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**THE HOUSE BUILDING ACTIVITIES
OF THE INFORMAL SECTOR**

A case study in Las Piñas City, Philippines

ANNALYN MARIBBAY

School of Architecture
Minimum-cost Housing Program

McGill University, Montréal
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ABSTRACT

House building activities of the informal sector constitutes the acquisition, consolidation and use of building materials and labor that may contravene existing standards, but affords them a coping mechanism to a dynamic urban environment. Studies show that the informal housing sector is largely responsible for most of the housing stock catering for the low-income families.

The research aims at understanding the house building activities of the informal sector and is limited to identifying and describing the building materials and building methods employed, together with its underlying networks.

The case study in the informal community of Sitio Pugad Lawin, Las Piñas City, Philippines, found that, the houses were built by its owners with friends and relatives or by small contractors. They used simple timber framing methods, and combinations of indigenous, conventional and non-conventional building materials for the housing elements.

Table of contents	Page
Abstract	
Acknowledgements	
List of figures, and Illustrations	
List of tables and charts	
Introduction	
• The problem with informal housing	1
• Research intent	5
• The approach	6
• Thesis rationale	6
• Scope and limitations	8
• Thesis structure	9
Part I : A literature review	
Chapter 1 Informal housing provision and house building activities in developing countries: Theories and Practices	
1.1 The concept of informality	10
1.2 Informal housing provision	12
1.3 House building Activities: the informal way	18
1.4 Small-scale contractors and the informal house: an interface	25
1.5 Building codes and standards	28
Chapter 2 Informal housing in the Philippines	
2.1 The informal housing situation: Past and current trends	30
2.2 House-building activities	36
2.3 The Socialized housing building standards	37
Part II: The Case Study	
Chapter 3 Setting: The Physical Condition	
3.1 The choice of site and dwellings	38

3.2	Las Piñas City	41
3.3	Sitio Pugad Lawin: The case study site	43
3.4	The Respondents	46
3.5	Socio-economic condition: summary	47
Chapter 4	Informal housing elements and building methods: A Description.	
4.1	The Dwelling layout	49
4.2	The Mode of construction	51
4.3	The Building materials	58
4.4	Data summary	74
Part III	Summary	
Chapter 5	Conclusions and recommendations	
5.1	Lessons Learned	79
5.2	Recommendations	86
Appendix 1	Survey Drawings and Photographs	
Appendix 2	The sample questionnaire	
	Bibliography	

RÉSUMÉ

Les activités du bâtiment dans le secteur informel se constituent de l'acquisition des matériaux, de leur rassemblement, de leur utilisation dans les constructions et du travail réalisé. Ce secteur ne suit pas les normes en vigueur, mais apporte un mécanisme modérateur dans les milieux urbains dynamiques. Les études réalisées montrent que le secteur informel de la construction se retrouve principalement dans la catégorie des familles à bas revenus.

L'objectif de cette recherche est la compréhension des activités du bâtiment dans le secteur informel, et cette recherche a précisément pour but d'identifier et de décrire les matériaux et les méthodes de construction utilisés, ainsi que les réseaux qui entourent ces activités.

L'étude de cas réalisée dans la communauté informelle de Sitio Puga Lawin, Las Piñas City, Philippines, montre que les maisons sont construites par les propriétaires eux-mêmes assistés par des amis et des parents ou par des entrepreneurs peu importants. Pour ce type de construction, on utilise des méthodes simples d'ossatures en bois combinées à des matériaux de construction locaux, conventionnels et non-conventionnels.

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Dedicated in loving memory, to my Mother.

This work could not have been completed without the immeasurable assistance, dedication and effort of many people. I wish to thank them all.

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LIST OF FIGURES

Chapter 1	Page
Fig.1.2a The regional differences in growing urban Populations. (Source: Tannerfeldt & SIDA.,1995, p.14).	14
Fig.1.2b Organizational chart of an informal housing provision process: An example. (Source: Cardoso,1983, p. 16).....	15
Fig.1.2c Houses on stilts, result of building on swampy locations. (Source:National Housing Bank, Brazil. Photograph reproduced from: UN, Improvement of slums and uncontrolled settlements, 1971, p. 56).	19
Chapter 2	
Fig.2.1a Map of the Philippines. (Source: National Bookstore Inc., 1983).	31
Fig.2.1b Map of Metropolitan Manila. (Source: Central Intelligence Agency, USA, 1990).	32
Fig.2.1c Measures taken by the government that was questioned by the UN Committee on Economic, Social and Cultural rights. (Source: Philippine Daily Inquirer, January 12, 1997).	35
Fig.2.1d During demolitions squatter families clashes with the Police. (Source: Philippine Daily Inquirer, January 12, 1997).	36
Chapter 3	
Fig.3.2a Base Map of Las Piñas. (Source: Las Piñas City, Planning Office, 1998).	42
Fig.3.3a Sitio Pugad Lawin, Almanza Dos. (Source: Las Piñas City, Planning Office, 1998).	44

Fig.3.3b	Passage from Pilar Village. (Source: By author, 1997).	45
Fig.3.3c	Entrance to the community. (Source: By author, 1997).	45
Fig.3.3d	Basketball court. (Source: By author, 1997).	45
Fig.3.3e	Deepwell, overhead water tank. (Source: By author, 1997).	46
Fig.3.3f	"Poso". (Source: By author, 1997).	46
Fig.3.3g	Water container used to fetch water. (Source: By author, 1997).	46
Chapter 4		
Fig.4.1a	An example of a unit floor area layout with store. (Source: By author, 1997).	50
Fig.4.1b	Exterior view of the store. (Source: By author, 1997).	50
Fig.4.1c	An example of the toilet fixture. (Source: By author, 1997).	51
Fig.4.1d	Similar toilet construction. (Source: Open House International, Vol.13:1, 1998, p. 25).	51
Fig.4.2a	Homeowner with a friend as a helper. (Source: By author, 1997).	52
Fig.4.2b	Hired small-scale contractor and his team. (Source: By author, 1997).	52
Fig.4.2c	An example of a unit on its 2nd day of construction. (Source: By author, 1997)	53
Fig.4.2d	Same house on the 6th day of construction. (Source: By author, 1997).	53

Fig.4.2e	Rough lumber post. (Source: By author, 1997).	54
Fig.4.2f	Bamboo post. (Source: By author, 1997).	54
Fig.4.2g	Rough lumber with concrete footing. (Source: By author, 1997).	54
Fig.4.2h	Coco-lumber embedded in a biscuit tin with concrete. (Source: By author, 1997).	54
Fig.4.2k	CHB wall construction. (Source: By author, 1997).	55
Fig.4.2L	Example of wall timber framing. (Source: By author, 1997).	56
Fig.4.2m	Example of floor timber framing. (Source: By author, 1997).	56
Fig.4.2n	Rafter construction with collar braces. (Source: By author, 1997).	57
Fig.4.2o	Rafter construction with corrugated GI sheets as roof covering. (Source: By author, 1997).....	57
Fig.4.3a	4x4 Coco-lumber post detail. (Source: By author, 1997).	59
Fig.4.3b	4x4 Coco-lumber post. (Source: By author, 1997).	59
Fig.4.3c	Senile coconut tree trunk to be sawn into lumber. (Source: Mosterio, 1985, p. 30).	60
Fig.4.3d	Section of coconut trunk. (Source: Brion, 1985, p. 9).	60
Fig.4.3e	The <i>Ipil-Ipil</i> . (Source: Enzyklopädie der Holzgewächse, 1999, p. 9).	62
Fig.4.3f	Underside of a bamboo floor. (Source: By author, 1997).	64

Fig.4.3g	CHB as wall material. (Source: By author, 1997).	65
Fig.4.3h	CHB wall corner detail. (Source: By author, 1997).	65
Fig.4.3k	Bamboo as wall material. (Source: By author, 1997).	66
Fig.4.3L	<i>Sawali</i> as wall material. (Source: By author, 1997).	66
Fig.4.3m	Windows from other houses used as wall material. (Source: By author, 1997).	69
Fig.4.3n	Example of an awning window and an example of A door. (Source: By author, 1997).	69
Fig.4.3o	A nearby hardware shop. (Source: By author, 1997).	71
Fig.4.3p	The "junk shop" inside Sitio Pugad Lawin. (Source: By author, 1997).	72
Fig.4.3q	The "junk shop" inside the nearby Pilar Village. (Source: By author, 1997).	72
Fig.4.3r	The typical cart used to carry the building materials (Source: By author, 1997).	73
Fig.4.3s	Trucks unload the materials at the entrance to the Informal community. (Source: By author, 1997)	73

LIST OF CHARTS AND TABLES

Charts

Chart A	Types of builders (Source: By author,1997).	52
Chart B	Source of materials (Source: By author,1997).	70
Chart 1	Post and framing materials (Source: By author,1997) ..	62
Chart 2	Floor materials (Source: By author,1997).	64
Chart 3	Wall materials (Source: By author,1997).	66
Chart 4	Roofing materials (Source: By author,1997).	68
Chart 5	Doors & window materials (Source: By author,1997). ..	69

Tables

Table 1	House construction data 1 (Source: By author,1997) ..	74
Table 2	House construction data 2 (Source: By author,1997) ..	75
Table 3	House construction data 3 (Source: By author,1997) ..	76

INTRODUCTION

- **The problem with informal housing**

During the 1970's and 1980's, it became increasingly clear that governments could not maintain their role as direct producers of housing, and that this role should be filled by the formal and informal private sectors (World Bank, *Housing: Enabling markets to work*, 1993, p. 19). The multi-disciplinary approach to housing, as revealed by decades of implementing human settlement projects, recognizes that house-building activity is a process. It starts with the acquisition of land, progresses towards the construction of the house itself, then proceeds to either maintaining the condition of the house or undergoes the process of housing consolidation through additions and alterations. The process holds true for both formal and informal housing. However, the difference lies in the manner in which the process is executed. In the informal housing provision, the manner of land acquisition, choice and availability of materials, construction methods and networks all contravene existing by-laws, rules and regulations.

Though informal housing defies conventional idealistic standards, it has presented an alternate solution to the ailing housing problem in the Philippines and many other developing nations. The informal sector exhibits great flexibility in responding to local housing needs and demands in the absence of statutory standards (Okpala, *Habitat Int'l*, Vol. 16:3, 1992, p. 18).

Unfortunately, detailed technical documentation on the informal housing sector is very minimal, as it is often interspersed with bigger issues of sustainable economic development and issues regarding new housing regulations and strategies. As such, it is difficult to fully understand the process by which informal house-building activity contributes to the housing provision in the Philippines.

In most developing countries, informal housing in unplanned housing settlements, share many common characteristics. They are commonly the result of rapid urbanization and rural-urban migration. The occupied lands are acquired illegally. The dwellings are built with scavenged or cheap materials and constructed below existing standards. The settlements have inadequate infrastructure that often poses health hazards. To explain this situation, Kishor Samal argues that:

“Proliferation of informal sector activities is a direct reflection of the changing pattern of urban life and is in response to the need generated by it” (Samal, *Urban informal sector*, 1990, p. 9).

Studies of unplanned housing settlements in developing countries such as India, Indonesia, Kenya, Mexico, Egypt and the Philippines showed that the informal sector—which comprises self-help housing and informal construction businesses—is responsible for most of the houses built in large urban areas

(Hardoy and Satterthwaite, 1981, pp. 5-6). As A.G. Tipple indicated, there is evidence that housing in informal settlements is not built exclusively by homeowners themselves, but also by hired local artisans and laborers belonging to the informal construction sector. The informal construction sector includes producers of building materials, artisans, small scale contractors and vast array of operators in various aspects of construction, all of whom play a role in the overall development of the housing settlements (Okpala, *Habitat Int'l* Vol. 16:3, 1992, p. 18). Preliminary data from sites and services schemes in the Philippines suggested, only about one fifth of the households concerned seem to have relied exclusively on their own labor (Tipple, A.G., *Habitat Int'l*, Vol. 4:3, 1994, p. 4).

Providing formal housing for the low-income group is not a simple undertaking. It is interwoven with issues ranging from the macro-level of sustainable urban and economic development, to the micro-level of the individual's needs and aspiration for a better life.

Countless attempts have been made to answer to the problem of housing provision for the low-income group. In the Philippines, the main occupation of the National Housing Authorities is to eliminate the housing backlog that has existed since the 1950's and remains unabated to this day.

Strategies to help alleviate the problem have ranged from the relocation of squatter families by the Peoples' Homesite and Housing Corporation (PHHC) during the 1950's, to current National Housing Authority projects such as medium-rise housing development, sites and services, slum upgrading and community mortgage programs to name just a few.

In another attempt to deal with the problem, the private sector housing developers formed a joint-venture program with the government, resulting in the creation of RA (Regulation Act) 7279. The Regulation states that 20% of the main projects of the private housing developers would be developed for socialized housing (Sambo, *Construction Management*, Nov. 1996, p. 31). CREBA (Chamber of Real Estate and Builders Association Inc.) believes the measure of RA 7279's success or failure should rely on whether something has been accomplished with regards to development of socialized housing program since its enactment in March 24, 1992 (Sambo, *Construction Management*, Nov. 1996, p. 30). However, housing deficits continue to grow as reported by the NHA in its annual reports. This suggests that the informal housing sector is building at a much faster rate than the formal sector.

Housing is a key factor that influences both environmental and social aspects of community development (Roseland, 1998, p. 146). The quality of the urban environment and the performance of the housing sector are inextricably linked. Examination of housing outcomes in cities also uncovers a strong link between

poverty and environmental quality (World Bank, *Housing: Enabling markets to work*, 1993, p. 31). Poor housing conditions are clearly a reflection of poverty (World bank, *Housing: Enabling markets to work*, 1993, p. 27). Slums, dilapidated urban neighborhoods, and squatter settlements which provide housing to the majority of the urban poor, are very often the places of lowest environmental quality. Such as the case may be, in the Philippines, as in many developing countries, low-quality housing is cheap and available, allowing the poor households to spend a relatively low proportion of their household income on housing, leaving greater amounts for expenditures on food and other necessities (World Bank, *Housing: Enabling markets to work*, 1993, p. 28). The informal sector has provided virtually the only delivery vehicle which has had any success in providing appropriate, low-cost solutions to the shelter problems of the urban poor (Rybczynski et al., *How the other half builds*, Vol.1, 1984, p. 1).

- **Research intent**

This thesis explores the question of how the building activities of the informal sector contribute to the housing provision in the Philippines. It describes the house-building process of the informal sector and its influencing factors. It also documents the types of building materials used and the manner of construction employed in the informal dwellings especially in terms of user's criteria.

- **The approach**

Existing documentation on the house building activities of the informal sector in the Philippines is very thin. Information on the kind of materials used and the manner of construction is generalized and often interspersed with the bigger issues of low-income housing provisions spearheaded by the government or by non-profit organizations. As such, it is difficult to form a framework for this study based on existing documents alone. To build a comprehensive base for this research, it was necessary to conduct a field investigation.

Prior to the field investigation, an exploratory study of informal housing sectors of developing countries in general, and of Metropolitan Manila in particular was conducted. This assisted in defining the tools used for the field investigation stage of the research. With the informal settlement under study, observational data was gathered with particular interest in the dwellings. This data was obtained through interviews, using structured survey forms, photographs and sketches of the selected dwellings. The collected data provided material and experience for future research work.

- **Thesis rationale**

The informal sector faces many constraints in the production of houses with acceptable quality. The unavailability of affordable high-quality building materials and labor makes the informal sector resort to either using recycled

materials or combining conventional building materials with recycled components (Cabral, 1992, p. 2). Large families and sporadic incomes also contribute in the choice of unconventional building materials (Rybczynski, et.al., *How the other half builds*, Vol. 1, 1984, p. 1).

Ill-designed policies also affect the housing conditions of the poor. In broad terms, when housing policies are designed to enable housing markets to function well, limited resources are effectively translated into housing improvements. When markets are functioning well, high-quality, affordable housing and infrastructure will be short in supply, with the inevitable result that better-off households will capture most of the benefits of housing and infrastructure improvements (World Bank, *Housing: Enabling markets to work*, 1993, p. 28).

Present day "standards" are a poor tool for determining the housing requirements of the urban poor. They reflect a view of optimal solutions that is not only culturally inappropriate but also inadequate (Rybczynski et. al., *How the other half builds*, Vol. 1, 1984, p. 1).

The accreditation of innovative building materials and building technologies, includes criteria such as, structural soundness, suitability to local climatic and topographic conditions, cost, appraisals acceptable to funding institutions and compliance with the existing building codes. Ease of application, low-level skill

requirement, simplicity of equipment and availability are not among the delineated guidelines. Moreover, the post-accreditation process only involves its dissemination to interested developers and other professional users.

- **Scope and limitations:**

This research is limited to the actual and current house-building activities of the informal sector that are drawn from the case study area. In order to facilitate documentation, this study is limited to the selection of one typical informal community. It deals only with the description of the current physical condition of dwellings together with those factors affecting its physical characteristics. These include: the current size, layout and initial cost of the dwelling; how the choices of the building materials were made; the process of its acquisition and assembly network; the manner of construction; and the role of both the users and the artisans or the small-scale contractors in the building activity. Built infrastructure services and other structures within the informal community remain in the background and are described only briefly. Likewise, the pattern of the community layout is not discussed in detail.

Layout and space organization within the informal house are also described and delineated. However, a description of the domestic activities being carried on the areas within the house and reasons why they are carried out as such, are not included in this research. Elements that influenced a structure's built form

such as land tenure, housing policies and cultural and socio-economic issues, are described only as they affect the dwellings.

- **Thesis structure**

This study develops in three parts. Part I comprising chapters 1 and 2, presents a background on the informal housing provision and the informal house building activity in developing countries. This part also introduces the general factors involved in the informal housing provision such as the building materials and supply networks, the process by which the informal house develops and, how the building standards contribute to the formation of informal housing. In this part, informal housing provision in the context of the Philippines is also described, together with the existing theories and practices in building an informal house.

Parts II (comprising chapters 3 and 4) and III (comprising chapter 5) contain the reports from the field investigation conducted in the informal community of Sitio Pugad Lawin at Almanza Dos. Based on the field investigation of the dwellings within this community, the current housing situation is described in Part II.

Likewise, the housing typologies, the respondents' and builders' profile, and the building materials supply network are presented and comprehensively described. Finally, in Part III, the results from the field survey as well as the conclusions drawn from the study are summarized. The Appendix contains full documentation on the informal houses chosen.

PART I : Literature review

Chapter 1 Informal housing provision and informal house building activities in developing countries: Theories and practices

1.1 The concept of informality

A dual economic and social structure exists in most developing countries. Among other development issues, this duality is seen as a result of the uneven distribution of wealth and complexities of regulations concerning any legal means of livelihood. Duality is expressed in terms of 'formal' and 'informal' sectors. The former is best described as legal, and privileged, with industries that are capital intensive. The latter is that sector which operates outside legal means, with labor -intensive activities and a poor population (Chickering and Saladhine, 1991, p. 3).

These two sectors, the formal and informal, are economically interdependent (Roberts, 1995, p. 117). In this study however, importance and concentration is given to the 'informal' sector, as it plays a larger and more immediate role in the provision of unplanned housing.

The term 'informal sector' originated from a study done in Ghana and was adopted by ILO/UNDP in their report on an employment mission to Kenya in

1972 (Hariharan, 1991, p. 1). Based on enterprises and not on individuals, ILO (International Labor Organization) defined the informal sector as having the following characteristics: Ease of entry for new enterprises and workers; reliance on indigenous resources; family ownership; small-scale operation; unregulated and competitive product markets; labor-intensive technology; informally acquired skills; low wage levels; and unprotected labor markets.

The term “informal” also connotes several other terms such as marginal or gray sector (Samal, 1990, p. 2). It is also referred to as the ‘underground’ economy (Chickering and Salahdine, 1991, p. 1). Sometimes it has even been called the illegal sector (Cardoso, 1983, pp. 2-3). Its illegality however, was not anti-social in intent, like trafficking in drugs, theft, or abduction. It was designed to achieve such essentially legal objectives as providing a service, or developing a business, and building a house (Soto, 1989, p. 11). The informal sector plays a vital role in economic development, as it uses a low amount of capital, it uses local resources efficiently, it recycles wastes and it provides goods and services which would otherwise be available only at a higher cost or not at all (Samal, 1990, p. 21).

There are at least five categories within the informal sector as distinguished in the study by Sethuraman. They are as follows; industrial production, transportation, retail trade, services, and construction. In the Philippines, 73% working in non-agriculture employment are informal, 78% of which are working in con-

struction (Alonzo, *The informal sector in the Philippines*, Chapter 3, In *The silent revolution*, 1991, p. 42).

The urban informal sector in Metro Manila was found to be made up of micro-entrepreneurs and have no employer-employee relationship. The labor relations are informal, and have been dependent on other operators, friends and relatives for gathering market information, as well as for carrying out normal commercial transactions. The educational level of this sector is quite low. A survey done by NSO (National Statistics Office) in 1995, showed that 42% of the male, and 33% of the female informals reached only the elementary level of education.

On one hand, the nation's awareness of the existence of an informal sector started in the early 1980s, during the national economic crisis. Large industrial corporations collapsed and laid off thousands of workers who later moved into informal market in order to survive. On the other hand, the existence of the informal housing sector in the Philippines was first noticeable in the 1950s. It was during the 1950s and early 1960s that authorities started relocating some 7,274 squatter families to sites outside Manila (Schmidt, 1989, p. 23).

1.2 Informal housing provision in developing countries

There is no single integrated housing market catering to low-income families in which allocation is determined by need and ability to pay: instead, there are a

large number of fragmented and localized markets (Roberts, 1995 p. 172).

Generally, however, the informal sector housing is best defined as that sector of the housing market which includes unauthorized and squatter housing (World Bank, *Housing: Enabling markets to work*, 1993, p. 151). The informal housing sector plays a strong role in the formation and proliferation of unplanned housing settlements.

In cities such as Cairo, Bangkok, Bogota, Sao Paulo, Mexico City and Metro Manila, the informal sector is producing housing at a much faster rate than its formal counterpart. In countries like India, Indonesia, Kenya and Egypt, the informal housing sector is responsible for the majority of houses, especially those built in urban areas (Hardoy, 1981, p.41). In Jakarta, the informal construction sector is an important generator of employment, income housing. In fact, about 70 to 80% of Jakarta's housing was built by the informal sector (Schmidt, 1989, p. 24).

As seen in various studies, informal housing provision in many developing countries arises from: unmanageable urban population growth; rural-urban migration; inequitable distribution of wealth; failure of the formal housing market to provide adequate housing for the urban poor; speculative land prices; inappropriate building standards; unresponsive financial institutions; and misunderstanding of the culture of the poor (Angel, et.al., 1983, pp. 528-546).

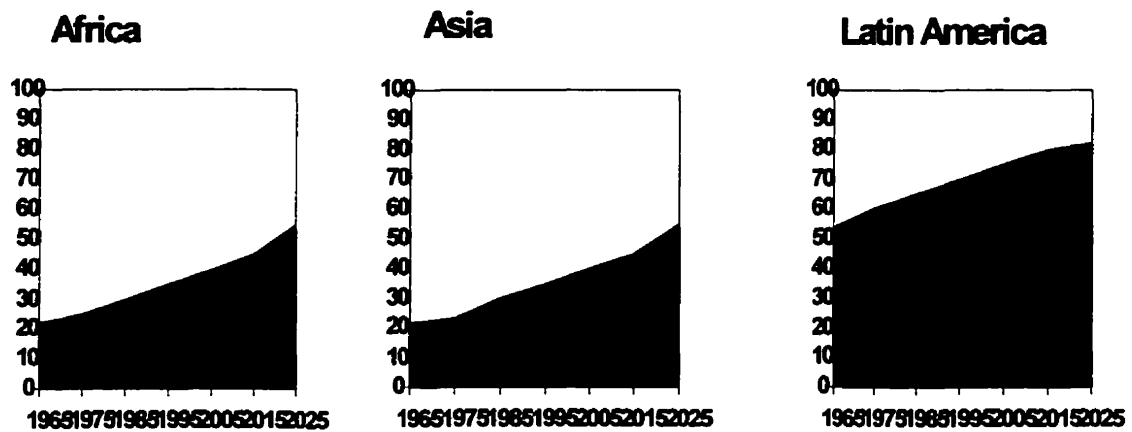


Figure 1.2a The regional differences in growing urban populations (Tannerfeldt & SIDA, 1995, p. 14).

Informal housing provision can be introduced and carried out in various ways. It starts with the illegal acquisition of land. This acquisition may be in a gradual, communal, mobilizing, or generated form. Gradual form is a result of the spontaneous act of the individual settlers seeking shelter in publicly or privately owned site. An example of gradual acquisition of land is the experience in the middle eastern cities such as Cairo, where land for industrial means is also used by the land owners to provide illegal housing for their workers. In time, because of kinship association, the number of dwellers increases (Alsayyad: *Open house international*, Vol. 18:2, 1993, p. 42). Communal form generally results from a collective act by settlers who have coordinated a specific act of invasion. Generated form is one that is organized by political opposition groups aimed at threatening the political legitimacy of a government. The mobilized form is likewise organized but it is initiated by urban authorities in return for electoral gain. (Alsayyad, *Open house international*, Vol. 18:2, 1993, pp. 38-39).

The two latter forms are common in most Latin American cities such as Bogota and Venezuela. An example of the informal housing provision process is represented in the following diagram done by Cardoso, in the study made in Portugal's *Barrios Clandestinos*.

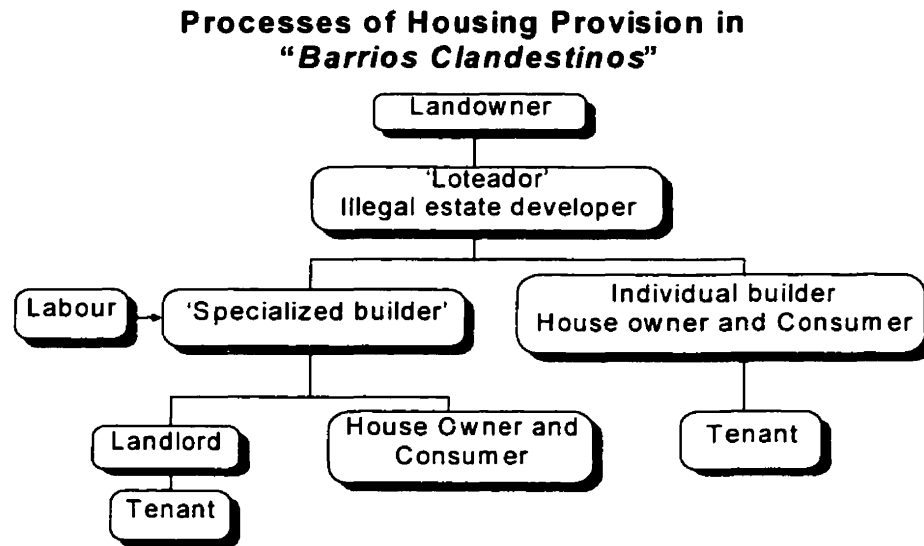


Fig.1.2b Organizational chart of an informal housing provision process: An example. (Cardoso, 1983, p. 16)

Informal housing settlements can be especially attractive to people whose families are growing in size and who find themselves increasingly inconvenienced by the cramped quarters in the inner city tenements. For such people, squatting may provide the only cheap alternative that is also close to their work. Other squatters may simply be people with unstable jobs who wish to avoid the difficulties of constantly having to pay rent, but who cannot afford to put the money down for a house or a legal plot of land (Roberts, 1995, p. 175).

Another common cause and element of the informal housing provision is the homeowner's questionable acquisition of land. In most developing countries, there are at least four sub-types of questionable land acquisition: Invasions (of either public or private land, whether organized or incremental), where no purchase of the lot is involved; pirate settlements, where land is purchased, but lacks planning permission; rental settlements, where houses are built on rented land; and usufruct settlements, where permission to use communal land has been granted by tribe, local government, or private owner (Gilbert and Gugler: 1992, p. 89).

Land tenure plays an important role in the informal housing provision. As H.W.O Okoth-Ogendo states; spontaneous settlements commence without, but in expectation of, legal right. Simply stated, although informal housing settlers may have no tenure rights at the place of destination, it is their expectation that a quantum appropriate to their needs will accrue. However, security of land tenure is a complex issue as it is heavily tied up with history (colonialism), national politics and national development programs. As cities become larger, and unbuilt land becomes more scarce, more and more families are compelled to buy land. Unfortunately the rates at which land prices increase in the Third World cities are generally high (Gilbert and Gugler, 1992, p. 91).

The association between security of tenure and the condition of the houses is not a new insight. Studies made in Karachi, Bombay and Jakarta, revealed that the provision of services by the authorities, such as water supply, availability of electricity and sewage systems, gave settlers a high degree of confidence. Turner also emphasizes the importance of security of tenure in the housing consolidation process.

In the informal housing sector, the original establishment is often based on prior social relationships among the invaders. Subsequent settlement also tends to have some relationship with the existing squatters. The search for housing is complementary to the other attempts of low-income families to secure a living in the city; individuals and families often prefer to locate near friends or kin who can help them find work or assist in times of emergency (Roberts, 1995, p. 172).

Most studies report that newly arrived migrants have contacts in the city before their arrival and that they settle with or near kin and fellow villagers (Roberts, 1995, p. 108). Social relationships are an important factor that helps settlers survive amidst the complexities of the job and housing market produced by rapid urban growth (Pahl, 1970, p. 54). Consequently, informal housing provision will often move up to the level where they mobilize services for the whole community. Over time, neighbors in these settlements may install

basic urban services through cooperative and individual enterprise (Roberts, 1995, p. 174). In cooperative ventures, neighbours collaborate to install sewage and water supplies, petitioning government and international agencies for aid. Neighbors often individually arrange to install electricity. Where necessary, they will bribe a company employee to let them install a light meter; then the person with the meter runs a large number of independent lines to other houses in the settlements, charging for this service and making a profit on the whole undertaking (Roberts, 1995, p. 174).

Informal housing settlements often show evidence of evolution and hence are regarded as transitional or temporary in nature (Obudho and Mhlanga, 1988, p. 9). In some of the oldest settlements of Rio de Janeiro, the process of housing improvement has reached a point where these settlements are hardly distinguishable from legal housing areas with a reasonably good standard of housing. Housing improvement and transformation is relative to the homeowner's increase in income and savings and the speed of the process depends on the security of land tenure (Koenigsberger, 1982, p. 50).

