp. 500.- (at official rate about \$40.-) or less, to join these cooperatives.<sup>3</sup> These

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<sup>2</sup>A city has a mayor, while a town has a regent as its administration chief. Both cities and regencies are autonomous regions. A town is the built-up area where the regent lives. With urban areas the author means the areas within the municipal boundaries, and the built-up areas of the towns. The larger cities have generally within their municipal boundaries a built-up area and an agricultural (semi-urban) area with rural-type settlements.

<sup>3</sup>Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30 - August 6, 1956, The Housing Situation in Indonesia.

people, however, should also be adequately housed, and the urban aided self-help housing scheme will serve this purpose. The labor will be supplied by the people who in the future will own the houses, while the government should fill in the financial, material and technical gap between materials and technical requirements on one side and financial, materials and labor contribution besides technical knowledge of the people on the other side.

The author takes the hypothesis that aided self-help housing is suited to Indonesian cultural conditions and can make an important contribution to help supply the housing need in the urban areas.

## II. THE AIM OF THE THESIS

In the following chapters the feasibility of urban aided self-help housing is examined in more detail, considering the meager economic resources of Indonesia at this time, the social aptitude and the availability of domestic materials. Furthermore, there is a chapter on design and plan of low-cost houses.

This thesis is divided into six parts: Part One deals with the problem and the hypothesis; Part Two contains a treatment of the Indonesian five-year development plans in relation to urban aided self-help housing; Part Three discusses the socio-economic potentialities; Part Four contains

a discussion of the potentialities in building materials, besides a survey of the existing financial institutions for housing developments; Part Five discusses the aided self-help housing principle in general and its application in Indonesian cities; and in Part Six the author comes to the conclusion that the urban aided self-help housing policy of the Indonesian government, i.e. the annual construction of 40,000 dwelling units for the people of the low-income group in (semi-) urban areas during the 40-year period from 1961 to 2000, is a sound policy, after which the consequences, the implications, and the prospects are treated.

PART TWO

THE FIVE-YEAR DEVELOPMENT PLANS AND

URBAN AIDED SELF-HELP HOUSING

## CHAPTER III

### THE AIM AND THE VARIOUS SECTORS

The Biro Perantjang Negara, National Planning Bureau, coordinates economic development planning in Indonesia. The basic plans are prepared by the various ministries. The Bureau reviews, revises, and integrates these plans into a national investment budget, while it also has administrative responsibilities with respect to execution of the investment budget.<sup>1</sup>

The National Planning Bureau is a regular government agency directly under the Prime Minister, and reports to a National Planning Board comprising the nine Cabinet ministers most concerned with economic development.<sup>2</sup> Its head is a Director-General who also serves as Secretary of the Planning Board.

In May 1956 the Bureau presented a five-year development plan to the Cabinet. By September the plan had been approved by the Cabinet, but had not yet been submitted to Parliament. The Plan appears in printed form in three volumes, the first presenting the proposed planning law, the second the

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<sup>1</sup>  
Benjamin H. Higgins, Indonesia's Economic Stabilization and Development, p.40.

<sup>2</sup>  
At present an enlargement of the membership of the National Planning Board is planned (Prof. Benjamin H. Higgins, Director Indonesia Project, Center for International Studies, M.I.T.).

"plan framework" and major projects, and the third specifications of individual projects. The second volume contains twenty chapters: Introduction; Population; Finance; Agriculture, Forestry, Animal Husbandry, and Fishing; Irrigation; Mineral resources; Electric Power; Industrialization; Transport and Communications; Manpower Resources; Labor Relations; Education; Public Health; Social Welfare; Housing; Community Development; Cooperatives; Transmigration; Public Administration; Implementation and Organization.

In this chapter the place of housing in the different sectors of the First Five-Year Development Plan is discussed, and also how the different sectors will influence housing. Community Development and People's Housing are the respective topics of Chapter IV and Chapter V.

#### I. AIM OF THE FIVE-YEAR PLANS AND ALLOCATION OF RESOURCES IN THE FIRST FIVE-YEAR PLAN

The National Planning Bureau is preparing 4 series of Five-Year Development Plans. The aim of these plans is to raise the level of social welfare as well as per capita income, and can be briefly explained as follows. It is hoped that the plans can be started in 1956 when net capital formation is about 6 per cent of gross national product, the annual increase in gross national product is about 3 per cent per year, and the rate of population growth 1.7 per cent per year. At the end of the 20-year period, by 1975, it is expected that the level of capital formation will be 20 per cent of national income, the increase in national income

5 per cent per year, and the rate of population increase 2 per cent per year. So the annual rate of increase of national income per capita will increase from about 1.3 per cent in 1956 to about 3 per cent in 1975. By 1975 Indonesia will have reached "a stage of self-generating expansion," i.e. the economy will already have its own power and dynamic for progress and steady growth, as in the economically more advanced countries, and each generation will then enjoy a rise in standard of living of 100 per cent over that of the previous generation.

The First Five-Year Development Plan 1956-1960 will cost Rp. 30 billion, Rp. 12.5 billion to be furnished by the government, Rp. 10 billion anticipated from private investments, and Rp. 7.5 billion from the general public in the form of donated labor, materials, equipment, money, and services working on community development projects.<sup>3</sup>

The money provided by the government, is divided into the following categories: Agriculture 13%; Power and Irrigation 25%; Industry and Mining 25%; Transport and Communications 25%; and Education, Welfare, and Information 12%. The allocation of the Rp. 12.5 billion government sector among categories of projects, and between rupiah and foreign exchange resources is shown in Table I, while the break-down in terms of major sources is shown in Table II. (See Appendix A).

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3

National Planning Board, "Some Explanation on Indonesia's 1956-1960 Five-Year Plan," *Ekonomi dan Keuangan Indonesia (Economics and Finance in Indonesia)*, Nopember 1956 (November 1956) p.667.



Due to the limited capital resources, public housing is allocated only Rp. 95 million in the First Five-Year Development Plan. In this plan emphasis is put on research in all facets of housing, encouragement to production of building materials, and gathering of information. Financing of housing construction is left to the society itself. The government gives assistance and direction to cooperative efforts such as housing cooperatives, foundations, etc. Housing credits are channeled through credit institutions such as banks, cooperatives, community development organizations, etc. The people should realize that if cooperatives get the benefit of financial government assistance, the size of the cooperatives' operations depends more or less upon the size of the assistance. And the larger the total amount of the other expenditures of the government, the less is likely provided for the cooperatives. The Indonesian cultural conditions provide a fertile soil for cooperative organizations so that these cooperative efforts should be based primarily upon the forces in the society rather than be dependent upon government's assistance.

## II. AGRICULTURE

The government investment budget allocation for agriculture which includes a. Agriculture, Forestry, Animal Husbandry, and Fishing; b. Transmigration; and c. Community Development, is Rp. 1,625 million or 13 per cent of the Rp. 12.5 billion.

Agricultural frontier development in the islands outside Java will promote transmigration of people out of Java and vice versa. Although entirely relieving population pressure in Java by means of sole agricultural development in the other islands would be highly improbable because of the high costs involved, yet this development has two advantages. First, it helps relieve population pressure in Java; and secondly, it cultivates otherwise wasteland in those islands so that more foodstuffs can be produced. In the author's opinion agricultural frontier development will also be encouraged by irrigation projects and also by multi-purpose projects as the Asahan project in North Sumatra. It can be expected that the method of agricultural cultivation in those areas will be different than that used in Java, namely, that mechanized agriculture will be introduced so that less seasonal workers will be available in the cities. On the other hand, living standards in those areas may be expected to be higher than the existing so that more people can join housing cooperatives and don't need to organize the self-help method.

### III. TRANSMIGRATION

The Indonesian population is unevenly distributed over the islands. The density in Java, 1,100 people per square mile, is much more than that in the other islands, the closest being Sulawesi with 78 and Sumatra with 66 people per square mile. However well the method of rice cultivation is practised

in Java, with a 1955 population of 54 million<sup>4</sup> and a very probable annual increase rate of 1.7 per cent or nearly 1 million yearly, existing agricultural output in Java will at last not be able to support its population. Natural resources such as metal ores, water power, and mines are located on islands with low population densities. On densely populated Java there is much less economic opportunity. Because two-thirds of the Indonesian population live in Java, the costs of absorbing the population growth into productive employment are much higher than they would be if the population were more evenly spread throughout the country. The present plan contains capital-output ratios, but does not include capital-job ratios.

The total budget for transmigration in the First Five-Year Development Plan is Rp. 383 million, or approximately Rp. 75 million per year. Experience shows that the cost of transferring and settling of one family has been running to nearly Rp. 15,000.-,<sup>5</sup> so that the Plan provides only for 5,000 families per year to be transmigrated. The transmigration program makes only a limited contribution to frontier development or resource discovery. In 1955 the number of families transferred by the government was 5,491; and in 1956 it was 6,100. During the years 1956 to 1960 the government

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<sup>4</sup>  
Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30 - August 6, 1956, The Housing Situation in Indonesia.

<sup>5</sup>  
Benjamin H. Higgins, Indonesia's Economic Stabilization and Development, p.63.

concentrates on two or three districts in South Sumatra as pilot projects. It encourages voluntary migration.

Not included in the Plan is how the population pressure in Java should be solved. It is suggested by the author that this should be paid attention to, and solution may be attained by transmigration, industrialization, and at the same time also opening land for agriculture on the islands outside Java. But careful study should be done before detailed plans can be worked out. An impetus to go to the islands outside Java may be attained for instance by establishing more vocational schools on those islands and less on Java. The existing conditions on transmigration are summarized in Appendix B.

Transmigration will result in a more even population distribution over the various islands. Its impact on urban housing is such that the sizes of the cities on the various islands will be approximately the same, so that cities in Sulawesi, Kalimantan and Sumatra will undergo a faster urbanization than those in Java in the near future. Local action on urban housing problems will then be more effective, because these will be more similar in kind and magnitude everywhere if compared with the present conditions.

#### IV. COMMUNITY DEVELOPMENT

The government anticipates that, if expressed in cash value, Rp. 7.5 billion will be the contribution of the society in doing community development projects. This shows that considerable importance is accorded to the community development sector. The Plan expounds the meaning of this sector and stresses the need for integrated development at the community level with cooperative efforts in agriculture, health, education, mass education, housing, industry, credit extension, etc., so that there will be a balanced growth in many fields. But at the start emphasis should be on economic development which means that those projects which directly cause higher productivity and as such elevate the income level, get first priority, e.g. building a bridge may in some instances come before education of illiterates, and other times the latter may be a pre-condition for the former.

The government also wishes that in community development the principle of self-help should be used, and the decision to undertake a project should be taken on the basis of mutual agreement. The Office of Community Development Education with an allocation of Rp. 28 million is very important to teach the common people to take action, to take their own initiative, to solve a community problem, instead of just waiting until something is being done from above by the authorities. In this context aided self-help housing can play an important role in that housing is one of the basic needs of the common man. An aided self-help housing project completed with success

within a not too long period, can ignite the people to work on other community development projects. The first project may also serve as a sample for neighboring and other communities.

#### V. OTHERS

Other facets of the Plan are: Power and Irrigation; Industry and Mining; Transport and Communications; and Education, Welfare, and Information. Only the last facet is discussed here.

##### Education, Welfare, and Information

This sector which gets Rp. 1,500 million or 12 per cent of the government's budget comprise: education, health, public housing, labor, social welfare, information, and reserves. While each item will directly or indirectly influence economic development, only the government's housing program and one facet of information are discussed here.

The Ministry of Information should make also available for the various levels of (village) community development agencies their facilities such as movie units, etc., besides cooperating with these agencies to promote popular support for the government's programs.

The housing situation in urban as well as in rural areas is generally not so good. It is not only caused by

poverty, but also by the traditional way of building houses which do not meet the basic conditions of health. This situation had not only consequences in the social well-being of the people, but also in the economic field. In the First Five-Year Plan 1956-1960 an amount of Rp. 95 million is allocated which will cover expenses for research on the techniques of building houses, technical assistance, efforts to simplify administrative procedures and facilities concerning the construction of houses, encouragement to the production of building materials, and on gathering of information. Considering the wide gap between income of the people and the construction cost of houses, the government encourages cooperative efforts in the form of promoting creation of housing cooperatives, encouraging and giving aid to self-help methods in housing construction and building materials production, etc.

## CHAPTER IV

### 1 COMMUNITY DEVELOPMENT

Community development which occupies a whole chapter in the second volume of the First Five-Year Development Plan 1956-1960, is explained briefly in the preceding chapter. Two reasons move the author to discuss community development or village community development (literal translation from the Indonesian "Pembangunan Masjarakat Desa") in a separate chapter. First, the municipal boundaries of the large cities include not only the urban built-up area, but also a rural area with rural-type settlements and agricultural land. The new sites of the urban aided self-help housing projects are as much as possible located in this semi-urban area. Secondly, many of the urban people of the low-income group are seasonal farm-hands, or have been immigrants from the village, or were born in a village. The principle of self-help and general concensus has already been in existence in our village community from of old and is called "gotong rojong" and "permufakatan bersama" respectively. It is being practised unwittingly by the village people for the benefit of one person, such as the construction of one's house, or for the benefit of the whole community, such as the maintenance of roads and sewers, village guards, etc.

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<sup>1</sup>  
Biro Perantjang Negara, Pembangunan Masjarakat Desa.



## I. EXISTING CONDITION

In many fields the government is actually already giving guidance and assistance with visible results.

The weaknesses and shortcomings are:

- a. each government agency with its vertical structure down to regencies (similar to autonomous counties or prefectures) or sometimes even two levels lower to sub-districts operates in one particular field which expresses only a certain factor of the village community needs;
- b. the joint effort of these different government agencies coordinated on different levels, etc., is not yet as it should be, especially in solving problems directly related to the village community; and
- c. each worker, especially from the lower level, has a limited technical capacity in this field, so that it is hard for him to see or to do something in a broader connection.

The consequence of this situation is that on the village level no integral development is attained as a joint effort of all of the government agencies based upon a definite base plan, but differentiated developments are taking place in various fields each executed individually based upon individual discretion so that they do not form a unity. It occurs many times that parts of such efforts cover the same terrain, or that they indirectly or unintentionally hamper each

other or that they are not in accordance with the local need. Also many efforts still rely upon government funds. Some of these efforts are: the Village Capital Development (Ministry of Interior), Village Social Institute (Ministry of Social Affairs), Village Community Education Center (Ministry of Agriculture), Intra Departmental Coordination Agencies (in various regions), etc., which efforts are based upon self-initiative and self-help, e.g. construction of schools, village community centers, etc. Viewed as a whole, it proves that the efforts are not so efficiently used as they should be, and that the results are actually still below the existing potential possibilities.

## II. EXECUTIVE ORGANIZATION

To achieve an efficient integrated plan a State Commission will be created to prepare a complete village community development plan. This Commission will be headed by the Prime Minister, and the other members will be six Ministers, the Director of the National Planning Bureau, the President of Indonesian People's Bank, etc.

Taking into consideration the importance of preparatory information to the relevant village communities, the author thinks that the Minister of Information should be included in the State Commission.

The State Commission's duty is to prepare a complete Plan for the Village Community Development.

The government budget allocation for community development is Rp. 198 million distributed over the five years as follows:

VILLAGE COMMUNITY DEVELOPMENT BUDGET

(in 1,000 rupiahs)

<u>Expenses</u>	<u>1st.yr.</u>	<u>2nd.yr.</u>	<u>3rd.yr.</u>	<u>4th.yr.</u>	<u>5th.yr.</u>	<u>5 years</u>
Preparation	5,500	5,500	5,500	5,500	5,500	27,500
Core Projects	8,000	11,000	14,000	17,000	20,000	70,000
Extended Programs	--	8,000	16,000	24,000	32,000	80,000
Others	500	500	500	500	500	2,500
Total	14,000	25,000	36,000	47,000	58,000	180,000
10% Margin .....						<u>18,000</u>
Grand Total .....						198,000

If it is possible to centralize all of the expenses which up till now have been spent by the different government agencies for similar projects or for projects parts of which are overlapping, much more could be done with the same amount of cash and energy. Taking the existing situation and administration of the government into consideration, such a centralization requires tactful discretion.

The organization to carry out village community developments consists of a body which coordinates government agencies from those ministries directly related with the development.

At the top is the Village Community Development Board with the Prime Minister as Chairman.

The day-to-day work is done by the Central Village Community Development Agency. Its Chairman serves as Secretary of the Village Community Development Board, and should have close contact with the National Planning Board. The Agency coordinates the technical departments of the various ministries directly related with village community development based upon a policy which is made by the Board. The same happens on the lower levels, ie. provincial level, regency level, down to district level with the governor, regent and district head as respective chairmen. The appointed vice-chairmen of the respective agencies are in charge of carrying out the village community development plans.

Form and personnel of the central and local agencies can be modified to suit circumstances. The various technical departments are represented down to the district level. Technically these representatives are responsible to the respective departments, but in carrying out their work they should cooperate with the other government agencies' representatives through the local village community development agencies.

On the subdistrict level, however, the technical departments have no representatives. The chairman is the subdistrict head, while the vice-chairman who is in charge

of the day-to-day work, has multipurpose responsibilities. He should give information on various fields, such as agriculture, animal husbandry, water supply, health and hygiene, small industry, road construction and maintenance, house construction, cooperatives, etc. Of course, he cannot know everything on all of those fields, but he still knows enough to supply information. And he should be in direct contact with the technical representatives on the district level. This officer may be called general information officer. In his work he is assisted by village general information officers each having charge of several villages.

To guarantee that the village community development is in actual agreement with the wish and will of the people, there should always be contact with the people's representatives through either the parliament or the local councils. If in a certain locality there is no or not yet a council, an unofficial advising body can be created.

### III. POSSIBILITIES

The executive organization has been explained to comprehend the possibilities of what can be accomplished with village community development's integrated multipurpose plans. Accomplishment in one sector will stimulate carrying out other sector's projects so that developments will be on an accelerated tempo with an increasing acceleration. If, for instance, within 6 months, illiteracy in a village is down

from 90 per cent to 50 per cent through the mass education sector, it is certain that the people become more receptive to new ideas than before. Not less important is the role which savings cooperatives play in this context.

Before the people have funds enough to organize and carry out self-help housing, they can start with improving the condition of their existing houses and the environment, e.g. cleaning the rooms, putting everything in order in the rooms, making windows to get more sunlight into and ventilation through the bedrooms, digging a ditch in the garden to drain rain water, etc. While on one hand housing construction is an important sector of (village) community development, on the other hand other sectors such as improving one's house's condition have an educational value for people who later on will start on self-help housing schemes.

Furthermore, community facilities are needed for a new housing project, and these facilities too can be provided by the community with the self-help method. Construction and maintenance of roads and sewers, school construction, savings and loans cooperatives, etc., should be encouraged. The role of the education and information sectors is not to be underestimated, especially at the start.

## CHAPTER V

### PEOPLE'S HOUSING

The People's Housing Department of the Ministry of Public Works and Power, which has the general task of solving aspects of the people's housing problem, was founded in 1951. To know the housing situation in Indonesia, an advisory board was created consisting of representatives of the relevant ministries and representatives of the parliament. The Department's program, adopted in 1953, is as follows:

- a. Rural housing for 85 per cent of the Indonesian population will be approached with the aided self-help method which still exists as a custom in the villages. The main objectives are:
  - a. health education;
  - b. improvement of construction;
  - c. introduction of simple techniques.These methods will be introduced by trained mobile demonstration teams in the framework of the national community development program.
- b. Urban housing shall be solved through housing cooperatives, which establishments had started in 22 towns in 1952 and by the end of 1955 had reached 148 in number.

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<sup>1</sup> Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-August 6, 1956, The Housing Situation in Indonesia.

- c. The Regional Housing Centre established as a foundation in 1953 came actually into being on March 1, 1955. It has the support of United Nations Technical Assistance Administration and International Cooperation Administration (U.S.A.). The Centre's activities include scientific solutions in planning house design, construction methods, improvement and development of tropical materials and standardization.
- d. Development of new building materials factories and improvement of existing factories will be promoted and extended through the Department of Industry of the Ministry of Economic Affairs and the National Industrial Bank. The main object is to get sufficient local materials for mass housing. This task is started in 1952.
- e. Any other steps which can smoothen and speed up the construction of healthy mass housing such as planning, land policy, etc.
- f. The ultimate objective is to build 400,000 healthy houses annually during the 40 years starting 1961. To be able to achieve this the Department has decided to use the period 1951-1960 to train the necessary personnel, to improve and increase production of materials, to economize the design of housing suitable for the various areas and to economize the construction and to get experience in the execution of large-scale programs.