1.3 House building activities: The informal way

Informal housing provision is sometimes referred to as a form of self-help housing in the sense of a private individual initiative and management in the creation of shelter (Koenigsberger, 1982, p. 45). House building activities of the informal housing sector include the consolidation of building materials and the use con-

struction modes that contravene existing standards. Physically, informal housing provision has very diverse types. Settlers may build in swampy sites, steep slopes, beside industrial sites and near railways, to name a few. Generally, the physical characteristics of the site influence the formation of the house (Rapoport, 1969, pp. 28-30). This would mean that the physical characteristics of the house, from the building materials used to the mode of construction, are affected by the physical nature of the site or what is available surrounding the site.

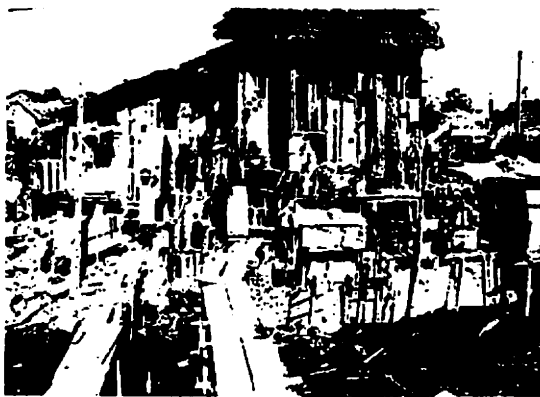


Fig. 1.2c. Houses on stilts, result of building on a swampy location (Source: National Housing Bank, Brazil. Photograph reproduced from UN, *Improvement of slums and uncontrolled settlements*, 1971, p. 56).

The Formal building process usually has five major groups of people participating; the client, designers, executors, public authorities and agencies. However, the informal building process starts with just a few participants. The building process is carried out by either the owner-occupant, building the dwelling himself or with hired small-scale contractors, local artisans and laborers. Community organization also becomes an important component of the housing process

itself. As A.G.Tipple attests, it is obvious that in many countries, individual households are the main providers of houses, but they are not actually building by their own efforts alone. Small-scale contractors and laborers operate outside formal means and are commonly hired by the homeowners. This type of informal activity has provided large shares of all new housing in developing countries over the last 20 years (Tipple, A.G., *Habitat Int'l.* Vol. 18:4, 1994, p. 4).

Informal houses that exist in Africa, Asia, and Latin America, are often described as having the physical characteristic of being mobile -- it can be assembled and dispersed in a very short period of time (Schmidt, 1989, p. 35). These structures are variably built using recycled materials or the second use of consumer product packaging for the different parts of the house. However, as observed by Cabral in the Dominican Republic, most recycled materials are transitional in usage and no house is entirely built of recycled materials. Conventional materials are likewise used and combined with the recycled materials. In a study made in India by Mahadevia, three categories of building materials were used in Ahmedabad. Conventional materials, materials recycled for building use, and materials which have other uses were used. In Jakarta, Indonesia, as with other Asian countries like the Philippines, Malaysia, and Thailand, the use of cardboards, plastic sheets, cloth and boards for this particular type of housing are often taken from rubbish (Schmidt, 1989, p. 24). Depending on the topographical condition of the site where informal houses are being built, build-

ing materials and mode of construction for the building elements such as foundation, roofs, walls, and floors, could vary extensively.

Foundation

Foundations do not normally exist in these houses. Those that are built on swampy land or near shores usually have wooden stilts propping the entire house up above the water. Examples of this can be found in Quayaquil, Ecuador, in Rio de Janeiro, Brazil, in Ibagué, Colombia (UN, 1971, p. 55), and also in Puerto Princesa in the Philippines as observed by Navarro. In most informal housing settlements in urban centers however, the informal house is generally built without a foundation (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 75) .

Floors

It is well known that a majority of floors in dwellings of informal settlements consist of rammed mud which may be more or less an extension of the outdoor surface conditions. Some have raised floors and are usually covered by woven mats which can be removed and cleaned (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 75). A study of informal housing in Ahmedabad, India, found that flooring was generally made out of mud mixed with cowdung, which required monthly maintenance. Sometimes, scavenged pieces of tiles are used in the mud-cowdung flooring (Mahadevia, n.d., p. 11).

The floor area of informal houses, whose average area is about 10 sq. meters, is virtually where all domestic activities are done and that is more the rule than the exception in squatter settlements (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 75) .

Walls

The United Nations reported two broad categories of wall and roof construction occurring in informal settlements. First, in older, established, low-density areas, methods usually follow traditional rural practices, using local materials. Second, in more recent, densely-built areas, a mixture of scrap and recycled materials is used (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 76).

Where the climate is hot and dry, stone is a popular wall material as seen in informal settlements on the hillsides surrounding Kabul, Afghanistan and the *gecekondus* settlements at Angara, Turkey. Mud, which is widely used in various forms such as adobe, pise, cob, rammed earth, can also be seen in informal houses. In a survey done with *sarifa* in Baghdad, Iraq, three types of housing construction prevailed -- reed, mud and a combination of both (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p.77). Mud and wattle are commonly seen in Latin America. An example could be seen in Ixtapa, Mexico, where a study was done in the community of

La Esperanza by graduate students of Architecture from McGill University (Bhatt, & Hanigan, 1996, [ww2.mcgill.ca/mchg/mchg](http://www2.mcgill.ca/mchg/mchg)). Bricks and blocks in various forms and types are also widely used.

Timber is commonly used for structural stanchions and for cladding material, but timber used in informal housing settlements is unseasoned, unprotected against termite attack and otherwise badly prepared. In hot, humid climates, a variety of traditional woven screens of bamboo or palm provide effective walls. (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 77) .

Roof

The roof covering materials and construction in informal housing ranges from traditional to conventional. The roof, like the foundation, is a component that helps determine the service life of the building. Traditionally, roofs were made of what was available locally: burnt clay, thatch or earth (Åstrand, 1996, p. 57). The type of roof, whether flat or pitched, depends mainly on the climate of the area where the informal houses are built.

A study done on roofing in warm, humid tropics of south-east Asia by G. Landaeta and Larsson, shows that in Hong Kong, tar oil felts and corrugated iron sheets are still used in low-income housing areas. In Penang, Indonesia, thatched roofing can occasionally be seen and corrugated iron sheets are

common. Pantiles, which is an inexpensive roofing material that is available, are also often used in informal housing settlements in Indonesia (Landaeta and Larsson, 1987, p. 46). Investment in a new corrugated, galvanized iron roof would be considered an improvement on the variety of scrapmetal, torn roofing felt, flattened cans and rags weighted down by stones or broken furniture, that is characteristic of roofs in so many informal settlements (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 79) .

For pitched roofs in hot and humid regions, wooden support structures for roofing are most commonly used. In the early stages of the settlement, these are usually made from unsawn or scrap timber in the form of simple wooden trusses. Flat roofs have a dual purpose in informal housing settlements of the hot and dry climate region. One is to insulate the interior and the other to provide an extra floor which is used for drying food and clothes. Flat roofs are also used for sleeping during hot summer nights. Ideally they are constructed with reinforced concrete. However, variations of this include shallow brick or stone-rubble vaults between steel joints, or hollow blocks placed between pre-cast concrete beams, both of which are consolidated with concrete screed. This type could be seen in a more progressive type of informal housing settlement (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 78) .

Non-conventional materials used in informal housing settlements for both walls and roofs, found especially in densely populated areas, include: flattened metal sheet drums, corrugated iron sheets, plastic bags, card boards, and tin cans.

Doors and windows

Windows and doors provide both natural lighting and ventilation. In most informal houses, whether built in a hot and dry area or hot and humid climates, doors and window openings are kept at the minimum. It is noticeable that settlers tend to invest in well constructed doors and windows with the necessary bolts and hinges to secure them, in otherwise temporary structures (UN, *Ad-hoc experts group seminar on improvements for slum & uncontrolled settlements*, n.d., p. 79). The most common material used for doors and windows is timber.

1.4 Small-scale contractors and the informal house: The interface

Small-scale contractors and self-employed artisans are almost inevitably working removed from the full panoply of regulation, taxation and accountability; they are in the informal sector (Tipple, A.G., 1991, p. 7). Most of them can be regarded as lying at the fringe of the construction industry -- a large and amorphous mixture of independent operators. These workers however, contribute extensively to the provision of informal housing.

By no means do small -scale contractors in developing countries represent a homogenous group. Their backgrounds may differ considerably, so it is difficult to trace and categorize them. International comparisons can be misleading (Relf, 1987, p. 23). This difficulty is due to the fact that their work is not circumscribed by formal contractual arrangements (Relf, 1987, p. 24).

Origin

The ILO -International Labour Organization has identified in its handbook two possible origins of these small-scale contractors. One is from within the industry itself, and the other is from commercial entrepreneurship.

a. Origins from within the industry

Those that are from within the industry are broken down further into two groups. One is the "trade route", where a trade apprentice goes on to become a foreman, eventually gaining sufficient experience and confidence to start his own business. This route tends to produce entrepreneurs with a sound grasp of the practicalities of simple building work and a personal ability to manage small work forces at the site level. A variation of the trade route is represented by contractors who begin as labour recruitment agents on behalf of larger firms. However this is only found in civil work projects. Another route is called the "management route." This includes entrepreneurs with backgrounds as supervisors, clerk of works, site managers or engineers. As a group, they seem to be less numerous than those who follow the trade route (Relf, 1987, pp. 24-26).

b. Commercial entrepreneurship

This group is comprised of entrepreneurs who have already established themselves as successful businessmen in a wide range of industrial or commercial fields. Their main strength is usually their ability to mobilize the necessary working capital from savings and cash flow surpluses in their regular business. A variant of the "commercial route" includes building material merchants and small-scale building material manufacturers. One of their advantages is their familiarity with the practicalities of the work on site (Relf, 1987, p. 26-27).

The small-scale contractors that are involved in the informal housing sector are generally those from the trade route. A study done in Jakarta, found that approximately 90% of all dwellings in the Jabotabek area were built by the informal sector. They were erected not only by the owners themselves but also by skilled workers and craftsmen were recruited during certain phases of construction, to give additional assistance (Schmidt, 1989, p. 23). Building informal housing for the lower 50th percentile of the population, involves a wide range of contractors that usually includes producers of building materials, artisans, small-scale contractors and a vast array of operators in various aspects of construction (Okpala: *Habitat int'l.* Vol.16:3, p. 18).

1.5 Building codes and standards

Perhaps one of the most significant variables determining the appropriateness of the resulting environment, especially in human settlements, are building codes, standards and regulations. These set guidelines and controls that define the quality of physical structures (UNCHS, 1980, p. 28). Standards as they apply to shelter have generally been defined as measures of acceptability at a given time and location within a given socio-cultural context and under certain technological and economic conditions (UNCHS, 1980, p. 29).

In many developing countries, present codes and regulations hamper national efforts by introducing into the building process inappropriate requirements and limitations either because they seek different objectives or attach different priorities to existing objectives (UNCHS, 1980, p. 30). Building codes and regulations in most developing countries comprise a structure of detailed statutory rules that are frequently enforced by small and inadequately trained staff (UNCHS, 1980, p. 38). Frequently, in order to implement the standards contained in these codes, foreign technologies are required. Such codes tend to be insensitive to indigenous technologies and building practices which might make better use of locally available materials. For example, many building codes do not accept traditional mud construction as acceptable. Although there is great similarity and uniformity amongst building codes and regulations around the world, it is clear that there are great variations among living habits, preferences

and needs of different national populations. In most developing countries, existing building codes are frequently difficult to understand and work with, usually because they have been copied from codes enacted in a developed country which has very different objectives and conditions from those currently found in the developing world (UNCHS, 1980, p. 39).

Chapter 2 Informal housing in the Philippines

2.1 The informal housing situation : Past and current trends

Background

The Philippines, with its composition of 7,107 tropical islands, is one of the most disaster-prone countries in the world. Aside from the events like the eruption of Mt. Pinatubo, the country is battered every year by dozens of typhoons, some of which make international headlines (Hall, *Coping with typhoons in the Philippines: builders and farmers tell their story*.

Basin News, Vol. 12, 1996, p. 17).

Without the proper means or money to repair a typhoon-damaged house, the homeowner is left with no choice but to seek alternative, unconventional repairs. In some extreme cases, they have to leave the place where their houses once stood and seek better ground. This becomes a reason to resort to illegal occupation of public or private land, especially in urban areas.

In the gradual formation of informal housing settlements, growth is often characterized by doubled-up households. Doubled-up households are situations where two or more households occupy the same dwelling unit. In the Philippines, the average household size is 5.3 persons (NHA, *Primer: Fast facts on Philippine housing and population*, 1994, p. 16). One family's search for housing tends to coincide with the search by other low-income families for a place to live in the city; and individuals and families often prefer to locate near

families or kin who can help then find work or assist in times of emergency (Roberts, 1995, p. 172). These phenomena which are also sometimes culturally based, results in doubled up household. Rapid population growth is also a contributory factor to the formation of double-up households.

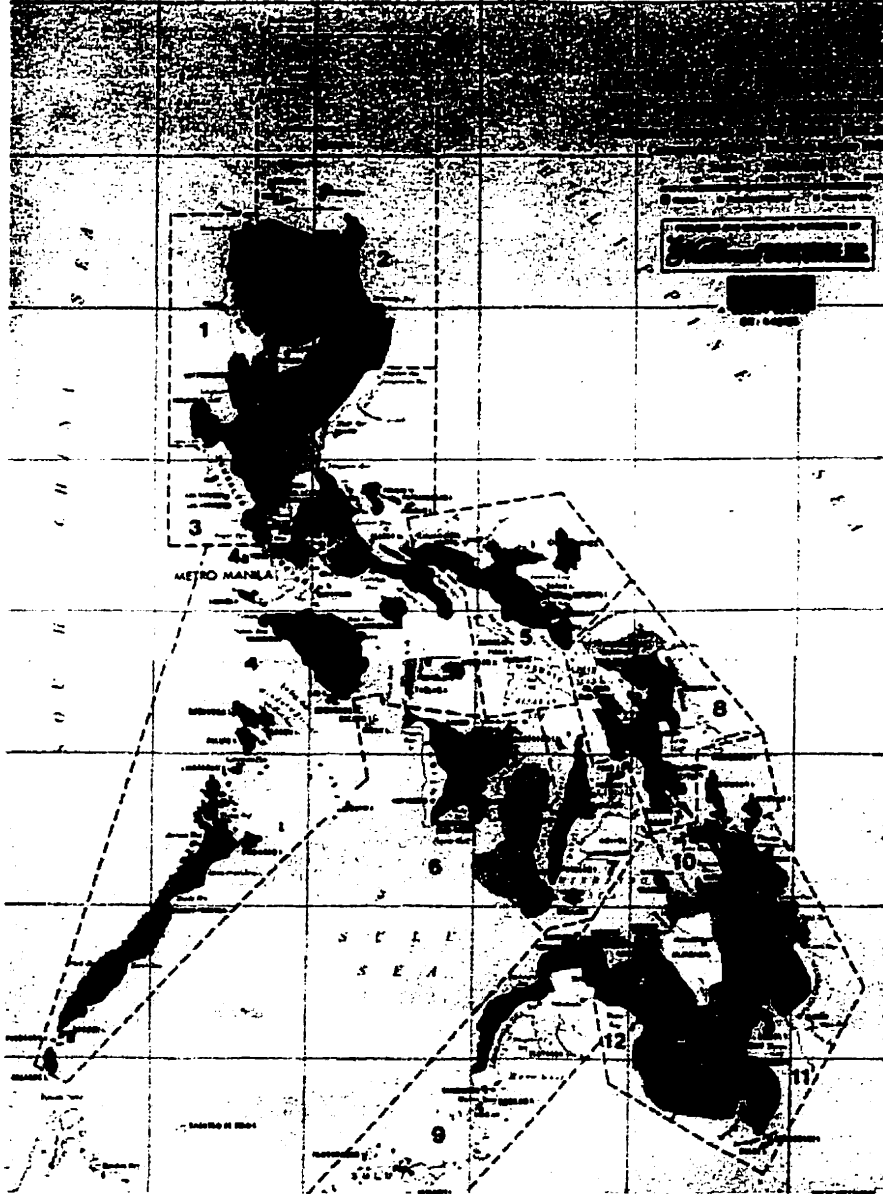


Fig. 2.1a Map of the Philippines
Source: National Book Store Inc., 1983.

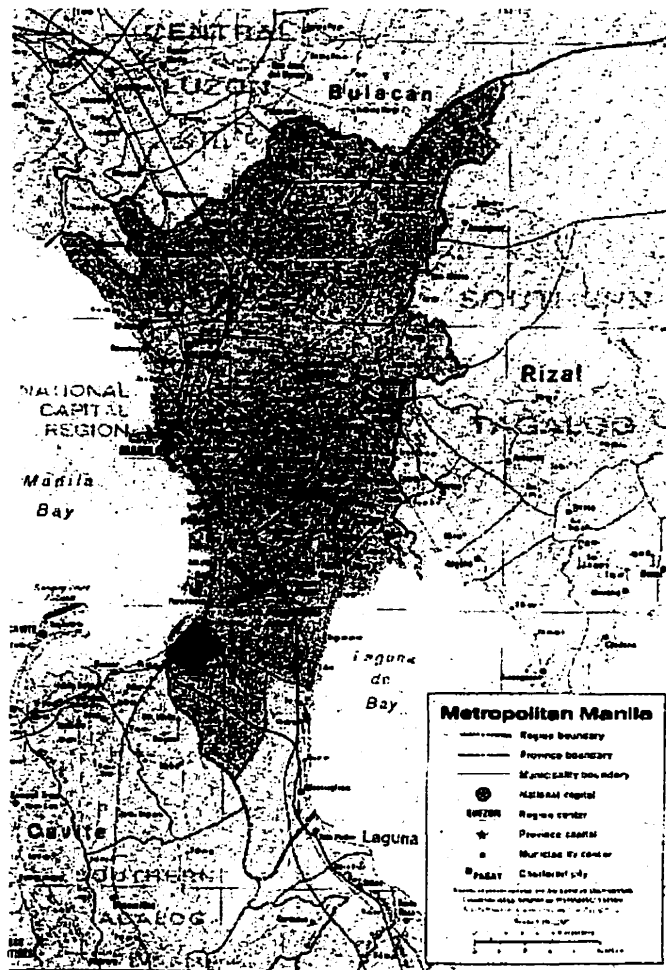


Fig.2.1b Map of Metropolitan Manila
Source: Central Intelligence Agency, USA: 1990.

The population of the Philippines is expected to reach 70 million by year 2000 with of which 42.45% living in urban areas. The urban poor account for an estimated 55% of the total urban population (NHA, Primer: *Fast facts on Philippine housing and population*, 1994, p. 2). The rapid population growth rate, which is estimated at 2%/ annum, gives rise to the housing backlog, which is placed at 5.4 million units, and grows by 350,000 units per year.

Settlement Patterns

The pattern of informal housing settlements that the Philippines has faced from the 1960s onward, was set immediately after the second world war. Rural insecurity pushed people to the cities. Owners whose houses were destroyed by the bombings and the new rural migrants settled anywhere on vacant urban land. It was at this time that Tondo and the Intramuros were squatted.

Because the government could not police the city, people continued to settle this way long after the war was over. The informal settlement pattern thus then established.

Another factor that contributed to the rise of the informal housing settlements is the concept of public land. In western culture, public land is something to be shared, maintained and developed by the community. In the Philippines, however, public land belongs to no one (Stone, 1973, p. 1). With land speculation completely uncontrolled in most third world cities, and spectacular profits possible for shrewd investors (Gilbert and Gugler, 1992, p. 91), many of the poor are being priced out of the land market (Grimes, 1976, pp. 42-44). The poor who cannot afford the existing land prices, build houses on public land, which does not belong to anyone.

Trends in informal housing provision

The issue of informal housing settlements in the Philippines had already been taken up by various researches since the 1950s. In the 1950s and early 1960s,

the authorities relocated some 7,274 squatter families to sites outside Manila. Mass evictions began in 1963 (Schmidt, 1989, p. 23). Most government efforts since 1951 aimed at relocating inner-city squatters in resettlement areas some 20 to 40 kilometers from Manila. In 1968 and 1974, additional resettlement centers were opened in San Pedro (Laguna), Carmona, and Dasmariñas (Cavite). By 1981, more than 36% of the relocated families returned to Manila, settling again in one of the Capital's 415 squatter colonies. The process was seen as a vicious cycle (Schmidt, 1989, p. 24).

The informal housing settlements also had a share in the international limelight during the 1970s, when the International Development Agencies took an informal settlement in Tondo, Manila to be the site for an international low-income housing design competition.

During the 1980s, anti-squatting laws were introduced through Presidential Decree No. 296 declaring it a criminal offence, punishable by imprisonment or fine or both (Schmidt, 1989, p. 25). In 1997, the Government of the Philippines had written to the United Nations that in cases where relocation is unavoidable, it would follow a legal process of consultation with the affected communities, proper notification and provision of relocation sites. However, in practice, this was not always the case.

“Professional squatters” exist in informal housing settlements. They turn squatting into a business venture and they are difficult to trace. An assessment report on a World Vision project at Mother Ignacia revealed that professional squatters exist and that they have rental businesses within the informal settlement.

UN body asks RP to explain squatter demolitions

THE LVC Committee on Human, Social and Cultural Rights (HSCR) has called the Philippine government to explain the recent large-scale forced evictions of squatter communities in Metro Manila.

In a letter to Dummer, French chair PHTG Almon said the company's last research detailed exposure of the asbestos. He said the increased number of those densely affected ranged from 10,000 to 25,000 families.

3. Position, change of position, and deputy permanent representative of the Philippine Mission to the United Nations in Geneva, 1945-present.

Alkins noted that the revisions were played up in the national and international media, especially in the lead-up to the Asia-Pacific Economic Conference in August in Singapore.

He reminded the Philippine government that as recently as October, a law against the United

studies of surface are available. It could follow a legal process of "consultation with affected communities, proper certification, and provision of information."

The committee was assured, Adams wrote, because the victims came to have been religiously advised, and are generally sincere.

He asked the Philippine government whether it "believed" that the systems were consistent with the

Sexual and Cultural Rights, of which the Participants is a signatory.

The completed letter was
"sent" Abraham.

These inquiries on the character of governments of the provinces of the International Council to Economic, Social and Cultural Rights.

2. has entered over the sea as
the Democratic Republic for
violating the passport.

Before the committee is a narrow compromise that is an interesting mixture of economic orthodoxy, as well as supporting current policy against the kind of growth of economy.

The computer said that the Philippines was one of only two countries in the world that overhauled existing criminal offenses.

It further reminded the Pro-Seymour that similar fines to be returned should be assessed of

Planning is the U.S. Justice
 1000s of the Queen City
 1000s of the Queen City
 1000s of the Queen City
 1000s of the Queen City

Letter was hand
delivered with the
document: "CASA" and
the FBI in Florida.

The President's Commission in the Lillian Steel has yet to issue a report, as the UN letter states.

Fig. 2.1c Measures taken by the government that were questioned by the United Nations Committee on Economic, Social and Cultural rights. (Philippine Daily Inquirer: January 12, 1997).

In 2000, despite several decades of attempting to stifle the problem, the Philippines is still struggling to cope with the unabated proliferation of informal housing settlements.

Currently in the Philippines, the Housing and Land Regulatory Board is reportedly working towards the generation of some 62,651 housing units through the issuance of 961 developing permits. Issuance of 1,597 licenses to sell covering 110,237 housing units were also reported.

Squatters, demolition men clash

Several squatters in Binondo, Manila, were wounded yesterday in a clash with a team out to demolish their shanties on a private lot.

Chief Inspector Franklin Gacutan, commander of the Western

Police District Station 11, said the wounded were taken to clinics and hospitals.

The melee started when residents of Sta. Elena St. occupying a 100-square meter pri-
(Turn to page 8, col. 7)



BINONDO DEMOLITION. Residents of barangay Sta. Elena in Binondo, Manila, heckle policemen dispatched to keep order during the demolition of several shanties on a court order. At least 10 persons were injured when the demolition crew clashed with the residents. (Pinggot Zulueta)



DEMOLITION CLASH. A member of the SWAT of the Western Police District reloads his tear gas gun during a bloody melee between a small group of demolition men assigned to dismantle squatter shanties and Sta. Elena residents in Binondo, Manila. Police said many people were wounded in the 30-minute clash. (Bob Dango)



CONTINUING RESISTANCE. Photo-journalists, and residents of Sta. Elena Street in Binondo, Manila run for safety while the barricade they set up behind caught fire after it was hit by a molotov bomb by the squatters resisting demolition. Members of SWAT team led by Senior Insp. Jimmy Santiago retaliated by throwing teargas canisters at the crowd. A news photographer was injured when he fell from a 10-foot rooftop. (Rudy Liwanag)

Fig. 2.1d During demolitions squatter families clashes with the police (Manila Bulletin: January 15, 1997).

2.2 House-building activities

With the prevailing housing situation in the Philippines, the formal private housing sector is slowly emerging as one of the key players in alleviating the housing problem next to its informal counterpart. Under the HUDCC, (Housing and Urban Development Coordinating Council) key agencies such as the Home Insurance Guaranty Corporation, assist private developers in building low and middle-income mass housing with the Republic Act 7279 or the Urban Development and Housing Act of 1992. This law required Balanced Housing

Development, forcing developers to provide 20% of the project cost or area for socialized housing. Proof of compliance with this requirement is needed before development permits can be granted to subdivision projects (Valenciano, 1998 , p. 5).

2.3 The socialized housing building Standards

Some of the most significant variables determining the appropriateness of the resulting environment, especially in human settlements, are building codes, standards and regulations. These set guidelines and controls that define the quality of physical structure (UNCHS, 1980, p. 28). Standards as they apply to shelters have generally been defined as measures of acceptability at a given time and location within a given socio-cultural context, and under certain technological and economic conditions (UNCHS, 1980, p. 29).

The existence of minimum building standards for economic and socialized housing through R.A. 7279. contributed immensely in addressing the issue of low-income housing. Nevertheless, most of the urban housing for the poor is still supplied by the informal sector. It is estimated that 70% of housing in Metro Manila was produced in this manner. In the Philippines as a whole, most of the urban housing is also provided by the informal sector. How this informal sector produces its housing is studied with the help of a case study discussed in the next chapter.

PART II: The Case study

Chapter 3 The physical condition

3.1 The choice of site and dwellings

To facilitate better documentation on the house-building activities of the informal sector, one important condition in choosing the site was that, the community must be in its matured stage of development, and that within this community, some dwellings needed to be are in the process of construction. The chosen site, Sitio Pugad Lawin, Almanza Dos, is a typical example of such an informal settlement. With very limited financial resources to carry out the study, accessibility of the site also became a factor in the site selection. The less time spent on traveling to get to and from the site, the more time spent in documenting the relevant information necessary to describe the house-building activities.

The field work was conducted from the first week of January to the first week February 1997. Out of the 574 housing units in the community, this number is considered sufficient to see the prevalent house-building activity pattern that exists.

Data was collected through different methods. The table below describes the means and the type of data collected.

Methods**Data collected****Interviews**

Household composition, tenure of stay, place of origin, Income, water, electricity and gas supply , expenditure on housing, type of sanitation. Also, type of construction materials used for the building elements, and the building methods.

**Recording
with photos**

Exterior and interior appearances of the houses, type of sanitation and cooking fixtures. Progressive development of the houses under construction and their builders.

**Recording
With sketches**

Sketching the plan of the structures and the whole view of the house together with the layout.

**Measuring
& drawing to
scale**

Size and layout of the dwellings

Summary of the physical investigation and interviews

After receiving permission from the Barangay captain, the surveys began.

Accompanied by one of the female residents who helped and played an important role in establishing contact with residents. She guided the interviewer to homeowners that were her friends and neighbors and that eased the gathering of the data.

The interviews were carried out for the 4 weeks duration of the field study. The main interviewee was often a woman. In some cases, both husband and wife participated. In cases where both the homeowners were not present, the eldest son or daughter was interviewed.

The first questions were directed to the members of the household, such as their age, gender, where they originally came from, how long they been staying in the community, their household income and number and ages of their children. They were also asked where they get their water supply, their source of electricity, what type cooking equipment they used and the type of sanitation facility they had.

The second group of questions included; the type of materials used in building their dwellings; the way they these houses were constructed over time; the number of workers that helped build the house and the cost of construction.

The physical investigation of the houses started out by measuring the perimeter of each house, and identifying the size and location of openings. The interior layout of the house was then measured and sketched. Full documentation of the houses are included in the Appendix 1 section of the study.

3.2 Las Piñas City

Las Piñas City is located in the southern part of Metropolitan Manila. It is one of the nine cities and eight municipalities comprising Metropolitan Manila, or the National capital region. From the East, Las Piñas is reached via the South Super Highway and through the Alabang-Zapote Exit. From the North-East, it is reached through the Coastal Road, and then through the Alabang-Zapote Road. With a total land area of 3298.60 Ha, it is composed of 21 political units called the *Barangays*. Las Piñas is bordered on the North by Manila Bay; on the North-East by the Municipality of Parañaque; the city of Muntinlupa on the South and South-East; and by the Municipality of Bacoor on the West and South-West.

Las Piñas City experiences the same two distinct seasons as the rest of the country: the dry season, which lasts from November to April; and the wet season, which lasts from May to October. Maximum rainfall normally occurs from June to August. The terrain is relatively flat.



Fig.3.2a Base Map of Las Piñas City
Source: Las Piñas City, Planning Dept.

Las Piñas City is famous for its Bamboo Organ, which was built in 1824 built by Fr. Diego Cera, the town's first parish priest. In 1901, the Municipality of Las Pinas was incorporated in the newly created province of Rizal, pursuant to Philippine Commission Act No. 137. Two years later, it was combined with Parañaque, the latter being the seat of a new municipal government. Las Pinas

was proclaimed an independent municipality by virtue of Philippine Commission Act No. 1625 on March 27, 1907 (Las Piñas City home page, <http://members.axti.com/neil/>).

In the mid 1960s, Dr. Felimon Aguilar was elected Mayor and held the position for 23 years. He became the town's congressman for three years from 1988-1992. During his leadership, he helped turn the town into what it is today--an economically and politically progressive municipality. Dr. Aguilar is seen as the "Builder of Las Piñas" because it was during his leadership that improvement and development of the town and people took place (Las Piñas City home page, <http://members.axti.com/neil/>).

Today, his son, Hon. Vergel A. Aguilar, is the newly elected mayor of the town. Like his father, Mayor Vergel A. Aguilar is also a developer, builder and a philanthropist. He promised to continue his father's work. However, their formal efforts have generally met the housing needs of the relatively rich people. As a result close to 50 % of Las Piñas lives in informal housing.

3.3 Sitio Pugad Lawin, Almanza Dos : the case study site

Sitio Pugad Lawin, in Almaza Dos, is located in one of the Barangays, or political units situated in Las Piñas City. The informal settlement is bounded on all sides by residential developments that have either high-end or middle-

income type of housing. It is bounded on the east side by Pilar Village, Camella Homes on the North-West, Ayala Land Corp. development on the West and by B.F Homes subdivision on the South.

The economic survey conducted on August 26-28, 1998 by MPPI (Mamamayang Pinagbuklod at Pag-kakaisa, Inc.), showed that the population of Sitio Pugad Lawin was composed of 574 households and still growing. Most of these families had been on the site for at least 10 years. The average income of the Household is around 5,000.00 Pesos per month (Cdn \$ 185.00).

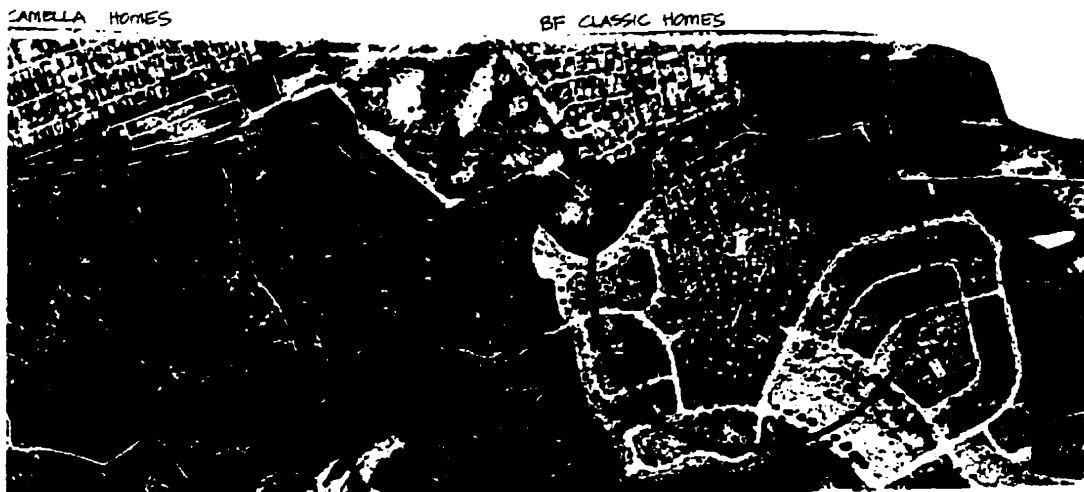


Fig.3.3a Sitio Pugad Lawin; Almaza Dos.
Source: Las Piñas Government, Planning Office.

Access to the informal community of Sitio Pugad Lawin is through Pilar Village. One has to travel all the way to the village's westernmost perimeter wall to reach the entrance to the informal community. A small passageway on the perimeter wall enclosing Pilar Village serves as the initial entrance. Behind the

entrance is an undeveloped piece of land owned by another residential developer.



Fig. 3.3b Passage from Pilar Village
Source: Photo by author



Fig. 3.3c Entrance to the community
Source: Photo by author

In the community area, a few amenities have been built. There is a Chapel that doubles as a meeting place for the residents; an administrative house, where the head of the community carries out his duties; and a basketball court situated near the chapel. The existence of these amenities indicates that the informal settlement at Sitio Pugad Lawin is at a mature stage of development.



Fig.3.3d Basketball court
Source: Photo by author

The community's water supply comes from a "poso" or deep well, drawn manually or by a powerful motor pump, located in the lot of one of the residents. The homeowner who has the pump in his lot is paid for every gallon or pail of water drawn by the other residents.



Fig. 3.3e Deep well overhead tank
Source: Photo by author



Fig. 3.3f "Poso"
Source: Photo by author

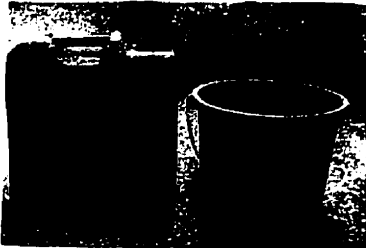


Fig.3.3g Water containers used to fetch water
Source: Photo by author

3.4 The respondents

There were different methods used to collect data for the study, including interviewing residents, measuring and drawing the houses, recording by means of photographs and line drawings, and observational notes. However, before any of this data collection began, a cordial meeting with the Sitio Pugad Lawin's

chieftain called the “*Barangay Captain*” was initiated. This meeting helped introduce the idea of the study to the residents and helped develop some form of trust between the residents and the interviewer. At the time of the study, the fear of being evicted and relocated were major concerns of the residents. One of the major issues that forms the basis of that fear is that the ownership of the land is unclear - a common characteristic in informal settlement patterns.

Moreover, because the site is encroached by lands owned by large private housing development corporations who are now in the process of implementing their plans for their properties, relocation of the settlement to a remote place is likely to happen.

For the study, 50 residents were randomly chosen. With all those who were willing to be interviewed prepared forms were used to facilitate recording the data. Interviews were conducted using the native language of *Tagalog*, but answers were directly translated in English. (A sample questionnaire is included in Appendix 2).

3.5 Socio-economic condition: A summary

The average age group of the respondents was from 22 to 45 years old. There were only a few respondents above 50. About 95% of the house owners were married and had on an average of 3 children. Their tenure or stay at the site, averaged of 10 years.

Interestingly, about 90% of the household heads, which were predominantly male, work in the construction field. These jobs included construction laborers, lead carpenters and foreman, welders, steelworkers, loader operators and painters. Other jobs included, jeepney drivers, school bus drivers, tricycle drivers and mechanics. The majority of the women were housewives, while a few worked as a “*labandera*” or laundry women, washing clothes for the homeowners of adjoining villas.

Chapter 4 Informal housing elements & building methods: A description

4.1 Dwelling layout

Site allocations within the study area were unregulated and varied considerably. As such, the average lot size and the plot configuration were difficult to establish. The position of the houses, within the unregulated plots that were surveyed, has no particular orientation pattern. However, in this study, the floor layout of the houses and their orientation were drawn and described, and the average floor area could be determined. It is not part of this study to present in detail the domestic activities that are performed within the spaces inside the dwellings, so they are described in general terms.

The surveyed dwellings had varying floor areas ranging from 7.5 sq. meters to 34 sq. meters. The approximate average floor area is about 18 sq. meters. Most of the floor spaces are basically rectangular in shape and every addition takes the same form, regardless of its use. Total household income is one of the factors that greatly affected the standards of the houses, in size, mode of construction and building materials.

In most of the houses, the cooking area and sleeping areas have a definite space allocation. The sleeping areas are defined by partitions, some of which have wooden doors and some just curtains. The cooking area, on the other hand, regardless of how many rooms there were in the house, typically had one

counter against a wall, made mostly of wooden planks. A large percentage of the houses surveyed had kitchen sinks but were without faucets or running water. Residents use water from a pail and a water scoop to pour water when washing dishes. Washing of clothes is done outside the house, on the ground. Some women do their laundry at a communal space near the water tank, or at the deep well pump where there is a water faucet. Here, generally, laundry is done with neighbors and friends.

The eating and receiving areas were frequently combined into one space, directly accessible from the entrance door. A couple of the houses surveyed had an adjoining room housing a small entrepreneurial activity, such as a variety store. This was usually accessible from the receiving area.

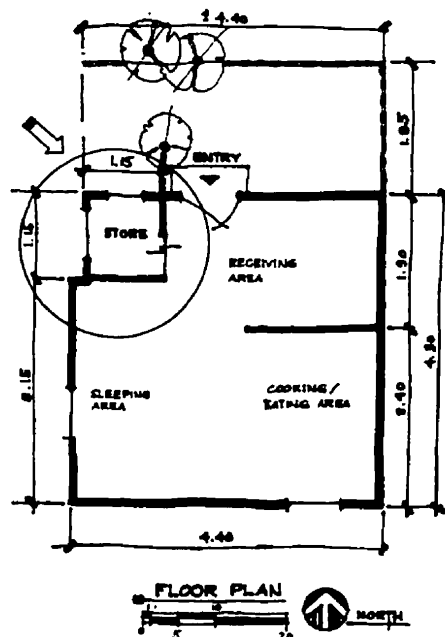


Fig. 4.1a An example of a floor layout with store.

Source: Photo by author.

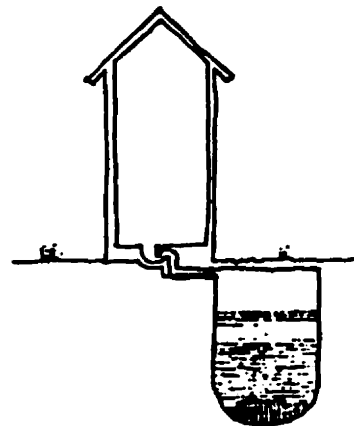


Fig. 4.1b Exterior view of the store.
Source: Photo by author.

For sanitation, the majority of the houses surveyed had their toilets located outside the house. A pour-flush toilet was the most common form of sanitation in the study area. Some of the respondents shared toilets with their friends and neighbors.



Fig.4.1c An example of the toilet fixture used.
Source: Photo by author.



Pour-flush latrine

Fig.4.1d Similar toilet construction
Source: Open house International, 13:1 1988, p.25).

4.2 Mode of construction

The building work for the houses was generally carried out with the involvement of the owners, friends, relatives, neighbors and some by hired small-scale contractors and artisans. The number of workers that participated ranged from 1 to 8 persons. Since most of the household heads worked in the construction field, it was fairly easy for them to assemble a crew of workers to help in the housing construction and repairs. For those house owners that hired small-scale contractors, the number of workers ranged from 8 to 2 people.

Builders

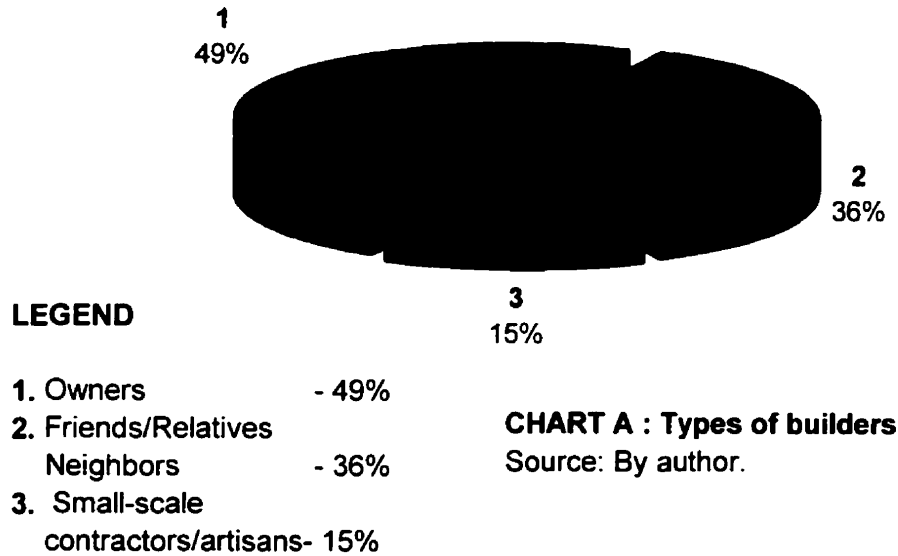


Fig. 4.2a Homeowner with a friend as a helper
Source: Photo by author.



Fig. 4.2b Hired small-scale contractor and his team
Source: Photo by author.

The construction period of the houses in the study area varied from a few days to several months. The speed of the building work largely depended on several factors, including the number of workers, the capacity of the workers to do

building work, the materials used, the financial capacity of the house owners, the feeling of security for the land tenure, and the stage of housing evolution.



Fig. 4.2c An example of a unit on its 2nd day of construction.
Source: Photo by author.



Fig. 4.2d Same house, 6th day of construction.
Source: Photo by author.

Not all of the homeowners surveyed declared the total building cost of their houses, mainly because some of them had already forgotten how much they had paid for certain portions of their homes. The approximate total initial building cost of most of the informal dwellings under study ranged from \$120.00 to about \$1,400.00. It was also recorded that a small percentage of the houses were built at no cost to the house owners. The declared figures by the owners were based on the initial cost, since at the time of the survey most of the houses had already undergone changes and repairs. From the dwellings surveyed, it was observed that the building cost was directly related to the type of materials used, and the number and type of workers who participated in building.

4.2a Framing

Among the informal houses within the study area, there were dwelling units that were also under construction. It was observed that these structures were built with either very little consideration for foundation or none at all. Clearly, construction of these houses started with the erection of posts. A hole about half a meter deep was dug in the ground, and the post, which came in different forms, was positioned in the middle of the hole. To keep it in place, pieces of timber were pegged to the ground next to the post. If the house owner's financial condition allowed, the hole was then filled with concrete. However, the post is often left as is, especially if the house owner did not have enough money for concrete.



Fig. 4.2e Rough lumber post
Source: Photo by author.



Fig. 4.2f Bamboo post
Source: Photo by author.



Fig. 4.2g. Rough lumber with concrete footing
Source: Photo by author.



Fig. 4.2h Coco lumber embedded in a biscuit tin
Source: Photo by author.

In cases where CHB (Concrete Hollow Blocks) were used as wall material, something similar to a wall footing was constructed. Here, the wall was placed in a trench of about 300mm width and 600mm in depth. At least 3 layers of CHB were placed in these trenches, acting as the wall footing. The subsequent CHB courses continued, forming the wall of the house. Blocks were joined with mortar.



Fig. 4.2K. CHB wall construction
Source: Photo by author.

The owner's financial situation permitting, CHB could go all the way up to the roof structure. Otherwise, it stopped at either 3 or 4 layers of CHB above ground, while the rest of the wall was built with different materials.

The majority of the informal houses that were under construction at the time of study used timber framing, which was erected before any wall material was put up. This was also evident in the existing houses. Regardless of the type and size of framing material used, the studs were spaced in relation to the length of the wall. There was no consistent spacing of the studs. However, it was

observed that, to put up a window or a door, the framing was adjusted accordingly so as to accommodate the opening.

Wall frame studs were attached by nailing them to each other. The horizontal studs were attached to the vertical ones and to the posts, often by rusty nails. All of the houses, regardless of whether existing or newly built, had only the exterior side of the frames covered with the available wall material. The interior was left bare with the studs exposed.

When the intention is to put up an elevated floor, approximately 600mm from the ground, a floor framing is constructed. The typical size of the floor joists used, is roughly 2"x4" -is the same as what is used for the wall framing. They are set horizontally at an approximate distance of 300 mm on center and a double header is formed at two opposite sides of the walls. In one of the surveyed houses, it was also observed that no bridging was used but there was a horizontal member running underneath, across the direction of the floor joists, and supported by a post at mid-span.



Fig. 4.2L Example of timber framing
Source: Photo by author.



Fig. 4.2m Example of timber framing for floors
Source: Photo by author.

After the desired wall height was achieved, the last horizontal member of the wall frame acted as the roof girder, which also served as the bottom chord of the roof framing.

Most houses had gable roofs. Houses having a gable or shed roofing used simple roof framing, consisting of rafters. The roof pitch was kept in place by collar braces and cleats that were nailed onto the roof girders. Purlins set at approximately 600mm intervals were nailed on top of the rafters to receive the roofing material.



Fig.4.2n Rafter construction with collar braces and cleats.

Source: Photo by author.



Fig.4.2o Rafter construction with corrugated GI sheets as the roof covering

Source: Photo by author.

4.3 The building materials

In this section, the building materials used in the surveyed houses are recorded. The information presented is based on the interviews and also from direct observation of the housing elements.

Most of the dwellings surveyed were already constructed and a few were under construction at the time of study. Regardless of the stage of evolution of the house, the frequency of use of different building materials is presented here in charts. These charts form the basis in understanding what materials were available, preferable and affordable among all the surveyed dwellings. The study is limited to the physical description of the building materials as they were being used in the different housing elements. The technical specifications are left unexamined and are not dealt with in this study.

Most of the building materials indicated on the charts were used in the dwellings in combination with the other materials presented on the same chart. The mode of transport for the building materials, the reasons given by the respondents for choosing the building materials used and the origin of these materials are also discussed in this section.

4.3a Post and framing materials

None of the surveyed houses had proper foundations, although the structures' stability largely depended on the posts and framing construction. Some of the posts would sit in a biscuit container made of tin, filled with concrete mix as a footing, holding the post in place.

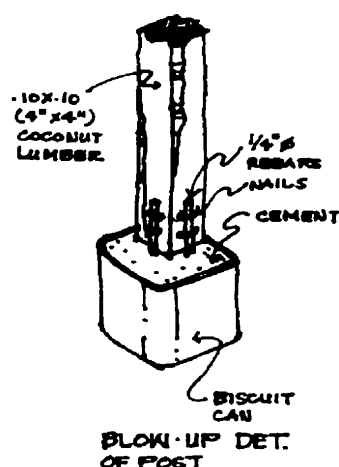


Fig.4.3a 4x4 Coco-lumber post detail
Source: Sketch by author.

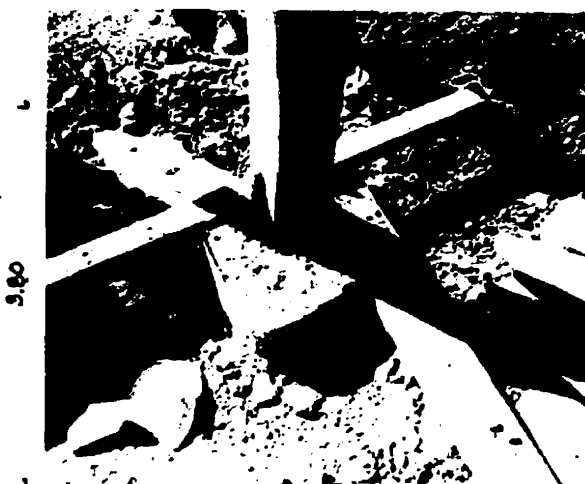


Fig.4.3b 4x4 Coco-lumber post
Source: Photo by author.

Rough lumber with nominal dimensions of 50mmx50mm, 50mmx100mm, 50mmx150mm and 50x200mm, was the most common form of structural support. In formal construction, rough lumber was used only for scaffoldings and in form works for concrete and so is relatively cheap to buy in hardware stores. In informal housing, however, rough lumber has become the preferred alternative for the structural framework. This was also the case in the surveyed dwellings.

Coco-lumber, which is currently being studied as a substitute for traditional wood species like Lauan, Tangulie, Guijo, etc, is the next preferred choice as a structural component. Coconut wood has been shown to possess acceptable structural strength and, if properly treated, also has durability properties comparable to those of the traditional wood species (Brion, An overview of the potentials and utilization of coconut wood, 1985, p. 2).



Fig. 4.3c Senile coconut tree trunks to be sawn into lumber
Source: Mosteiro, 1985, p. 30.

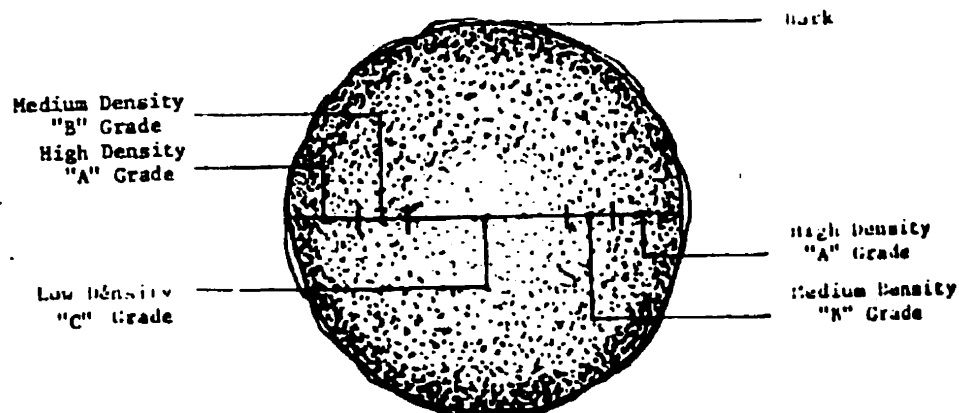


Fig. 4.3d Section of a coconut trunk
Source: Brion, 1985, p. 9.

Ipil-ipil, (*Leucaena Leucocephala*) or Lead tree, is one of the most common trees found in the vicinity of the study area. It is called *uaxin* or *yaje* in Latin America, or *subabul* in South Asia. It is a very fast growing, nitrogen fixing, tropical tree species. It is used in ways as fuelwood, fodder, or food, in construction as poles and in soil conservation. In the lower elevations of the tropics some of these species can grow as much as 5-6 meters in a year, but typical growth is somewhere in the range of 2 to 4 meters a year.

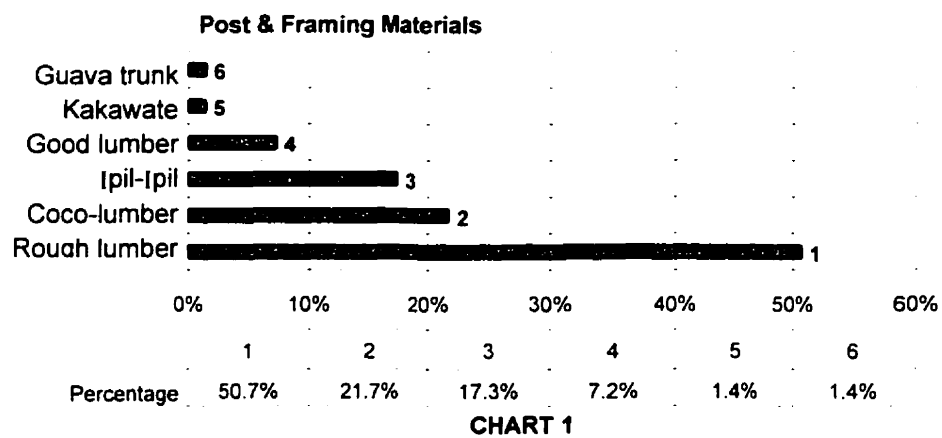
Between 1565 and 1825, Ipil-Ipil was brought to the Philippines on Spanish galleons. The species did extraordinarily well in the warm tropical climate of the region, even becoming a weed in some areas. The tree produces long slender trunks useful as construction poles. It is able to survive long periods of drought because of its deep and extensive taproot system (BOSTID & NFTA, 2000, p.2).

In the informal community of Sitio Pugad Lawin, the *Ipil-Ipil* was used in many ways as well. The trunk of the *Ipil-Ipil* was mostly used as a post. Its smaller branches were used as roof supports and wall framing. Sometimes it could be seen as a strut for the awning windows to keep them open. It was one of the building materials that were easily procured in the area by the residents.

However, the *Ipil-Ipil* is not as popular as *Yakal*, or *Guijo* in terms of structural strength. The *Ipil-Ipil* was used by the residents in its natural form and so it can neither be categorized as good or bad lumber.



Fig.4.3e The Ipil-Ipil
Source: Enzyklopädie der
Holzgewächse, 1999, p.3.



House owners who hired local artisans and small-scale contractors generally used good lumber for the housing framework in combination with the other materials specified in Chart 1. *Kakawate* and Guava tree trunks, which are not known to be used in building construction, were utilized by some of the respondents, largely because they grew abundantly in the vicinity of the study area and could be easily procured.

4.3b Floor materials

Plain concrete, without reinforcing bars, is commonly used as flooring. Some used only cement screed on top of combined soil and crushed gravel or stones. However, the level of the floor is always a little higher than the natural grade. Linoleum, which is a resilient floor-covering material with burlap or canvas backing, was also used by some house owners. Linoleum can be bought by meter and it comes in rolled form. It has very low abrasion and dent resistance. It is laid out either on top of the concrete or cement screed floor or even on top of a compacted soil. Compacted soil floors, though they require regular maintenance, offer a cheap alternative to concrete floors. Some of the respondents had placed the linoleum on top of the compacted soil.

Second-hand Plywood or any scrap wood was also used as flooring, especially when floors were elevated.

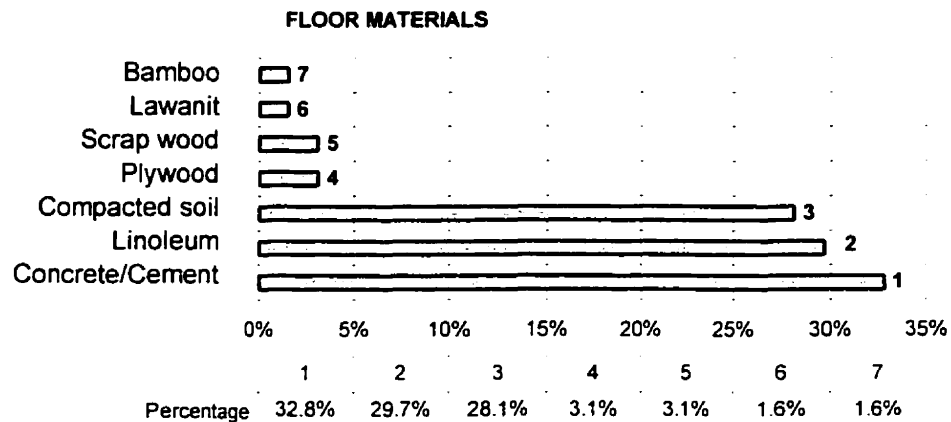


CHART 2

Lawanit, a hard fibre board or masonite, is cheaper than plywood and is also used as a flooring material. The *Lawanit* has one smooth surface while the other side is lined with burlap. In formal construction, this is used as a plywood substitute but mostly used for interior partitions only. It is cheaper than plywood. Bamboo as flooring was used on a couple of houses surveyed. However, bamboo doesn't grow in the vicinity of the study area, so most the of the bamboo used on the dwellings was purchased from sidewalk vendors.



Fig. 4.3f Underside of a Bamboo floor
Source: Photo by author.

4.3 c Wall materials

Plywood was the most common material used for walls among the surveyed houses. It was used in combination with other materials indicated in Chart 3. Plywood sheets were nailed to studs of different materials, ranging from good lumber to branches of trees. The second most common material was *Lawanit*. It was used the same way as the plywood, where the owners would nail it to the studs of different materials. The concrete hollow block (CHB) was the most permanent material among the rest of the wall materials recorded.

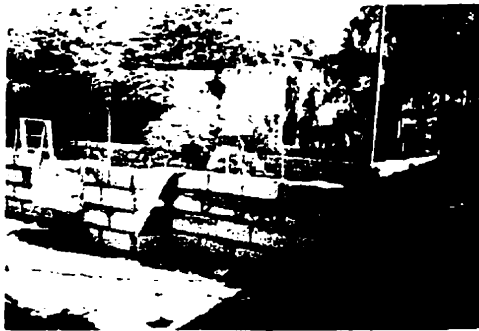


Fig.4.3g CHB as wall material
Source: Photo by author.



Fig.4.3h CHB
Source: Photo by author.

The best quality of CHB in the Philippines is built with Jackbilt system, but they are expensive compared to the ordinary blocks used by the respondents in the study area. Most were “backyard” produced. Backyard production of the CHB not only make construction cheaper, it also provided a more stable and permanent wall material.

The majority of those respondents who hired small-scale contractors and artisans used the CHB as their wall material. However, the blocks were used

only up to a certain height level, as it becomes too expensive to build the entire height of the wall of CHB. Plywood panels on stud framing were used for the rest of the wall.

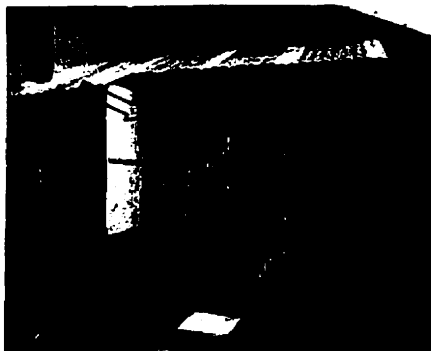
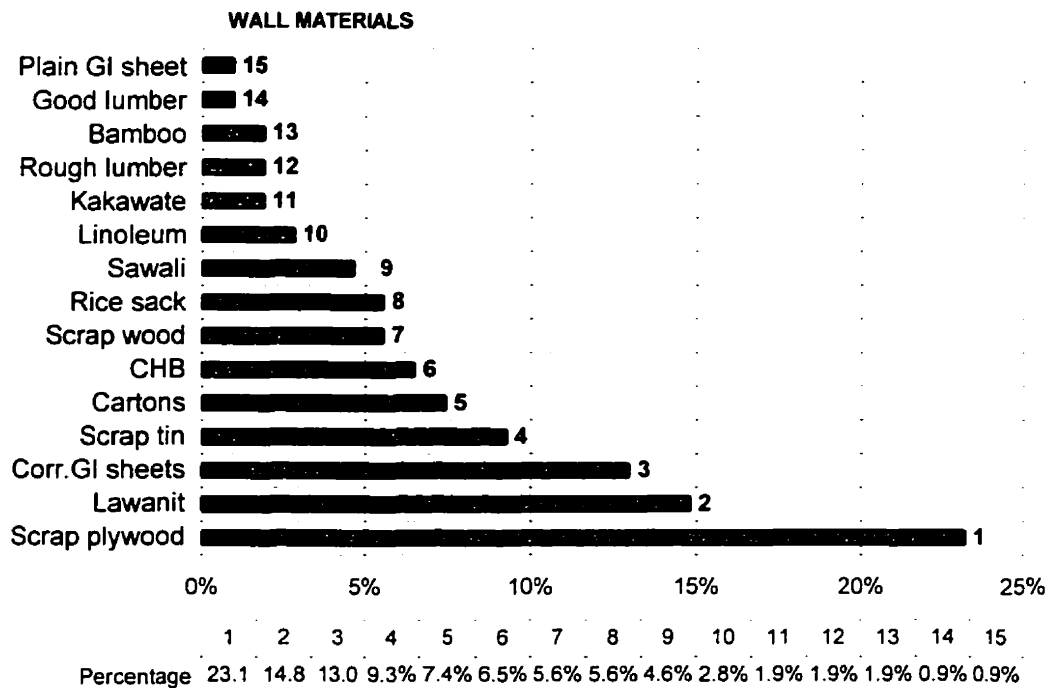


Fig.4.3k Bamboo as wall material
Source: Photo by author.