## I. EXISTING CCNDITION

The major achievements up till now are in brief:

- 1951: Establishment of the People's Housing Department with its advisory board.
- 1952: Start towards the establishment of housing cooperatives, development of factories for new materials, mass produced doors and windows, trass hollow blocks, and coconut fibre hardboard.
- Establishment of a general outline for the solution of the housing problem.
- 1953: Establishment of Regional Housing Centre (ECAFE meeting).
- 1954: First group of personnel, sent abroad for post-graduate specialized training.
- Establishment of a training course on housing for self-help teams.
- 1955: Regional Housing Centre started (UN Project).
- First 3-mobile team trained (ICA Project).
- Start of survey on traditional housing in 7 areas.
- 1956: Training of planners by United Nations Technical Assistance Board planning expert.
- First group of personnel, sent abroad for post-graduate training in city and regional planning.
- 1957: Other groups sent abroad for post-graduate training in city and regional planning.
- Accelerated research on bamboo, pozzolana, timber construction and stabilized soils.

Since 1952 the autonomous areas started housing schemes in the towns. One hundred and four cooperatives had been established by the end of 1955 when they had built 6,689 houses. The cooperatives advanced credits of 80 per cent of the building costs. In total Rp. 100.3 million credit has been so provided.

The low-income group (Rp. 250.- to Rp. 500.- monthly) still cannot join these cooperatives. It is proposed to assist this group with self-help systems and the provision for loans from Rp. 6,000.- to Rp. 12,000.-. With this system it is planned that materials can be given in loan, while a part of the labor cost will be provided by their own family.

Aided self-help housing is a part of the community development program. In 1955 the first three rural mobile demonstration teams were trained, consisting of men with a lower technical school (2 years after 6 years primary school) and a one-year post-school training course in housing. These teams will be used as pilot teams to gain experience after which the one-year training course will be modified and if possible shortened to six months.

## II. EVALUATION AND POSSIBILITIES

The existing government housing policy put the emphasis on construction of houses for the low-income people and for the very-low-income or under-privileged people. Construction of these houses are channeled through government sponsored

and government encouraged cooperatives, and government aided self-help organizations. Besides the P.T. Perusahaan Pembangunan, a semi-government housing development corporation established in 1953, builds houses for the middle-income people, but its scope is very limited. Houses built by the P.T. Perusahaan Pembangunan, are either leased or sold to the tenants. The government also builds houses for its employees. This is done by private builders through public bids. The rent for these houses depends on the tenant's income which is less or more similar to the public housing in U.S.A., the main difference being the tenant's occupation which in the latter case can be a government officer as well as a private employee.

In reviewing the existing government housing policy it seems that construction of houses for people of the high-income group, who earn more than Rp. 1,500.- a month, is left to the private builder; but construction cost is so high that actually only the wealthier part of this group can afford to have a contractor build a house.

Private builders operate on a commercial basis. Up to now the government has not made any steps to encourage private contractors to build individual houses or housing projects. There are many ways to stimulate the building industry, and the author's recommendations are summarized in Appendix C.

PART THREE

EXISTING POTENTIALITIES:

SOCIO-ECONOMIC FACTORS

## CHAPTER VI

### LAND

In this chapter land is discussed in relation to the ease or difficulty of acquiring land for the urban aided self-help housing projects. As the densities vary on the various islands, the geography is described to get a clearer picture of the Indonesian conditions.

Indonesia is an archipelago consisting of more than 3,000 islands stretching from 95° East to 135° East and from 6° North to 11° South. On the east is Irian or New-Guinea, the western part of which the Indonesian Republic is claiming. Taking West-Irian aside, the 3,000 islands superimposed on a map of U.S.A., stretch far into the oceans on either side, and from Canada to mid-Texas. Even when only land masses are included, the area of Indonesia is about equal to U.S.A. east of the Mississippi. With some 83 million people, it is the sixth biggest country in the world in terms of population. Java is the most crowded among the islands. Relatively the size of the State of Illinois, it has only 7 per cent of the archipelago's total land area but 76 per cent of the cultivated land, and almost three-fourths of the people.<sup>1</sup> They average 1,100 to the square mile, making Java the most densely populated island in the world. Sumatra, lying northwest of Java, is more than three times its size and comes second in population and development of its natural resources.<sup>2</sup> The population and land areas of the large Indonesian islands

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<sup>1</sup> Margueritte Harmon Bro, Indonesia: Land of Challenge, p.11.

<sup>2</sup> Ibid.

and island groups are shown below:

<u>Island</u>	<u>Population</u>	<u>Area</u> <u>(sq.miles)</u>	<u>Density (people</u> <u>per sq.mile)</u>
Kalimantan (Indo- nesian Territory)	3,200,000 <sup>3</sup>	208,286 <sup>4</sup>	15
Sumatra	12,000,000 <sup>3</sup>	182,812 <sup>4</sup>	66
Sulawesi	5,700,000 <sup>3</sup>	72,967 <sup>4</sup>	78
Java	55,000,000 <sup>3</sup>	48,830 <sup>4</sup>	1,100
Moluccas	560,000 <sup>4</sup>	32,298 <sup>4</sup>	17
Lesser Sunda Islands	1,540,000 <sup>5</sup>	30,479 <sup>6</sup>	50

Considering the very high population density of Java, the fact that rice cultivation in Java hardly produces enough to feed its population, its annual population increase of nearly 1 million, and the difficulties in effecting mass transmigration to other areas in Indonesia, the author suggests that in planning urban growth in Java, agricultural land should be left untouched. Furthermore, the author is of the opinion that an integrated plan should be made so that it results in a more even population distribution over the various islands of Indonesia so that urban growth of cities on islands outside Java will be more rapid than that of cities on Java.

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<sup>3</sup> Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-August 6, 1956, The Housing Situation in Indonesia.

<sup>4</sup> The Encyclopedia Americana, 1957 Edition.

<sup>5</sup> Deducted from the total Indonesian population after the 1956 U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand.

<sup>6</sup> Deducted from the total area of the Indonesian Archipelago, after The Encyclopedia Americana, 1957 Edition.

Land in urban areas of the various islands forms a problem in carrying out housing projects mainly because of two reasons: the complicated, various kinds of rights and easements on land, and the expropriation procedure; and the appearance of squatters in cities.

#### I. THE COMPLICATED, VARIOUS RIGHTS AND EASEMENTS ON LAND, AND THE EXPROPRIATION PROCEDURE

A comprehensive study and evaluation of the existing Indonesian agrarian law is beyond the scope of this thesis. The purpose of the author here is to show the difficulties in acquiring land for housing projects because of the existing complicated land rights and easements. Djakarta, Indonesia's capital city, for instance, has more than 15 kinds. Other cities very probably have a less number of kinds of land rights and easements, but the existing agrarian law in general is so complicated that it has attracted the attention of the Constituent Assembly now meeting at Bandung which assembly will formulate the new constitution of Indonesia.

If a city has a housing project in mind, and wants to acquire a tract of land which covers parts on which there are different kinds of rights and easements, it tries first to purchase these rights and easements by separate negotiations. If these negotiations fail, the city authorities take steps to acquire the tract of land by means of expropriation. Expropriation and the amount to be paid by the government to the owners must go through the cabinet and parliament by law.

The draft goes sometimes back and forth from and to the local authorities, the cabinet and the parliament, so that this procedure of expropriation takes at least one year before it becomes law.

The author suggests that the power to expropriate land be delegated by the central government to the provincial governments. This will shorten the procedure. To further expedite the procedure of expropriation it is suggested that clearing of the site can start without awaiting the determination of the amount of compensation. To accommodate the relevant persons, provisional compensation, about 75 per cent of the assessed value for taxation purposes, may be paid to the owners on account, pending adjudication. This means that the decision of expropriation by the provincial government is separated from the determination of the amount of compensation.

## II. THE APPEARANCE OF SQUATTERS IN CITIES

As has been mentioned in Chapter I, squatters build shacks in cities on the various islands. They settle mostly on government-owned land, and it is very hard to move them out. Even if another place is provided for them, sometimes they refuse to move. The problem comes then down to a choice between leniency for social reasons and police power to force respect for the government. The police department is at present a government branch under the office of the Prime



Minister. As such the mayor can ask the aid of the police force to help the city move its squatters to other sites, but the city police is at this time not under the mayor's jurisdiction. To secure this backing of police force, the author suggests that the city police administratively be placed under the mayor's office as a branch of the municipal government.

If the site occupied by squatters is appropriate for low-cost housing, the government should start approaching the people for an aided self-help housing project on that site. But if the site is planned for another use, the government supplies cleared land on another place, helps the squatters move to the new site; and after having them settled, the government approaches them to build better houses with the aided self-help method. In the meantime, the original site should be immediately used to prevent others squatting there.

An efficient solution of the squatter problem calls for a separate study; but if the housing construction program proposed in this thesis can be carried out, the squatters will disappear automatically.

## CHAPTER VII

### LABOR

In this chapter labor is discussed in the context of urban aided self-help housing. It is important to know beforehand if the relevant people are willing to work with their hands and if they have the time to do the job.

#### I. MANUAL WORK

In pre-war days manual work was considered very low. To a great extent the cause was the small literacy percentage of the population, smaller than 10 per cent and literacy meant a background of schooling and good education. It was in World War II during the Japanese occupation that the people were instructed to organize themselves and did manual work for the benefit of the community. Although the ultimate purpose was to consolidate the people behind the front in the interest of the Japanese forces, this consolidation had its own merits for the Indonesian people. The changing attitude towards manual work was further brought about because of service of youth in the Indonesian guerrilla army during the fight against the Dutch immediately after World War II and later on because of the difficult economic situation after Indonesia's independence.

Although at present manual work is still reserved for the lower educated, it is not regarded as something humiliating. As of this time even in industries in the more advanced countries qualities of personalities pertaining to the selling and distributive processes are given higher status than qualities of persons who physically produce the goods.

In his speech opening the first elected Parliament on March 26, 1956, President Soekarno of Indonesia stated that<sup>1</sup> the period from August 17, 1945, to December 27, 1949, - from the Declaration of Independence to the recognition of sovereignty - was one of "physical revolution," the years 1950 to 1955 were a "survival period," during which the new nation was unified, the process of orderly government established, and the economy rehabilitated after a decade of war and revolution. With the inauguration of the elected government, said the President, Indonesia had entered a period of "planning and investment." With economic development in view, the President and other government officials then proceeded and gave the example of doing manual work for the community by taking the spade and working on a road for a few hours. Within the general sphere of this situation, aided self-help which implies much manual work, adapted in Indonesia at this time, will be welcomed by the people.

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<sup>1</sup> Benjamin H. Higgins, Indonesia's Economic Stabilization and Development, p.xxi.

Education, too, should be reoriented. Quoting Maurice Zinkin's "Development for Free Asia:"

... so long as a man gives more pleasure to his mother by becoming a failed B.A. than a successful overseer, he will become a failed B.A. The way to deflate the value attached to academic education is not to deprecate it, but to increase the number of people who have it. More people must be educated; and to give practical jobs the same prestige as desk jobs, more of them must be taught academically.

Basic education in Indonesia should be more adjusted to the present conditions, and more emphasis should be put in the curriculum on manual work, for instance, manual agriculture of digging and planting and weeding, as the craft through which other subjects are taught. In engineering the student should do more field work. All this will increase the general appreciation of manual work which is very important in any self-help construction program.

## II. TIME REQUIREMENT FOR URBAN AIDED SELF-HELP HOUSING

A team working for houses with the self-help method should finish the houses within a not too long period, otherwise team members may lose their initial enthusiasm. There are two factors which should be taken into consideration, the climatic conditions and the number of man-hours each team member is able to furnish a week.

Most of the areas in Indonesia have two seasons, the dry and the rainy season. In the rainy season it rains nearly every day for about four or five months. Of course, local

conditions are different, at Medan, Sumatra, for instance, there is rain in all months of the year. But putting special local conditions aside, it is obvious that the outdoor work on self-help housing construction should preferably be finished within six months.

To be able to finish the outdoor work within six months, the group size and the number of man-hours each member of the group ought to work, should be determined. The group size should be such as to avoid having idle hands during a working period on one hand, but having on the other hand enough men available to do a continuing job as all members of the group may not be able to work at the same time. The author suggests that for the first pilot project a group of 18 families is chosen. The head of the family or his substitute should represent each family. These 18 people are then divided into 6 teams of 3 persons, each team having one team leader and the group itself electing one group leader. Work can be done by one team or by more teams together at one time.

To assure enough man-hours a week a rule should be set that each team member must work one working day (8 hours), Saturday being a working day in Indonesia, and one-half day (4 hours) on Sunday. Members of a team who work one-half day on Friday because they go to the mosque to pray, should work either one-half day on another working day, or else the whole Sunday. If by some reason a man cannot come to work, he should send a substitute, e.g. his son. So each family of the group of 18 families must supply 12 working hours a week, or about 300 man-hours within six months.

In carrying out the rural aided self-help housing projects the people in Puerto Rico work two days a week, one working day and one holiday, i.e. either Saturday or Sunday. This means 16 hours a week. The groups with the best organizations can finish the houses in six months, while the slowest groups do it in 1 1/2 years or 18 months. So there are variations in the speed of the work. And to finish the rural-type concrete house of Figure 8 in Appendix G it takes a minimum of about 400 man-hours.

In the proposed urban aided self-help housing scheme the author thinks that as the preparations can be done before, the essential core including the roof of 18 houses can be finished after six months outdoor work, after which time interior work can still be done in the rainy season.

## CHAPTER VIII

### GOTONG ROJONG, THE SOCIAL VILLAGE TRADITION OF MUTUAL ASSISTANCE

As has been stated in Chapter IV, there is a close relationship between housing of urban people of the low-income group in semi-urban areas, and village community development. The author thinks that the urban aided self-help housing policy will be a success, especially because it fits the Indonesian cultural conditions. Gotong rojong, the social village tradition of mutual assistance, is treated in this chapter. Gotong-rojong has its root in the village where it is still being practised at this time. This social village tradition of gotong rojong tends to fade away in the more complex city environment if not kept alive. During the Japanese occupation in World War II the occupation administration roused the slumbering gotong rojong spirit and created the "Tonarigumi," a Japanese word meaning "Neighborhood Group" or "Neighborhood Unit" of which the Indonesian word is: Rukun Tetangga. A Rukun Tetangga consists of about 10 houses, each house occupied by 1 to 3 households; and in each household there are 1 to 5 persons. This Rukun Tetangga was and is not an official part of the city-ward, and the head of the Rukun Tetangga was and is not paid by the municipal government.

During the War rationing of food and clothing was channeled through the Rukun Tetangga, and its head set up organizations to train people to put out fire and to teach illiterated to read and write, to mention only a few of the functions. When Indonesia gained independence, these Rukun Tetangga's had shown to serve the people so well that in Djakarta and many other cities they were not disbanded. To-day the active ones perform social functions as for example if someone dies, collecting money for the bereaved family if they do not have enough money to meet the ceremonial expenses. During the general elections in 1955 these Rukun Tetangga's helped the city-wards in the preparations.

#### I. AGRICULTURE

The majority of Indonesia's population has rice as staple food. Depending on the kind it may be grown as wet crop or dry crop. In sparsely populated areas dry crop is grown one season, and after the harvest the soil is left wasted, while seed is sown in the tract of land next to the first. This wasteful system of shifting agriculture, fortunately, is disappearing. To-day most of the rice is wet crop rice grown in terraced rice-fields, a common scene on Java and Bali. At harvest-time relatives, neighbors and acquaintances, men and women, young and old, help with reaping the harvest, talking and joking while they work. At the end of the day the crop is collected, and the helpers get one-fifth of what they have brought in. In this tropical climate reaping the



harvest is not done in one day for all of the rice-fields belonging to the people of one village. So the next day or after a couple of days the people help reap the harvest of another man of the village. Because of the fertile volcanic soil and the heavy rainfall of some of the islands there are two and in some places even three crops within a year. This tradition of assisting each other, gotong rojong, during harvest time, promotes the primary group relationship between the villagers.

## II. CONSTRUCTION

The villagers know each other and are generally willing to offer services to each other without asking any payment other than a token of gratitude. If someone wants to build a house, he asks his neighbors for help. He purchases the materials; the neighbors come with spades, saws, and other tools, and help him build the house. He supplies his neighbors with meals and drinks, but does not give them any money. At the end when the house has been built, he gives a dinner, called a slametan, thanks the Almighty for the successful ending and thanks his neighbors for their generous help.

Before aided self-help became a government policy, a mountain village in east Central-Java with 500 families, Torongredjo, showed what can be achieved in construction with adaptation of modern organization in the social village

tradition of gotong rojong. Before the self-help effort was started in 1951, the economic and general morale situation of the village was poor. The lurah, administrative village head, reported: "People leaving the community did not like to admit they came from Torongredjo." The people borrowed money, generally a few weeks before harvest time, from alien money lenders. If they sold their green rice on the field, they got much less than what their crop would cost. Rice production itself was not adequate for local needs. Industries to provide some cash income for the village did not exist so that its economic base was not sound. The houses were made of non-durable, fire-hazardous, unhealthful bamboo and had thatched roofs. Water used in the village for cooking, etc., was taken from where the people took their bath.

The self-help system started to function in 1951. A credit cooperative replaced the money lenders, then followed production credit and seasonal credit cooperatives. By the self-help method with the government only supplying some printed materials, literacy increased from 10 per cent to 60 per cent.

The first structural self-help improvements were of the community type. The villagers built roads and bridges, and by doing so supplied communication with the world outside. Then a school building was built of home-fired brick. Afterwards cleanliness and health were stimulated and improved by the

construction of sixteen community bathing stations, developed by self-help method.

But the most impressive of all is in the field of housing. Before 1951 less than 50 houses were of the permanent and semi-permanent type<sup>1</sup> and 3/4 of the total were of temporary plaited bamboo and wood construction. After application of the self-help method, 212 new permanent and 142 new semi-permanent houses replaced an equal number of the bamboo structures, although the number of houses on the whole did not increase. The soil of the local rice-fields were molded and burned in home-made kilns to supply the bricks and roofing tile. These were made during the slack farming season. On cash requirements for building materials money was only needed to purchase cement,

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<sup>1</sup> What is meant by permanent and semi-permanent type of house can be illustrated to the reader by the official building regulations of Djakarta, the capital city:

Batavian Building Regulations 1919 - 1941  
(translated from Dutch)  
Article 13

- (1) There shall be four classes of building works:
- Class 1.  
Buildings which have permanent exterior walls and in which any interior walls supporting beams are likewise constructed of permanent materials, and buildings in which such walls are frame-built with stone infilling.
- Class 2.  
Semi-permanent buildings.
- Class 3.  
Buildings constructed entirely of temporary materials and buildings in which everything but the roof covering and foundations is constructed of temporary materials.
- Class 4.  
Other structures not covered by Classes 1,2, or 3.
- (2) The Director shall determine the class to which a structure belongs.

glass, and hardware. Another cash payment was for an outside skilled worker to do some of the roof framing and masonry until local men learned how to do it. The total cash expense for a 54 square meter home, including about Rp. 1,000.- for the paid skilled labor, was Rp. 2,200.- (about U.S. \$200.-).

In the case of Torongredjo it is clear that the social village tradition of gotong rojong can be applied to meet the existing need of housing construction, while there is so little ready cash. The organizational procedure followed in Torongredjo was to divide the participants into groups according to their wealth. Money was collected in each group to buy the necessary materials. The financially poorer groups built smaller homes so they did not have to contribute much money. In the construction phase, however, all worked together in new groups based on a more convenient arrangement determined by locality. While no time record for each man was kept, well established social pressures were imposed to restrain shirkers. Special mention should be made in the production of houses for 30 widows. They did not participate in the construction, but supplied drinks and smokes for the people who worked.<sup>2</sup>

To show what the cost reduction amounts to, it can be quoted here, that in the United Kingdom the cost of housing schemes is divided equally between materials and site labor.

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<sup>2</sup>

I.C.A., Aided Self-Help Housing, pp. 9-10.

In the tropics labor is often the more important of the two, in some cases amounting to as much as 80 per cent.<sup>3</sup> In Indonesia labor cost is about 60 per cent of total building cost.<sup>4</sup>

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Otto H. Koenigsberger, "Problems of Housing Laborers in the Tropics," Tropical Housing and Planning Monthly Bulletin No. 3. December 31, 1955. Cambridge, Mass: Compiled for Private Circulation by Prof. J. Tyrwhitt.

4

P. K. Hadinoto, "Self-Help Houses," Bulletin of the National Institute of Sciences of India, No. 6. (September 30, 1955), p.239.