Fig.4.3L Sawali as wall material
Source: Photo by author.

Some indigenous materials, like bamboo and *sawali* (woven reeds) were also used. Both materials were purchased from a shop selling indigenous materials. Corrugated and plain GI (Galvanized Iron) sheets were also used in combination with the other wall materials, nailed to the framing structure.

4.3d Roof materials

Metal roofing was the most preferred material in the study area. A large percentage of the dwellings under study use the corrugated GI (Galvanized Iron) sheet as roofing material. Whether the material is new, second-hand or scavenged, the availability, affordability and performance of the metal sheets remained the major reasons for the respondents' decisions to use it a roof covering. The ease of application for the GI sheets, their light-weight nature and large span coverage all contributed to a great extent in the speedy construction of the dwellings within the study area. The GI sheets were nailed to a roof structure made of different materials, ranging from tree branches to good lumber. Most of the houses under study employed a gable or shed type of roof.

The typhoons that frequent the area and the considerable yearly rainfall are two main considerations in the construction of the roofs. Most of the roofs on the surveyed dwellings had a pitch of approximately 15 to 20 degrees, which permits ease rain-water discharge. They also have large overhangs, projecting

between 60mm and 100mm from the exterior wall to protect the interior of the dwellings from water seepage and flooding.

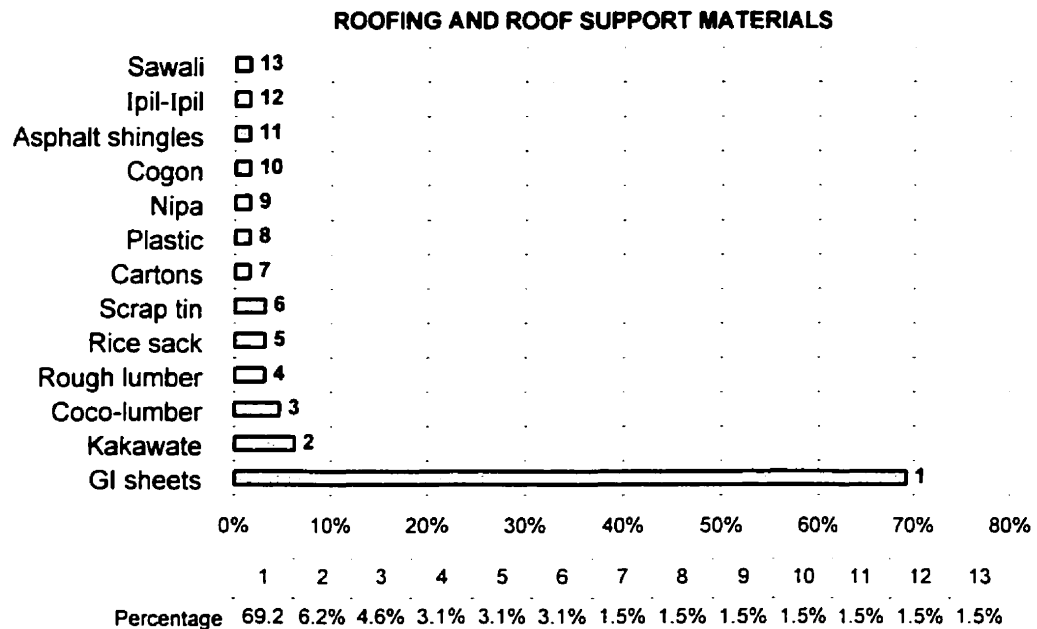


CHART 4

4.3e Doors and windows

Of the recorded door and window materials for the dwellings, plywood was the most commonly used, followed by the *lawanit*. Some of the surveyed houses also used old doors and windows recycled from other houses. According to the respondents, they are able to acquire such items when houses in nearby villages are renovated and the owners throw away their old doors and windows.

The most common window operation is the awning type, well suited to the rainy climate of the region. These windows can be opened even when it is raining.

These were typically propped up by different materials, ranging from tree branches to rough lumber. The window sizes were usually small compared to

windows on formal housing, and the door heights observed were about 1.8 meters x .75 meters.

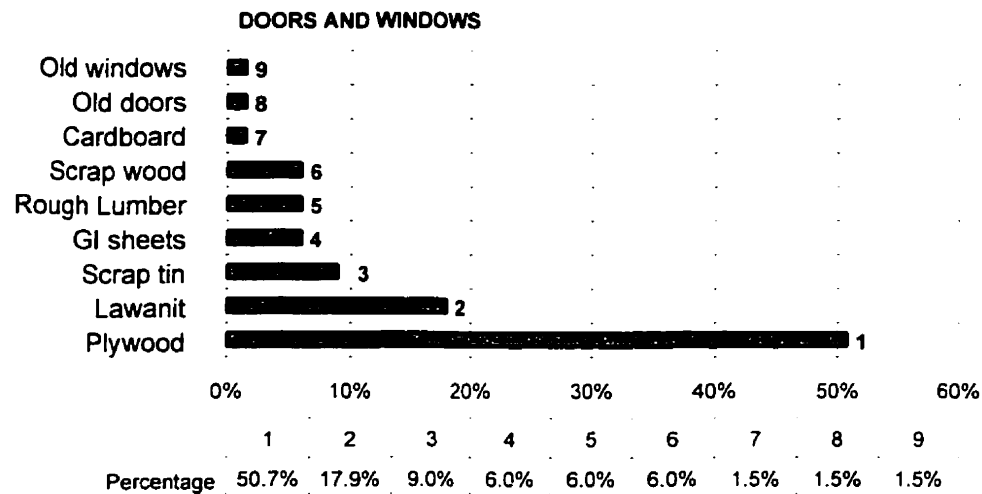


CHART 5



Fig.4.3m. Windows from other Houses

Source: Photo by author.

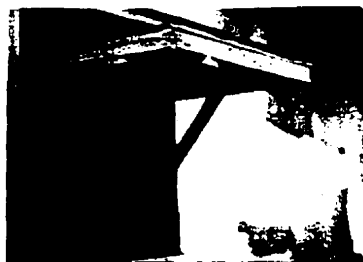


Fig.4.3n. An example of an awning window and a door.

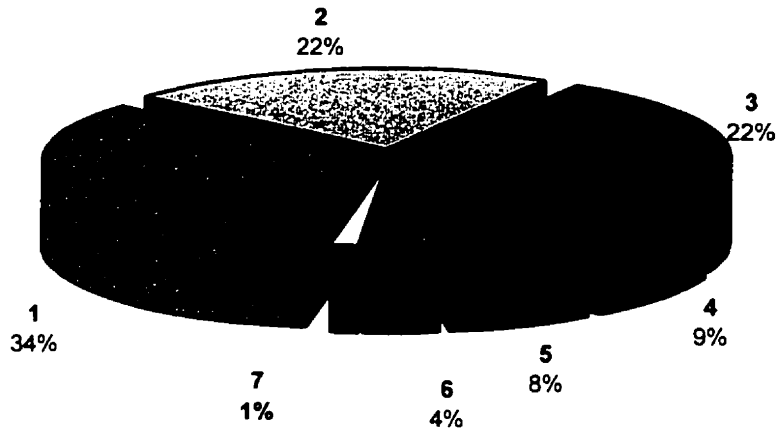
Source: Photo by author.

4.3 f Sources of building materials

Materials used on the houses were procured from different sources. Depending on the age of the houses, the income of the household, the outlook of the house

owners on land ownership, and need for security, the choice of building material sources varied considerably. However, a large percentage of the building materials used on the surveyed dwellings were bought from nearby hardware shops.

Sources of the Materials



LEGEND

1. Hardware	34%
2. Friends	22%
3. On-site	22%
4. Construction Site	09%
5. Relatives	08%
6. Garbage Collector	04%
7. SWD-Social Welfare Department	01%

CHART B



Fig.4.3o Nearby hardware shop
Source: Photo by author.

This is clearly evident on houses undergoing an upgrade from, temporary materials to more permanent ones. Likewise, house owners who hired local artisans or small-scale contractors often used superior materials like CHB, concrete flooring, good lumber and some of the corrugated GI sheets, all bought from the hardware shops.

It was also found that some of the materials they used were given by friends and relatives, and that a certain percentage of the materials were taken from a construction site located near the study site. Some of the materials, however, were bought from garbage and old newspaper collectors who live within the community and are active distributors of building materials like plastic sheets, used tin cans, scrap plywood, and old cardboards, to name just a few. There was also one house that was in the same business of selling junk, but it was situated inside Pilar Village, which is not far away from the survey location



Fig.4.3p The "junk shop"
inside Sitio Pugad Lawin
Source: Photo by author.



Fig.4.3q The "junk shop"
inside the nearby Pilar
Village
Source: Photo by author.

The presence of such businesses within and not far from the community afforded the households easy access to the replacement or repair materials they need.

4.3 g Mode of Transport

The materials were transported by many different means. Carts were used for transporting those that were given by friends and relatives living in the same area. This was the easiest, fastest and cheapest way to move the materials. Materials bought from the hardware store were delivered by truck. The delivery truck unloaded the materials at the entrance to the community area, and the house owners loaded the materials in the cart to carry them all the way to their lots. Sometimes a tricycle was hired to carry the materials inside the

community, but whenever it was practical, the materials were transported by foot.



Fig.4.3r The typical cart used to carry the building materials.
Source: Photo by author.



Fig.4.3s Trucks unload the materials at the entrance to the community.
Source: Photo by author.

SUMMARY: HOUSE CONSTRUCTION DATA													
Sitio Pugad Lawin, Almanza Dos, Las Pinas City													
R.No	Tenure	Mode of construction					Building Materials						
		No of Workers	Origin	Ap. Cost cdn \$	Const. Period	Approx. rea (sq.m)	Floor	Walls	Roof	Posts / Beams	Doors/ Windows	Origin	Mode of Transport
1	6yrs.	4	relatives owners	free	2 weeks	18.9	c. soil linoleum	rice sack/ lawanit/tin	asphalt	kakawate	lawanit	on site friends	by cart/ on foot
2	10 yrs.	2	owners	free	In stages	28.4	c. soil	kakawate/tin lawanit/CHB	GI shts.	rough & coco lumber	scrap plywd/ tin	on site/ friends	on foot
3	12yrs.	3	owners		In stages	27.88	c. soil linoleum	GI shts/ scrap plywd	GI shts	rough lumber	scrap plywd/ tin	const.site garbage	on foot/ cart
4	7 yrs	3	owners relatives	free	1 week	8.4	c. soil/ linoleum	kakawate/tin scrap plywd.	sack/tin/ G.I. shts.	guava trunk	scrap plywd/ tin	relatives on site	on foot/ cart
5	18yrs.	2	relatives	free		11.76	soil linoleum	G.I. shts.	tin/ipil/ coco-lumber	kakawate	scrap plywd.	onsite relatives	on foot/
6	10yrs.	2	owners			18.36	c. soil linoleum	lawanit scrap plywd	G.I. shts	ipil / rough & coco-lumber	coco-lumber lawanit	const.site g.collector	by cart
7	21yrs.	2	owners			18		scrap plywoo tin/ rice sack	G.I. shts.	rough lumber coco-lumber	plywood lawanit	const.site	on foot
8	8yrs.	2	owners/ friends	free		9.6	c soil	GI Shts./tin plywd/scrap wd	G.I. shts.	rough lumber	plywood tin	hardware/ on site	by cart
9	2 yrs.	4	relatives/ friends	1,000	6 days	15.28	cement/ linoleum	lawanit bamboo slats	G.I. shts.	rough lumber	plywood	hardware on site	by truck/ cart
10	4 yrs	3	friends/ relatives		1 week	7.44	plywood/ linoleum	cartons scrap plywoo	G.I. shts. kakawate	rough lumber	plywood	const.site on site	on foot/
11	7mo.	2	owners			12.21	c. soil	cartons GI shts	G.I. shts. kakawate	Ipil rough lumber	plywood	on site friends	by cart
12	10yrs.	5	contractor	600	on-going	16.74	UC	CHB	G.I. shts.	rough lumber coco-lumber	UC	hardware	truck
13	10yrs.	6	neighbors friends		3 days	28.36	c.soil	CHB/sacks scrap plywood	G.I. shts.	rough lumber	old doors plywood	friends/ SWD	by cart
14	10yrs.	2	relatives	120		25.74	cement	CHB/sacks lawanit	G.I. shts	good lumber coco-lumber	plywood ipil	relatives/ hardware	by truck/ cart
15	6 yrs.	renting		12.00/mo		13.76	linoleum	lawanit plywood	G.I. shts	rough lumber	lawanit GI shts.		
16	2mo.	2	owners	120 fr. relative	1 week		c.soil	scrap wood tin/cartons	G.I. shts	ipil	scrap wood tin/plywood	on site/ friends	by cart/ on foot
17	10yrs.	2	owners	280	by stages	14.56	cement	cartons	G.I. shts. sawali	rough lumber	scrap wood	g.collector hardware	by cart

The house building activities of the informal sector

Part II - Chapter 4

SUMMARY: HOUSE CONSTRUCTION INFORMATION													
Sitio Pugad Lawin, Almanza Dos, Las Pinas City													
Mode of construction							Building Materials						
R.No.		No of Workers	Origin	Approx. Cost	Const Period	Approx. Area(sq.m)	Floor	Walls	Roof	Posts / Beams	Doors/ Windows	Origin	Mode of Transport
18	10yrs.	2	friends/ relatives	240	1 week & going	19.2	UC	UC rough lumber	G.I. shts	rough lumber tree trunks	UC	hardware/ on site	truck cart
19	23yrs.	3	contractor		6 days		c. soil w/cement	CHB/lawanit scrap plywood	G.I. shts	rough lumber	G.I. Shts rough lumbe	hardware/ on site	truck
20	2yrs.	2	owners	free	1 week	15.64	plywood	G.I. Shts cartons	G.I. shts/ cartons	ipil/lpil coco-lumber	scrapwood/ plywood	on site	on foot
21	3yrs.	3	friends/		2 weeks		cement linoleum	plywood linoleum	rough lumbe plastic	ipil/lpil rough lumber	plywood	const.site fr. Friends	by cart
22	10yrs.	3	friends/ relatives	160	1 wks.	14.25	UC	scrap plywoo	G.I. shts coco-lumber	coco-lumber scrap wood	UC	hardware const.site	by truck/ cart
23	7 yrs.	2	realtives/ owner		5 days	11.02	c. soil	lpil / bamboo scrap plywood	sack/GI sheets	rough lumber coco-lumber	plywood ough lumber	relatives	cart
24	5yrs.	2	owner			34.04	rough planks	scrap plywood	nipa kakawate	lpil/lpil kakawate	scrap tin/ cardboard	hardware on site	on foot by cart
25	9 mo.	2	owner/ contractor		3 wks	17.43	c. soil	lawanit / tin	cogon/ G.I. shts	coco-lumber rough lumber	plywood	hardware on site	by cart
26	uc	2	contractor		uc		c.soil	CHB	UC	UC	UC	UC	cart
27	5 yrs.	2	owners	200	5 days	12.25	c. soil w/cement	lawanit sawali / tin	G.I. shts coco lumber	rough lumber coco-lumber	plywood ough lumbe	on site hardware	by cart
28	1yr	2	friends		3 days	21.85	bamboo/ c.Soil	lawanit	G.I. shts	rough lumber Yakal	plywood rough lumbe	friends hardware	by truck/ cart
29	1 yr.	2	contractor	800	3 mo	18.06	cement linoleum	lawanit	G.I. shts	coco-lumber	plywood	hardware friends	by truck/
30	3 yrs.	2	contractor	780	on going	48	UC	CHB UC	G.I. shts	rough lumber	UC		by truck
31	8 yrs.	1	owner	400	2 weeks	23.65	cement linoleum	lawanit	G.I. shts	lpil	plywood	hardware (2nd hand)	by cart
32	2yrs.	2	owner/ friends		1 mo		cement c.soil	lawanit	G.I. shts	lpil/ rough & coco-lumber	plywood	hardware friends	by truck
33	12 yrs.	2	owner/ friends	1,400		33.14	cement linoleum	.I.shts/sawal bamboo	G.I. shts	rough lumber	plywood lawanit	hardware friends	by truck

SUMMARY: HOUSE CONSTRUCTION INFORMATION													
Sitio Pugad Lawin, Almanza Dos, Las Pinas City													
Mode of construction							Building Materials						
R.No	Tenure	No of Workers	Origin	Ap.cost cdn \$	Const Period	Approx. Area(sq.m)	Floor	Walls	Roof	Posts / Beams	Doors/ Windows	Origin	Mode of Transport
34	8 mths.	2	owners		1 week	9.84	cement linoleum	G.I. shts carton	G.I. shts	rough lumber	tin	friends	on foot by cart
35	6 yrs.	2	owners/ friends		3 weeks	9.2	cement	plywood good lumber	G.I. shts rough lumbe	rough lumber	plywood	hardware friends	by cart
36	8mo.	8	contractor relatives	800	4 days	17.29	lawanit	lawanit	G.I. shts	rough lumber	lawanit	hardware friends	by cart/ truck
37	8 mo.	2	owners relatives		3 days		wood planks	1 shts/o.wdo scrap plywood	G.I. shts	rough lumber	old windows (2nd hand)	friends relatives	by cart/
38	8mo.	2	owners		on going		wood planks	UC	G.I. shts	rough lumber	UC	friends relatives	by cart on foot
39	8 yrs.	2	owners	92	2 days	9.85	plywood	plywood Gl. shts	G.I. shts	rough lumber	plywood	fr. const. site	by truck
40	11 yrs.	8	contractor	480	4 days	13.95	cement linoleum	sawali/G.I./ plywood/sack	G.I. shts	coco- lumber/lpil	plywood	hardware on site	by foot
41	15 yrs.	3	owners/ friend	240	5 yrs.	15.2	cement linoleum	plywood awanit/Gl sht	rough lumbe G.I. shts	rough lumber	plywood	hardware	Cart
42	18 yrs.	4	owners/ friends		1 week	21.09	cement linoleum	sawali//G.I./ plywood	G.I. shts.	good lumber	lain G.I.shts plywood	hardware friends	by cart
43	2 yrs.	2	contractor	1,400	2 weeks		cement linoleum	sawali/ tin rough lumber	G.I. shts.	lpil/ rough lumber	lawanit plywood	hardware	Tricycle
44	10 yrs.	3	contractor	1,400	1 week	24.92	linolieum cement	plywood 1 shts/lawanit	G.I. shts.	rough lumber coco lumber	plywood lawanit	hardware const.site	by truck/ cart
45	7 yrs.	2	owners friends	200	2 weeks	19.64	cement linolieum	CHB/lawanit plywood	G.I. shts.	rough lumber	lawanit plywood	hardware friends	by truck/ cart
46	1 yr.	2	owner contractor		1 mo	15	cement	plywood plainsht.	G.I. shts.	coco- lumber/lpil	plywood	hardware friends	by truck/
47	1 yr.	house bought	was	480		11.7	cement	CHB/plywd./ linoleum/carton/	G.I. shts.	rough lumber kakawate	lawanit plain G.I.		
48	13 yrs.	2	owners/ wife	160	1 week	8.4	cement	G.I sheet/tin linoleum/carto	G.I. shts. kakawate	ipil-ipil kakawate	plywood	hardware on site	by cart/ truck
49	4yrs.	2	owners	18/mo renting		14.8	c.soil	plywood	G.I. shts	ipil-ipil rough lumber	lawanit plywood		
50	4yrs.	3	brothers	free	1 mo		c.soil	plywood/sack tin	G.I. shts	rough lumber	lawanit plywood	given by friends	on foot by cart

House Construction Data Summary:

The house construction data gathered were organized into two sections: The mode of construction and the types of building materials used. The respondents' tenure of stay in the community was likewise included as it is one of the elements that can influence the quality of the informal housing produced, both in its mode of construction and the types of building materials used.

As the findings showed, the mode of construction in general was carried out by 2 to 5 workers, where in most cases included the owners. The construction data showed that most of the houses were not built by the homeowners alone but with relatives, friends and hired contractors. The construction period ranged from a couple of days to a month. It was observed that aside from income level, the type of materials used also determines the length of the construction period. Majority of the houses were built incrementally, and some were under construction at the time of study. As such, it is difficult to determine the precise construction cost. Most of the respondents have forgotten how much it cost them to build the house initially. However, a large percentage of them disclosed that they didn't pay so much financially for the building labor employed on their houses. Strong social relationship with relatives, neighbors and friends has enabled them to construct their homes with less cost and time. It can also be seen that those respondents that employed contractors, have been in the community for at least a year.

There was no relationship between the area of the house and the number of workers that helped build the house. Two workers can build either dwellings with the areas of less 10 sq. meters, and those that have more than 25 sq. meters.

The origin building materials used contributed in large measure to the speed of the house construction. They don't have to go far from the community to get their building materials, and that transporting these materials to their intended site by cart or on foot would be practical. The use of *Lawanit*, plywood, GI sheets, rough lumber and CHB that were bought from the hardware are exceptions. However, these building materials can also be found in the vicinity of the community either as a hand down or gift, but sparingly. The choice of the linoleum as a floor covering, for example, is a cheaper alternative to any form of floor material like ceramic tiles and it can be laid out easily. As such, it's the most commonly used material for flooring. The inexpensive element, accesibility and ease of application, were the main reasons for respondents' choice of the building materials used for their houses.

PART III: Summary

Chapter 5 Conclusions and Recommendations

5.1 Lessons Learned

This investigation of 50 informally built houses has contributed in great measure to the understanding of how the informal housing sector caters to the housing needs of the low-income group in the Philippines. It has also made it possible to draw several conclusions.

This chapter outlines the conclusions derived from the investigation concerning the age and stability of the informal dwellings. It discusses lessons learned from the layout of the informal house, the construction methods applied and building materials used in relation to the phases of informal housing development. The chapter also shows how the survey contributed to understanding the quality and speed of the informal building methods as well as the performance of the chosen building materials.

The informal houses surveyed were generally developed in phases. Therefore, the study was limited in terms of its investigation of the total amount spent on their building, repair and maintenance.

The lifetime of the houses

Most of the respondents have lived in the community for 10 to 20 years. The houses that they have built over time, have withstood the typhoons that the Philippines experiences more than 5 times a year. The lifetime of these houses, however, is determined by the quality of materials and building techniques used in all stages of the informal housing development . Because the houses that were surveyed were poorly built in the beginning, regular maintenance and repairs were crucial to their stability. For example, roofs were one of the elements constantly being repaired or replaced, especially when exposed to the strong winds that are common during the typhoon season. The survey showed that, in addition to cost, proper roof attachment is also a critical factor to be considered if improvement of informal house building techniques is to be carried out.

When households reach the stage where they are financially capable of building stronger and more stable dwellings, constant maintenance and repairs are no longer that crucial and frequent. However, rain and termites remain threats to the dwellings' longevity.

Housing Layout

There were several factors that affected the layout of the houses. Generally, the area of the plots where they built their houses helped govern the dwelling size. The financial capacity of the household and the availability of building materials and labor also helped determine the housing layout.

The length of time that the respondents had lived in the dwelling also had an effect on its layout. As the amount of time that the household has been in the community grows, the layout tends to develop from a one-room unit to a multi-room house. Interviews with the house owners, showed that houses generally started as a one-room structure where the toilet was either typically located abutting the house or constructed as separate structure if it was not shared with a friend, relative or a neighbor. In multi-room dwellings, the spaces were defined by partitions of different materials, ranging from curtains to framed wall construction. All of the housing layouts were essentially rectangular in shape.

Horizontal expansion, and even demolition of the old dwelling structure to build a bigger house were the two most common methods of increasing space in the houses surveyed. Vertical expansion, however, was not common, as it was structurally easier for them to expand horizontally. Family size was also an influential factor on the layout of the houses and their growth.

Phases of Construction Development

Informal housing is a continuing process. While comparatively less effort was dedicated to the construction of houses that were in the first stages of housing development, the effort required for regular maintenance and repair was considerable. On the other hand, as the house owners improved their financial capabilities, more effort was expended on solid housing construction and less on maintenance and repairs.

In the earlier phases of construction, dwellings were mostly self-built and inexpensive, with less-durable building materials and construction methods. Materials such as tree trunks, rice sack, cardboards, scrap tin and scrap plywood were commonly observed. As progress takes place, help from small-scale contractors was sought, and investments were made in more durable and conventional building materials such as the CHB, good lumber, plywood panels and new corrugated GI sheets.

Construction methods

Construction methods in all stages of house building largely depended on the owner's resources and skill of the builders. The quality of the techniques used reached an improved standard when small-scale contractors were hired. Many heads of households had worked in the construction field, like masonry and

carpentry, and had the acquired skill advantages and industry knowledge. These households eventually became established enough spend money on better materials. However, in most cases, the absence of proper construction tools and materials inhibited the construction of good-quality dwellings. Posts and frames frequently suffered as a result, and were built in a precarious manner.

The incremental development of housing construction was well adapted to the owner's capacity to pay. For example, the CHB (concrete hollow blocks) walls were built only up to a certain height and completed at a rate that complemented the owner's budget. In the meantime, the CHB was combined with other wall materials such as plywood or *Lawanit* to complete the wall façade. However, the CHB wall's stability often became questionable because only a few horizontal and vertical reinforcing bars or none at all, were used. Nevertheless, even with its shortcomings, this method was still an improvement over walls made from scavenged materials.

In cases where wood framing was used instead of concrete blocks, the framing was mostly left exposed on the interior side of the house. Depending on the homeowners' preference and finances, the wall could either be completed by applying another wall sheathing on the interior side, or left exposed. Since the wall materials were unpredictable, especially in the early stages of the housing development, the spacing irregularity of wall framing was not an issue. However,

when a uniform wall covering such as 2'x4' plywood panel type of wall material is applied, irregular framing did not serve its purpose very well.

The light weight of the GI sheet roof covering made simple rafter construction possible, although there were some deficiencies in member sizes and spacing. Splicing of different wood lengths to create the desired span was a common technique but did not pose a problem, considering the lightweight roof covering. The chief weakness found in the roof construction was in the method of attachment to the roof girder and to the wall framing, which are roughly of the same size. With resources and materials being limited, the roof framing was only attached with nails to walls and girders and no other strapping materials were used.

The post footings were cleverly made from large tin cans filled with concrete and other recycled materials. Once buried in the ground, the post with its improvised footing made a stable support for the roof and the wall framing. The size of the posts used was generally larger than the rest of the framing, regardless of the phase in housing development and type of material used.

Building Material Performance

The use of coco-lumber in all stages of the housing construction gave the house owners an affordable material for wall framing. Its strength and durability, served its purpose of accommodating the need of the low-income families to build better structural supports than scavenged materials with questionable building properties. Coconut lumber is already in use in formal construction and its application to informal construction suggests that it has become a successful indigenous building material.

Lawanit was an effective wall covering, used in combination with other wall materials such as CHB, and plywood. One disadvantage of using *Lawanit* as an exterior wall covering is its poor water resistance. The panel often warps when soaked with water from the rain. Improvements on the material composition are important if an affordable and effective wall covering for the low-income housing is to be addressed.

The CHB is the most stable, affordable and versatile building material used in informal construction. It has also proven to be suitable for innovative ventilation and lighting. Its integrity, however, with the application of inadequate reinforcement remains questionable, especially in unstable seismic conditions.

The GI sheets are among the most versatile building materials used by the homeowners. Affordable and easily acquired in new or recycled condition, corrugated GI sheets were used either as a roof covering or wall material. Plain GI sheets were used mainly as a wall covering.

Ease of application and malleability were among the reasons why the homeowners prefer to use this material. One disadvantage was that nails alone were used to attach the GI sheets to the framing with no other protection for the connection. Caulking and use of gaskets were almost non-existent, mainly because of limited resources. Painting the GI sheet roofs, especially the recycled ones, which can help in improving the life span of the material was not commonly done in the houses surveyed.

5.2 Recommendations

Informal house-building activities cater to the housing needs of the low-income group , providing them with a way to cope with the harsh effects of rapid urbanization, such as rising house and building material prices, changing housing policies, and uncompromising building standards. To fully address the possibilities that exist in the informal house building, it must be looked at from several perspectives, namely:

- A more structured and organized study on informal house building activities where factors such durability, cost and building material performance are fully integrated.
- Determining what can be done with informal building methods to attain a higher quality of workmanship.
- Realizing the peoples' attitudes towards improved indigenous building materials, their application and properties.
- Studying of the accessibility of commonly used conventional building materials and their innovative applications to the informal house building elements.

The formation of a separate, socialized house building standard under the Urban Development and Social Housing Act of 1992 is one positive step in bridging the gap between the informal and formal housing development. However, questions remain as to what aspects of the informal housing elements are to be maintained and which are to be adopted for socialized housing. For instance, although the average floor area of informal houses is around 25 sq. meters, the adoption of this size as the minimum floor area required for socialized housing created several problems. It appears to be difficult to strike a balance between a humane established minimum floor area and one that can be advantageous for housing developers.

Improvement of the skill of small-scale contractors, especially those from the trade route, requires involvement of building material producers and construction agencies. Further study on how they will compliment each other is also required.

With the informal houses being self-built early in settlements' development, the ease of application of conventional materials and building application of non-conventional materials has to be addressed.

Improvement on the properties of building materials starting with conducting further research on coco-lumber as an affordable and durable building material is necessary if better housing for the low-income group is to be addressed. The water and termite resistance properties of *Lawanit* should also be improved, as this study revealed that it was an effective wall material alternative to more expensive plywood.

Changing social attitudes towards indigenous building materials such as the bamboo and *sawali*, may not be easy but reviewing the cost of their production would help boost their use by the low-income group.

These ideas for possible improvement of the informal house building, are the result of many findings of the field study. These recommendations will be critical

in increasing awareness and understanding of the several factors that affect the informal methods of house building and the informal house itself.