**PART FOUR**

**EXISTING POTENTIALITIES:**

**BUILDING MATERIALS AND FINANCIAL INSTITUTIONS**

## CHAPTER IX

### BUILDING MATERIALS AND THEIR TREATMENT<sup>1</sup>

After having discussed the socio-economic potentialities, the potentialities of building materials are treated in this chapter, and those of financial institutions in the next chapter. While Indonesia is so rich in various building materials, its existing financial institutions do not give any impression of the tremendous need of housing construction. By discussing these two sectors in two consecutive chapters, the author tries to show the feasibility of a gigantic housing program.

Through all the discussion in this chapter the objective of low-cost self-help housing is kept in mind. Before coming to the subject matter some environmental conditions are put forward.

Indonesia has a hot, humid climate of which the characteristics are bright, cloudy or overcast skies, particularly in the afternoon; hot days and only slightly cooler nights; high humidity; and heavy rainfall. There are two seasons in a year, the wet or rainy season, and the dry season.

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<sup>1</sup> See for more details: P. K. Hadinoto, "The Effective Use and Production of Local Building Materials for Low-Cost Housing in Indonesia, Proceedings of U.N. Regional Seminar on Housing and Community Improvement, New Delhi, India, January 21 - February 17, 1954.

Generally the mean daily range is about 10° F. (6° C.) to 20° F. (12° C.),<sup>2</sup> at sea level the range is small and in the mountains it is large. Shade temperatures exceed 90° F. (32° C.) only occasionally but, because of the humidity, they are more unpleasant than the higher day temperatures of the dry tropics.<sup>3</sup> Apart from those mountain areas with high altitude, the average monthly temperature remains within 10° F. (6° C.) of 82° F. (27° C.).<sup>4</sup>

In this kind of climate, air movement is essential for comfort, and it is preferable to let the outside air pass through the house during the day as well as at night; to accomplish this openings should be large, and walls should be built of materials through which the air can pass, for which purpose, other factors not being considered, domestic plaited bamboo walls for instance suffice entirely. As there is only a small drop in temperature at night, there is little to be gained by making the walls thick.

## I. BUILDING MATERIALS

As is expected, the indigenous methods of construction with local building materials are mostly handled very well. However, in the same form, these are regarded as temporary in

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<sup>2</sup>

Maxwell Fry and Jane Drew, *Tropical Architecture*, p. 34.

<sup>3</sup>

B. Galepides, *Building Industry and Building Materials of Indonesia; Practical Rules for Designing in Wet Tropical Climate*, 1954, Bandung, Indonesia

<sup>4</sup>

Appendix of Statement of the Indonesian Delegation to the U.N.E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-August 6, 1956, *The Housing Situation in Indonesia*



modern times. The house remains seldom water-tight, and even although it may be given continual maintenance, it has but a limited life against the ravages of termites and weather.

Procurement and transportation of materials which are not produced locally, increase building costs. Especially in Indonesia with her wide range of local building materials and where the people's economy is weak, the choice of materials plays an important role in the building of low-cost housing. It is most impossible to use the same materials and the same construction method throughout the whole country to effect the most economic house, because different building materials are found in different localities.

In using building materials for low-cost housing the cost should be low, the use easy, the transport easy and cheap, and the resulting construction sound. While most of the building materials are domestic materials, portland cement, glass hardware, and chemicals for paint are still imported. In Appendix D the following are discussed in succession: Domestic Wood; Domestic Gaba-Gaba; Domestic Bamboo; Rammed Earth, Cinder Blocks, Brick, and Pozzolana Trass Concrete Blocks; Roofing Materials; Mortars with Domestic and Imported Components; and Imported Materials.

## II. PLUMBING AND ELECTRICITY FOR LOW-COST HOUSING

In urban areas where there is a water supply system, the main pipe should be laid along the rear yard. By doing so the cost of the connection between the main pipe and the house is lower than if the main pipe is laid on the street side. One faucet in the bath-room satisfies the need. If there is no water supply system, a well can be dug, either one well for each house, or, if it costs too much, one big well for more houses. The minimum distance from a well to a septic tank or cesspool depends on the kind of soil, but as a rule of thumb 33 feet seems to be sufficient. If the drinking water is from the well, an impermeable concrete wall 3'3" thick, should be made around the shaft of the well.

If electricity is available at a price which the occupant-owner can afford to pay, one light point in each bedroom, living-dining room and kitchen would make a low-cost house more comfortable.

## CHAPTER X

### EXISTING FINANCIAL INSTITUTIONS

An urban aided self-help housing program needs government aid in one or another form. In this context a brief survey of the existing financial institutions, which relate to housing construction, is considered helpful to know about the existing conditions. There are only a few existing financial institutions which relate to low-cost housing construction. This situation shows that the bulk of the limited financial resources is allocated in other fields.

#### I. GOVERNMENT

The two central government agencies which are directly related to an eventual aided self-help program in the cities, are the Department of People's Housing of the Ministry of Public Works and Power, and the executive Village Community Development Agency. The present chairman of this agency is an official of the Ministry of Interior Affairs. He is also ex-officio the secretary of the Village Community Development Board, the chairman of which is the Prime Minister and the members ministers directly related to village community development. The Department of People's Housing calculated that, starting 1961, about 400,000 people's houses have to be built annually in Indonesia. The preparation of 10 years started in 1951. The enormous building program will for the greater part be executed by means of aided self-help housing.

The Department of People's Housing is allocating every year some funds to the local governments which use them to build houses for government employees. When in 1956 the Village Community Development Agency started to work out its projects, the Municipal Public Works Department of Djakarta, the capital city, used its allocated materials from the People's Housing Department to start carrying out community buildings projects, such as school, community center, etc., located in the Village Community Development Agency's projects. At the end of 1956 there was already a smooth coordination between the Djakarta municipal branch of the Village Community Development Agency, the Djakarta Municipal Public Works Department and the People's Housing Department of the central government.

## II. SEMI-GOVERNMENT

The people may get the facilities of the government-sponsored Bank Rakjat Indonesia, Indonesian People's Bank, if they have a government guarantee. The harbor of Djakarta is Tandjung Priuk. The people working for the Direksi Pelabuhan Tandjung Priuk, Tandjung Priuk Harbor Authority, may borrow from the local Bank Rakjat Indonesia to build houses with the aided self-help system with the guarantee of the Tandjung Priuk Harbor Authority.

In 1952 the P.T. Pembangunan Perumahan, Housing Development Corporation, was founded as a subsidiary of the

Bank Industri Negara, State Industrial Bank. The 15-year 3 per cent per year interest bonds of the corporation have a government guarantee.<sup>1</sup> The houses built by the P. T. Pembangunan Perumahan are allocated to government officials as well as private people.

It cannot be expected from an organization such as the P.T. Pembangunan Perumahan, of course, that it helps finance a housing project for the under-privileged people, and built with self-help system. This last project should be operated on a social basis rather than on a profit-making basis.

### III. PRIVATE

There are many private contractors, but they don't build housing projects for the under-privileged people. A few years ago, an Indonesian industrialist, B. Yudoprasetyo, invented a cheap, prefabricated house, the YUDO house. The YUDO House consists of a wooden framework, walls of plaited bamboo and a sink roof, while the plan comprises 2 bedrooms 10' by 10' each, a living-dining room 5'11" by 10' and a kitchen 5'11" by 10'. The materials would cost Rp. 5,555.- (\$490.-at official rate), and a man and a woman can erect the house with a saw and nails. The framework consists of 235 pieces of wood. Because this is still in the starting

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<sup>1</sup> Benjamin H. Higgins, Indonesia's Economic Stabilization and Development, p. 66

stage, improvements can still be made. In some places the local people organize cooperatives to build houses, as was the case at Torongredjo, which has been discussed in Chapter VIII.

Seeing the bad housing situation in urban areas, private companies build dormitories and houses for their employees in the cities. A particular situation faces the oil companies. Their oil fields located close to the tropical jungles, they build self-contained towns of their own to house their employees. As an example of their efforts the Stanvac experiences are described in Appendix E.

The Stanvac efforts, especially the Stanvac J.P.P., have attracted wide interest from private as well as government circles. The other two big oil companies have also their housing projects in Sumatra. In East Kalimantan the B.P.M. has another big housing project.

**PART FIVE**

**AIDED SELF-HELP HOUSING**

## CHAPTER XI

### EVALUATION OF SOME EXPERIENCES IN OTHER COUNTRIES

While aided self-help housing is being practised in many developing countries, some of the economically more advanced countries, too, have resorted to this method, especially where the housing need for the under-privileged is urgent.

#### I. ORGANIZATION

Some experiences are described in Appendix F to show that while the basic principle is the same, the ways of carrying it out are different depending on the environs. These experiences in other countries are evaluated to develop an organization most suited to the Indonesian conditions. In Sweden many component parts of the aided self-help houses for the low-income people are mass produced by the government. This can be done in Indonesia for the wooden planks if the nailed timber construction is used (see Appendix D), and for the doors and windows. The climatic conditions in Indonesia do not require as many technical facilities as those in Sweden. The principle of locating urban aided self-help housing projects in city outskirts, as is the case in U.S.A., can be applied in Indonesia. The author thinks that starting to build the basic core of a house, as is the case in Greece, and eventually expanding it, as is done in India, can well be



adapted to the Indonesian conditions. The experience with the Taiwan dockers shows that a participant has more interest if he knows he is building his own house. But on the other hand, he may not work as hard if he is working on a house which is not his. This human psychology should be taken into consideration during the execution of the program.

In organizing the working parties of the participants the group size should be so that it can work efficiently. In carrying out a project, space to store building materials on or near the site should receive appropriate attention.

## II. DESIGN AND SPECIFICATIONS

In Appendix G some examples are taken from other countries on design and specifications of low-cost housing. Although circumstances are different, and purchasing power of local currencies varies a great deal, those examples are taken where the cost per square foot is less than \$1.-. The author evaluates the design and specifications of the examples in Appendix G one by one in view of possible adaptation of the good points in urban aided self-help housing projects for Indonesia.

Figure 2 and Chart 2 are of a house of the Sarteneja Project in British Honduras of the British West Indies. The design and plan are not so bad for the Indonesian environment; however, the materials should be different. Stone for walls, unalite for partition wall coverings, and ardex asbestos for roofing are too expensive at present.

Figure 3 and Chart 3 are of the Phnom Penh Demonstration House in Cambodia. The plan fits a house for a childless couple. However, the roof does not have a ridge so that there is no air space between the roofing material and the space of the rooms. This kind of roof is in Indonesia only suitable in the mountains where it is not so hot. Furthermore, corrugated aluminum roofing is at present still expensive in Indonesia. Because bauxite is found on the islands east of Sumatra, this kind of roofing may be possible for low-cost housing in the mountains in the future with the establishment of aluminum plants.

Figure 4 and Chart 4 are of a rammed earth (or earth block) self-help house in China (Taiwan). The plan is similar with that of the Sarteneja Project in British Honduras, B.W.I., but because of the use of rammed earth for walls and of its small size it costs about one-half as much. It is interesting to note here that 808 pieces of brick are used for the foundation of each house.

Figure 5 and Chart 5 are of a row house of the Kaohsiung Dockworkers Project in China (Taiwan), which carries out a rowhouse design of 1 3/4 stories. Although it is very economical in design, it is very unlikely that the people in Indonesia will like it due to the hot, tropical climate.

Figure 6 and Chart 6 are of a rural worker's house of the Cuyuta Seed Farm in Guatemala. Actual construction in Guatemala is in three stages; in the first stage: the

permanent foundations and wooden frame are made, the temporary roof is made of bamboo and thatch, and the temporary exterior walls of bamboo or other temporary material; in the second stage: the temporary roof is substituted with a permanent wooden roof frame and asbestos cement; and in the final stage: the temporary exterior walls are substituted with permanent, vertical wooden planks, while partitions of wooden planks and plumbing are installed.

Figure 7 and Chart 7 are of a rammed earthen house at Mohammed-Abad in Iran. The people in Indonesia are not familiar with this kind of house plan. To reach the kitchen from the living room or bedroom, one must go through the entry (front porch) or through the back yard along the rear wall. Furthermore, there is no air space between the roof and the space of the rooms. This design does not fit the Indonesian environment.

Figure 8 and Chart 8 are of a reinforced concrete, rural house in Puerto Rico, U.S.A. built with the aided self-help method. The organization of the Puerto Rican rural housing project is described in Appendix F. Use of reinforced concrete in Indonesia would at this time raise the over-all costs so that the resulting house would be beyond the economic capacity of the low-income group. The flat roof is furthermore not suited in Indonesia.

Before leaving the subject of design and specifications, it should be noted that ventilation is an important factor

in housing construction in Indonesia as the country lies in the hot, humid climate zone. So even if a pitched roof is provided for, air movement under the roof should be stimulated.

## CHAPTER XII

### CRITICISM ON AIDED SELF-HELP HOUSING

Experience in other countries shows that aided self-help method can be adapted for low-cost housing construction. Although there are many advantages, the drawbacks of this method should not be overlooked. Because of the use of unskilled labor, the product is necessarily of less quality than houses constructed by established private contractors. Many of the participants take part in housing construction with this method only once in their lives so that the acquired skills are not fully exploited and the education of the building skills not efficient. There are also other disadvantages.

#### I. TECHNICAL QUALITY OF THE PRODUCT

Most of the participants of the self-help housing construction are not workers for any construction firm, and have never worked in a housing construction team before. It is especially hard for the leader of the group to keep the work going. Such details as making joints or corners of the walls may have vital consequences. To make it easier for the layman to work in a construction team, it should be so arranged that the construction should be very simple, and if necessary even at the cost of some more materials. It is also important to make construction parts as much as possible

uniform, using standardization and serial production.

Some semi-self-help systems have professionals make the frame construction, and leave the filling in of the walls to the self-help participants. Other methods employ skilled workers for the plumbing and other specialized work. There should be a balance between quality control and limited capital resources. If, for instance, rammed earth is used for the walls, the first walls erected should be those of the bathrooms and kitchens, and as the workers gain experience the walls for the bedrooms and the living rooms will be of better quality.

To assure a good construction, team members should be given preliminary training in house-building methods. This preliminary work should include not only technical training, but also training in team work so that the work could progress unimpeded, once it had begun.

Furthermore, while self-help housing may appear, theoretically, to mean a lowering of certain legal standards existing in Indonesian cities, in fact, the achievement which can be expected from self-help housing, will make possible more adequate shelter than would otherwise be available to the lower-income groups in Indonesia, besides making more responsible men from these people.

## II. WASTE OF TECHNICAL SKILLS AND EDUCATION?

Many of the people take part in housing construction with the self-help method only once in their lives. So it might be thought that the technical skills they acquired, are wasted for the rest of their lives and that the education of these skills is not so efficient. But on the other hand, it can be argued that after having built their homes, many of them have become semi-skilled. The family benefits, because now the head of the family has learned how to do the maintenance and how to improve his house. This is important, because without regular maintenance and improvement these low-cost housing complexes tend to become future slums. The construction industry benefits, because there is a new supply of skilled and semi-skilled labor. And the government benefits because to many persons who never had the opportunity to go to school, effective schooling for the building trade has been given at an insignificant cost. Besides, if these people later on transmigrate to other parts of the country, they may work on, or even sponsor and become the leaders of new self-help housing schemes. And the children, who see in their youth how their houses are built, will be more receptive to self-help in their later life. Furthermore, accomplishment of the work with the self-help method may have the desired psychological effect on the people. Communities which have been stagnant and static before may become ambitious towards improvement and dynamic. So after all, the people themselves and the community at large get the most benefit

by changing their attitude towards social improvement, and as a result also towards economic development.

### III. OTHER CRITICISM

It may be argued that the people have to sacrifice their time which they might spend more in leisure with their families. Others might earn extra money by working for others. Against this argument can be put forward that as a result of their free labor they will have a house which they themselves own.

As for the private firms which give time off to their workers and employees to enable them to work on self-help housing, they may get in return workers and employees whose minds are less troubled with domestic affairs, and so can concentrate more on their work, besides having become more receptive to new ideas and more ambitious in their work.

Another factor is that housing standards change, and that what is satisfactory at present may be below standard in the next generation. This may be true and can be kept in mind, but in the next generation new techniques may well be developed. So present objectives are set based upon existing standards and the methods can be modified if circumstances make them necessary.



## CHAPTER XIII

### APPLICATION OF URBAN AIDED SELF-HELP HOUSING

Assuming a total population of 89.75 million people in Indonesia in 1960<sup>1</sup> of which 15 per cent<sup>2</sup> live in urban areas, and an annual population increase rate of 1.7 per cent, then the urban population increases by 1961 with 1.7 per cent of 15 per cent of 89.75 million or 230,000 people. Assuming also that the average family size is 4.5<sup>3</sup>, then approximately 51,000 new dwelling units are needed in that year to accommodate the urban population natural increase. How many urban dwelling units will be built annually with the aided self-help ~~how~~ method?

The Djakarta Raja Municipal City Development Division estimated by projecting a sample survey done in the city that the population of the area within the municipal boundaries

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<sup>1</sup> Biro Perantjang Negara (National Planning Board), Indonesia, Garis-Garis Besar Rentjana Pembangunan Lima Tahun 1956-1960 (Outline of Five-Year Development Plan 1956-1960) assumes the population of Indonesia in 1955 as 82.5 million. If the annual population increase rate is 1.7 per cent, the population in 1960 will be 89.75 million.

<sup>2</sup> Statement of the Indonesian Delegation to the U.N. E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-August 6, 1956, The Housing Situation in Indonesia.

<sup>3</sup> Statement of the Indonesian participants to the U.N. Seminar on Population in Asia and the Far East, Bandung, Indonesia, November 21-December 3, 1955, The Population of Indonesia, p. 8

which includes urban and semi-urban areas, was 2,250,000 in 1956. In the period from 1948 to 1953 the immigration into Djakarta Raja was just over 100,000 yearly, and this was about 85 per cent of the annual population increase of the city.<sup>4</sup> So in 1955 the Djakarta Raja population was likely to be between 2,000,000 and 2,250,000. The total urban population was estimated at about 15 per cent of 82.5 million or 12,375,000 in 1955 which was about six times the Djakarta Raja population. In the period from 1951 to 1955 the number of houses built with a license in Djakarta Raja was 9,116.<sup>5</sup> This means an annual average of less than 2,000 in that five-year period, although it includes the new settlement of New Kebajoran, which up until now is not finished. Kenneth Watts, United Nations Planning Advisor to the Municipality of Djakarta Raja, Indonesia, is of the opinion that the maximum number of new dwelling units in Djakarta Raja is unlikely to exceed 10,000 units within one year.<sup>6</sup>

To carry out the New Kebajoran project in the semi-urban area of Djakarta Raja a Pembangunan Khusus Kotabaru, New Town Special Development, agency of the Ministry of Public

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Lembaga Penyelidikan Ekonomi dan Masyarakat (Institute of Economic and Social Research), "Urbanisasi Djakarta" (Urbanization of Djakarta), Ekonomi dan Keuangan Indonesia (Economics and Finance in Indonesia), Maret 1955 (March 1955), p. 113

<sup>5</sup> Statement of the Indonesian Delegation submitted to the U.N. Spring E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-August 6, 1956

6

Interview with Kenneth Watts on June 13, 1958.

Works and Power was created. Owners of dwellings and flats in New Kebajoran are individuals, private firms, or government agencies. Although each new dwelling was immediately occupied after completion, the number of dwelling units built during the five-year period from 1951 to 1955, was only 3,855 which means an average of 771 units a year. This experience seems to support Kenneth Watts' opinion for Djakarta Raja. For a big urban aided self-help program in Djakarta Raja the administration of the organization besides the availability of funds to finance it seems to put an upper limit on the possibilities. In relation to land requirement the feasibility is discussed in Chapter XIV. Because the assumption for Djakarta Raja is used in this case as a base to estimate the possibilities for the entire program,<sup>7</sup> the author makes the following more optimistic assumption: Not taking into consideration new construction by private enterprise, a maximum number of 10,000 units a year is assumed in Djakarta Raja for new dwellings built by housing cooperatives and those built with the aided self-help method. Then the annual number of new dwelling units as a result of construction by housing cooperatives and with the aided self-help system, which is the optimum capacity, is likely to be six times 10,000 or 60,000 units for the entire urban areas of Indonesia, which is exactly the same number as the goal set by the People's Housing Department. This being 15 per cent of the

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<sup>7</sup> Djakarta Raja is used as the base because, besides being the capital, it is the biggest city in Indonesia, and has the largest municipal administrative organization in the country.

total urban, semi-urban and rural construction, the annual construction of low-cost housing is then 100/15 times 60,000 or 400,000 units. Annual construction by housing cooperatives for the middle-income group is 5 per cent of 400,000 or 20,000 units in urban areas, and that with the aided self-help method for the low-income group is 10 per cent of 400,000 or 40,000 units in semi-urban areas.