APPENDIX 1 :

Survey Drawings and Photographs

Legend:

R. No. - Respondent Number

HH - Household Head

SP - Spouse

SO - Structure Owner

R - Renter

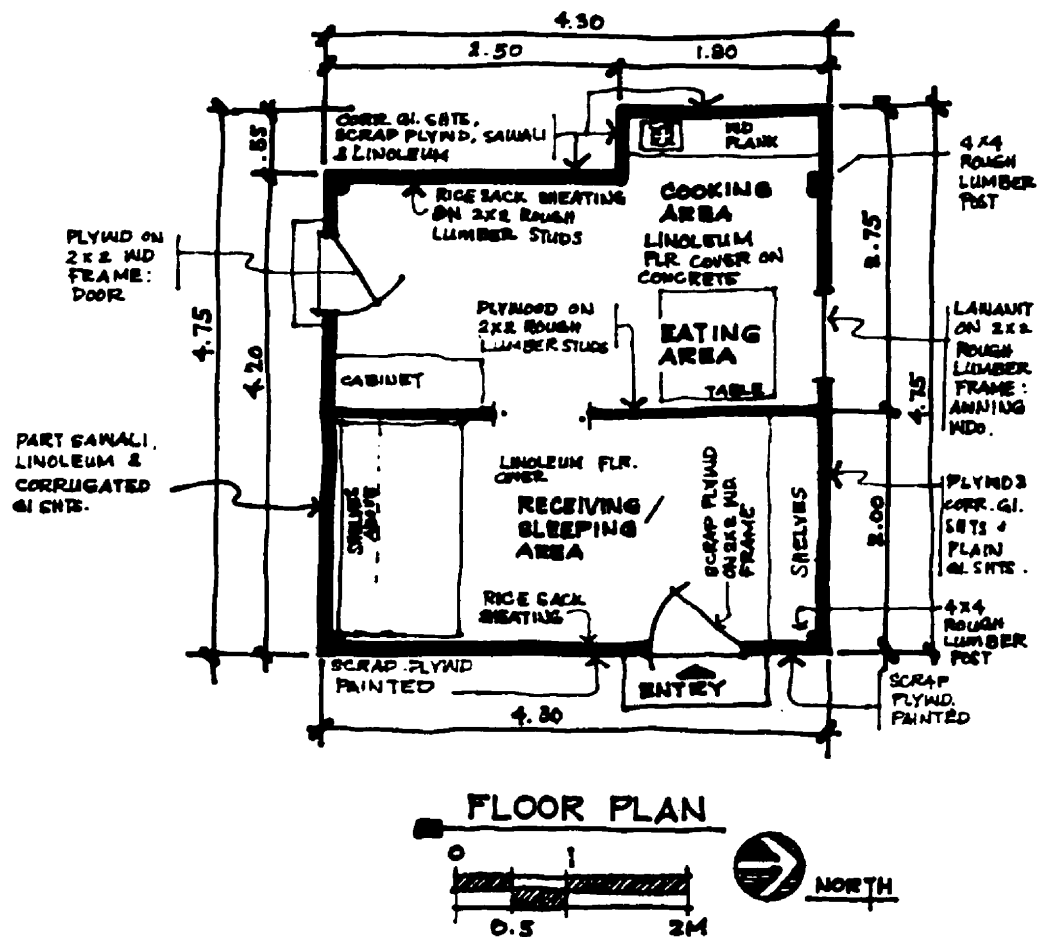


Fig. A.1 Exterior view of the house.
Source: By author.

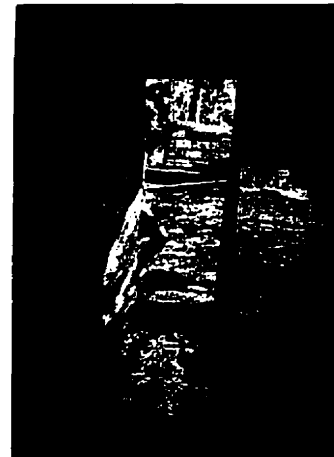


Fig. A.2 Interior view of the house.
Source: By author.

Respondent name: **Enriqueito Teves** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
1	54 / Male	Married-HH	2	Steelworker	214.00/mo	9 yrs.

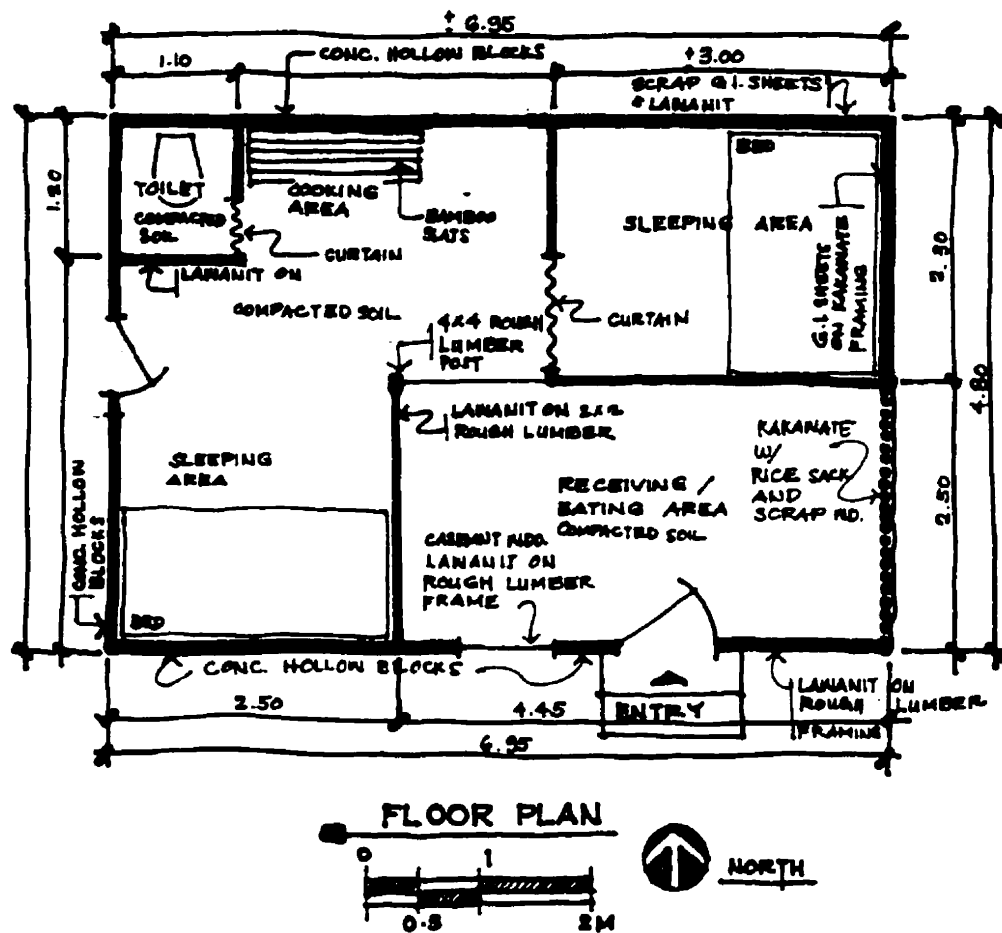


Fig. A.3 Exterior view of the house.
Source: By author.



Fig. A.4 Rear view of the house.
Source: By author.

Respondent name: Tirso Habuhab : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
2	50 / Male	Married-HH	6	Coconut vendor	71.00/ mo	10 yrs.

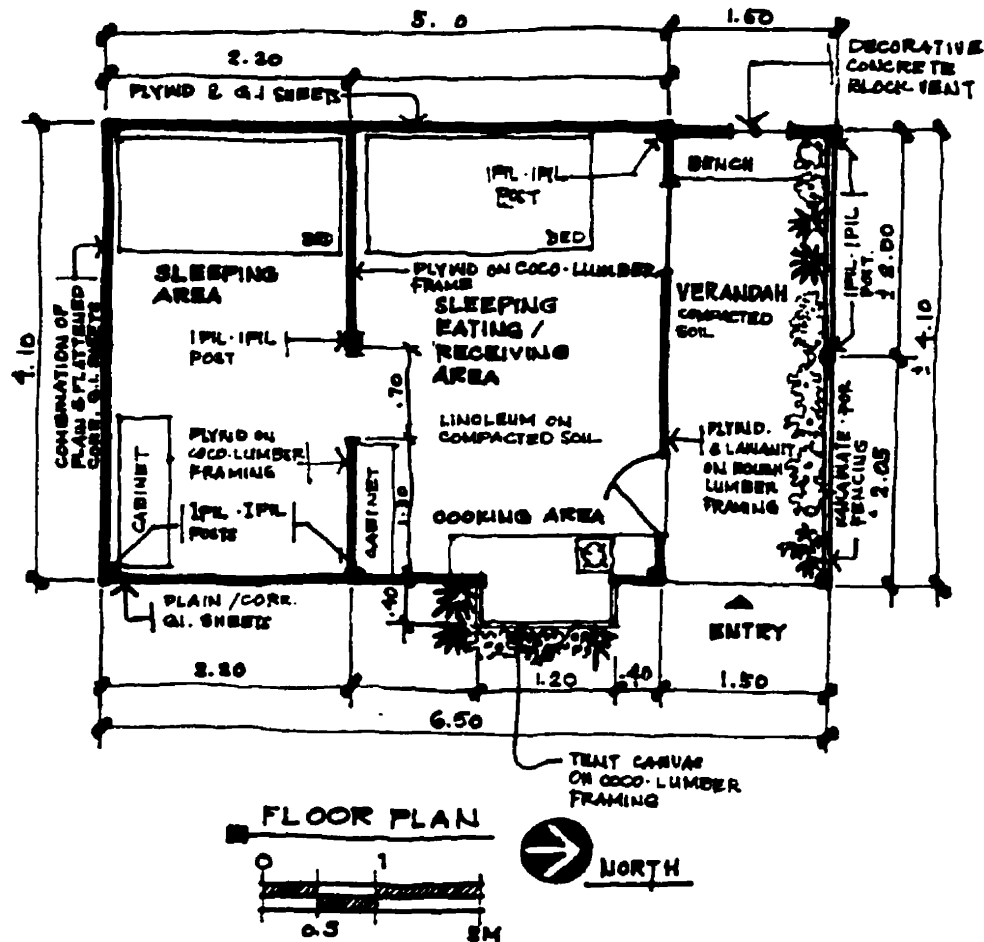


Fig. A.5 Exterior view of the house.
Source: By author.



Fig. A.6 View of the separate toilet, at the background.
Source: By author.

Respondent name: **Rosario De Vera** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
3	30 / Male	Married-SP	4	Laundry woman	60.00/mo.	12 yrs.

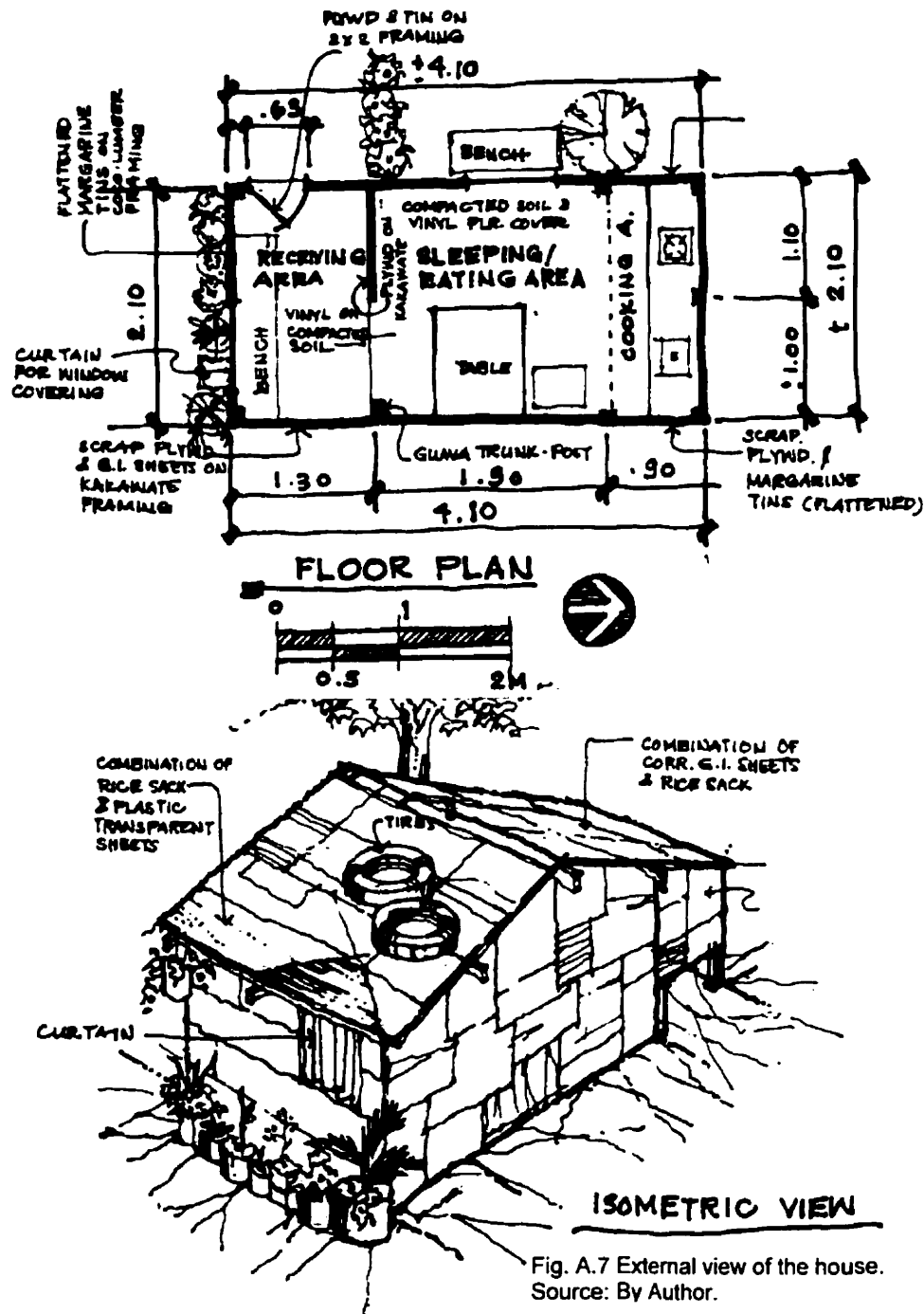


Fig. A.7 External view of the house.
Source: By Author.

Respondent name: Catalina M. Cotingjo : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
4	32 / Female	Married-SP	3	Housewife	100.00/mo. HH	7 yrs.

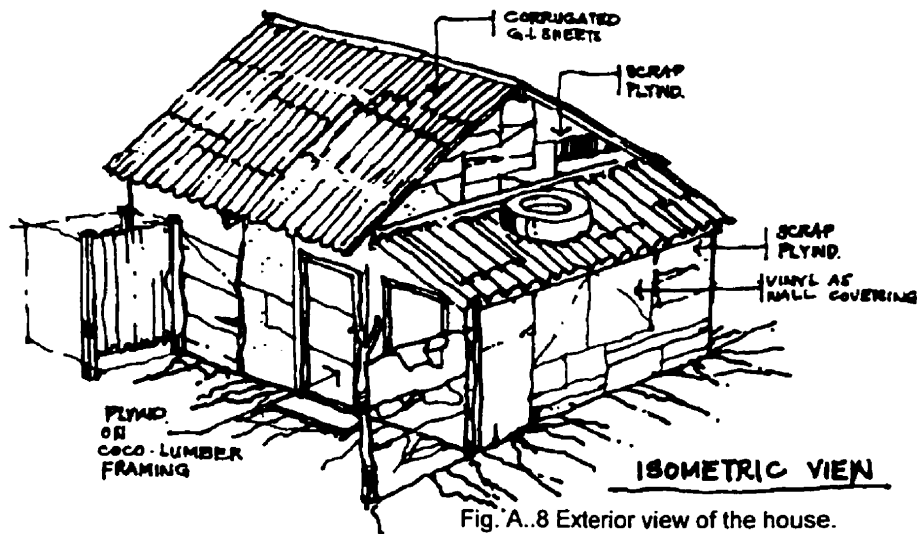
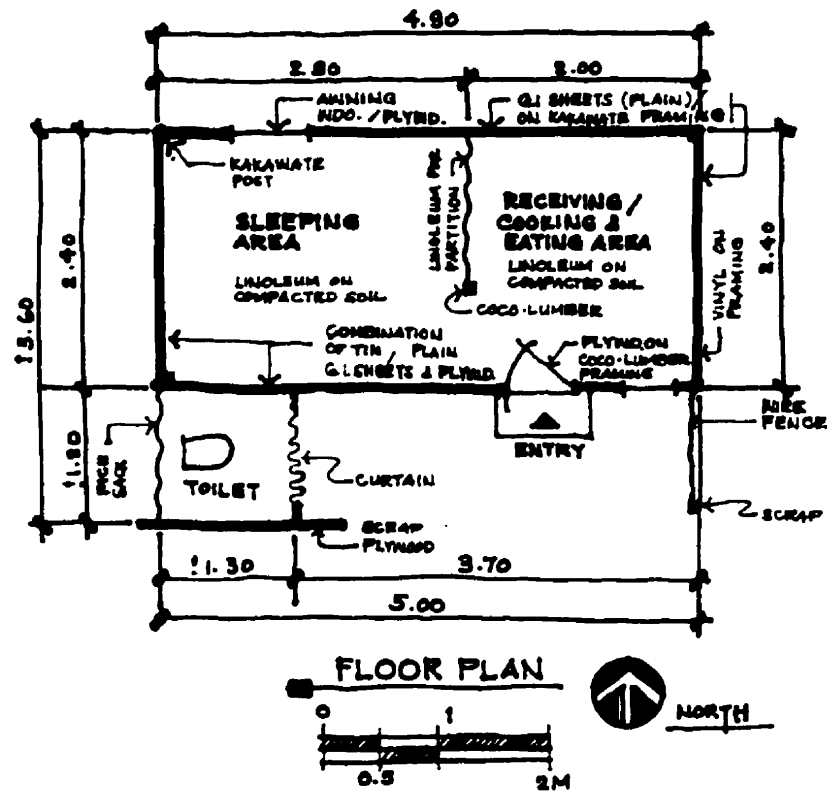


Fig. A..8 Exterior view of the house.
Source: By Author.

Respondent name: **Myrna Brown** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
5	20 / Female	Married-SP	2	Const.Labor-HH	100.00/mo.	18 yrs.

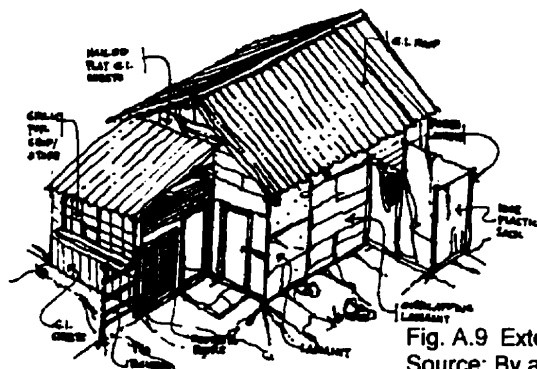
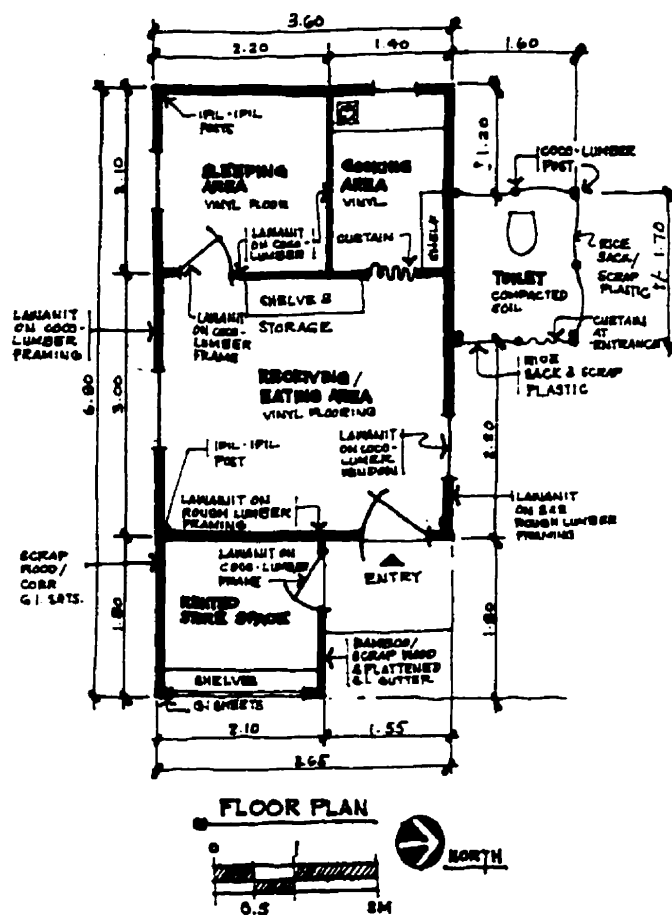


Fig. A.9 Exterior view of the house.
Source: By author.

Respondent name: **Ma. Gracia Golimlim** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
6	28 / Female	Married-SP	4	Streetsweeper	53.00/mo	10 yrs.

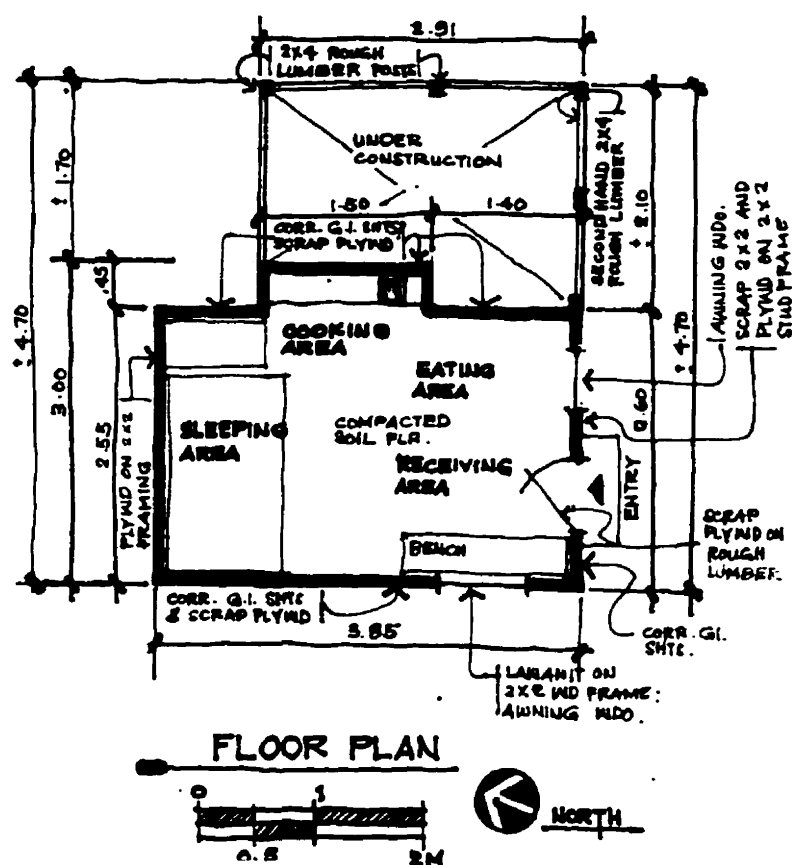


Fig. A.10 Roof framing detail.
Source: By Author.

Fig. A.11 External view of structure under construction
Source: By Author.

Respondent name: **Estrella Oreo De Vera** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
7	56 / F	Married-HH	3	Laundry woman	140.00/mo.	21 yrs.

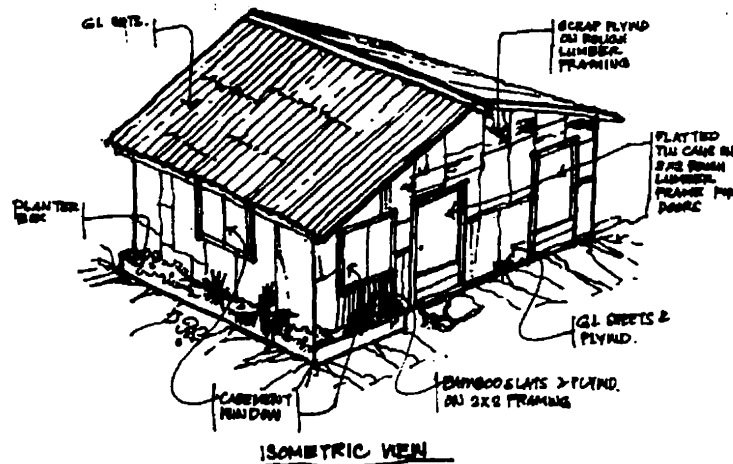
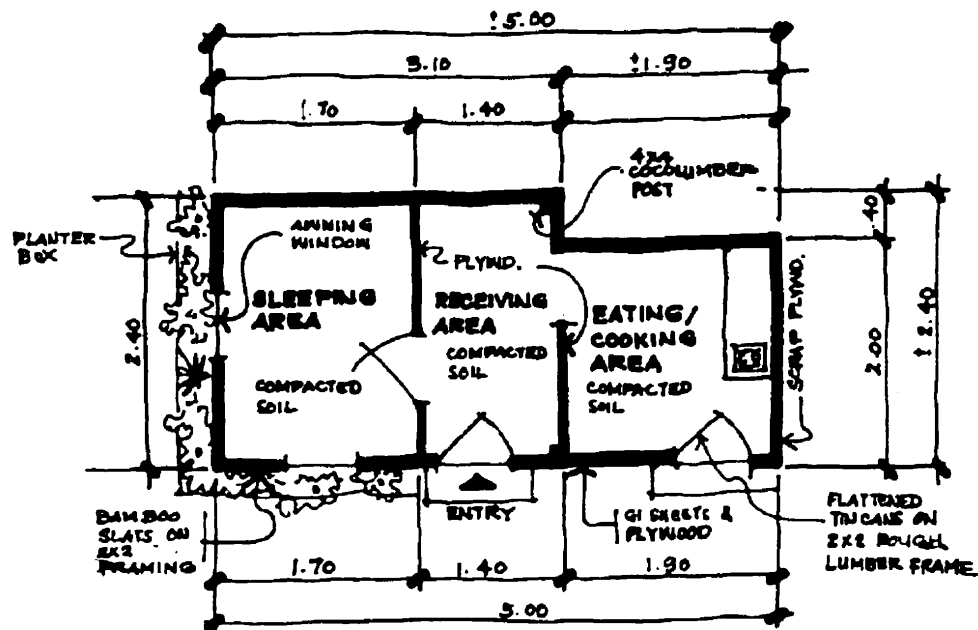


Fig. A.12 External view of the house.
Source: By Author.

Respondent name: Leonora De Vera Ferrera : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
8	30 / Female	Married-HH	1	Cosmetician	140.00/mo.	8 yrs.

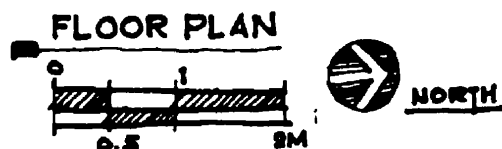
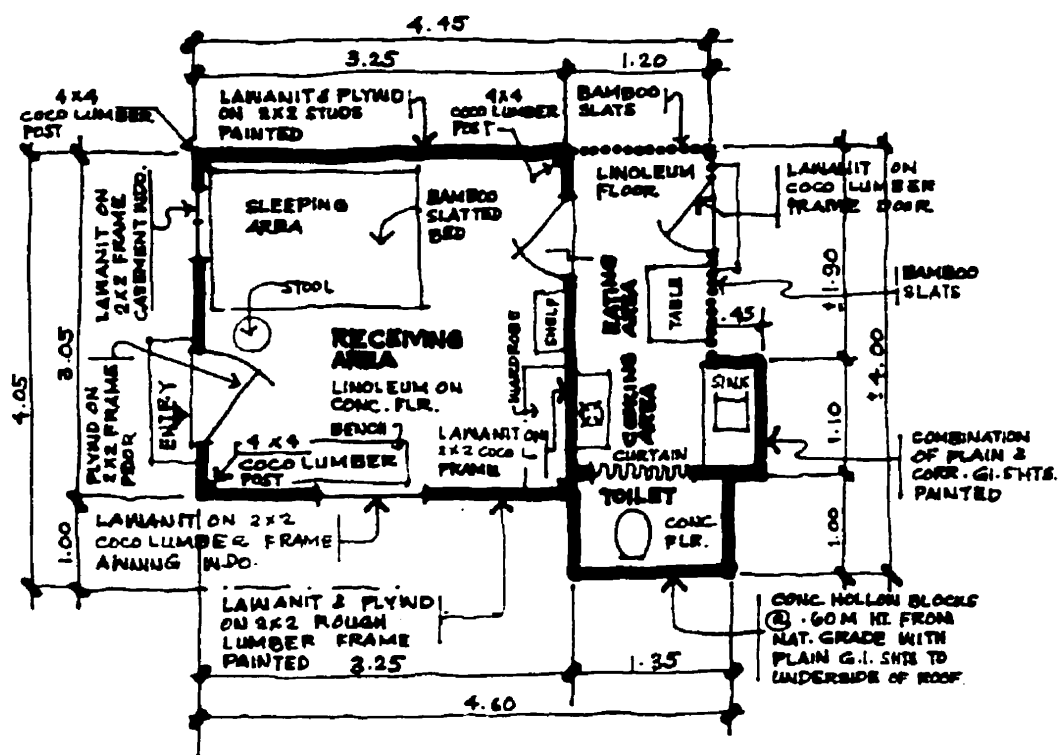


Fig. A.13 Exterior view of the house.
Source: By author.



Fig. A.14 Rear view of the house.
Source: By author.

Respondent name: **Tito Rosero** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
9	26 / Male	Single-HH	-	Driver	214/mo.	2 yrs.