In reviewing the program it is noted that in cities in Europe the production of dwelling units numbers annually between 1 and 10 per 1,000 population.<sup>8</sup> The building activities in the urban areas in Indonesia are expected to produce an annual average of 60,000 plus 20,000 plus 40,000 or 120,000 dwelling units. This is just below 9 per cent of the estimated urban population in 1960 which is 15 per cent of 89.75 million or 13.5 million. So the urban housing program is not an unrealizable one.

Furthermore, it is expected that at the beginning of the 40-year period the production of dwelling units will be lower than the annual average, but that it becomes higher and higher the more the program advances. The author also hopes that the number of new dwelling units in urban areas outside Java will be proportionately more than those in Java so that the end result will be a more even population distribution over the various islands in Indonesia.

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<sup>8</sup> Statement of the Indonesian Delegation to the U.N. Spring E.C.A.F.E. Fourth Meeting, Bangkok, Thailand, July 30-Aug. 6, 1956.

## I. ECONOMIC CAPACITY

The feasibility of the program is now examined from the economic side. The author suggests that two main types of houses are taken for the aided self-help housing:

Type I is a semi-detached; and

Type II is a detached house.

To attain uniformity in the parts, the dimensions of both types are the same. Without much difficulty both types can be constructed in the same project. To get the greatest flexibility in costs, both types can be constructed in two stages, 1 and 2, while there are two kinds of stages, A and B.

Stage A-1 (see Figure 9) is a "max now" house, i.e. the maximum house of good quality which can be acquired now. It consists of Room 1, Room 2, and Room 3. Room 1 is the bedroom which at day time can be used for other purposes. Room 2 is the kitchen, and Room 3 is the bathroom.

Stage A-2 (see Figure 9) is the "max now" house expanded with Room 4 and Room 5. Rooms 4 and 5 are the new bedrooms, while Room 3 becomes the Living-Dining Room.

For a Stage A-1 and a Stage A-2 house the walls are of permanent material, i.e. whitewashed, unplastered rammed earth, cinder block, pozzolana trass concrete block, or brick.

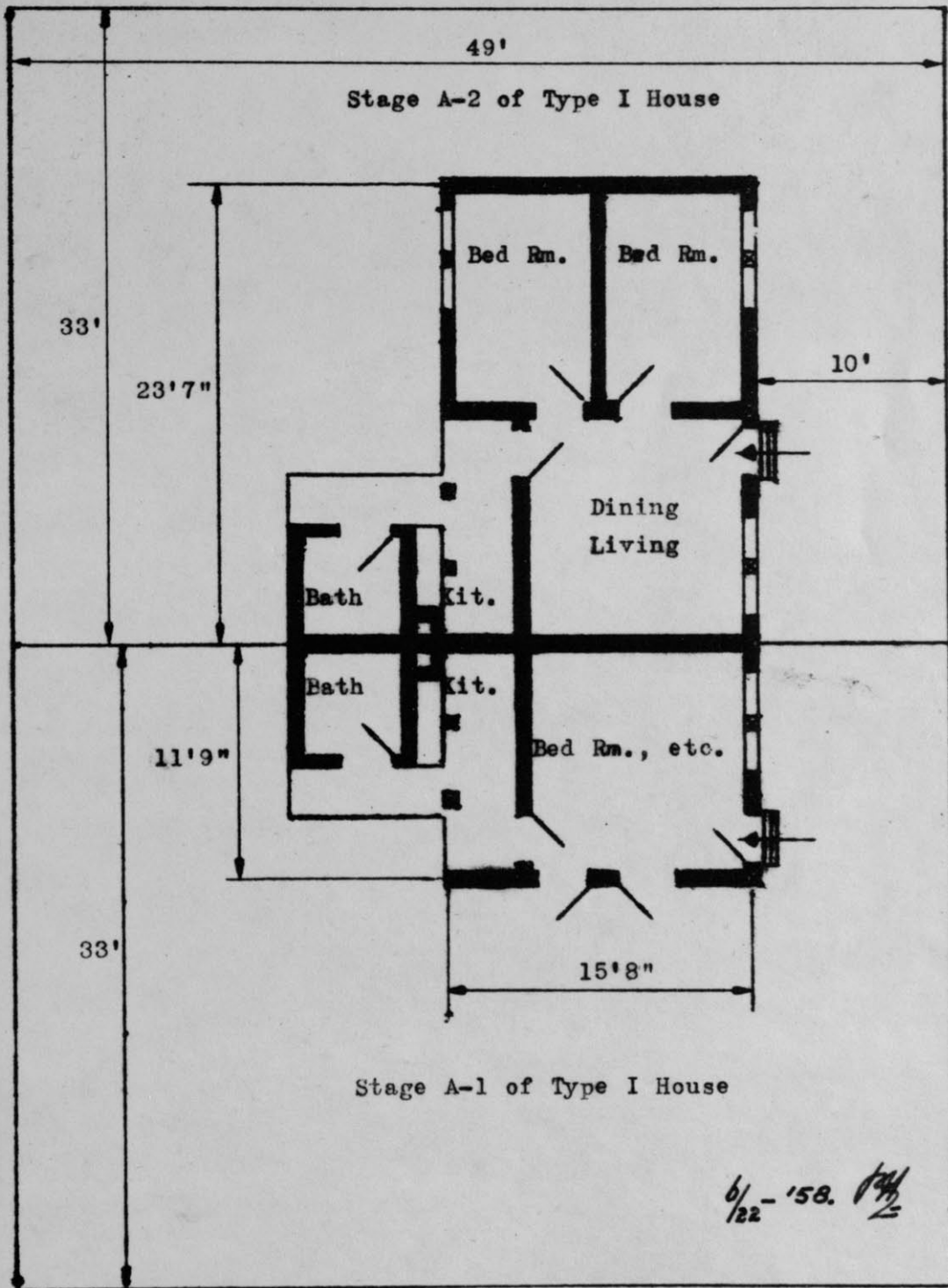


Figure 9. Minimum Lot Size, and Stage A-1 and Stage A-2 of Type I House. Plan.

Stage B-1 is a semi-permanent house, the walls from the ground to 3'3" above the ground made of permanent material, and the rest of the walls made of bamboo or gaba-gaba which have been made durable, or it is a semi-permanent house of wooden frame construction with wooden panels for walls.

Stage B-2 is a house of which the walls are made of permanent material.

Among the permanent materials for walls rammed earth is the cheapest, and a rammed earthen wall costs about one-half as much to construct as a brick wall of the same dimensions. In places where the special clay for a rammed earthen wall is found, the fortunate people can immediately build a house of Stage B-2, instead of starting with a Stage B-1 house.

In Indonesia labor costs comprise 60 per cent of total construction costs. With 10 per cent of the total costs for hiring some skilled labor, a self-help house would cost about one-half of a similar house constructed with the conventional method.

Chart 9 is a list of the costs of a Type I or Type II house in the different stages, constructed with the self-help method.

If the owner of a house in Stage A-1 has saved some money, he can develop his house to Stage A-2; if the owner of a house in Stage B-1 has some money to spend, he can convert his house into Stage B-2.

CHART 9

Stage	Cost in Rupiahs*	
	Type I	Type II
Stage A-1 (rammed earthen walls)	5,000	5,500
Stage A-2 ( " " " )	7,500	8,000
Stage A-1	8,000	9,000
Stage A-2	12,000	13,000
Stage B-1 (wooden panel walls)	9,000	10,000
Stage B-2 (rammed earthen walls)	7,500	8,000
Stage B-1	9,000	10,000
Stage B-2	12,000	13,000
Variation of Stage A-2 or B-2	13,000	14,000 (Figure 10)

\*  
Cost estimates by author.



Having analyzed the costs, the author suggests that the government makes annually available for the whole urban aided self-help housing program Rp. 400 million plus Rp. 100 million for land acquisition or Rp. 500 million. '

This means an average cost of Rp. 9,000.- each with 10 per cent overhead costs for the 40,000 dwelling units. Rammed earthen walls are cheap to construct only when the special clay material is locally available. For the lots including the access streets the author estimates that the average cost is Rp. 2,250.- each. If 10 per cent is added for overhead costs, then it is roughly Rp. 2,500.- for each dwelling unit or Rp. 100 million for the annually projected 40,000 dwelling units. The source of the Rp. 500 million is discussed in Chapter XV.

The costs for the new public facilities and services are not the responsibility of the People's Housing Department, but of the relevant Municipal Public Works Departments. The author suggests that the execution of the housing scheme and the provision of facilities and services should be in the hands of separate divisions of the Municipal Public Works Departments. Although the housing construction program may be influenced by the absence or presence of public facilities and services, the program should not be deferred just because of the uncertainty of these facilities and services. The Municipal Public Works Departments, however, should take care that a certain amount is put aside for the provision of the most basic facilities and services. These basic facilities and services may later be improved as more funds are available.

Public facilities and services are further discussed later on in this chapter.

## II. BUILDING MATERIALS

Although the over-all cost of the house should be low, minimum requirements should be maintained. If there are no minimum requirements, the people, in pulling the strings of the purse too tight, may tend to build future slums. In that case the urban housing problem is not solved, but is merely postponed, and still worse than that, the government loses billions of rupiahs, and all the time and effort put in the program by the people, is also lost. So the resulting house should be of sound construction and can be easily maintained. The minimum requirements of building materials for a Type I or Type II house in the first stage are:

- a. Roofing is of locally produced tile or Kalimantan-wooden shingles;
- b. Walls are either of wooden boards or rammed earth<sup>9</sup>, or at least the lower part made of other permanent material; cinder block, pozzolana trass concrete block, or brick.
- c. Floors are of concrete.

In the second stage, which is the final stage, the walls should be of permanent materials.

The intermediary first stage serves for those cases where the occupant-owner cannot afford to pay for the Stage 2 house, or when it is already known that in the future the

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<sup>9</sup>If rammed earth is used for walls, this wall construction should follow specific rules. The wall surface should be flush.

site is intended for another use. It is suggested by the author that from the start the floors should be of permanent material impermeable to water, and concrete is the cheapest among these materials. It is also suggested by the author that in Stage A-1 and Stage B-1 the bathroom and toilet are already included. All of this will serve the purpose that the people should be more hygienical about their living environs. A concrete floor will very much lessen the danger of hookworm disease which is always a threat in the hot, humid areas.

The choice of rammed earth, cinder block, pozzolana trass concrete block or brick, of plaited bamboo or gabagaba, and of roof tile or Kalimantan-wooden shingles for low-cost housing construction depends upon the local availability and prices. It is hoped that in the near future portland cement, glass, and hardware including chemicals for paint will be produced domestically in such a quantity that they need not be imported. Then Indonesia will be self-sufficient in building materials for low-cost housing, which design at that time can be modified to suit the circumstances.

### III. DESIGN, PLAN, AND COST

To attain flexibility two main types are suggested by the author, Type I is a semi-detached house, and Type II is a detached house. To reduce the costs, doors and windows are mass produced by skilled carpenters. The "strauss-piles" floor construction has been described in

Appendix D. In the final stage the total floor area is 40 square meters or 430 square feet. Stage A-1 and Stage A-2 are illustrated in Figure 9. While Chart 10 shows the materials, specifications and total construction cost of an ordinary Type II house built with the self-help method, Figure 10 illustrates a variation of a Type II house. The ordinary Type II house which is being recommended by the People's Housing Department of the Ministry of Public Works and Power, has no door between the two bedrooms, and no wall and door between the kitchen and the rear yard.

To stimulate air movement and so improve ventilation, ventilation openings should be provided on the upper side of the front, rear and side walls (see Figure 10). Furthermore, there should also be ventilation openings on the upper side of the partition walls.

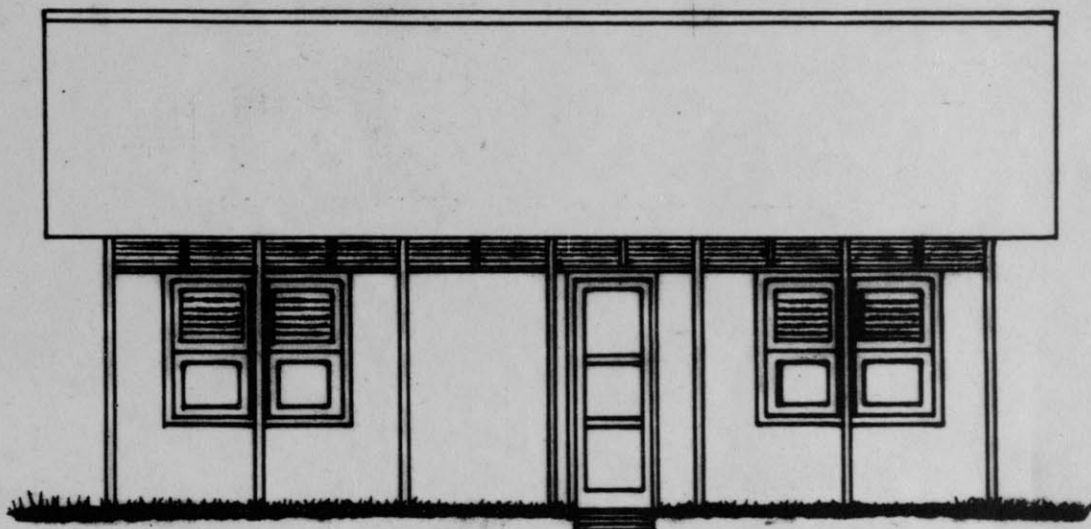
The minimum lot size is 33' wide and 49' deep. The street in front of the house should be at least 20' wide which allows one-way traffic for motor-cars. This makes a maximum net density of 27 dwelling units per acre, and a maximum lot coverage of less than 30 per cent. The building line should be 10' from the nearer border line of the right-of-way of the street. If streets of 20' right-of-way width are made, no curb parking is possible, and parking spaces or garages should be provided for the neighborhood. One and one half empty lots, for instance, may serve as a parking space for eight cars if parked on both sides on a 45° angle, one side for "back-in" parking and the other side for "drive-in" parking.

Chart 10

Materials and Cost

Item	Description	Quantity	Cost
Earth Work		12.5 m <sup>3</sup>	
Concrete	Masonry	60.35 m <sup>3</sup>	
Woodwork	Roof Framework	0.60 m <sup>3</sup>	
	Panels for 5 Doors	8.5 m <sup>2</sup>	
	Panels and Louvres for 6 Windows	6 m <sup>2</sup>	
	Wire Gauze for Ventilation. Frames 2cm. by 12 cm.	12 m <sup>2</sup>	
		5 m <sup>2</sup>	
Roofing	Kalimantan-Wooden Battens	80 m <sup>2</sup>	
	Wooden Shingles	80 m <sup>2</sup>	
Ridge	Zinc	9 m'	
Paint Work	Exterior of Doors and Windows, etc.	20 m <sup>2</sup>	
	Whitewash 3 times	250 m <sup>2</sup>	
	Varnish for Doors and Win- dows	15 m <sup>2</sup>	
Hardware	Door Locks	2 pcs.	
	Poumelles	39 pcs.	
	Bolts	15 pcs.	
	Anchors, etc.	abt. 10 kg.	
	Windhooks	17 pcs.	
Services	Electric Bulbs	5 pcs.	
	Water Supply Pipes	10 m'	
	Faucets	2 pcs.	
TOTAL COST		Rp. 13,000.00 or	\$1,140.00
COST PER SQUARE FOOT		Rp. 32.50 or	\$2.65

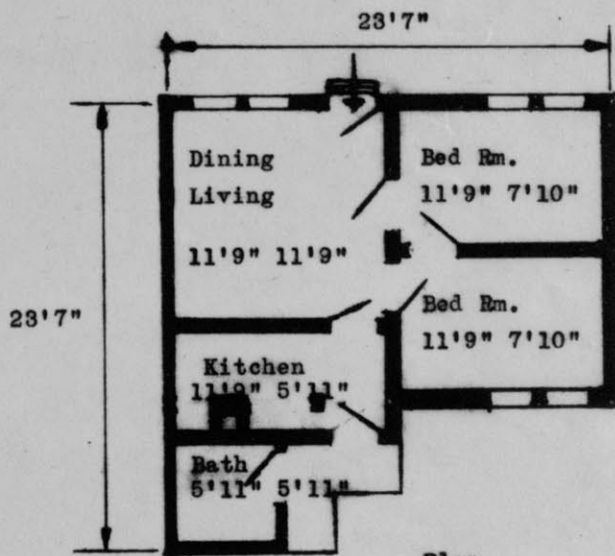
<sup>1</sup>  
Source: People's Housing Department



Front Elevation



Perspective (from Rear-Right Side)



Plan

Adapted from:

P.K. Hadinoto's  
description of  
Nailed Timber  
Construction House

6/3-'58. *[Signature]*

Figure 10. Type II House. (variation).

The standards for minimum lot size and maximum lot coverage suggested by the author, may seem too high, but it should be remembered that these standards are set as a general base for the semi-urban areas or outer fringes of the cities and towns over the entire area of the Indonesian archipelago. The minimum lot size, minimum lot width, and minimum distance from the building line of a detached house to the nearer side of the right-of-way of the street in the areas in the outskirts of Bandung capital of the province of West Java, for instance, have about the same standards as those suggested by the author.<sup>10</sup> Although climatic conditions in Djakarta are much less favorable than at Bandung, smaller distances are allowed there. If these high standards are followed in Djakarta, it would need about 1 km<sup>2</sup> of precious land for house lots and access streets alone to carry out projects totaling two thirds of 10,000 or about 6,667 dwelling units.

But local conditions should be taken into consideration. The author is of the opinion that for places on the islands outside Java these basic standards are very reasonable. It should be remembered that especially in this hot, humid climate air movement is important so that the distance between buildings depends both upon minimum air movement and upon fire protection. And so minimum distances may vary according

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See: J.P. Thijssse, "The Siting of Buildings in Tropical Areas," Proceedings of U.N. Regional Seminar on Housing and Community Improvement, New Delhi, India, January 21-February 17, 195

to the local climatic conditions.<sup>11</sup>

It will be noted that there is a rather large yard in each lot. If both septic tanks and wells must be provided for the houses, one septic tank for two adjoining houses should be placed on the boundary line near the bathrooms, while a well for every two or four houses should be dug in the rear corner farthest from the house so that the distance between a septic tank and a well is at least 33'<sup>12</sup> (see for minimum lot size Figure 9). If a special backlane is provided for main pipes of a central sewer system and/or a central water supply net, the width of the backlane needs not be more than 7'. If provision is made to widen the one-way street in the future, the front yard should be 14' deep instead of 10', and small trees, e.g. fruit trees, can then be planted in the front yard.

The water supply main pipe should be laid along the rear yard so that the connection cost to the bathroom faucet is economized. If there is money available, another faucet in the kitchen can be installed. If there is no water supply system locally, a well should be dug in the rear of the house. A public well for more houses would economize the cost.

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11

Ibid.

12

This minimum distance may vary according to kind of soil, etc.



Where there is already a sewer system, a sewer main pipe should be laid also along the rear yard for the same reason as for the water supply main pipe. Where there is no sewer system, one septic tank for every two houses should be made.

Where there is electricity, one light point for each bedroom, living-dining room, and kitchen would suffice the need.

#### IV. TECHNICAL AND ADMINISTRATIVE OPERATION, AND SUPERVISION

A city in Indonesia has as its chief executive a mayor who also heads the city council, and who is appointed by the President. The technical department is called the Municipal Public Works Department with a director as its head. The author suggests that the technical operation of the urban aided self-help housing program is entrusted to the Director of the Municipal Public Works Department, who designates a deputy to carry out the projects. This deputy-designate should keep close contact with the Vice-Chairman of the municipal branch of the Village Community Development Agency. To avoid future troubles, the deputy-designate should be someone from the Planning Division of the Municipal Works Department. On one hand, he should try to fit the Village Community Development Agency's plans into the city plans, and on the other hand, he should be able to reason with the municipal branch of the Village Community Development Agency to make plans which can be coordinated

with and fitted into the city plans. As such the deputy-designate is the relations officer of the Planning Division of the Municipal Public Works Department with the municipal branch of the Village Community Development Agency. The usual delay to execute approved city plans will be one of the bottlenecks faced by the deputy-designate. In special cases, the plans would have to be amended to make possible the carrying out of an urban aided self-help housing project.

While the supervision of the technical side is in the hands of the Director of the Municipal Public Works Department, administratively the deputy-designate must report to the Vice-Chairman of the municipal branch of the Village Community Development Agency who should know the details of the housing projects to be able to coordinate them with other projects of the Agency.

#### V. OTHER COMMUNITY DEVELOPMENT PROJECT ITEMS

Introduction of aided self-help housing projects in cities will add the responsibilities of the Municipal Public Works Departments including their Planning Divisions. Once these houses are built, they stay on the sites more or less permanently. So it requires community planning to execute an urban aided self-help housing scheme. Within or near that community a health center, a school, a market, and other community facilities should be located. Furthermore, community services should be provided. The Municipal Public Works Department should help as much as possible in

in giving supervision and eventually technical and material aid for the construction and maintenance of roads and sewers, digging wells, etc.

## VI. PUBLIC FACILITIES AND SERVICES

Improvement of the urban housing situation should be balanced with extension and development of public facilities and services. Good housing without adequate public facilities and services is like a good house without an adequate foundation. While a part of these facilities and services can be done by the community with the self-help method, the main responsibility rests with the Municipal Public Works Department. This sector is the more important, because provision of new public facilities and services will also influence the direction of the urban growth. Roads and parking, sewers, recreation facilities, schools, markets, and other facilities and services should be given appropriate attention. The magnitude of the work which the Municipal Public Works Departments have to face is extensive. Parts of the many urban areas are flooded after a heavy rain; this means that in the rainy season the water does not drain off. The relevant Municipal Public Works Department should either innovate a realizable method to drain these areas or resettle the population. Another problem which the Department has to face and solve, eventually together with other relevant government agencies, is the appearance of make-shift markets in the cities. These people first put their wares on a piece of cloth in front of them, while they sit on a low chair

on the trottoir; later they set up a shelter made of cloth or plaited bamboo; after a while you find a tax-free market on that site, the shelters being made of temporary materials. These people are eager to pay duties to the city authorities because by doing so their marketing would be legalized. It is to be hoped that careful planning will improve the existing conditions in the cities.

## CHAPTER XIV

### LOCAL PLANNING CONSIDERATIONS

Having discussed the house types, the desirable minimum lot size, and the desirable minimum street width in an urban aided self-help housing project, local conditions should be considered. The government program calls for housing for the middle-income group built through housing cooperatives in the urban areas, and housing for the low-income group built with the aided self-help method in the semi-urban areas. This means that the people of the low-income group would have to be moved to the semi-urban areas or to the fringes of the built-up area. It is true that land in this part of the city is cheaper, but the fact that a great part of the existing low-income population still lives near the city center, would make such a removal a costly undertaking. Still other aspects should be considered. This chapter deals with densities and land availability, besides access, and public facilities and services.

#### I. DENSITIES, AND LAND AVAILABILITY

Most of the dwellings in Indonesian cities are one-story houses. People of Chinese descent and some of the people of the high-income group live in two-story, or even three-story, brick or concrete buildings. Although it looks as if it is crowded in the city, the density is actually

lower than that in an American or European city. Prevailing planning practice calls for solid, brick or concrete buildings or villas to be built along the main streets, while behind these buildings rural type houses are found very often accessible only through narrow alleys or paths. The author is of the opinion that this condition will change with the time. There are already many people living in these rural-type houses who own a motored bicycle, a scooter or a motorcycle, and so have to maneuver between the houses, sometimes bowing their heads to avoid a crash with a tree-branch, every time they go out or come home. If the site of such a rural-type community is better subdivided, streets may well substitute these curving alleys and paths. Because these streets are straight, house lots tend to become more regular in form. Corners which have never been used before have now become part of the public streets or parts of the new lots which are used more efficiently. Although the net density has become higher, the gross density does not change very much.

It is common practice in Indonesian cities which have a planning division to divide the municipal area into more or less concentric circles. The area within the innermost circle is the densest and that of the ring between the two largest circles is the least dense, expressed in maximum allowable densities. The areas of the rings in between are denser the nearer they are to the innermost circle.

Usually the municipal boundaries cover the built-up, urban area, and the semi-urban area where the people cultivate agriculture. In this semi-urban area the existing density is much lower than the maximum set in Chapter XIII, i.e. a net density of 27 and a gross density of 22.5 dwelling units per acre. It is obvious that the density requirements in the various municipalities in Indonesia are different. In many cities there are requirements to provide minimum open space within the lot. If an area of 1 ha. or 2 1/2 acres of a new housing development has allotted 15 per cent to 20 per cent for streets and waterworks, 5 per cent to 10 per cent for open space, 10 per cent for community buildings and shops, then 60 per cent to 70 per cent or roughly 1 1/2 acres is provided for dwellings, and about 1/4 acre is for access streets. If there are 40 dwellings in this area these dwellings should be, if the existing ordinances are followed, of the low-income category. The author's suggested maximum lot coverage conforms with existing regulations. In the urban area of Djakarta Raja, for instance, the allowable maximum lot coverage for dwellings of the low-income category is 70 per cent, and in the semi-urban area it is 65 per cent of the lot size. If community facilities such as playgrounds, etc. are provided by the municipalities, the maximum lot coverage percentage can be set much higher than the one suggested by the author. In the semi-urban area of Djakarta Raja, for instance, this can be very well 65 per cent but in that case the access street would be wide enough to allow a double lane for motor-car traffic.

In carrying out the program, the government may move people from an inner ring to an outer ring without moving those of the outer ring. So the site in the inner ring is cleared or made less dense, while the site in the outer ring is made denser. In doing so care should be taken that the original people in the outer ring do not suffer any mentionable loss. The new subdivisions which should accommodate the original people and the people moved from the inner ring, should be done according to the new standards. Because the city core and the inner rings have high densities, the government should in solving the housing problem in those areas also develop two-story and three-story public housing programs as soon as some catastrophe has destroyed the houses, e.g. after an earthquake, after a fire, etc. A discussion on this subject is beyond the scope of this thesis.

It should be remembered that the urban housing policy should be coordinated with the broader, national, population resettlement policy which has as its purpose a more even population distribution over the various islands of Indonesia.

## II. ACCESS, AND PUBLIC FACILITIES AND SERVICES

As has been mentioned before, efforts should be made to provide the new communities with streets wide enough for a one-way motor-car traffic. In doing so the minimum street width should be 20'. Labor for constructing the streets and eventual bridges, can be supplied by the local people. If this cannot be done, the Municipal Public Works Department



should do the work. Attention should also be given to parking spaces.

Provision of public facilities and services should be along the standards set in Chapter XIII.

Where there is no water supply system, and the local housing program covers an extensive area, a new water supply system should be considered. In the meantime the people should be urged to purify drinking water by simple means as free information is given by the Public Health Department. The Municipal Public Works Department should coordinate the housing program with the programs of the other government agencies and cooperate with them in carrying out the integrated program.

The existing means of transportation of the low-income people consists of cycles and busses. The Indonesian family has usually one or more bicycles in his house. To carry luggage there are plenty of tricycles in the cities. However, tricycles fare is much higher than bus fare. In the larger cities there are city busses which run along main routes. The most convenient transportation in the middle-size and large cities are the small busses which do not have fixed hours and definite stops such as the common busses, but which carry several passengers and stop whenever a passenger wants to get in or get out. Because of this they are a traffic hazard in the large cities, especially

during rush hour, although their routes are fixed by the police. The only street car is in Djakarta Raja, the capital city. The author is of the opinion that at this time the number of common city busses should be increased, and the routes extended to substitute for the small busses and for the obsolete Djakarta street car. If in the future new cities are built with wide streets, the use of street cars for public transportation can be considered.

**PART SIX**  
**CONCLUSION, AND**  
**THE IMPLICATIONS AND PROSPECTS**

## CHAPTER XV

### CONCLUSION:

#### ADAPTATION OF AIDED SELF-HELP HOUSING IN INDONESIAN CITIES

Having examined and evaluated aspects of aided self-help housing and the possible application in Indonesian cities, the author comes to the conclusion that the government policy to build in (semi-) urban areas 40,000 dwelling units annually for the low-income people during the 40-year period from 1961 to 2000 is a sound policy. As has been roughly calculated in Chapter XIII, the size of the program is based upon the optimum capacity to produce, although it is hoped that this would satisfy the need. Its success depends upon many factors.

First, assumptions have been used which may not be correct. It is assumed that:

- a. The population in Indonesia is 89.75 million in 1960.
- b. The urban population is and remains 15 per cent of the total population.
- c. The urban aided self-help housing construction program can produce annually 10 per cent of 400,000 units or 40,000 units (and the rural program 85 per cent of 400,000 units or 340,000 units.)

- d. The average family rate is and remains 4.5.
- e. The annual natural increase of the population is and remains 1.7 per cent.
- f. The annual natural increase of the urban population is and remains 1.7 per cent.
- g. The annual production of urban dwellings by the private industry is 60,000 units. The author is of the opinion that this number can be attained more easily, if the author's seven recommendations in Appendix C are immediately accepted and carried out.
- h. The annual number of new dwellings built by housing cooperatives is 20,000 units.

Secondly, the author estimates that the number of urban houses in bad condition which need replacement, comprise 40 per cent<sup>1</sup> of the total of urban houses. This estimate may be too low, but it could also be too high.

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<sup>1</sup> Dr. J. Leimena, Minister of Health, said in 1955 that 7 million of the urban population in Indonesia including squatters in the cities, had houses in obviously bad condition because of overcrowding and insanitary conditions (U.N. Seminar on Population in Asia and the Far East, Bandung, Indonesia, November 21-December 3, 1955). This was more than one-half of the total urban population which was 15% of 82.5 million or 12.4 million.

The municipality of Djakarta Raja covers an urban and a semi-urban area, and the Municipal City Development Division estimated that in 1956 the population in the urban area was 1.75 million and that of the semi-urban area 0.5 million. The number of people living in houses in bad condition in the urban area was estimated at between 300,000 and 400,000 or about 20% of the population in that area.

Considering the two estimates of Dr. J. Leimena and the Municipal City Development Division, and reasoning that an overcrowded house may in construction very well meet the building code, the author assumes that 40% of the total urban dwelling units in Indonesia need to be replaced. In 1961 the number of urban dwelling units in Indonesia is 15% of 89.75 million divided by 4.5 or 13.5 million divided by 4.5 or 3 million. So the number of houses in bad condition which need replacement, is 40 per cent of 3 million or 1,200,000 units.

Thirdly, the success depends a great deal upon the number of immigrants in the future which in turn depends upon other factors. This calls for a separate study which is beyond the limits of the present undertaking.

Suppose that the assumptions and estimate are correct, that there is no immigration at all, and that the program is carried out according to the scheme, then the entire Indonesian urban population will be adequately housed in healthy houses within less than 20 years. This time span exceeds 40 years if in similar circumstances the immigration is at an annual rate of 1 per cent of the urban population. And if in similar circumstances the immigration continues at an annual rate of 2 per cent of the urban population, then the number of urban houses in bad condition will never decrease in number. These are the limitations of the program.

#### I. PROCESS OF A PROJECT

The process of an urban aided self-help project is threefold, first the preparations, secondly the preparation of the site for the construction eventually including moving of people from one site to another site, and thirdly the aided self-help housing construction itself.

The preparations are done by the deputy-designate in coordination with the municipal branch of the Village Community Development Agency. Meetings are held with the people of the relevant community. Films on self-help housing

are shown. After the scheme has been explained, the people are free to ask questions. Afterwards the people are asked to fill in questionnaires about their living circumstances and their background.

In the meantime the site for the project is selected, it may be the same site as where the people of the community live, or it could be another site. The Public Works Department, in cooperation with the Urban Land Division and the local Ward Administration of the municipality, pegs the land according to the new subdivisions plan of the Municipal Planning Division, and clears the site. Now the 18 lots for the first aided self-help housing construction group are selected.

The selection of the first group of 18 family heads is important. This should be carefully done, because the success of the first project of 18 houses will ignite enthusiasm among the other people of the community. From here on the construction should continue during the dry season. Teams of 3 people are working 8 hours daily, except for Sundays when 9 people are working 4 hours in the morning and the other 9 people 4 hours in the afternoon. Some variation occurs if there are people who work 4 hours only on Fridays. If someone cannot come to work, he must send a substitute. So each of the 18 families provides 12 man-hours a week. The foundation, the floor, the outer walls, and the roof should be constructed first. This should be finished during the dry season. The rest can be done even after the first rainfalls. These first 18 houses should serve as a demonstration project for the other people. So the next time other

groups are formed, each group consisting of 18 people. In their work the people get material assistance from the government, and technical guidance from the mobile demonstration teams or other technicians under the supervision of the deputy-designate of the Municipal Public Works Department. While the people are working on the construction of the houses, the Municipal Public Works Department should smoothen and harden the course of the future roads so that trucks can bring in materials. If there is no water supply system yet, wells should be dug, or the Municipal Public Works Department should bring water with its water trucks. Sewer and storm water mains should be made and connected with the city system, or, if these cannot be done yet, septic tanks or at least cesspools made, while a drainage system should drain off rain water. If electricity is not or not yet available, kerosene lamps are used.

The group of 18 families should be so chosen that as much as possible they are of the same wealth and have a similar number of children so that they are building similar types and similar stages of houses. Bachelors and childless couples can build Stage A-1 houses.

The author is of the opinion that in selecting the areas and in planning the new subdivisions, the Municipal Planning Division has a great responsibility upon its shoulders. As such a great part of the urban population will take part in this urban aided self-help housing program, a new kind of street lay-out



can be introduced. Furthermore, zoning, hitherto not so well known in Indonesian cities, can start to take form. The areas selected for these new subdivisions where the aided self-help houses will be built, should be as much as possible located in the semi-urban, outer rings of the city. Care should be taken that the "journey to work" of the participants gets full attention.

Efforts should be made that the land of the selected areas, if it is not already owned by the municipality, is bought by the municipality so that it can be leased to the participants. This may be easy in some localities, and difficult in other localities.

The building materials are provided by the government under a loan agreement. The financing method is treated later on in this chapter.

## II. AFFECTED SOCIAL GROUPS

Urban aided self-help housing will affect the very-low-income group or under-privileged people, and the low-income group, while applicants for a project may come from people of the middle-income group, taking an income of Rp. 500.- a month as the border-line between low-income and middle-income groups. The gap between family income and availability of a good shelter in the cities is such that many people of the lower-middle-income group, especially those who have moved in for less than five years, live in temporary houses. These people should be encouraged to join housing cooperatives which may organize self-help housing construction too.

The lower-income group of people generally cannot join housing cooperatives so that the urban aided self-help method of housing construction is intended for these people. People of the very-low-income group can also be included for the urban aided self-help method of housing construction, but as many among them do not have regular jobs, selection of these people should be done in coordination with the Ministry of Social Affairs, other social agencies and social institutions.

It is the author's opinion that if this gigantic housing program can be effected efficiently, the resulting satisfaction of the minority living in urban areas will mold Indonesian public opinion for support of the government who dares to and succeeds in carrying out the program. This will greatly enhance the authority of the government which then can proceed with other measures for the economic development of the country.

### III. ADMINISTRATION

The administration of urban aided self-help housing should be in the hands of the People's Housing Department of the Ministry of Public Works and Power. They should get the annual allocation of Rp. 400 million, plus Rp. 100 million for land acquisition,<sup>2</sup> or a total of Rp. 500 million. This

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<sup>2</sup>The author estimates that the average price for one lot plus its access street is Rp. 2,250.-. If 10% is added for overhead costs, then it is roughly Rp. 2,500.- for each lot or Rp. 100 million for the annually projected 40,000 dwelling units. The costs for the new public facilities and services are not the responsibility of the People's Housing Department, but of the relevant Municipal Public Works Departments.

Rp. 500 million should not be included in the Five-Year Development Plans, because Rp. 500 million is 20% of the annual government investment in the First Five-Year Development Plan, and it would become a too heavy burden in the Five-Year Development Plans. So it should be a regular yearly budget expenditure, and as good housing of the urban people of the low-income group will affect beneficially health, social relations, economy, education and culture, crime, and religious affairs, the author suggests, after having examined the government 1956 budget and expenditures in Table III of Appendix A, to take Rp. 50 million from the Ministry of Health, Rp. 25 million from the Ministry of Social Affairs, Rp. 50 million from the Ministry of Finance, Rp. 100 million from the Ministry of Education and Cultural Affairs, Rp. 100 million from the Ministry of Defence, Rp. 25 million from the Ministry of Justice, Rp. 50 million from the Ministry of Home Affairs, Rp. 25 million from the Ministry of Religious Affairs, and Rp. 75 million from the Ministry of Public Works and Power. The administration of the rural aided self-help housing program, and of the program for creation of housing cooperatives for the middle-income group in the urban areas should also be with the People's Housing Department to ensure cooperation and to expedite exchange of informations, etc.

In general building materials should be bought through the Central Purchasing Department of the Ministry of Economic Affairs, and stored in the warehouses of the Municipal Public Works Departments before being transported to the various construction sites. If it is cheaper to acquire materials

locally, this should be so done. Flexibility in carrying out the program to suit the circumstances will benefit the ultimate objective. The deputy-designate of the Director of the Municipal Public Works Department carries out his job with help of the mobile demonstration team. Another of the deputy-designate's duties is to sponsor housing cooperatives for the middle-income group of the urban areas.

It should be noted that housing construction which is financed by the Building Fund on a revolving fund basis, is done by another division of the Municipal Public Works Department, i.e. the already existing People's Housing Division. To avoid confusion, it may be necessary to have new names for these two divisions, e.g. the Division of Housing Cooperatives and Urban Self-Help Housing, and the Building Fund and Emergency Housing Division. The Building Fund and Emergency Housing Division also handles emergency housing as often occurs after a big fire in the cities, etc. Although separated, these two divisions should always keep close contact with one another to avoid overlapping of their respective programs. Housing construction financed by the Building Fund is done by private contractors.

#### IV. FINANCING METHODS, AND PARTICIPANT'S ELIGIBILITY

The wide gap between construction cost of a (semi-) permanent house and income of the people of the low-income

group makes it impossible for the government to have these people build their houses with the self-help method in (semi-) urban areas without any aid of the government.

The author suggests that the government's aid consists of:

- a. Directing the program.
- b. Supplying cleared land, or clearing the land already occupied.
- c. Supplying most basic developmental facilities and services, including some transport if the people have to move.
- d. Supplying materials at half of the cost on the site.
- e. Supplying technical data and guidance.
- f. Supplying interest free long-range loans.
- g. Giving tax exemption during the amortization period of the loans.

In supplying long-range loans the author suggests that the amortization period does not last more than 40 years. So either the participant of the self-help construction himself or at least his children who see the work being done in their youth, will likely survive the amortization of the loan. They will value their house all the more, and will be receptive to another self-help housing scheme. The author is of the opinion that the permanent-type house, i.e. Stage A-1, Stage A-2 or Stage B-2 house, will last at least 40 years. The minimum a

day-laborer earns, is about Rp. 150.- a month. The maximum he can afford to pay for his house is Rp. 10.- a month. Considering on one side these two facts of a maximum of a monthly payment of Rp. 10.- for a period of at the most 40 years, and on the other side the minimum cost of a self-help house which is roughly Rp. 9,000.-, except in places where the special clay soil is found for a cheaper self-help house, it is obvious that the government must give some other aid besides a 40-year interest free loan.

The author suggests that the government bears one-half of the construction cost of the house. By doing so the participant whose (future) house costs Rp. 9,000.-, pays roughly Rp. 9.50 a month for 40 years. To ensure that the participant will persevere, he must pay his first Rp. 9.50 before he starts with the housing construction. Every month afterwards he has to pay Rp. 9.50, and is allowed to pay more. But to prevent the housing program from being misused by some entrepreneur to make fast profit by purchasing the house at the low cost, and reselling it at a much higher price, a minimum amortization period should be fixed, e.g. half of the maximum period. Furthermore, the home-owner can sell the house at any time, but only to a buyer selected by the Municipal Division of Housing Cooperatives and Urban Self-Help Housing of which the head is the deputy-designate of the Director of the Municipal Public Works Department, and at a price determined by the Division. Within the 40-years maximum amortization period the

seller is not eligible for another aided self-help housing project, while if the owner himself has amortized the loan in full, he is free to sell the house and is eligible again for another aided self-help housing project. There are exceptions in special cases, e.g. by moving from one island to another island, and this should be determined by the relevant Head of the Municipal Division of Housing Cooperatives and Urban Self-Help Housing. During the amortization period the (future) owner must occupy the house himself.

These general rules apply for the following Type a, Type b, and Type c loans.