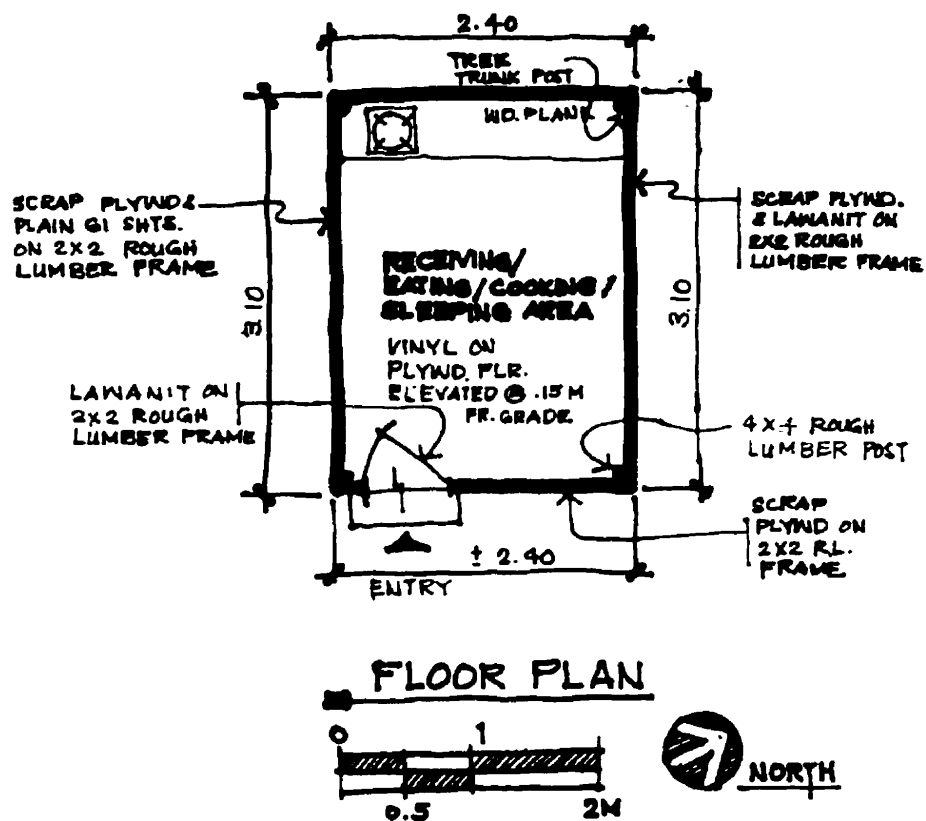


Fig. A.15 Exterior view of the house.
Source: By author.

Respondent name: **Nenita Espinosa** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
10	24/ F	Married-SP	2	Laborer-HH Toy maker-SP	120.00/mo.	4 yrs.

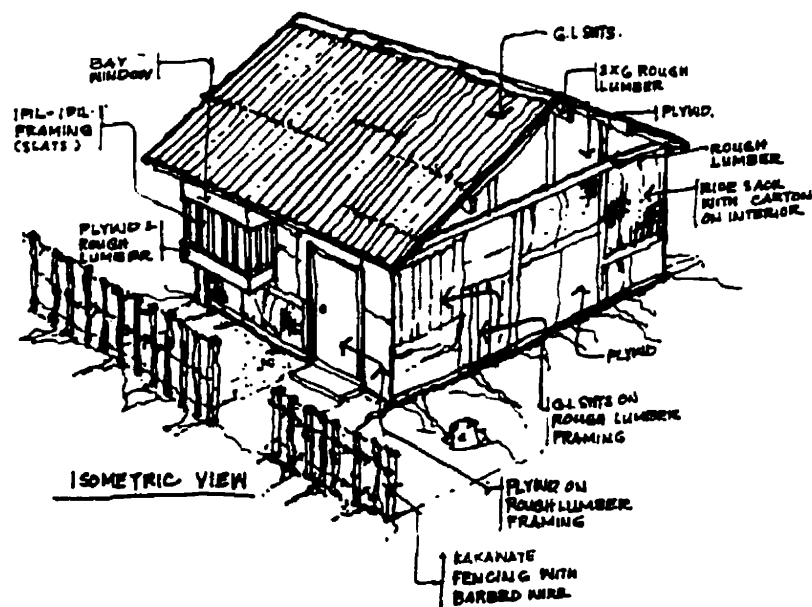
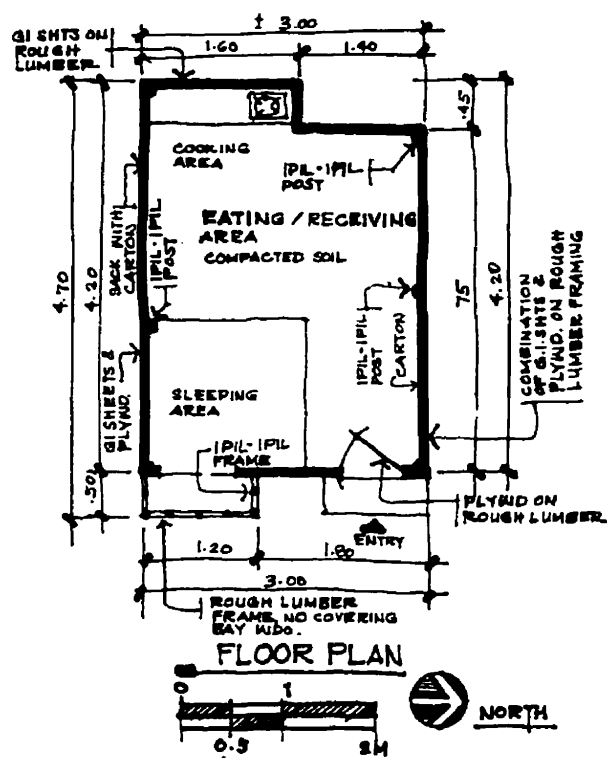


Fig. A 16 External view of the house.

Source: By Author.

Respondent name: Melinda Labrador : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
11	32 / F	Married-SP	1	Photographer-HH	198.00/mo.	7 mo.

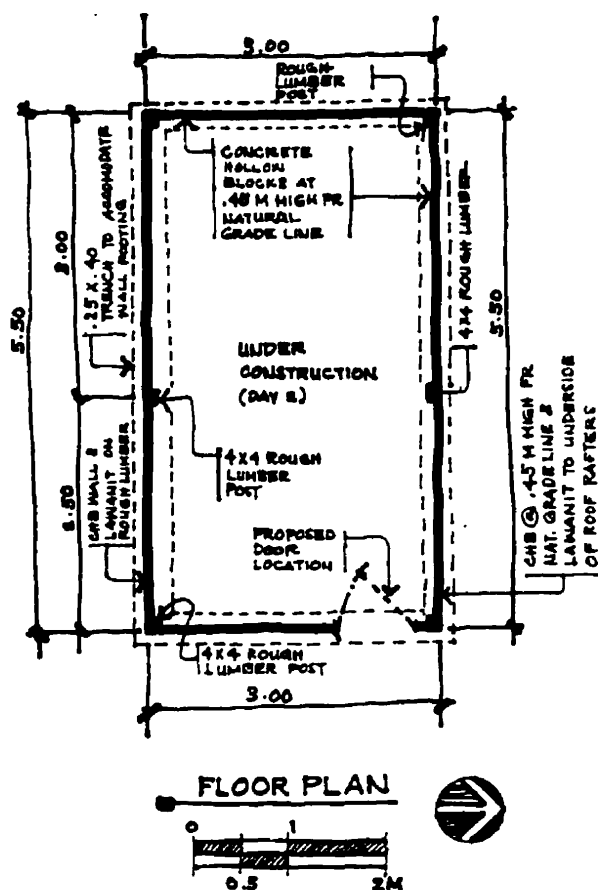


Fig. A.17 The house under construction: Day 2. Fig. A.18 The house under construction: Day 2.
Source: By Author. Source: By Author.

Respondent name: Virginia Ong : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
12	59 / F	Separated-HH	4	Housewife-on pension	285.00/mo.	10 yrs.



Fig. A.20 Exterior view of the house
Source: By Author.

Respondent name: Joselyn Baran : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
13	42 / F	Widow HH	3	Laundry woman	54.00/mo.	10 yrs.

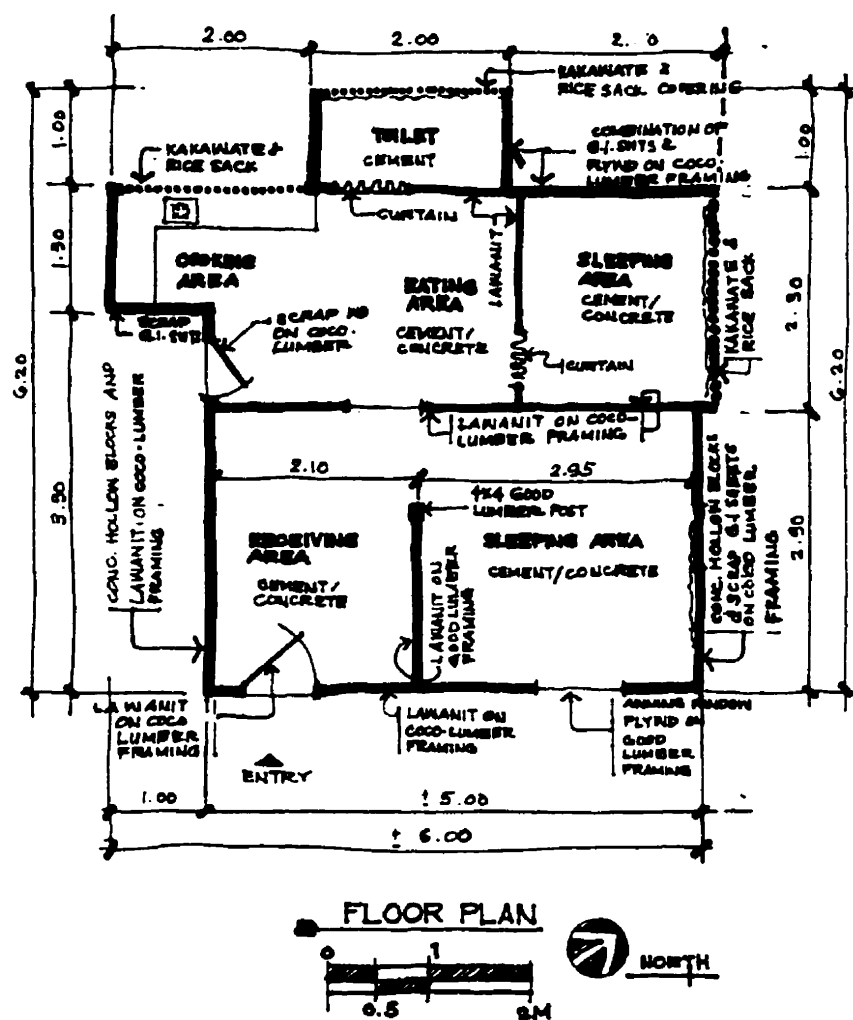


Fig. A.21 Exterior view of the house
Source: By Author.

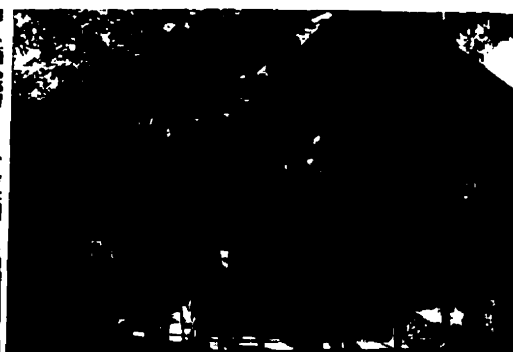


Fig. A.22 The house under construction
Source: By Author.

Respondent name: **Pedro Lanuzo** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
14	45 / M	Married-HH	6	Leadman/carpenter	214.00/mo.	10 yrs.

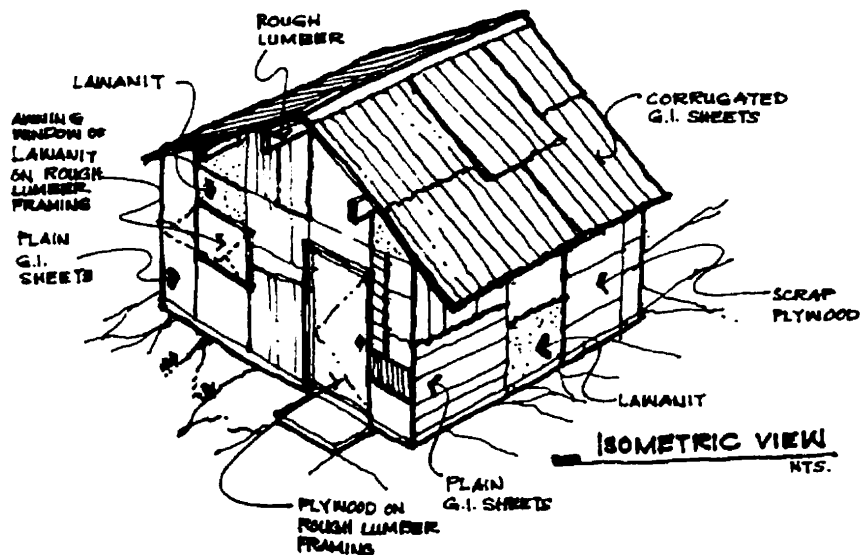
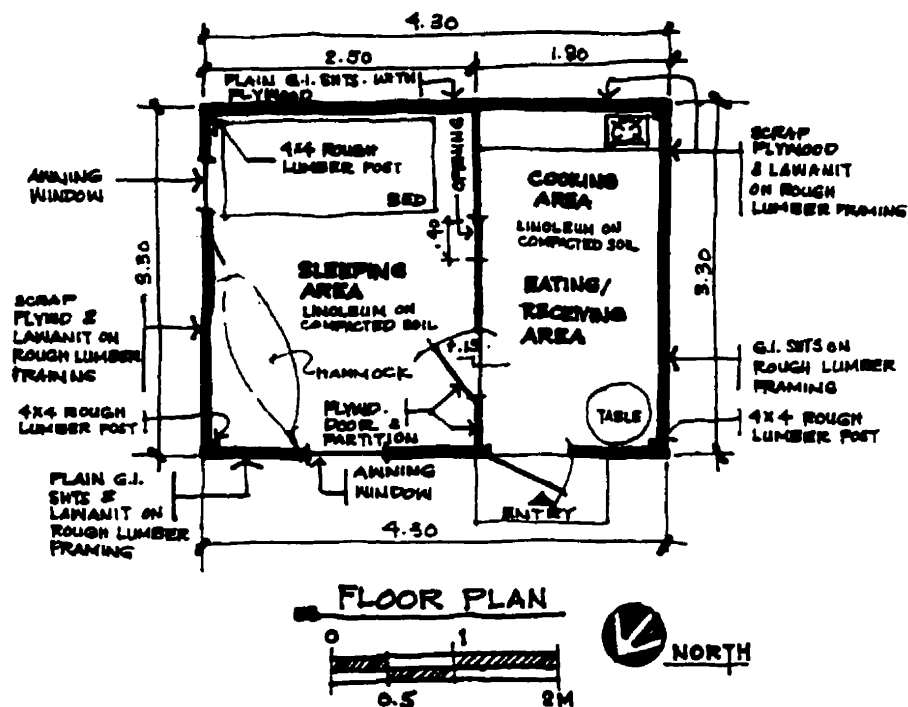


Fig. A.. 23 Exterior view of the house
Source: By Author.

Respondent name: **Emma Nakila** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
15	28 / F	Married-SP	4	Const.Labor-HH	190.00/mo.	6 yrs.

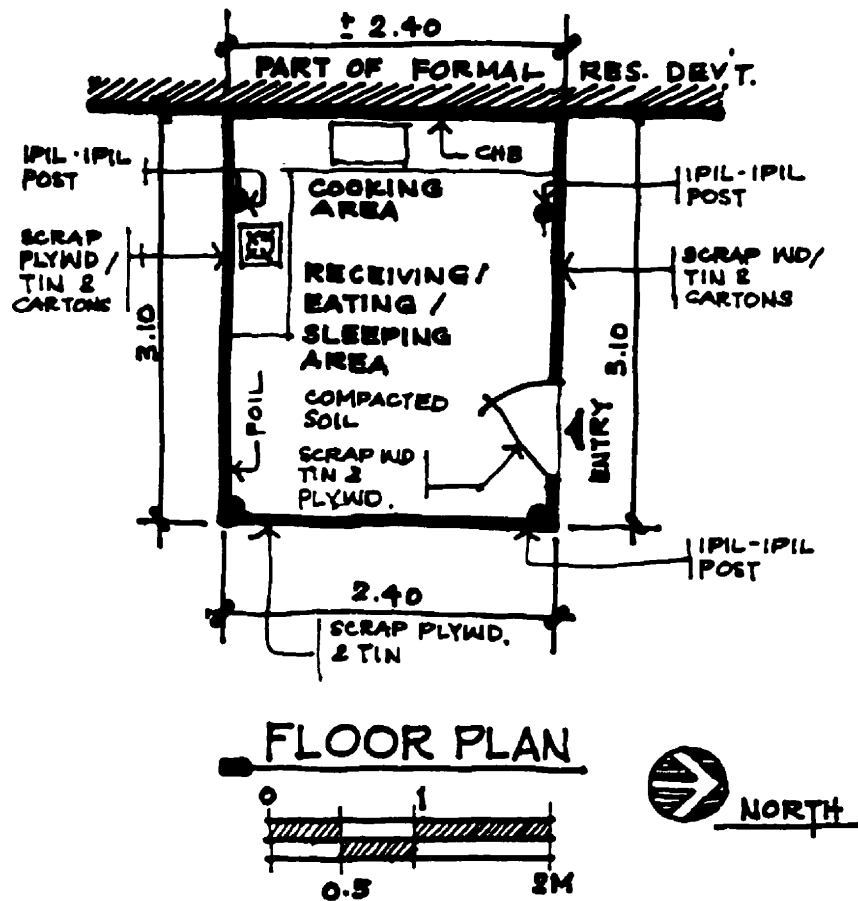


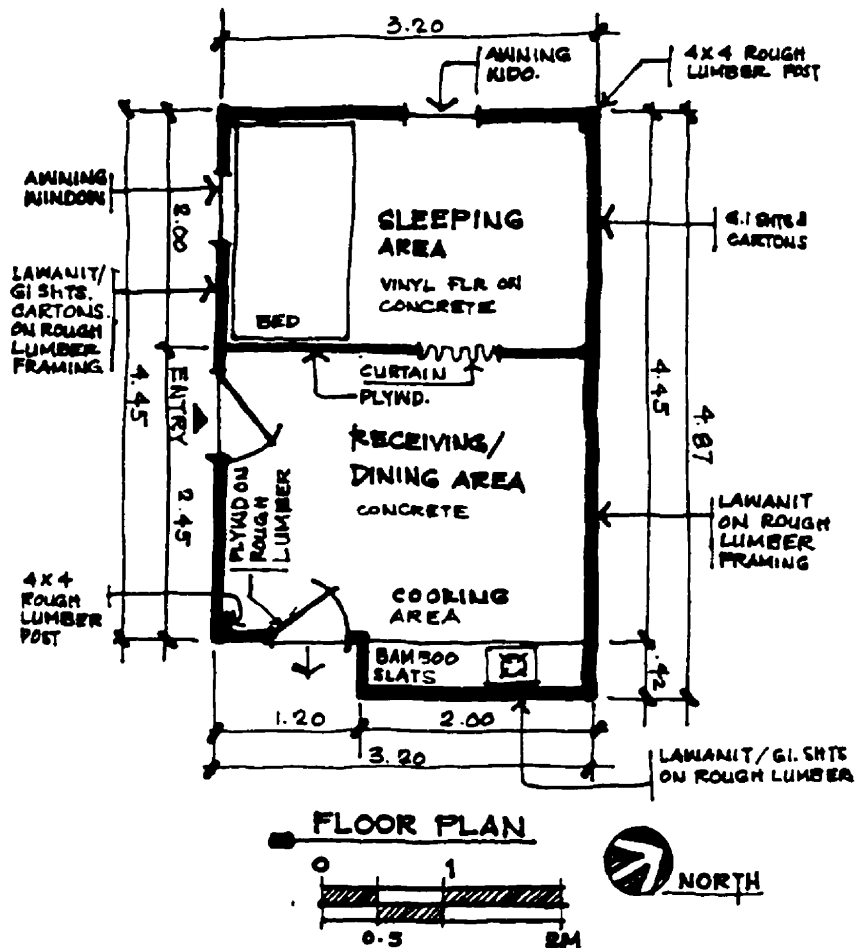
Fig. A.24 Interior view of the house
Source: By Author.



Fig. A.25 Exterior view of the house
Source: By Author.

Respondent name: Amy Luna : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
16	27 / F	Married-SP	-	Tinsmith	107.00/mo	2 mos.



Respondent name: Lourdes De Vera : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
17	56 / F	Married-HH	3	Laundry woman	7.00/day	21 yrs.

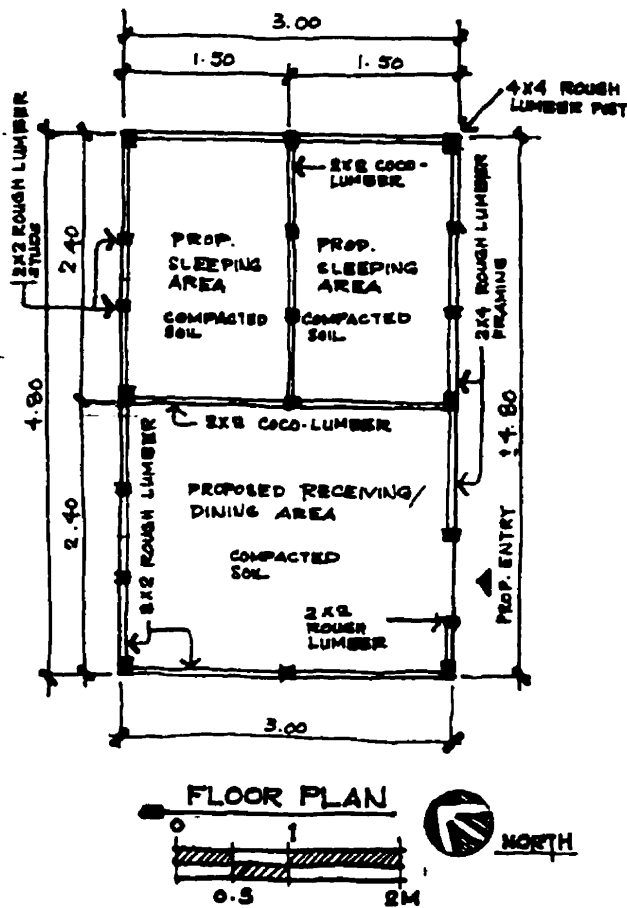


Fig. A.27 Post detail
Source: By Author

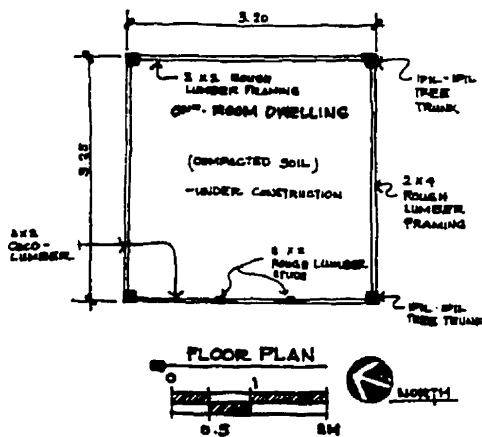


Fig. A.28 Framing Construction
Source: By Author.

Respondent name: Alfredo Salvacion : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
18	38 / M	Married-HH	3	Mason-Const.	8.00/day	10 yrs.

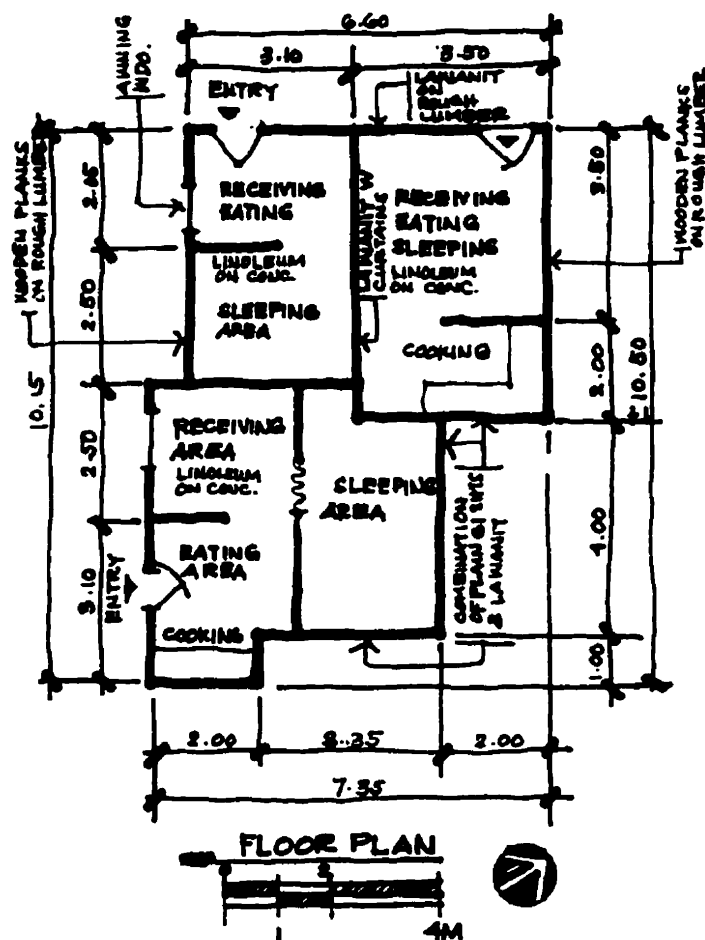


Fig. A.30 Interior view of the house.
Source: By Author.



Fig. A.31 Exterior view of the house.
Source: By Author.



Fig. A.32 Exterior view of the house.
Source: By Author.

Respondent name: Deogracio Floranza: SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
19	75/ M	Married	2	Technician	100/mo.	23 yrs.

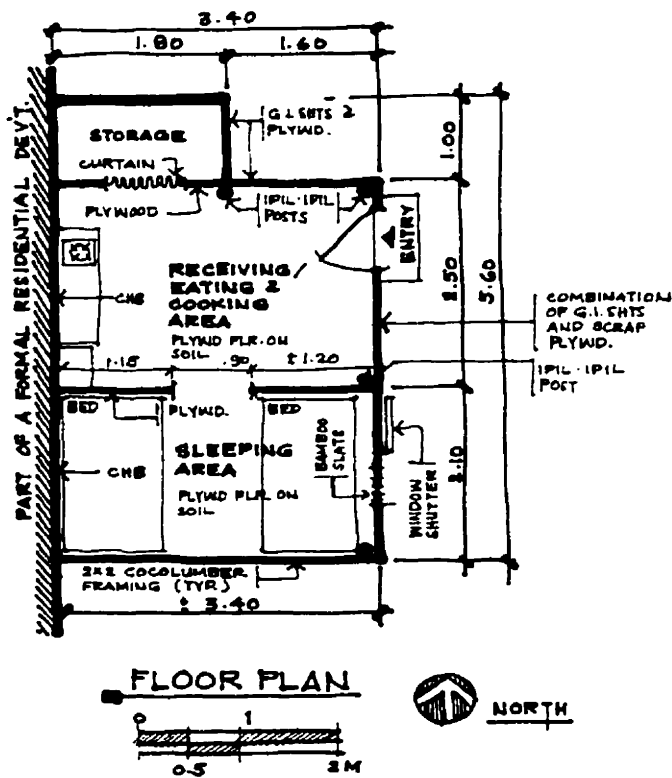


Fig. A.33 Exterior view of the house.
Source: By Author.



Fig. A.34 Exterior view of the house.
Source: By Author.

Respondent name: **Marie Almoguerra** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
20	32 / F	Married-SP	1	Driver -HH/ Hosuewife-SP	260.00/day	2 yrs.

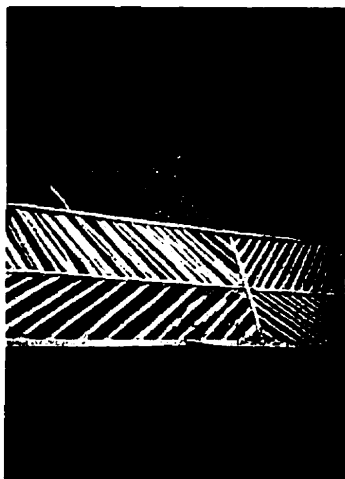


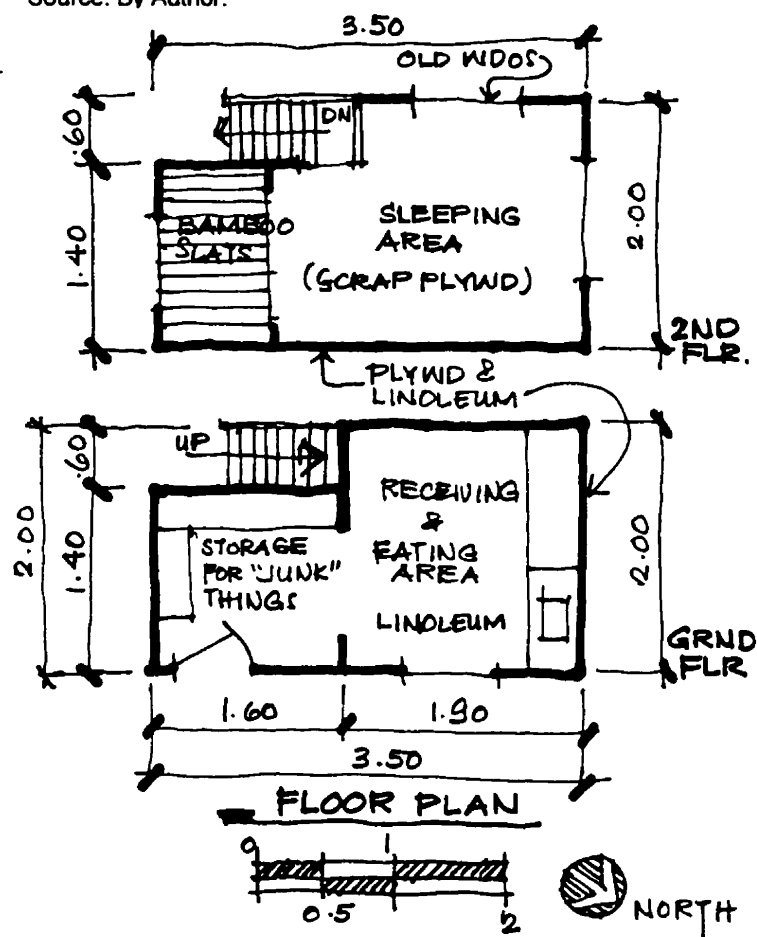
Fig. A.35 Exterior view of the house.
Source: By Author.



Fig. A.36 Corrugated plastic roof.
Source: By Author.



Fig. A.37 Means of livelihood-recyclable materials.
Source: By Author.



Respondent name: **Arlyn Roxas** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
21	35/ F	Married-HH	9	Junk collector	89.00/mo	3 yrs.

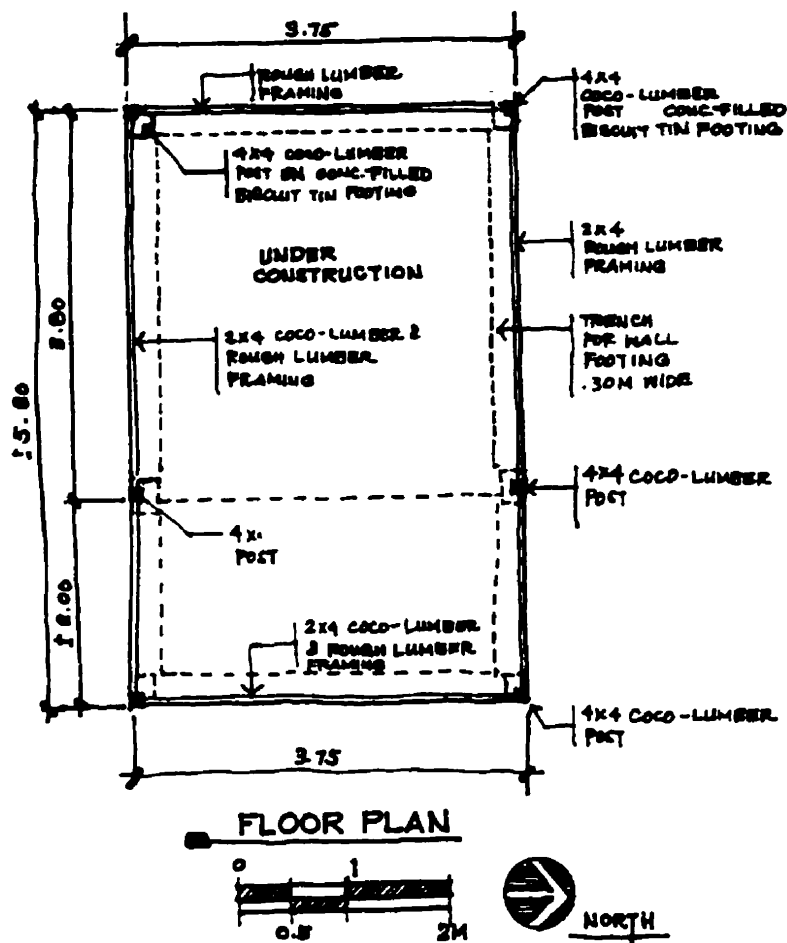


Fig. A.38 Exterior view of the house.
Source: Bv Author.



Fig. A.39 The roof.
Source: Bv Author.

Respondent name: Julian Reblora : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
22	45 / M	Married-HH	5	Security Guard	285.00/Mo.	10 yrs.

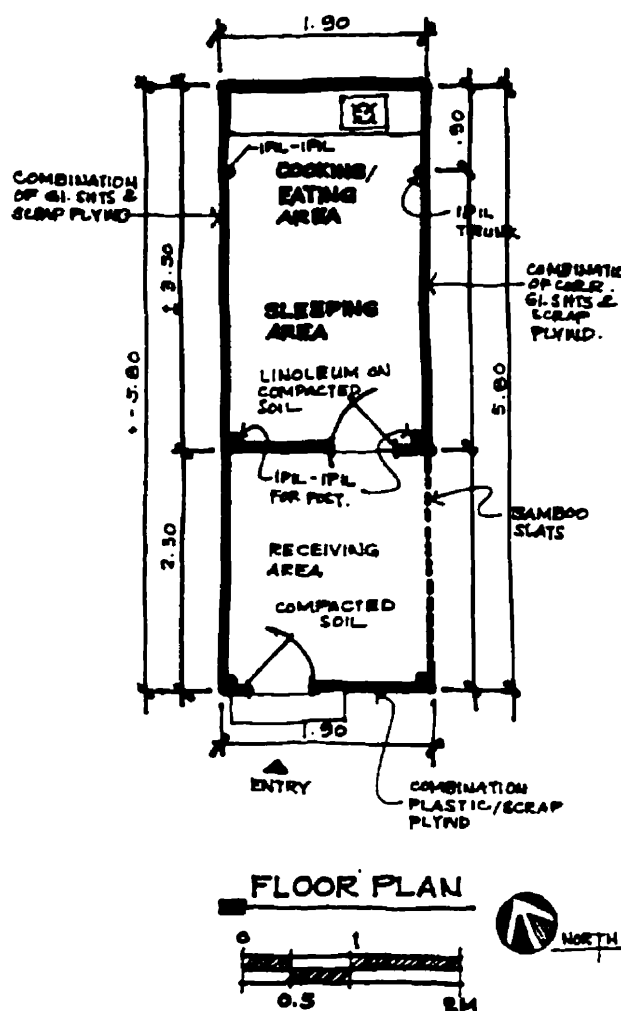


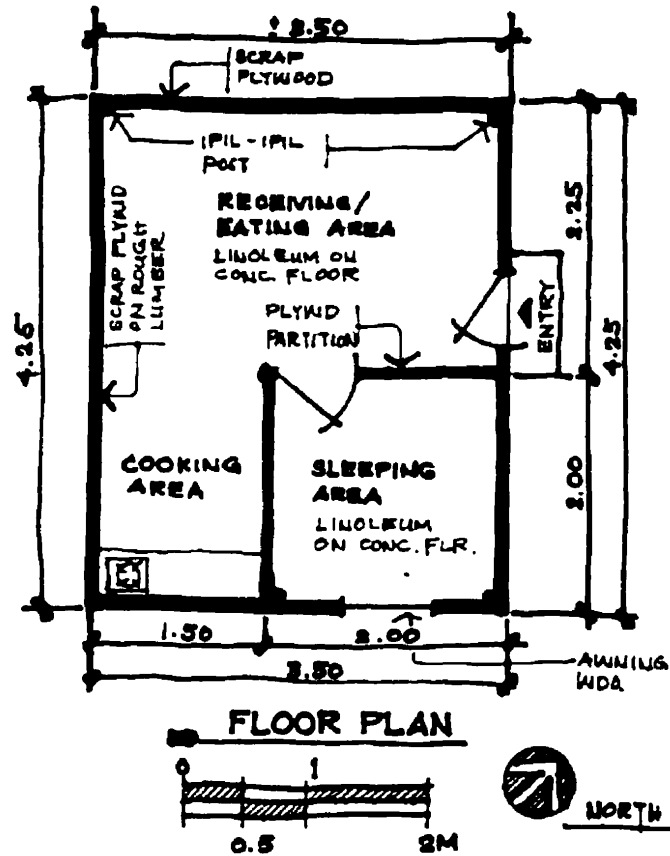
Fig. A.40 Exterior view of the house.
Source: Bv Author.



Fig. A.41 Exterior view of the house.
Source: Bv Author.

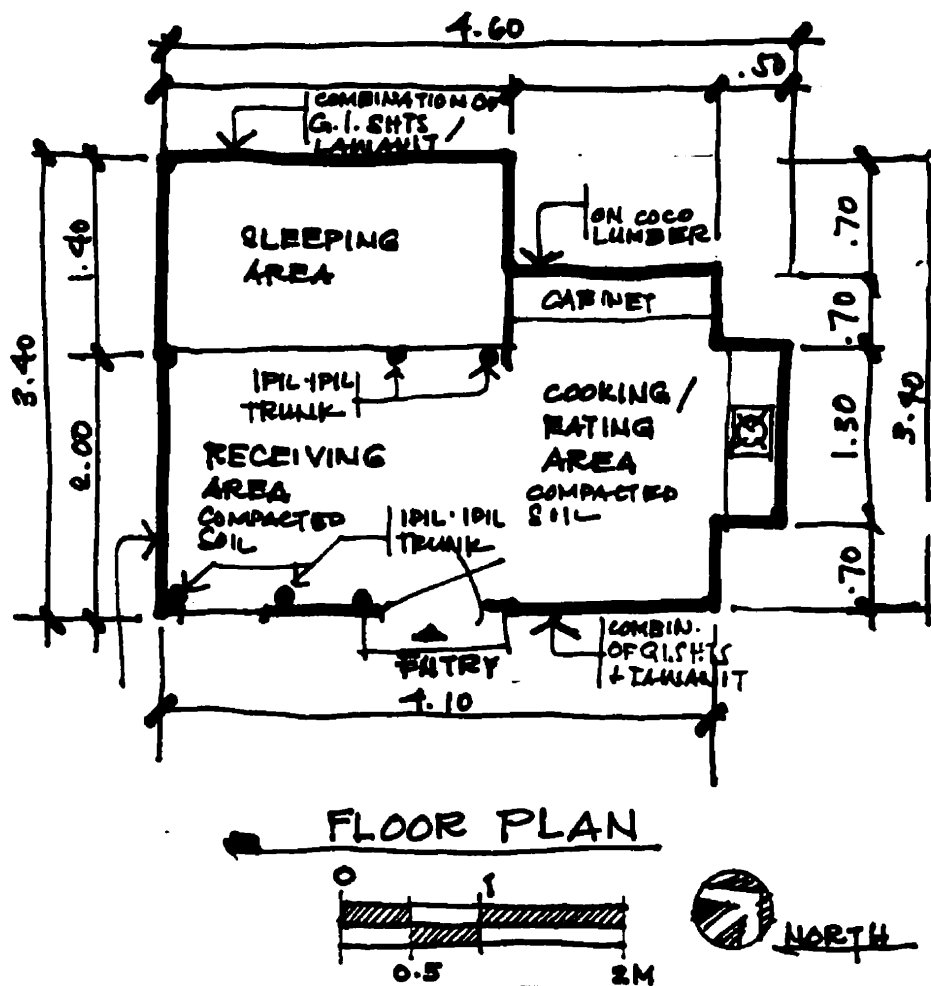
Respondent name: **Sarah Visbal** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
23	16 / M	Married-SP	1	Painter-HH	120.00/mo.	7 yrs.



Respondent name: **Jane Decano** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
24	22 / F	Married-SP	1	Const.Labor-HH	43.00/Mo.	5 yrs.



Respondent name: Jovy Pellarda : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
25	29 / F	Married-SP	3	Const.Labor-HH	129.00/Mo.	9 mths.

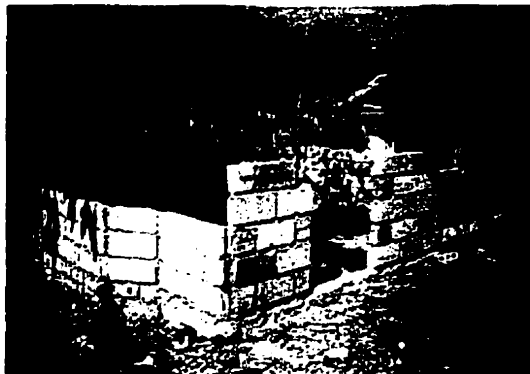
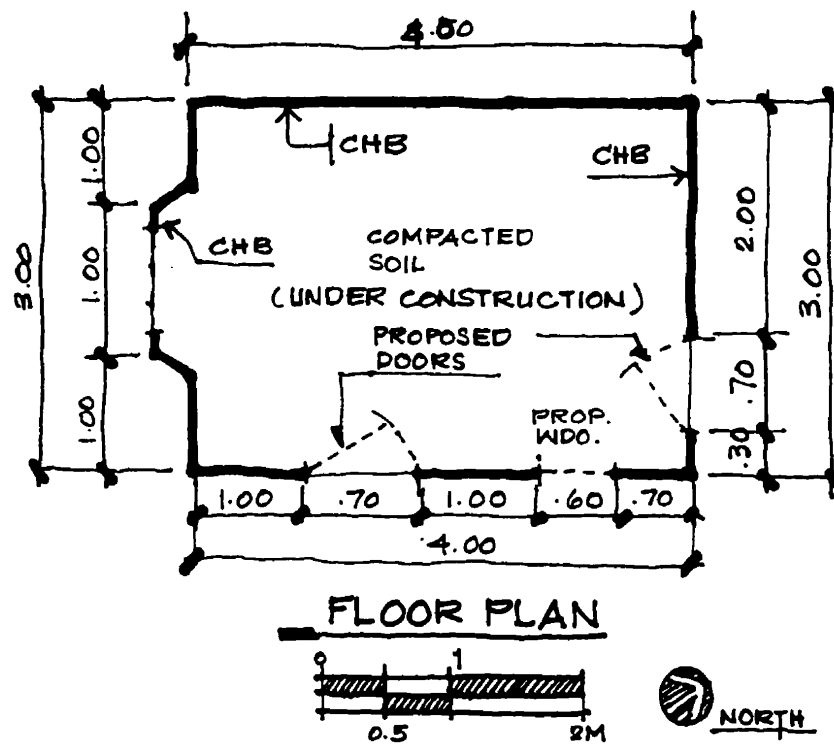


Fig. A.43 Exterior view of the house.
Source: Bv Author.



Fig. A.44 Exterior view of the house.
Source: Bv Author.

Respondent name: **Undisclosed** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
26	Male	UC	UC	Const.Labor-HH	-	2mths.

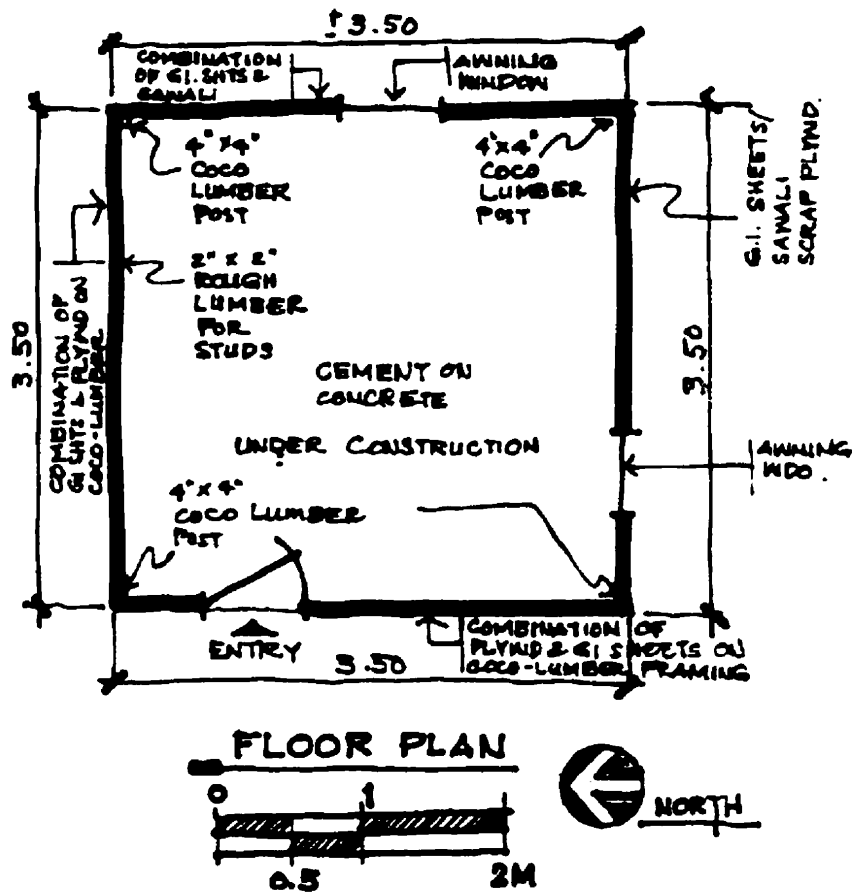


Fig. A.44 Exterior view of the house.
Source: Bv Author.



Fig. A.45 Exterior view of the house.
Source: Bv Author.

Respondent name: **Zaldy Balinas** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
27	35 / F	Married-SP	3	Tricycle driver	214.00/mo	5 yrs.

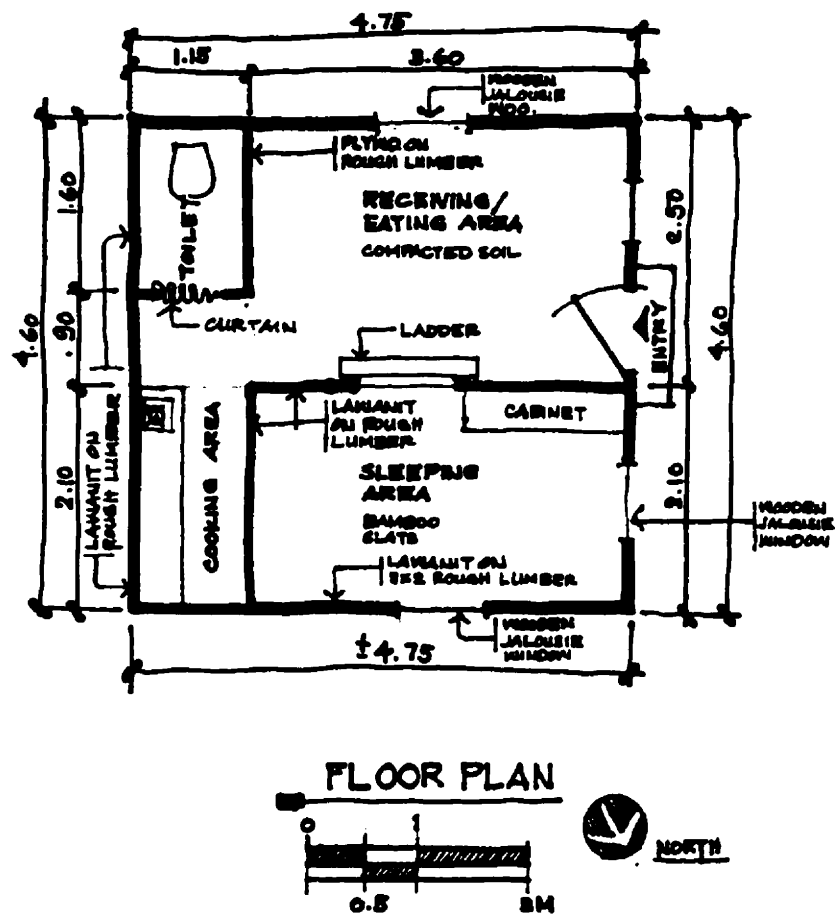


Fig. A.45 Exterior view of the house.
Source: Bv Author.



Fig. A.46 Interior view of the house.
Source: Bv Author.



Respondent name: **Bessie Oliva** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
28	32 / F	Married-HH	3	Carpenter-HH	8.00/day	1 yr.

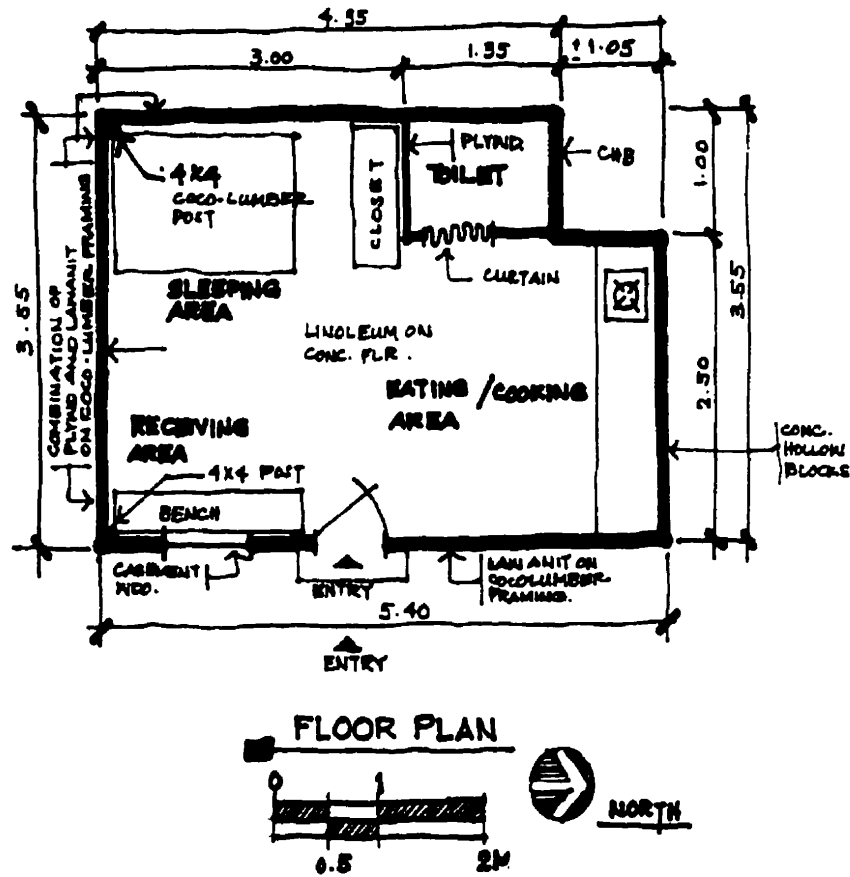


Fig. A.48 Exterior view of the house.
Source: Bv Author.



Fig. A.49 Interior view of the house.
Source: Bv Author.

Respondent name: Leonora De Vera Ferrera : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
29	24 / F	Married-HH	2	Barber-HH	7.00/day	1 yr.

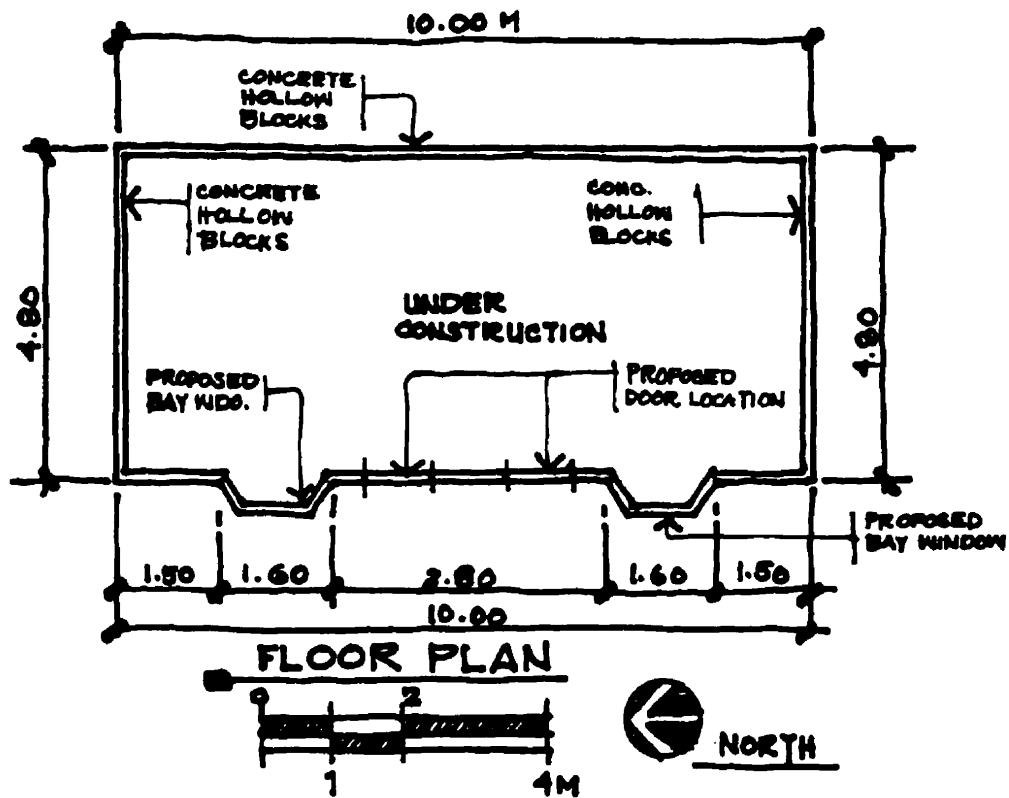


Fig. A.50 Exterior view of the house
Source: Bv author



Fig. A.51 CHB
Source: Bv author

Respondent name: **Josephine Casano**: SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
30	28 / M	Married HH/SP	3	Contractor-Iron works	150.00//day	3 yrs.

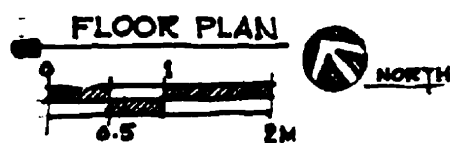
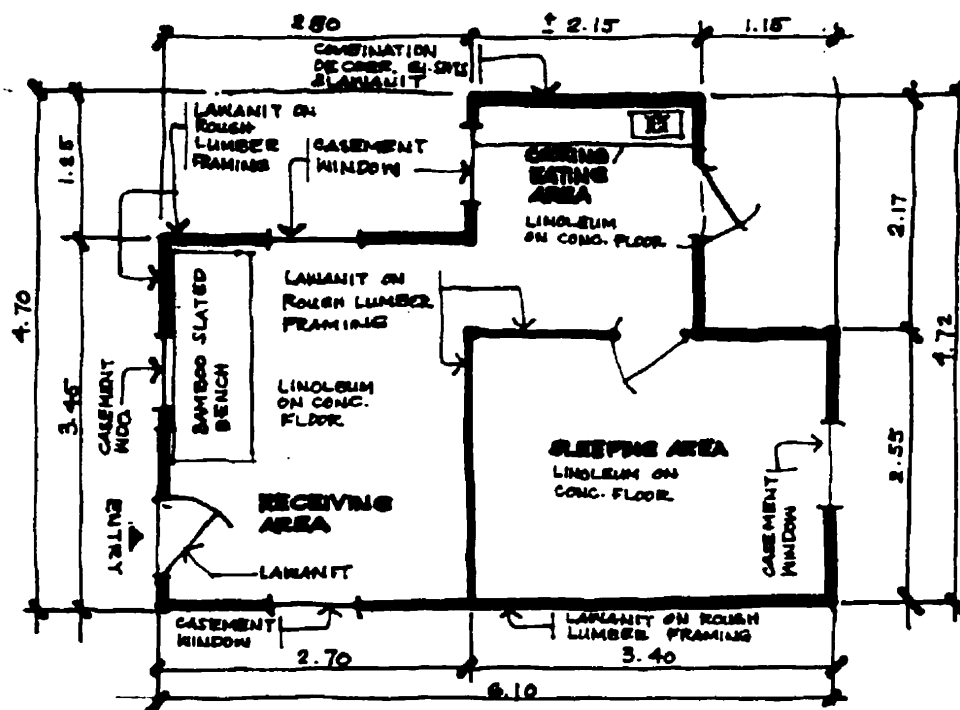


Fig. A.52 Interior view of the house.



Fig. A.53 Exterior view of the house.

Respondent name: Delia De los Santos : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
31	26 / F	Married-SP	4	Welder-HH	392.00/mo	8 yrs.

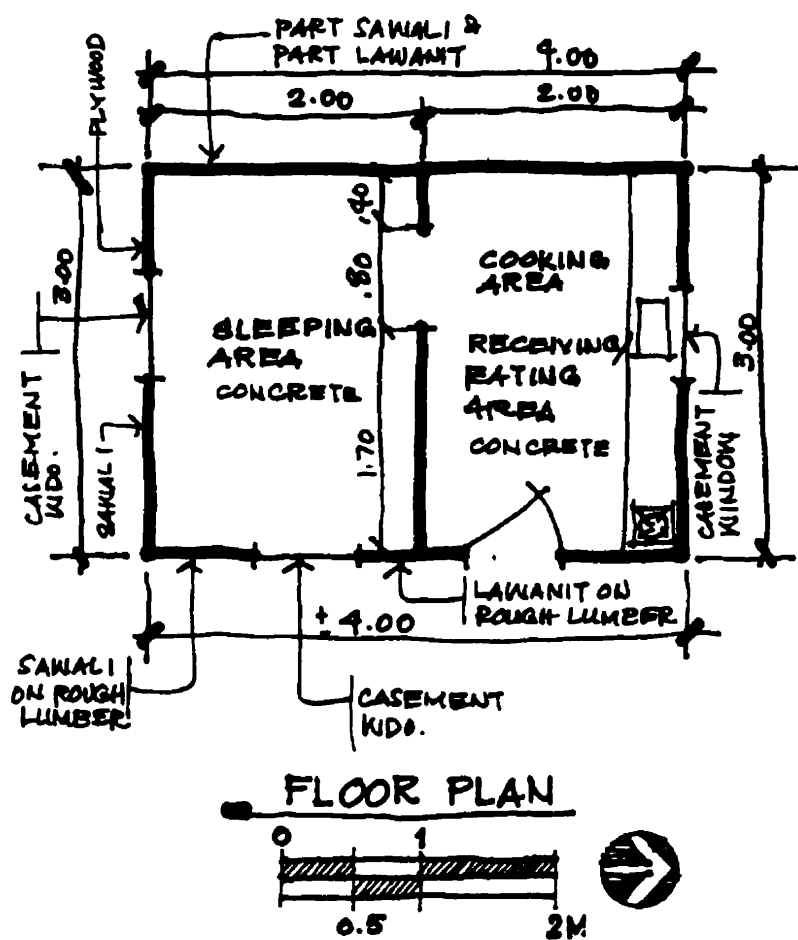


Fig. A.54 Exterior view of the house.



Fig. A.55 Exterior view of the house.

Respondent name: **Rossana Dancel** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
32	28 / F	Married-SP	3	Range Officer-HH	3.57/day	2 yrs.