Type a loans from Rp. 2,500.- up to Rp. 4,500.- have an amortization period of from 20 to 40 years. Sample: Payments of roughly Rp. 9.40 a month over a period of 40 years serve to amortize a loan of Rp. 4,500.- for a Rp. 9,000.- house.

Type b loans of more than Rp. 4,500.- up to Rp. 6,000.- have an amortization period of from 17 1/2 to 35 years. Sample: Payments of roughly Rp. 14.30 a month over a period of 35 years serve to amortize a loan of Rp. 6,000.- for a Rp. 12,000.- house.

Type c loans of more than Rp. 6,000.- up to Rp. 7,000.- have an amortization period of from 15 to 30 years. Sample: Payments of roughly Rp. 19.50 a month over a period of 30 years serve to amortize a loan of Rp. 7,000.- for a Rp. 14,000.- house.

To ensure that at participant's death during the amortization period the house will be inherited by his heirs, the loan should be covered by insurance with an insurance company which will then continue to pay the rest of the loan. If the participant by some reason cannot get insurance, his future heir, e.g. his wife or his eldest son, should purchase the insurance.

The eligibility to become a participant of one of the urban aided self-help housing projects with the interest free loans is in general:

- a. Wage earners with a monthly income of from Rp. 150.- to Rp. 270.- are eligible for a Type a loan. So they pay at the most from 1/16 to only 1/29 of their income for the maximum amortization period.
- b. Wage earners with a monthly income of from Rp. 270.- to Rp. 375.- are eligible for a Type b loan. So they pay at the most from 1/19 to only 1/26 of their income for the maximum amortization period.
- c. Wage earners with a monthly income of from Rp. 375.- to Rp. 500.- are eligible for a Type c loan. So they pay at the most from 1/19 to only 1/26 of their income for the maximum amortization period.

Their participating in the projects should be with the consent of their employers.

Wage earners with a monthly income of Rp. 500.- or more are not eligible for these interest free loans. They are urged to join the housing cooperatives.



The loans suggested by the People's Housing Department of the Ministry of Public Works and Power is from Rp. 6,000.- to Rp. 12,000.-. Details of the amortization methods are not available to the author at the time of writing this thesis.

#### V. THE ROLE OF THE HOUSING CONSTRUCTION BANK

Although a participant of an urban aided self-help housing project gets one-half of the construction cost of the house as a grant from the government and the other half as an interest free loan, he does not get any cash into his hands. What he gets consists of building materials, and with his monthly payments he actually purchases these materials at half the price on an interest free long-term credit. As the government has other housing programs besides the urban aided self-help housing program, the author suggests that a Housing Construction Bank is created. The monthly payments of the participants of the urban aided self-help housing projects should be done to the Housing Construction Bank, and should become a subsidy of the government to the bank. If these payments are not sufficient, the government should give the bank other subsidies. This bank should have a large field of operation. If it gives loans to builders, it should get a government guarantee. Mortgage insurance systems should be extended to include low-cost housing. If the Housing Construction Bank gets its funds from private sources, the basic principle in this context is the underwriting by the govern-

ment of risks in housing investment by means of insurance and credit reserves. In connection with the urban aided self-help housing program the Housing Construction Bank is on the receiving end. A discussion of its other activities is beyond the scope of the present undertaking.

## VI. OTHERS

In adapting the aided self-help system in the Indonesian cities, it has been noted before that this can serve as a tool for the Municipal Planning Division to carry out the housing projects along a long-range Master Plan of the relevant city. In doing so the author suggests that housing developments with the urban aided self-help system should not be executed independently, but that the operation should be adequately planned. Care should also be taken against possible land speculation.

The author suggests that the housing development plan should be integrated with the present government educational policy, i.e. compulsory education up to sixth grade. Having that in mind a neighborhood unit should be formed around an elementary school. This unit should have besides the school also an edifice for worship, a market, a health center, shops, and small, public open spaces. The edifice for worship should be a small mosque or prayer's house in the case of a mohammedan community, a church if it is a christian community, etc. A recent survey in a subdistrict in the built-up area of

Djakarta Raja reveals that about 17 per cent or one-sixth of the population is of the elementary school age between 5 and 13 years old. If one elementary school has between 150 and 300 pupils, and this can be assumed to be one-sixth of the neighborhood population, then a school neighborhood unit has between 900 and 1,800 people. If the average family rate is 4.5, this means between 200 and 400 families. In view of these considerations the author suggests that each time a site is chosen for a new urban aided self-help housing project, the number of dwelling units should be between 50 and 100 so that 4 or 5 groups of 13 families are formed. The project is about 1/4 of an elementary school neighborhood, because of the following reasons:

- a. The number of groups is limited because of practical reasons, e.g. supervision, space locally available to store building materials, balanced growth of the city or town in relation to other areas, etc.
- b. Provision of space for houses constructed by other means, i.e. by housing cooperatives for people of the middle-income group and/or by private enterprise as is the case in the Indonesian public housing.

If by some reason the new project is to be within the inner rings of the city, the number of dwelling units could be less, but on the other hand if the new project is to be in the sparsely populated outer rings, more families can participate. However, the ultimate objective to create school neighborhood units should be kept in mind, and should be told to the participants.

Space to store building materials should get appropriate attention in project planning. Absence of sufficient space to store materials may limit the size of the project.

In view of the fact that the First Five-Year Development Plans has officially started in 1956, the author thinks it appropriate that the urban aided self-help housing program should start in 1961 with the beginning of the Second Five-Year Development Plan. By doing so interchange of data will be simplified, and a smooth cooperation with the other government agencies will be paved through the broader, national socio-economic development policy.

Many critics will say that a period of 40 years is too long even for a long-range housing program, that the situation is very likely to change within that time, and that Rp. 1/2 billion per year can be spent on other fields. To them can be asked to compare the housing situation in Indonesian cities of 1955 with that of 1940. Everyone will agree that the appearance of squatters in urban areas in 1955 means a burgeoning urban population as compared with the situation in 1940 when there was not a noticeable presence of squatters housing. For the outsider it looks as if the authorities have not done any important step towards the improvement of the housing situation. A period of 40 years means nearly three times the period of between 1940 and 1955. If there is not a bold urban housing program, what will

the Indonesian city scene look like? A city of squatters may-be? On the other hand, if this big urban housing program can be undertaken, however radical it seems now, the result will be a healthier living environment with as a result a happier life for to-day's urban generation's grandchildren.

## CHAPTER XVI

### THE IMPLICATIONS AND PROSPECTS

It is obvious that such a gigantic urban aided self-help housing program as is discussed in this thesis, has many implications and prospects. If the program can be carried out, it will have a direct impact on the urban society, and indirectly on the Indonesian society as a whole. Once the organization is established and the program started, the assumptions and targets can be modified and corrected as experience suggests. For instance, while the idea is to carry out this self-help program in the semi-urban areas there will actually be many cases which render it necessary to do it in the urban areas as well.

#### I. SOCIAL CONSEQUENCES

The home should provide the man a shelter against natural forces, a place to rest and recover physically and mentally after the daily work while enjoying family life. While a bad housing situation may result in social deterioration and frustration, success in self-help housing construction may improve, or even bring back a man's creative powers and initiative.

Improvement of housing conditions in the urban areas will have the following social consequences:

a. Less need for social care, including clinics, etc. can be expected.

b. People living in a healthy environment will likely work well so that labor output will be more. If this is projected over the entire low-income group of the Indonesian urban population, it will produce more than the size of the investment in terms of propensity to work, ingenuity and productivity.

c. Less crimes and less juvenile delinquency can be expected in the cities.

d. The psychological effect upon the participants in particular and the urban population in general who now realize that with simple equipment they can with the self-help method accomplish things they never thought or dreamed before.

e. The chain-reaction that is likely to follow. With self-help housing done, the people will start to think of building a school, constructing a bridge, etc. Furthermore, they know their neighbors better than before. Coupled with the community development programs of the Village Community Development Agencies of the Five-Year Development Plans, the urban aided self-help housing program will surely contribute an important part in the socio-economic development of the country.

## II. MAGNITUDE, AND IMPACT ON URBAN GROWTH

Urban aided self-help housing done everywhere over the entire Indonesian archipelago will create a sense of initiative among the whole urban population. This will benefit the execution of the Five-Year Development Plans in particular and the socio-economic development of the country in general. The impact on urban growth cannot be overlooked. If the program can be carried out as is scheduled, the result is tremendous because while at present more than one-half of the urban population live in houses in bad condition in terms of overcrowding and insanitary conditions, the great mass of urban people of the low-income group will have healthy neighborhoods. A great many of them will have solid, healthy permanent houses. Furthermore because provision of public facilities and services influence the direction of urban growth the planning agencies of the cities will have a key role in the program. This is important because hitherto actual developments of the cities have always been lagging far behind the approved office plans. Now the city planning agency can coordinate the plans for the extension of public facilities and services on one hand and the plans for the urban aided self-help housing projects on the other hand, in such a way as to fit the city plans and the long-range master plan of the city. These coordinated, integrated plans may serve a planning policy, e.g. whether it is intended to create new towns outside the urban areas and so cause decentralization or whether the purpose is to expand existing



urban areas. Although in each case the local conditions should be considered, the policy followed should be based upon a national policy. Here, too, the government should have as its ultimate goal a more even population distribution over the whole area of the Indonesian archipelago. Troubles will be met and the implications are many but as the author sees it the prospects are bright enough to make the billions of rupiahs a worthwhile undertaking.

## APPENDICES

APPENDIX A

TABLES

TABLE I

THE INVESTMENT BUDGET, 1956 - 1960  
(figures in Rp. millions)

	Allocation	Domestic Currency	Foreign Exchange
I. Agriculture	1,625		
1. Agriculture	(-13%)	1,044	208
2. Transmigration		383	80
3. Community Development		198	40
		<u>1,625</u>	<u>328</u>
II. Power and Irrigation	3,125		
1. Power development	(-25%)	1,750	880
2. Irrigation		1,100	204
3. Reserves		275	104
		<u>2,850</u>	<u>1,188</u>
III. Industry and Mining	3,125		
1. Special projects	(-25%)	1,078	735.6
2. Central projects		776.5	351.9
3. Local government projects		425	200
4. Mining		757	442.2
5. Reserves		88.5	67.3
		<u>3,125</u>	<u>1,797</u>
IV. Transport and Communications	3,125		
1. Roads	(-25%)	1,200	240
2. Railroads		600	187
3. Post Office & Tele- graph		495	230
4. Shipping		350	285.2
5. Harbors		275	138
6. Airways		100	27.8
7. Other		105	61
		<u>3,215</u>	<u>1,169</u>
V. Education, Welfare, and Information	1,500		
1. Education	(-12%)	1,050	157.5
2. Health		250	25
3. Public Housing		95	9.5
4. Labor		25	1.3
5. Social welfare		12.5	-
6. Information		37.5	8.7
7. Reserves		30	4
		<u>1,500</u>	<u>206.0</u>
	12,500	12,500	4,688

Source: Framework of the Five-Year Development Plan, 1956-60  
(Garis-Garis Besar Rentjana Pembangunan Lima Tahun)

TABLE II

FINANCING OF THE GOVERNMENT SECTOR  
(figures in Rp. millions)

Year	Budget	Increase in Deposits	Bonded Securities	Total Domestic	Foreign Aid	TOTAL
1956	1,700	-	-	1,700	200	1,900
1957	1,800	320	-	2,120	200	2,320
1958	1,900	340	100	2,340	200	2,540
1959	2,000	360	200	2,560	200	2,760
1960	2,100	380	300	3,780	200	2,980
TOTAL	9,500	1,400	600	11,500	1,000	12,500

Source: National Planning Bureau Development Plan 1956-1960.  
(Garis-Garis Besar Rentjana Pembangunan Lima Tahun.)

TABLE III

GOVERNMENT 1956 BUDGET AND EXPENDITURES  
(figures in Rp. millions)

	<u>Budget</u>	<u>Expenditures</u>
I. Government and High Colleges of State	1,565.8	1,536.7
II. Ministry of Finance	1,530.6	1,612.4
III. Ministry of Defence	4,075.0	4,378.9
IV. Ministry of Justice	343.7	305.4
V. Ministry of Home Affairs	3,841.9	3,658.9
VI. Ministry of Agriculture	668.9	675.7
VII. Ministry of Economic Affairs	315.0	193.2
VIII. Financing Service	3,681.4	4,455.6
IX. Ministry of Transportation and Communication	361.8	315.3
X. Ministry of Navigation	168.2	168.8
XI. Ministry of Public Works and Power	650.0	602.3
XII. Ministry of Information	270.2	221.9
XIII. Ministry of Education and Cultural Affairs	1,295.7	1,138.0
XIV. Ministry of Religious Affairs	228.7	297.6
XV. Ministry of Health	466.6	472.3
XVI. Ministry of Social Affairs	292.2	273.1
XVII. Ministry of Labor	65.9	55.7
XVIII. Foreign Sector	<u>179.6</u>	<u>387.2</u>
Total	20,001.2	20,749.0

Source: Bank Indonesia Report for the Year 1956-1957.

## APPENDIX B

### DATA ON TRANSMIGRATION

The handling of resettlement is divided among three different agencies: the Bureau of National Reconstruction (B.R.N.) for ex-fighters, the National Reserve Corps (C.T.N.), and as the permanent agency in the field, the Department of Transmigration of the Ministry of Social Affairs. The numbers of people transferred from 1950 to 1956 are as follows:

<u>Year</u>	<u>Dept. of Transmigration</u>	<u>B.R.N.</u>	<u>B.P.E.A.T., C.T.N.</u>	<u>Total</u>
1950	23	--	3,141	3,164
1951	773	1,150	587	2,510
1952	3,850	5,235	2,079	11,164
1953	9,857	1,651	3,194	14,702
1954	8,582	300	--	9,382
1955	5,491	--	--	5,491
1956	--	--	--	6,100

Source: National Planning Bureau

To encourage voluntary transmigration, the government wishes to increase the contacts between the existing communities and the areas from which the people came. The government will administer its transmigration program on the same principles as in the community development programs: its role will be to move the people, to clear the land, install irrigation, build roads, improve roads and bridges, and provide

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<sup>1</sup> Benjamin H. Giggins, Indonesia's Economic Stabilization and Development, p. 170.

support for six months.<sup>2</sup> Despite the small scale of the present transmigration program, an elaborate organization is provided for it. It is to be hoped that in the future this organization will be given a task of a larger scale.

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<sup>2</sup>

Ibid., p. 63



## APPENDIX C

### RECOMMENDATIONS TO STIMULATE THE BUILDING INDUSTRY

To stimulate the building industry the author recommends the following:

- a. Imports of necessary building materials should be encouraged. Most of the buildings termed permanent in Indonesia, which means roughly that they last at least 30 years, use cement in one form or other. Import regulations for cement should be such that the price of imported cement is about the same as domestic cement as long as domestic cement production cannot meet the requirements yet. Encouragement of building materials factories, among others of cement factories, is present government policy; but as long as import of certain building materials is necessary, the relevant regulations should be made as to encourage their import in sufficient quantities.
- b. The procedure of acquiring land for building purposes should be made so that it can be done in a shorter time. The existing procedure of expropriation including the determination of the amount of compensation goes by law through the cabinet and parliament, which takes a long time. The power of expropriation should be delegated by the central government to the provincial governments.<sup>1</sup>

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<sup>1</sup> In 1955 there were 11 provinces, besides the Special Territory of Jogjakarta, and the Municipality of Djakarta Raja (Greater Djakarta). The number of provinces has been increased since 1955. The Special Territory of Jogjakarta and the Municipality of Djakarta Raja have the status of a province.

- c. The procedure to fix the amount of compensation should be separated from the expropriation procedure. So after expropriation has been approved by the provincial council, clearing of the site can be started, while in the meantime the amount of the compensation is examined.
- d. If there are squatters and fruit trees on land which is intended for construction purposes, the squatters should move by giving them a predetermined amount, and the fruit trees should be bought at a pre-determined price. These amounts should be fixed by law or by-law.
- e. The police department is now a department under the office of the Prime Minister. To secure backing by the police force, city police should become a municipal department. Mayor's orders to stop construction without license, to resettle squatters, etc., would then be assured to be backed by police power.
- f. Creation of a Housing Construction Bank which gives long-range loans to those who build houses on mortgage. Monthly payments to the Bank should be so arranged as to be within the monthly budget of the borrower, the mortgagor.

- g. Creation of a Government Loans Board. To expedite the actual site clearing and carrying out of municipal housing projects a Government Loans Board should be created. Among the Board members should be the Ministers of Interior Affairs, Public Works and Power, and Finance. After a housing scheme has been approved and the contractor(s) has (have) been designated, the City Council can get a loan from the Government Loans Board to be able to start immediately with the housing project. Although the recommendation of a Government Loans Board concerns only government housing projects, nevertheless the private builder will benefit as actual construction of government housing projects are done by private contractors in Indonesia.

If these seven recommendations can be carried out, the building industry will be more profitable, and is likely to attract more private capital.

## APPENDIX D

### BUILDING MATERIALS AND THEIR TREATMENT

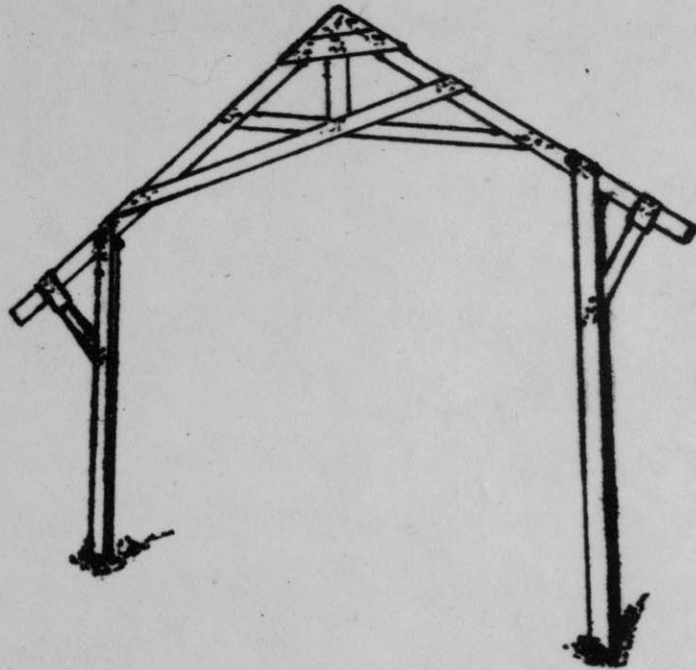
#### I. DOMESTIC WOOD

There are two kinds of wood in Indonesia, those resisting insects and those vulnerable to insects. The first kind is usually priced so high that it is not considered for low-cost housing construction, while the second kind can be made longer lasting by artificial methods.

Of the different kinds of wood construction, the planks and nails construction or the nailed timber construction is the kind most adapted to self-help housing. The materials are wood and nails, while the tools used are the hammer and the hand-saw. To lessen the effect of shrinkage of the wooden planks, their width and thickness are made as small as possible. The planks are  $3/4$  inches thick and  $4\ 3/4$  inches wide; and the use of wet wooden planks is in practice not objectionable. Timber which shows cracks or has a loose or large eye is not to be used; planks sawn from a tree trunk which is rather destroyed by insects, should also be removed. All this can be done because planks with a length of  $3\ 1/2$  feet can still be used, which means economy of material. While the frames are light, the nailed timber construction is easily made by unskilled people. As a further economy on wood the nailed timber construction uses the slanting members at the top of the standing frames also as rafters. This method of construction

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<sup>1</sup>  
See Figure 1.



6/122 - '58 JH/L

Figure 1. Nailed Timber Frame.

to sustain the roofing tiles is easier to make, uses less labor, and economizes 50 per cent in material compared with the conventional method. Soft wood used in this construction is easily obtainable in Indonesia. Due to the short dimensions the transport is also cheap and easy. To resist insects and to remain good for a long time, soft wood must be made durable by artificial methods. By soaking wood in water with chemicals, the resulting impregnated wood can still be painted. Wet wood can be treated in this way without waiting to become dry first.

In South and East Kalimantan wooden shingles which can last 20 to 30 years are also used for low-cost housing because of the local availability of hard-wood.

## II. DOMESTIC GABA-GABA (STALK OF SAGO-LEAF)

The sago-palms grow in the Moluccas islands in the eastern part of Indonesia. The bark of the stem is used for walls and ceilings. When used for roof covering, the leaves of these trees last longer than those of other palm trees. The stalk of the leaves is called gaba-gaba which after having been cleaned, forms a long stick of 3 to 5 m. in length with an average diameter of 0.06 m. The skin of this gaba-gaba can be peeled and used for ropes to tie up the thatch or plaited to make ceiling matting or decorative wall covering. To improve gaba-gaba it is dried while placed vertically. Because of its light weight gaba-gaba is suited as building material in areas with many earthquakes. While young gaba-gaba is vulnerable to insects, old and dry gaba-gaba can last 12 to 15 years.

## III. DOMESTIC BAMBOO

Besides timber, bamboo is an important material for low-cost housing. Bamboo is planted by the people on the river banks or on the borders of their gardens, and by simply cutting with an axe it is converted into building material. Bamboo for building material should be fully grown, its color either bright-yellow or dark-green, have compressed fibres, have a shining surface, and should not show cracks on the articulations. Bamboo is made durable by simply soaking it in water for some weeks, or by placing freshly cut bamboo still with its leaves on straight up in a tank containing a chemical fluid whereby the chemicals will be saturated in its trunk. In the construction bamboo columns should stand at least 1'8" above the ground, if the lower part of the column is in the ground, this should be covered with indjuk, hair of aren-palm, and asphalted, while the hole in the ground should be cleaned and covered with sand. In this way a column of treated bamboo can last 10 to 15 years. In using bamboo, rats should not get a chance to build their nests, so the open ends of round bamboo should be filled; there should not be a space between two layers of plaited bamboo walls, etc.

#### IV. RAMMED EARTH, CINDER BLOCKS, BRICK, AND POZZOLANA TRASS CONCRETE BLOCKS

In certain areas clay blocks can be made from the clay soil mixed with water and stamped in forms, and after curing in shade under shelter, these blocks form a cheap building material for the walls.

The State Railways still runs the major part of its trains by steam locomotives. Cinder from the locomotive depots mixed with cement in a mixture of 1 part cement, 9 parts cinder, and 2 parts water, forms a concrete mixture which after being formed and cured in shade under shelter, produces cinder blocks for walls.

Brick is usually burnt locally or in home-made kilns, and the quality is good enough for walls of low-cost houses. Sometimes it is used for foundations.

Near the volcanic mountains where pozzolana trass is found, pozzolana trass concrete blocks and hollow blocks can be produced. Because of the uncertainty of the composition of this pozzolana trass, it still needs research to be done before this kind of blocks can be easily used for low-cost housing. It is to be hoped that in the near future this material will be made available for use of low-cost self-help housing construction.



## V. ROOFING MATERIALS

The roofing material for low-cost housing should be so chosen that while it is cheap, it should be durable and not so lightly inflammable. Although a thatched roof is good in all weather conditions, it is inflammable and is very often the cause of a big fire in the city.

A bamboo roof lasts from 7 to 20 years, depending on the age of the bamboo used and the wetness or dryness of the atmosphere. A bamboo roof does not last long in places where it rains all year around. The construction is rather complicated.

Corrugated aluminum is imported material and rather expensive, although used as a roofing material, it does not need much roof framework. On low land it causes a hot atmosphere in the house; in the mountains the atmosphere in the house is cool during the day, but cold at night time. Because it is light, it shivers in each quall, and tends to leak at the bolt fastenings after some time.

Although imported material, galvanized sheet zinc is one of the cheapest roofing materials. Corrugated galvanized zinc is more expensive. A roof of this material has similar characteristics as an aluminum roof. Because its surface is not shiny like aluminum, zinc has a worse influence on the atmosphere in the house.

A corrugated asbestos roof resists the heat and the cold of the outdoor atmosphere. It does not shiver so much in a quall. But corrugated asbestos is imported material and expensive. If in the future this material can be made domestically and becomes cheaper, it will be a good roofing material for low-cost housing.

The wood for wooden shingles comes from Kalimantan. On the other islands it is too expensive, but where it is cheap in Kalimantan, it is used to roof low-cost houses. These wooden shingles last from 20 to 30 years.

The kind of earthen tile made domestically and widely used to roof low-cost houses, is pantile, a curved roof tile. It is cheap, and although it requires some labor, it is easy to put on.

#### VI. MORTARS WITH DOMESTIC AND IMPORTED COMPONENTS

Mortar used in Indonesia for housing construction varies in components from place to place due to the wide range of mortar components, and their availability and prices in the different localities. For low-cost housing construction three kinds are popular:

- a. Portland cement-mortar is used generally in the neighborhood of Padang, West-Sumatra and Gresik, East-Java where there are cement factories, besides the areas near the big harbors where imported cement comes in. Portland cement-mortar is used mainly for damp course of low-cost housing.

- b. Trass-mortar is used in Java and West-Sumatra near the volcanic mountains. Especially for works near the sea, this pozzolana trass makes a good mixture.
- c. Brickpowder-lime-mortar is the kind used most in Indonesia, because the two cement factories don't produce enough for domestic consumption and imported portland cement is not cheap, while pozzolana trass is found only near the volcanic mountains.

Where stone is cheap, foundations for low-cost housing can be made of stone and mortar. Most foundations for low-cost houses of the permanent type use mortar. A cheap and practical method to make floors and foundations is as follows. This method of floor construction is called "strauss-piles" construction. No layer of sand is needed. The soil is rammed and at distances of 2'4" holes are made with a crowbar, swinging the top end while the bottom end is in the grounds. These holes and the foundation trenches which in the meantime have been made, are filled with a concrete mix of 1 p.c. : 3 sand : 7 crushed stone or 1 p.c. : 8 cinder. A concrete floor, 1 1/2 inches thick, is now laid, which goes over the upper part of the foundation. The concrete mix for the floor is 1 p.c. : 3 sand : 5 crushed stone or 1 p.c. : 8 cinder.

Chart I shows the different kinds of mortars and their specific use.

Chart 1

## LIST OF MORTARS

## Quantity of Materials in Volume Unit

Portland Cement  
 Maria Trass (Pozzolana powder Trass)  
 Brick- Lime  
 Sand

Portland Cement	Maria Trass (Pozzolana powder Trass)	Brick	Lime	Sand	Mortar
-	-	1	1	1	Foundation of heavy construction
-	-	1	1	2	Foundation of normal house
-	-	1	1	2	Foundation of low-cost house
-	-	2	3	4	Walls of house
-	1	-	1	3	Foundation of house
-	1	-	1 $\frac{1}{2}$	5	Foundation of low-cost house
-	2	-	1	-	Foundation of low-cost house
-	1	-	1	5	Wall of house
1	-	-	-	2	Damp course in wall
1	-	-	-	-	Foundation of house
1	-	-	$\frac{1}{4}$	5	Wall of house
1	1	-	-	4	Foundation near sea or silt water
					<u>Concrete</u>
-	-	1	1	1	Mixed with 3 $\frac{1}{2}$ brick parts or 4 gravel for foundation of floor
-	1	-	1	1	
1	-	-	-	2	Mixed with 3 gravel for reinforced concrete
1	-	-	-	2	Mixed with 4 fine gravel for floor-stiles
1	-	-	-	3	Mixed with 6 gravel for concrete floor
1	1	-	-	4	Mixed with 8 $\frac{1}{2}$ gravel for floor
					<u>Plaster</u>
-	-	-	1	2	For old and new wall
-	-	1	1	1	For new wall
1	-	-	-	2	For damp course
1	-	-	-	3	For floor
1	-	-	-	4	For matting(bamboo or wire)
1	1	-	-	4	For sea area
-	1	-	1	3	For wall

Source: P. K. Hadinoto: "The Effective Use and Production of Local Building Materials for Low-Cost Housing in Indonesia," U.N. Regional Seminar on Housing and Community Improvement, New Delhi, India, January 21-February 17, 1954.

## VII. IMPORTED MATERIALS

The only building materials for low-cost housing, which still need to be imported, are portland cement, glass, and hardware including chemicals for paint. In the Five-Year Development Plans provisions are made to build new portland cement factories in addition to the two now operating, and Iron and Steel Works. Glass plants, paint industries, and construction materials industries are included in those projects of the First Five-Year Development Plan, which are recommended to local government action and private enterprise. If in the not too distant future Indonesia will be self-sufficient in building materials, housing construction will certainly proceed at a faster speed.

## APPENDIX E

### STANVAC HOUSING FOR INDONESIAN EMPLOYEES

To house their Indonesian employees Stanvac founded on December 18, 1952, after seven months of discussions between management and personnel, the Jajasan Pembangunan Perumahan (J.P.P.), Housing Development, in South-Sumatra.<sup>1</sup> The Foundation Board has 5 Indonesian members, 3 of them Stanvac employees and 2 non-employees.<sup>2</sup> The initial financing was:

- Rp. 500,000.- was Stanvac grant to set up the foundation;
- Rp. 1,200,000.- was interest free loan for Stanvac employees; and
- Rp. 800,000.- was the amount of bank guarantee to cover loans.

Because rate of bank loans was too high (about 8%), they did not make use of the Rp. 800,000.- guarantee. Instead, on January 1, 1955, Stanvac put Rp. 400,000.- more as interest free loan for Stanvac employees, and reduced the bank guarantee to cover loans with Rp. 400,000.-. The Foundation got its capital funds free of interest from Stanvac, so it is able to lend money on mortgages at the comparatively low interest rate of 5 per cent. The down payment is 5 per cent of total development cost, plus the cost of the building lot. To cover risk of death, the monthly payments are insured for 3 per cent insurance fee. In principle, the houses are not confined to Stanvac employees, although nearly all of them are occupied by Stanvac personnel.

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1

M.I.T. Indonesia Project, mimeographed.

2

Interview with Danda Tasrip, a former Member of the J.P.P. Board, on June 7, 1958.

In another area Stanvac sponsors self-help housing for Indonesian employees. The company provides the land and building materials free, except for roofing material, with the future owners building the houses themselves. These are wooden structures, and employees in the lower salary range can obtain houses with this system.<sup>3</sup>

## APPENDIX F

### ORGANIZATION EXAMPLES IN OTHER COUNTRIES

#### I. SWEDEN<sup>1</sup>

The Small Cottage Bureau in Stockholm was created to make houses for a variety of low-paid workers. In view of the climatic conditions and the very high structural and design standards in Sweden, the principle was used in a relatively highly specialized version.

The Bureau directs operations and contributes financial, technical and administrative assistance. It purchases and makes available on the site all materials at cost and price, and also arranges with contractors for such special work as the owner is not entitled to carry out himself, such as plumbing, gas fitting, electrical installations, etc. There are four standardized house plans, two with two bedrooms, and two with three bedrooms. A highly detailed, illustrated instruction material is made available which explains even the simplest operations to the layman. With the assistance of this manual and the help of the supervisor on the job, the actual physical problems are reduced to a minimum.

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<sup>1</sup>  
U.N. E.C.A.F.E. Committee on Industry and Trade, Second Meeting, February 18-23, 1954, New Delhi, India, Second Report on Housing and Building Materials in Asia and the Far East, p.72.



Components and materials are almost completely standardized and are interchangeable between the cottage types. The government produces the majority of the component parts (particularly the joinery work) by mass-production methods, thus keeping costs down. The house builder, however, is at liberty to purchase the equivalent components privately.

Repayment of the government's contribution to costs is arranged to be made in the form of weekly sums spread over a 25-year period.

## II. U.S.A.<sup>2</sup>

To solve the squatter and slum clearance problems in San Juan, Puerto Rico and Tuskegee, Alabama aided self-help projects were organized along the following lines:

- a. Land was acquired on city outskirts.
- b. This was subdivided in building plots of approximately 2,050 sq. ft. in area.
- c. Basic developmental services, roads, sewer and storm water mains, electrical and water supply systems were initiated.
- d. The authorities then approached the under-privileged people to be re-housed and encouraged them to move their existing shacks or to put up new shacks on the newly subdivided plots. Some free transport was provided to bring this move about. Having thus cleared the original congestion and provided some temporary shelter on the new site, the authorities initiated a self-

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<sup>2</sup>Ibid., pp.73-75.

help plan in the following manner.

- e. About 15 families were selected for training at a time. The head of each was called up and instructions in simple language given, explaining ways in which they could help themselves. This group of 15 family leaders (mostly daily or monthly wage earners), were asked to pay \$30.- each to meet part of the cost of the house which all were to assist in building and which they and their family would ultimately own. This deposit was received in advance to insure that all members would persevere with the scheme.
- f. The 15 people forming the group worked on all 15 buildings on adjacent plots and not only on their own particular house. The group was divided into five parties of three and it was made obligatory for each member of each party to work for one day per week on a pre-arranged day which, once determined, could not be changed. Thus, one party of three for each five consecutive working days was assured.
- g. Walls were constructed of pre-cast cement blocks, formed of shingle, sand, and cement in the proportions of 8 shingle and sand to 1 cement, and cast in simple, wooden moulds. These were then set up on previously prepared flat rammed earth

- surfaces and the working parties set about forming a total of approximately 15,000 blocks, the number required at the rate of 1,000 per house, re-using the moulds as blocks took up their initial set. The blocks were sun-cured.
- h. The housing authorities' supervisors meanwhile had pegged profiles for the cottages with working party assistance and foundation trenches were dug to a depth of 16" by 16" wide. Mass concrete was then mixed and deposited in the trenches to half the depth of the trench, without the use of steel reinforcement.
  - i. The working parties were then instructed in block-laying by a skilled mason, who demonstrated the simple principles of levelling, bonding and making corners and junctions for cross-walls. This is not a difficult trade, when solid blocks and non-cavity walls are adopted.
  - j. The help of a skilled carpenter was sought for the making of door and window frames and shutters, unskilled labor again being provided by the working party. The carpenter also demonstrated and assisted with the fixing of frames and roof members.

The total cash cost of each house was not to exceed \$300.-. The housing authority lent \$100.- for each house in the form of materials, but no cash. On completion, each family was allowed to occupy a house on the basis of payment of a monthly rental of from \$5.- to \$10.- according to the income of the occupant. The family eventually becomes the owner of the house. The land belongs to the housing authority and the homeowner can sell his house at any time only to a buyer selected by the authority at a price determined by it. The house, can, however, be inherited by his heirs. In San Juan, the capital of Puerto Rico, hundreds of such houses (approximately 13 ft. x 13 ft. and 8 ft. ceiling height) have been successfully erected. The same has been happening in the rural areas of Puerto Rico, and at Tuskegee, Alabama.

### III. GREECE<sup>3</sup>

23% of the buildings in Greece had been destroyed, when the Greek government developed several types of housing programmes to attack the problems of re-settlement and reconstruction. One of these was an aided self-help scheme. The problem of reconstruction was made particularly difficult, because the greater part of the destruction took place in the rural villages.

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<sup>3</sup> U.N. Housing and Town and Country Planning, "Case Studies in Aided Self-Help," Bulletin 6, Housing in the Tropics, pp.62-63.

The first stage of the scheme was the material-in-aid plan. Over a three-year period, beginning in 1947, about 30,000 homes were rebuilt or repaired through this plan. Scarce building materials generally not available locally, primarily timber, hardware and roofing, were procured from abroad with foreign exchange, or manufactured under contract with local lumber mills and roofing tile plants. These materials were distributed to villagers who could demonstrate their ability to use them effectively in meeting their own emergency or long-term housing needs. To keep up with the supply problems, funds were often advanced to the lumber and sawmill contractors. Transport, warehousing and distribution arrangements had to be made.

But many of the families in need of housing assistance could not build their own homes, because they lacked the skill or the money to pay for the help they needed to rebuild their homes. Hence, the second stage in the evolution was a decision of the government to supplement the materials-in-aid programme with a programme of repair and minimum house building done by contractors entirely at government expense. After having reviewed different ideas, the Ministry of Reconstruction decided to build a "nucleus", the core of the basic Greek house, consisting of one and a half rooms, to provide immediate and necessary shelter which the occupants could later expand into a full size house.

Nearly 15,000 of these nuclei have been built. The minimum house required, on an average, materials, mostly in timber and roofing, worth about 4 million drachmas (\$267.-), besides other expenses.

Skilled labor was another problem; contracts and specifications could not be organized on a broad enough scale to reach nearly 1,000 villages. The third stage came in the spring of 1950, when the government decided to provide each resettled village family in need of a house, with the required timber and roofing, besides 5 million drachmas (\$334.-) in cash. The cash assistance is made available in instalments = 800,000 drachmas (\$53.-) as the work is started and the balance in three instalments until the work is completed.

The cash instalment is paid only if satisfactory progress is made. The Ministry maintains one paid employee in the village, generally a building foreman who advises the villagers on their construction problems, issues the materials and makes payments as the work progresses. Payments are made in the presence of the village committee who, together with the recipient, signs the receipts. Periodic reviews of the foreman's work are made by a competent district engineer. This new programme has spread rapidly; in the six months beginning July 1950, about 60,000 families in nearly 1,000 villages have made shelters for themselves. In this scheme the

whole family can and does participate, lending what skills they possess, supported by necessary skilled labor which the family can now hire, with the financial assistance given them.

The cost to the government of the scheme in the second stage was at least 15 million drachmas (\$1,000.-) per unit. In contrast, the aided self-help scheme in the third stage cost the government a maximum of 9 million drachmas (\$600.-) per unit, and the average cost is less, as in many cases a home did not have to be completely rebuilt, but could be repaired or re-roofed. As experience develops, it is expected that the participation of the family can be increased and perhaps many instances, be possible as loan of which all or part is recoverable. In any event, this new scheme of aided self-help housing has developed into a programme which offers the hope that the Greek villager can again obtain his minimum housing needs.

#### IV. CHINA (TAIWAN)<sup>4</sup>

In carrying out aided self-help housing programmes for workers in China (Taiwan), some difficulty was encountered in the organization, training, and actual self-help work of the dockers. They just could not understand why they

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<sup>4</sup> T. K. Djang, "Aided Self-Help Housing Programmes for Workers in Taiwan," Tropical Housing and Planning Monthly Bulletin No.9, June 30, 1956. Cambridge, Mass.: Compiled for Private Circulation by Prof. J. Tyrwhitt, p.23.

should work 160 man-hours, as required by the union, without being paid.

The initial failure of the self-help system owing to the apathy and misunderstanding of the dockers led the union housing committee to adopt new rules. First, the dockers were allowed to do self-help work on their own houses only. Secondly, those who did not contribute up to 160 man-hours of voluntary labour were not to be allowed to occupy the new houses when they were completed. Thirdly, dockers' family members between 15 and 55 years of age were allowed to substitute for dockers in contributing self-help labor. Fourthly, a docker contributing more than 160 man-hours of voluntary labor was to be paid a wage of about NT \$2.- an hour for the excess time worked. After these rules were adopted and made known to the dockers in mid-October 1953, the inertia of the participants in the self-help scheme was soon overcome. The Keelung Harbour Bureau also sent its civil engineers to the spot to offer technical assistance to the self-help workers and to train them when necessary. Technical supervision of the housing construction proper was done by these engineers, and this incidentally made for better labor-management relations and understanding between the rank-and file dockers and the engineers of the Harbour Bureau.



The construction work that the dockers could do was rather limited. They could, however, carry building materials, mix the mortar, dig the foundations, lay the walls under technical supervision and guidance, and, with proper training do some carpentry work. The self-help project was therefore limited to work that needed little or no skill.

The main construction work was undertaken by a contractor engaged after proper bidding conducted by responsible personnel of the Harbour Bureau and the dockers' union. The Harbour Bureau engineers supervised the work of the contractor in order to ensure that the housing blueprint and construction requirements were followed. The result was satisfactory to all concerned.

## 5

## V. INDIA

An unique design is the "Growing House" in India which was exhibited at the International Exhibition on Low-Cost Housing held in New Delhi from January 20 to March 5, 1954. In the four stages of the "Growing House" pucca as well as kacha is used. Pucca is burnt brick, while kacha is sun dried brick.

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5

Herold R. Hay, "The House That Grows," Nirman,  
(January-March, 1954)

Stage One starts with adequate accommodation for two persons living in a rural area. The room size is 9' x 10'9" or 97 1/2 sq. ft. An overhead shelf at 6'6" level provides ample storage space and permits the hanging of a curtain which will partition the room for purposes of privacy when this is desired. The side walls and foundations are provided with keying bricks which permit wall extension in Stage Two. The front wall, 6' to roof level, is of kacha brick mud-plastered and is built on a temporary brick-in-mud-mortar foundation. It contains a burnt brick honeycomb window with a woven bamboo closure. Other fill-in walls are of lime mortar. Pillars are burnt brick in lime mortar except for the top 2' embedding the holding-down bolts and at points of higher stress.

There cement mortar is used. Pucca bricks are used in a bearing course for the shelf resting on the 10 1/2' high, shared wall. All kacha bricks are at least 6" above the level of the rammed earth floor. Light and ventilation enters through the honeycomb window and through the two doorways. The braced and battened door to the outside closes against the masonry, and has a wooden fillet only on the hinged side. No door is provided between the room and kitchen, and no electric lighting is installed.

The kitchen, 6' x 8', is of pucca pillar and kacha panel design on pucca foundations. All specifications are as for the room except that a door leads to the courtyard. A grain grinding stone and a stone work slab are installed. A portable cooking stove is provided to permit cooking in the courtyard if the kitchen is used as a dining room. This also reduces the fire hazard of cooking under a thatched roof. A concrete sink 18" x 24" is located under a honeycomb window. The sink receives any rain which passes through the window. Water from the sink and from the hand pump in the courtyard drains to a soak pit in the compound or to a street drain outside of the compound wall. The compound contains a thatch-covered cattle shed, 10' x 20' in size, for two bullocks, a cow, a calf pen, and fodder storage. Locations for two pit latrines are provided for alternate use. The space not in use can be utilized for fodder storage. Bathing and washing facilities may be set up over the soak pit of the kitchen drain, if desired. The compound contains adequate space for outdoor sleeping (in the area reserved for the building of a second room). A bullock cart also can be accommodated.

Stage Two represents an extension of Stage One to form a room 9' x 15' (135 sq. ft.). This is made by adding two new pillars and by replacing the thatch roof of

slope 1 to 2 with a galvanised iron roof of slope about 1 to 5. The roof height of the common wall with Stage One remains 10 1/2' and of the front wall is 7 1/2'. The intermediate pillars are raised to appropriate heights and the holding down bolts are extended. This enlarges the volume of storage space. The outside door is shifted to a front location and the old doorway is filled in with burnt brick. The exterior of the kacha wall panels, the floors of the room, kitchen and cattle shed, as well as the compound walls, are protectively plastered with bitumen-stabilized mud. A burnt brick honeycomb window with a bamboo table closure and one adjustable wooden shutter near the ridge are provided. There is no verandah. The kitchen of Stage Two contains a sink, a two-hole wood-fired oven, fuel storage, shelves, grain grinding stone and stone work slab. The roof of the room is insulated on the under surface with grass held in place by woven bamboo and by bamboo poles. The kitchen roof is not insulated.

**APPENDIX G**

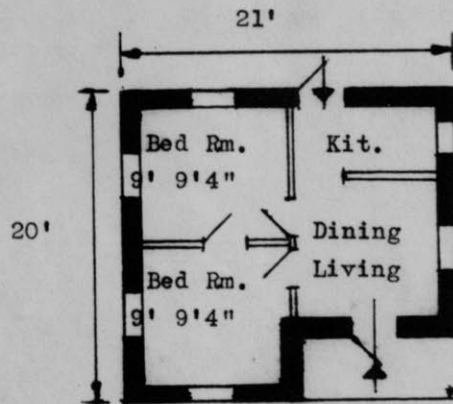
**DESIGN AND SPECIFICATIONS EXAMPLES IN OTHER COUNTRIES**



Front Elevation



Perspective



Plan

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Ideas and Methods  
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Figure 2. British Honduras, B.W.I..

Chart 2

Materials and Cost

Item	Description	Quantity	Cost
Footings .....	Concrete and stone .....	6.4 cu.yds. <sup>1</sup>	\$24.00
Walls .....	Stone, 12" thick .....	21.0 cu.yds. <sup>1</sup>	95.00
	Mortar .....	5.6 cu.yds. <sup>1</sup>	
Floors .....	Concrete, 3" thick .....	3.1 cu.yds. <sup>1</sup>	24.60
Roof .....	Framing .....	296 fbm	29.00
Trim .....	Fascia and vergeboard ....	46 fbm	4.50
	Porch posts .....	30 fbm	2.90
Window and Door Frames .....	Wood, 2" x 4" and 2" x 6".	111 fbm	10.90
Window and Doors.	Wood .....	150 fbm	14.70
Partitions .....	Studs, 2" x 4" and 4" x 4"	72 fbm	7.00
	Wall covering, unalite, 4'0" x 8'6" sheets .....	5 each <sup>1</sup>	9.75
Roofing .....	Ardex, asbestos, 6'0" sheets	44 each	77.00
	Ridging .....	24 lin.ft.	4.90
	Roofing nails .....	15 lbs.	2.94
Gutters .....	Metal .....	8 lengths	10.35
Hardware .....	Nails .....	5 lbs.	.84
	Bolts, 1/2" x 7" .....	22 each	6.15
	Hinges .....	8 pairs	2.24
TOTAL COST (\$470.00 B.H.).....			\$326.77
COST PER SQUARE FOOT .....			0.82

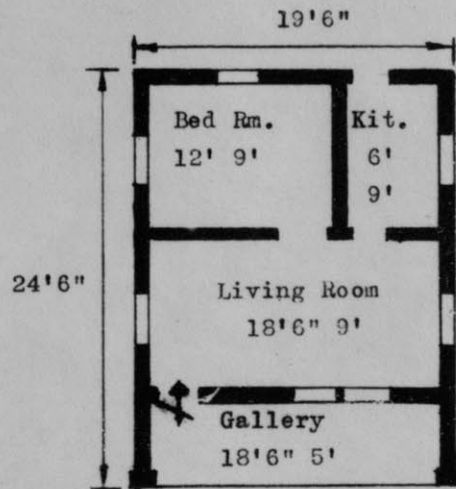
<sup>1</sup>  
Estimated by IHS.



Front Elevation



Perspective



Plan

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Figure 3. Cambodia.



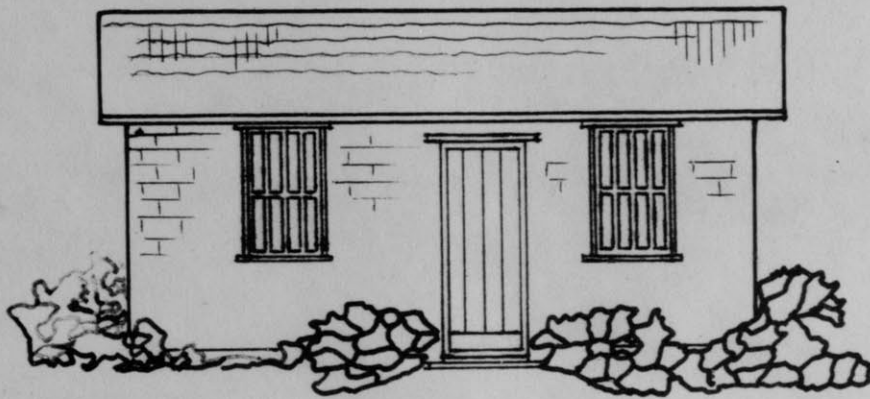
Chart 3

Materials and Cost

Item	Description	Quantity <sup>1</sup>	Cost
Walls and Partitions ....	Stabilized earth block 12" x 9" x 4" .....	4000 each	(2)
	Cement for stabilizing block .....	45 cu.yds.	\$104.00
Roof framing ....	Wood, rafters and purlins .....	388 fbm)	
Doors and Windows .....	Frames .....	157 fbm)	
	Doors, wood panel .....	36 fbm)	
	Windows, solid shutters..	65 fbm)	
Grill .....	Wood .....	34 fbm)	
	Total Lumber	680 fbm	166.00
Roofing .....	Corrugated aluminum .....	672 sq.ft.	86.00
Hardware .....	Nails, hinges, etc.....	.....	14.00
TOTAL COST (12,900 Riels) .....			\$370.00
COST PER SQUARE FOOT .....			0.74

<sup>1</sup> Quantities estimated by IHS.

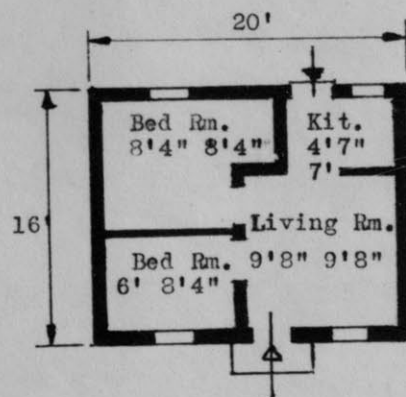
<sup>2</sup> Blocks made by aided self-help housing teams.



Front Elevation



Perspective



Plan

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Ideas and Methods  
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Figure 4. China (Taiwan), I.

Chart 4

Materials and Cost

Item	Description and use	Quantity	Cost
Footings .....	Concrete and Stone .....	2.7 cu.yds.	See cement
Foundations .....	Brick .....	808 each	\$ 8.51
Walls and Partitions.....	Stabilized earth blocks, 4" x 9" x 12" .....	1289 each	1
Floor .....	Stabilized earth over gravel .....	285 sq.ft.	
Cement .....	For soil blocks and mortar	9 sacks	13.85
	For foundation & cement wash	10.5 sacks	16.15
Lime .....	For soil blocks and floor.	127 sacks	36.00
Gravel .....	For concrete footings ....	4.53 cu.yds.	(2)
	For floor .....	4.8 cu.yds.	(2)
Sand .....	For floor, footings & mortar .....	1.96 cu.yds.	(2)
Roof framing ....	Bamboo purlins		
	5" Ø x 25'-0" Long .....	9 each	4.00
	Bamboo pole		
	4" Ø x 25'-0" Long .....	8 each	2.59
	Bamboo pole		
	3" Ø x 20'-0" Long .....	12 each	1.94
	Bamboo rafters		
	2" Ø x 20'-0" Long .....	72 each	4.38
	Bamboo pole 1" Ø x 15'-0" Long .....	12 each	.49
Roofing .....	Cement tile .....	516 each	29.24
Doors .....	Hardwood .....	72 fbm	15.68
Windows .....	Hardwood shutters .....	82 fbm	17.87
Damp course .....	Pitch and Firewood .....	10 lbs.	.69
Miscellaneous ...	G.I. wire, hardware, etc..	.....	2.02
TOTAL COST (NT \$3,789.10) .....			\$153.41
COST PER SQUARE FOOT .....			0.48

1 Quantity estimated by IHS.

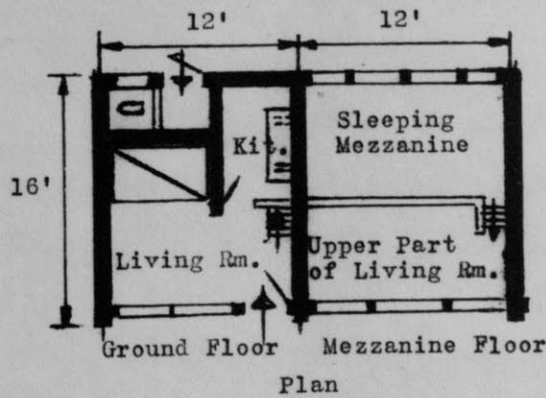
2 Material supplied by family.



Front Elevation



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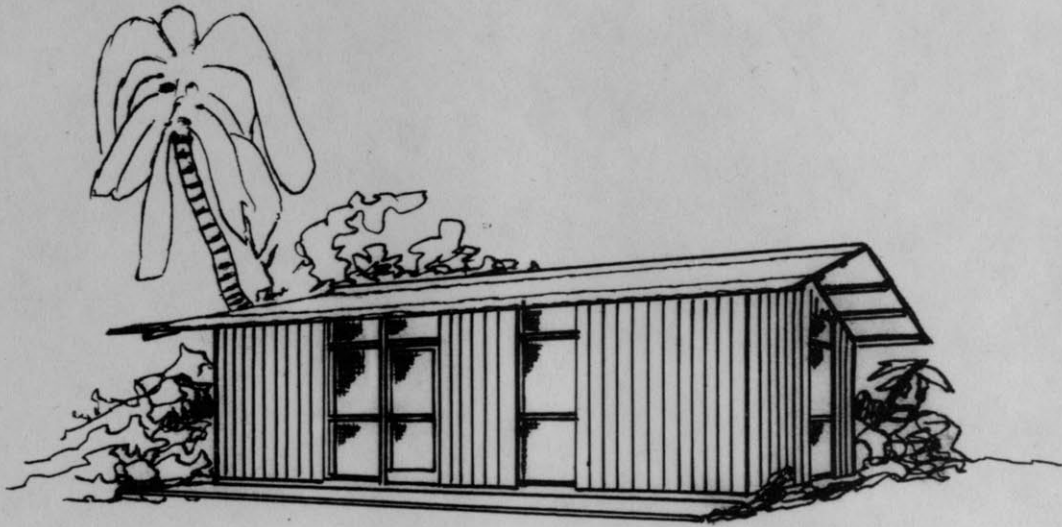
Figure 5. China (Taiwan), II.

Chart 5

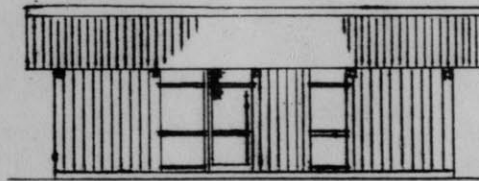
Materials and Cost

(for five houses)

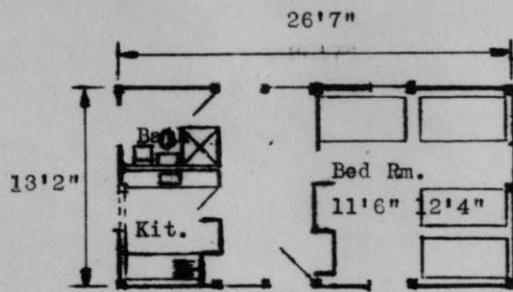
Item	Description	Quantity	Cost
Grading and Pavement .....			\$53.00
Foundations .....	Concrete .....		
Columns and Lintels .....	Reinforced concrete .....	See materials for concrete	See materials for concrete
Floors and Drainage Gutters ...	Concrete .....		
Walls and Partitions ....	Concrete block, plastered 4" x 9" x 11" .....	6700 each)	See materials
	4" x 6" x 11" .....	800 each)	for concrete
Materials for Concrete .....	Cement for concrete blocks	8250 lbs.	100.25
	Cement for other concrete, mortar and plaster .....	9460 lbs.	114.75
	Sand .....	18.3 cu.yds.	18.45
	Gravel .....	31.4 cu.yds.	31.60
	Lime .....		12.75
	Reinforcing, steel bars ..	745 lbs.	41.10
Roof framing ....	Timber .....	648.8 fbm	102.25
Windows, doors, ladders and upper floor .....	Timber .....	1092.8 fbm	175.50
Roof Sheating ...	Bagasse sheets, 3'0" x 6'0"	75 each	24.30
Roofing .....	Galvanized sheets, 2' x 0" x 6' 0" .....	75 each	91.25
Windows .....	Glass .....	40 sq.ft.	14.70
Bricks .....	Clay .....	100 each	4.10
TOTAL COST OF 5 UNITS (NT \$19,359.50)...			\$784.00
TOTAL COST OF 1 UNIT (NT \$ 3,871.90)...			\$157.00
COST PER SQUARE FOOT .....			\$ 0.83



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Figure 6. Guatemala.

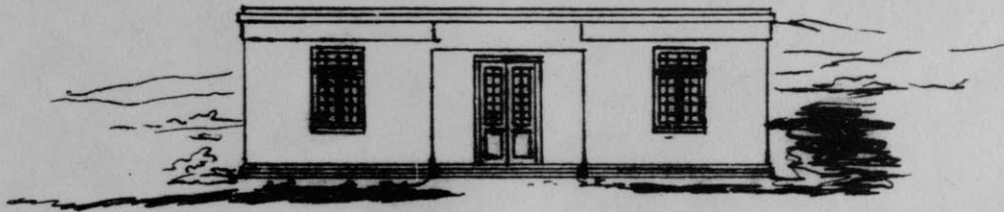
5/ - '58. *John L.*

Chart 6

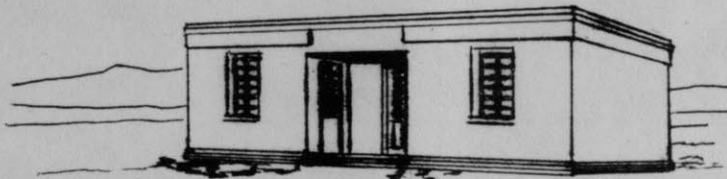
Materials and Cost

Item	Description	Quantity	Cost
Floor .....	Concrete .....	4.69 cu.yd.)	\$25.10
	Thickened edge .....	4.75 cu.yd.)	
	Anchor Bolts .....	33 each	
Framing .....	Walls, 4" x 4" posts with girts .....	240 fbm	119.20
	Roof .....	620 fbm	49.60
Siding .....	1/2" x 8" boards .....	282 fbm	22.56
Partitions .....	Wood .....	130 fbm	10.40
Windows and Doors	Insect screen .....	193 sq.ft.	19.00
	Hinged vents, wood .....	54.33 fbm	4.28
Roofing .....	Asbestos cement, corrugated 8'-0" x 37-1/2" sheets... 4'-0" x 37-1/2" sheets... Ridge cap .....	22 each) 22 each) 11 pieces)	150.39
Nails .....	.....	.....	14.50
Plumbing Fixtures <sup>1</sup> .....	Kitchen sink .....	1 each	
	Shower .....	1 each	
	Water closet .....	1 each	
	Lavatory .....	1 each	
Cooking Equipment .....	Kitchen stove, Asbestos cement .....	1 each	13.00
TOTAL COST (Estimated) .....			\$330.88
COST PER SQUARE FOOT .....			0.94

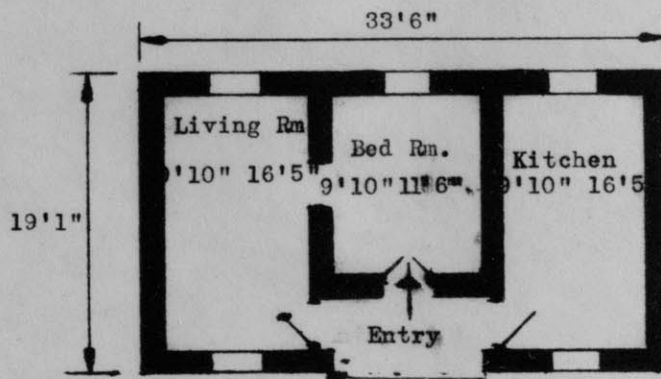
<sup>1</sup>  
Net included at this time.



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Figure 7. Iran.



Chart 7

Materials and Cost

Item	Description	Quantity <sup>1</sup>
Foundation .....	Burned brick .....	299 cu.ft.
Walls & Partitions..	Rammed earth .....	1025 cu.ft.
	Burned brick capping .....	299 cu.ft.
Floor .....	Thin square brick .....	435 sq.ft.
Roof Framing .....	Wood poles, apprx. 10'0"long	26 each
Roofing .....	Reeds and matting covered with mixture of clay, lime, and sand .....	505 sq.ft.
Lintels .....	Wood .....	9 each
Windows .....	Two-leaf wood casement, glazed .....	5 each
Doors .....	Wood, glazed .....	3 each
Interior Finish ....	Lime plaster .....	1022 sq.ft.
Stove .....	Smokeless chula .....	1 each

Chart 7  
(Continued)

Materials	Actual Construction Cost of Demonstration House	Estimated Cost by self-help method building 5 units at one time
Brick, Lime, & Plaster		
Plaster .....	\$117.00	\$118.50
Cement .....	3.30	3.30
Poles .....	Obtained in village	79.00
Timber, Lintels ..	Trimming included with labor	15.72
Reeds and Mata ...	23.80	23.80
Bitumen and Gunny.	15.60	15.75
Windows, Doors, & Hardware .....	104.80	104.80
Rain Spouts .....	5.25	5.25
Forms .....	119.12	252.40
Wrenches and Tools	13.90	35.24
Labor, Head Mason (\$3.26 p.d.)....	185.36	
Unskilled (\$0.85 p.d.)	215.47	39.30
<b>TOTAL COST ..</b>	<b>\$803.60 (Rls. 61,470)</b>	<b>\$463.06 (Rls. 35,250)</b>
<b>COST PER SQUARE FOOT .....</b>	<b>1.20</b>	<b>0.68</b>

1

All quantities estimated by IHS.

2

Two sets @ \$131.00 each equals \$52.40 per unit.

3

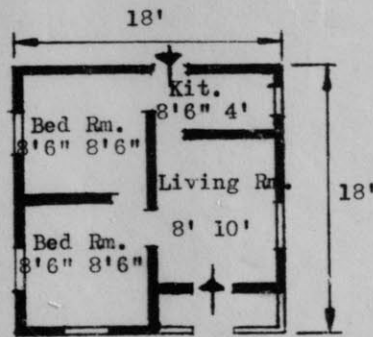
Two sets @ \$ 13.10 equals \$5.24 per unit.



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Figure 8. Puerto Rico, U.S.A..

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