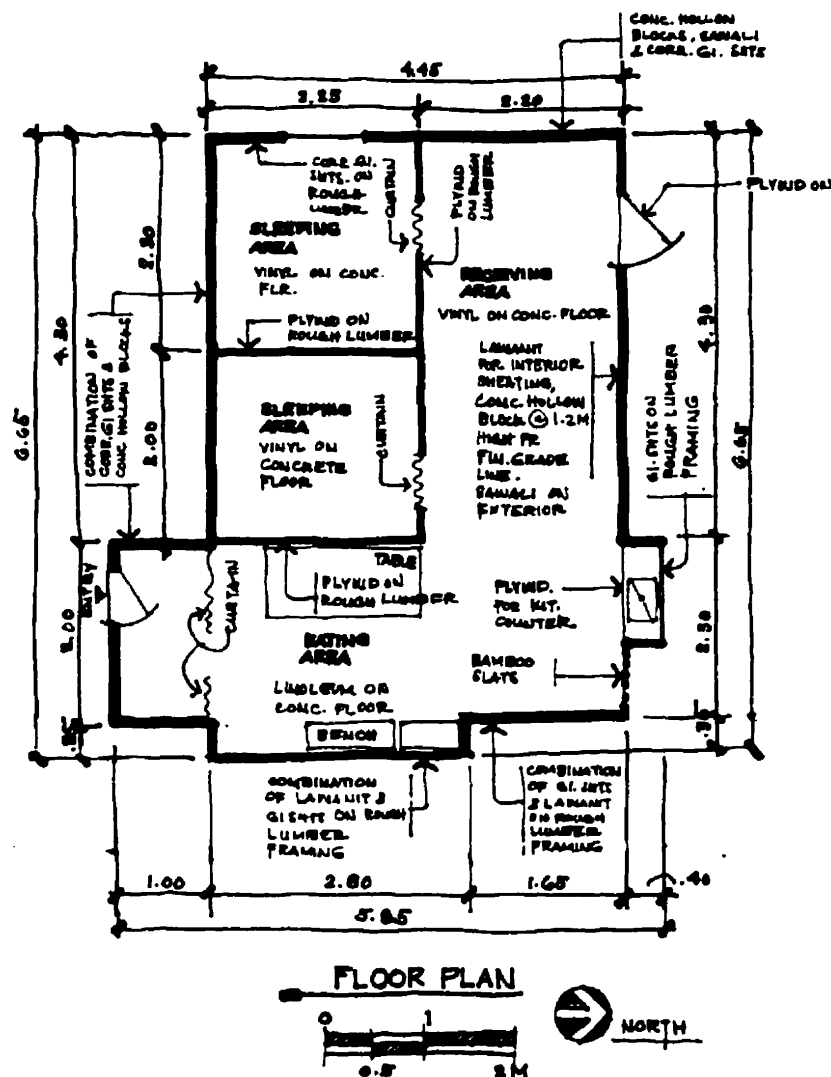


Fig. A.56 Exterior view of the house.

Respondent name: **Mildred Atayde** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
33	32 / F	Married-SP	3	Driver	5.35/day	12 yrs.

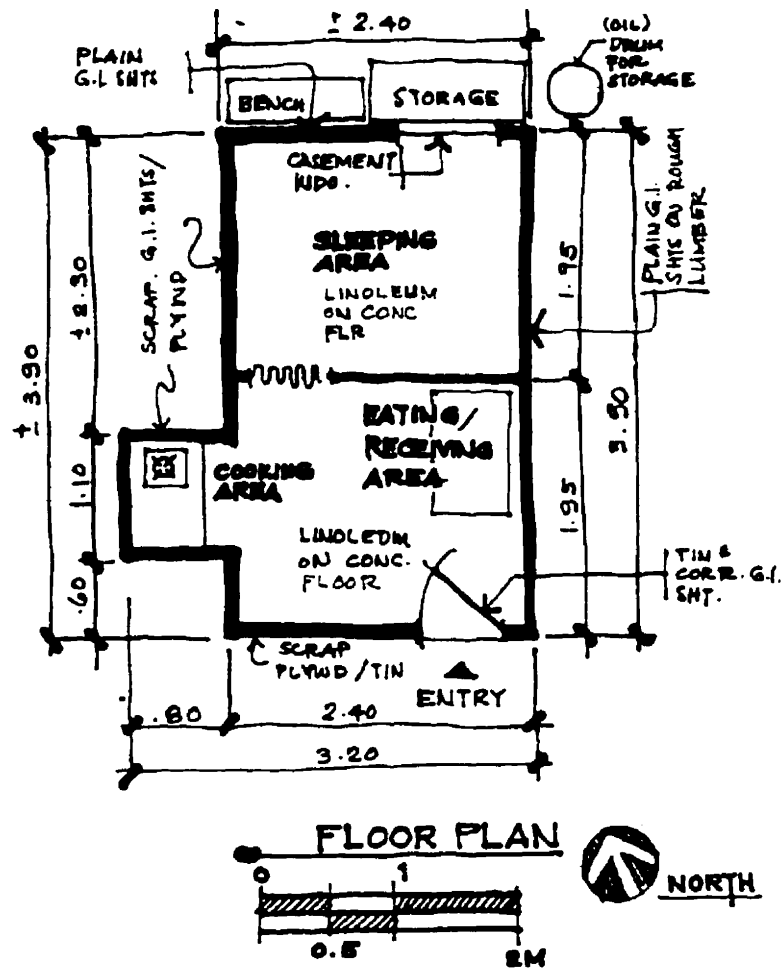


Fig. A.57 Exterior view of the house.



Fig. A.58 Exterior view of the house.

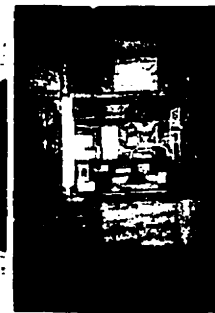


Fig. A.59 Interior view of the house.

Respondent name: **Anita Badilla Jalos** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
34	31 / F	Married-SP	3	Cigarette Vendor-HH	35.00/mo. HH	8 mths.

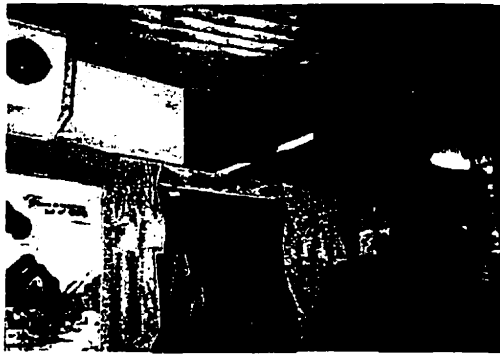
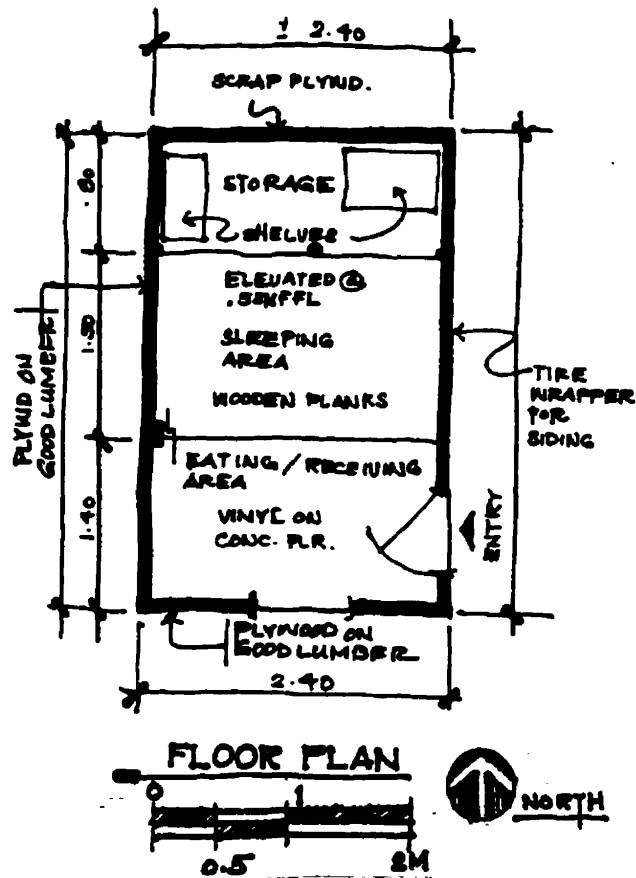


Fig. A.60 Interior view of the house.



Fig. A.61 Interior view of the house.

Respondent name: **Lorna Rosas** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
35	31 / F	Married-SP	3	Const.Labor-HH	120.00/mo.	6 yrs.

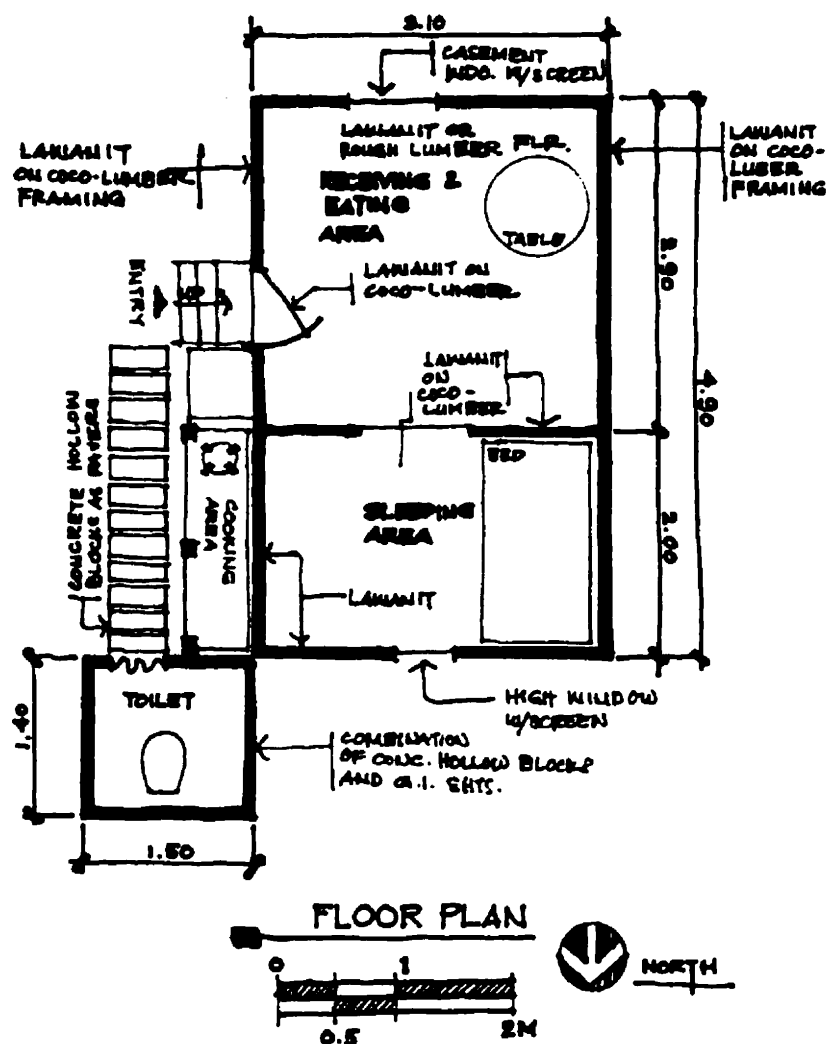


Fig. A.62 Exterior view of the house.



Fig. A.63 Exterior view of the house.

Respondent name: Christy Ferrer : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
36	28 / F	Married-SP	2	Mechanic-HH	178.00/mo	8 Mths.

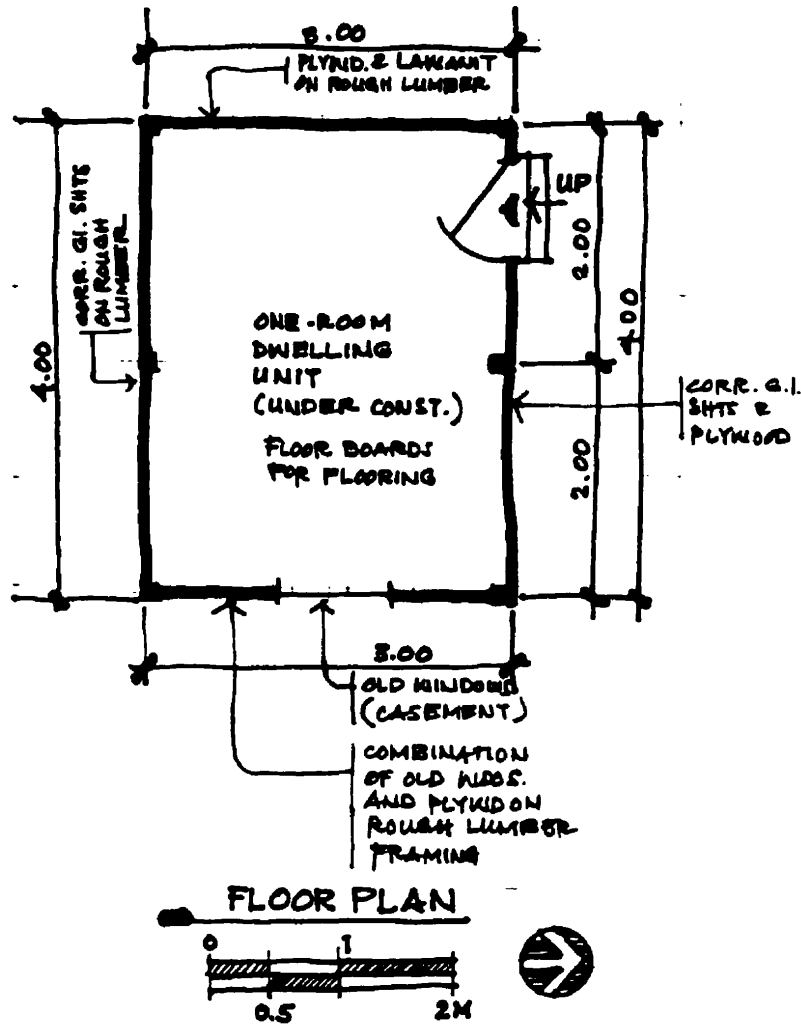


Fig. A.64 Exterior view of the house.



Fig. A.65 Exterior view of the house.

Respondent name: Amalia Castell : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
37	34 / F	Married-SP	3	Const.Laborer-HH	257.00/mo.	8 Mths.

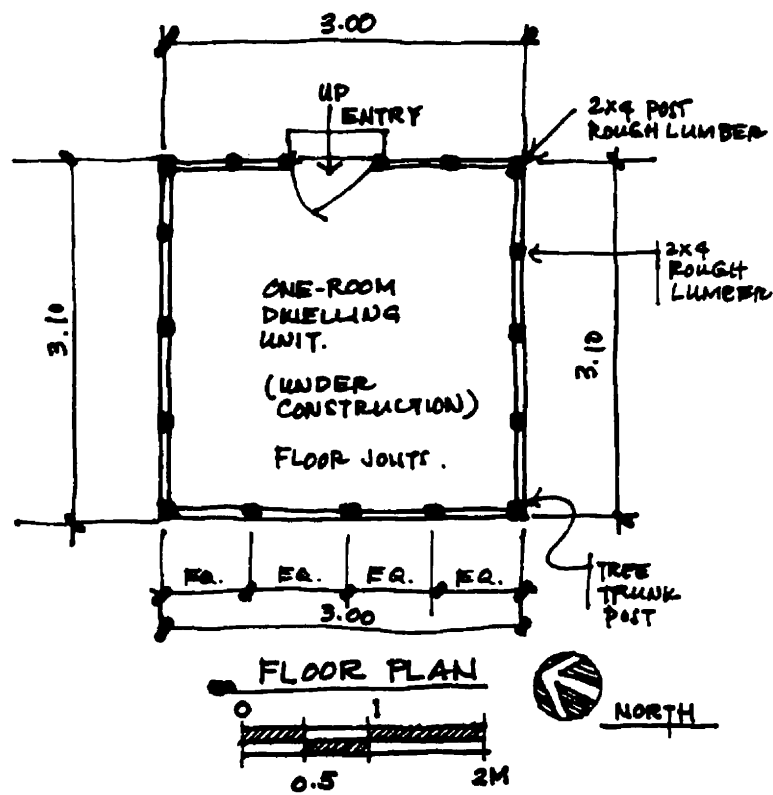


Fig. A.66 Exterior view of the house.

Respondent name: **Victoria Fradejas** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
38	60 / F	Married	-	Pensioner	250.00/mo.	8 mths.

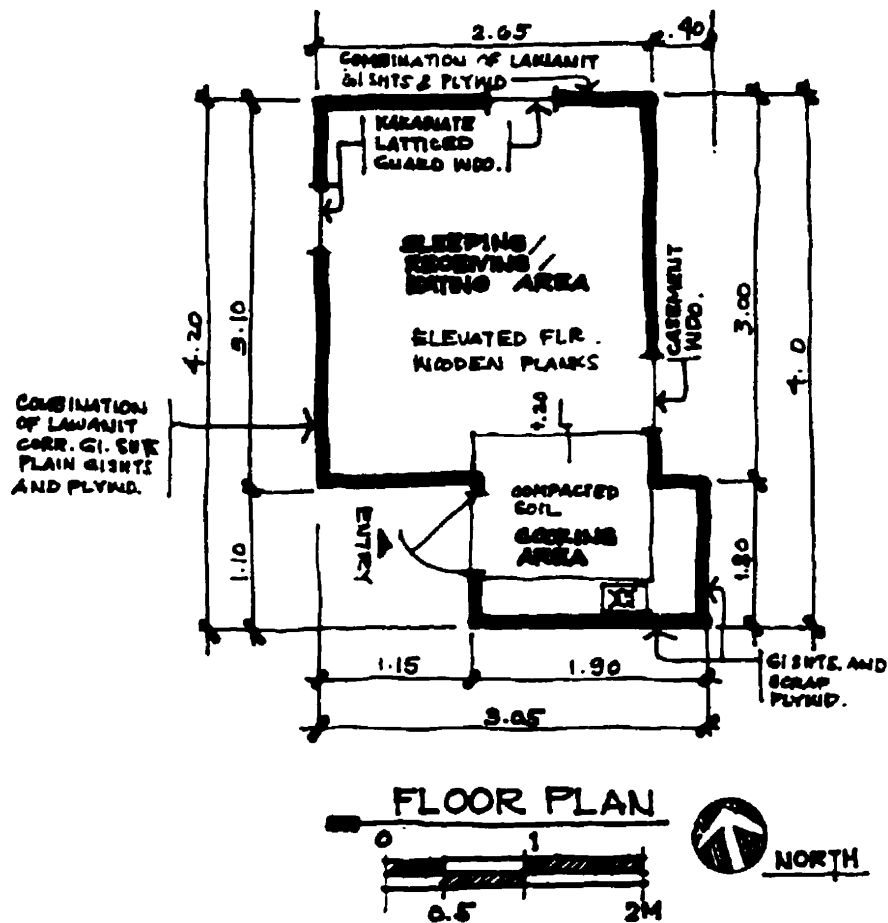


Fig. A.67 Exterior view of the house.



Fig. A.68 Interior view of the house.

Respondent name: **Ma. Lanie Dahinog** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
39	30 / F	Married-SP	5	Finishing Mason -HH	357.00/mo.	8 yrs.

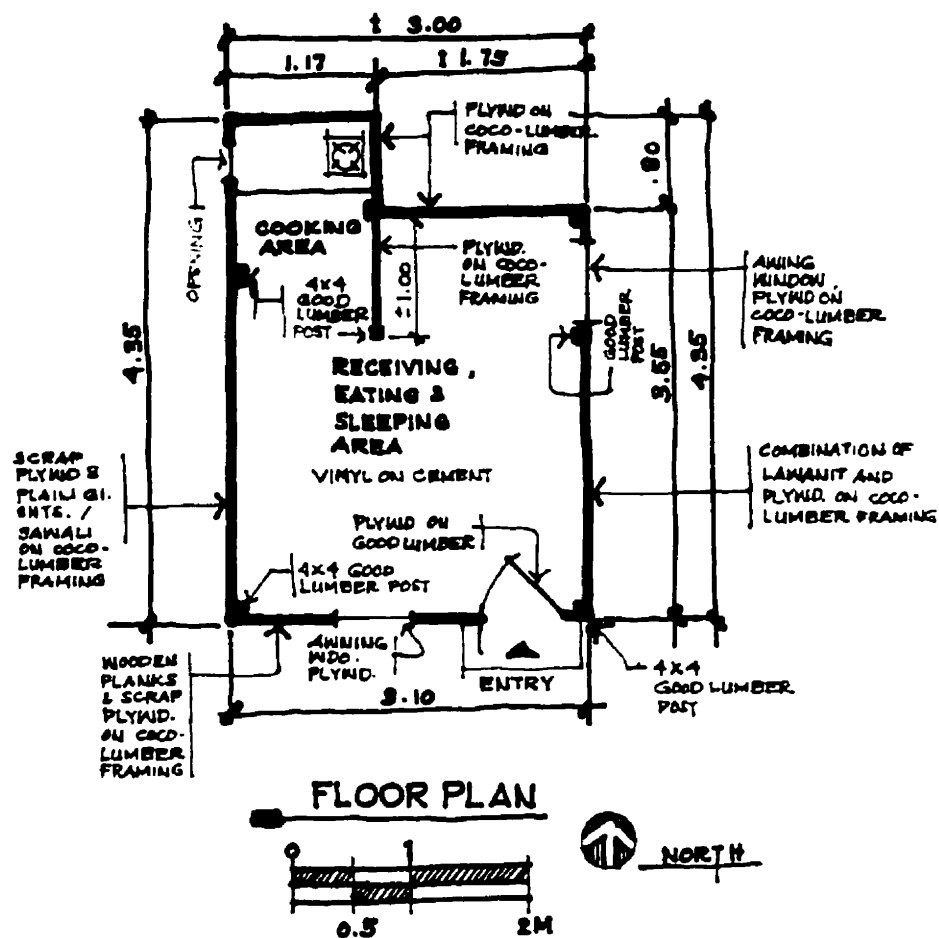


Fig. A.69 Exterior view of the house.



Fig. A.70 Exterior view of the house.

Respondent name: **Larry Labadista** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
40	28/ M	Married-HH	3	Driver	125.00/mo.	11 yrs.

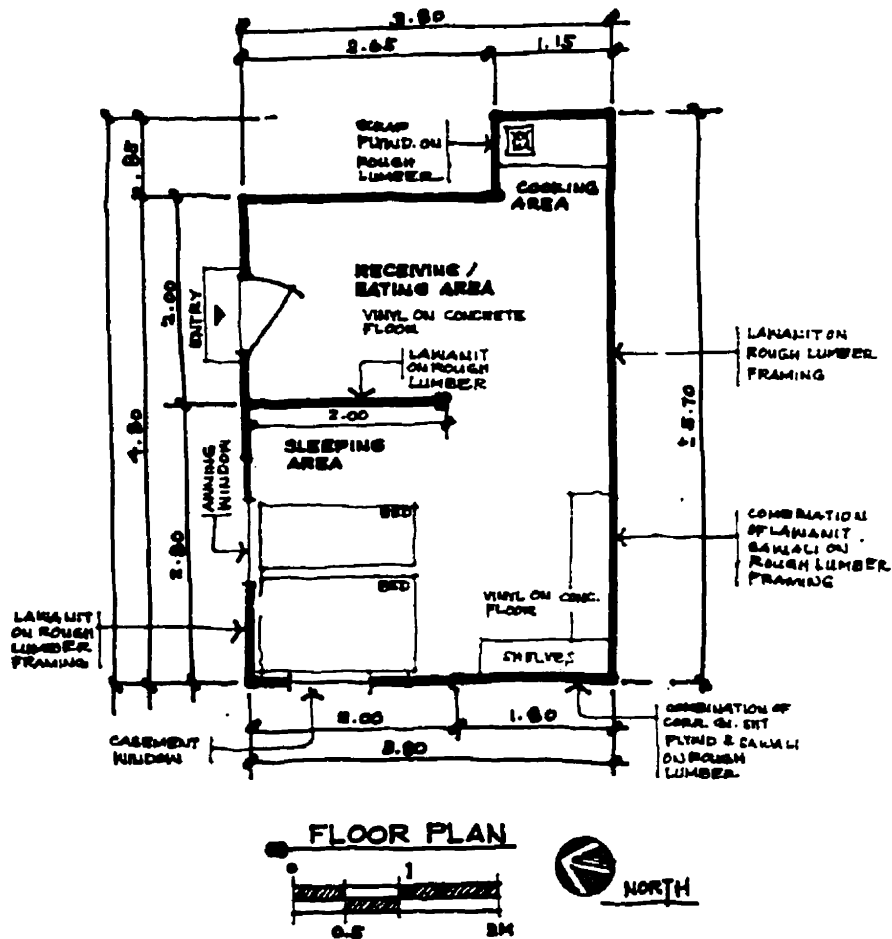


Fig. A.71 Exterior view of the house.



Fig. A.72 Exterior view of the house.

Respondent name: **Samson Abit** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
41	32 / M	Married-HH	4	Driver	179.00/mo	15 yrs.

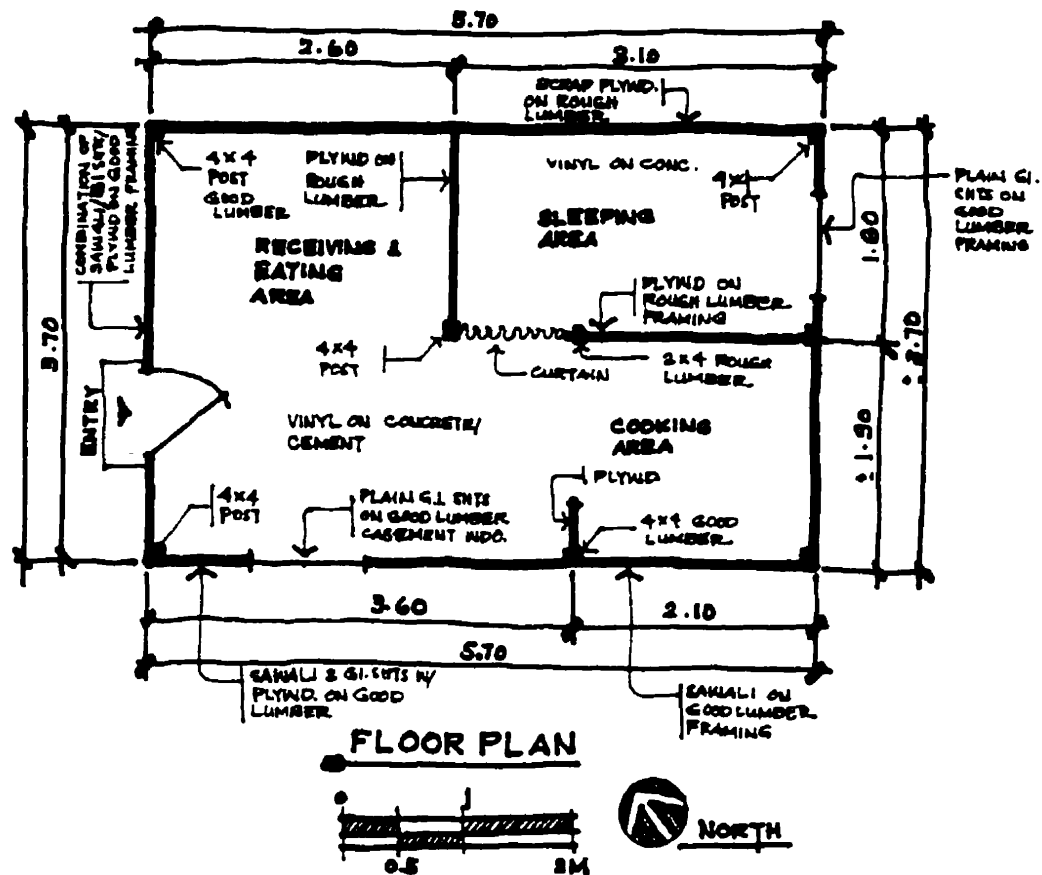


Fig. A.73 Interior view of the house.



Fig. A.74 Exterior view of the house.

Respondent name: **Belen Samson** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
42	38 / M	Married-SP	7	Mechanic-HH	6.00/day	18 yrs.

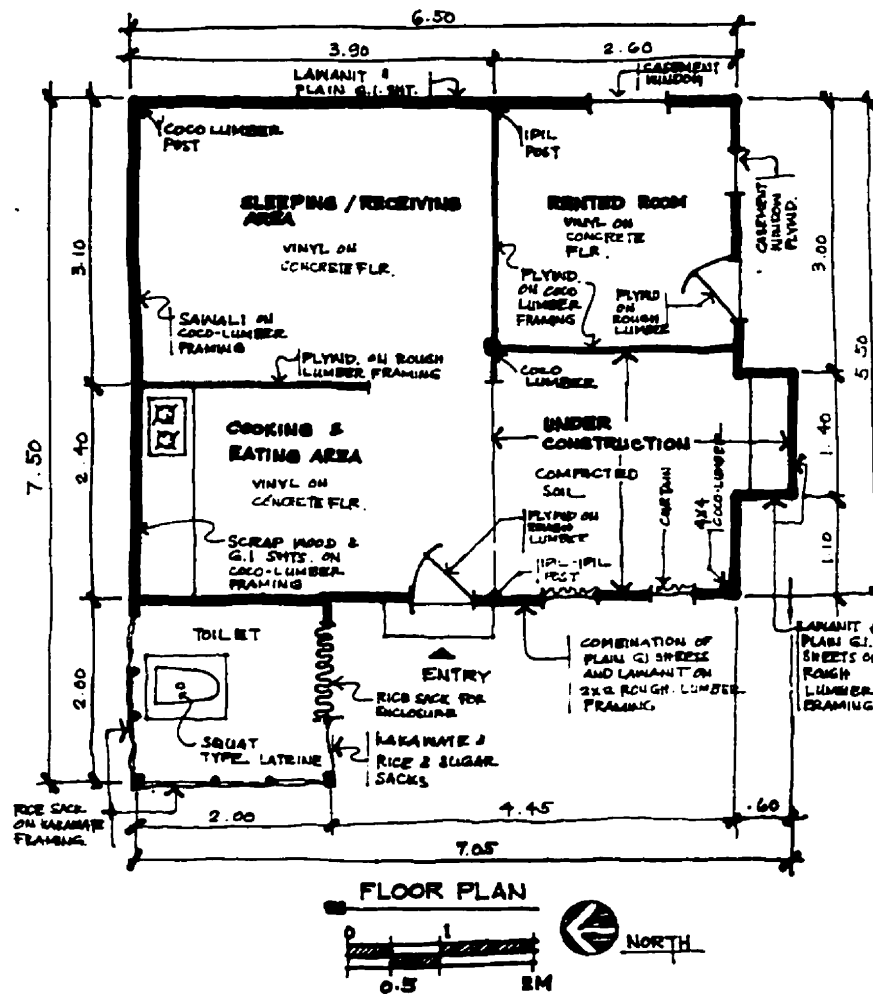


Fig. A.75 Exterior view of the house.



Fig. A.76 Exterior view of the house.

Respondent name: **Amelita Villanueva** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
43	36 / F	Married-SP	4	Tricycle driver-HH	192.00/mo.	2 yrs.

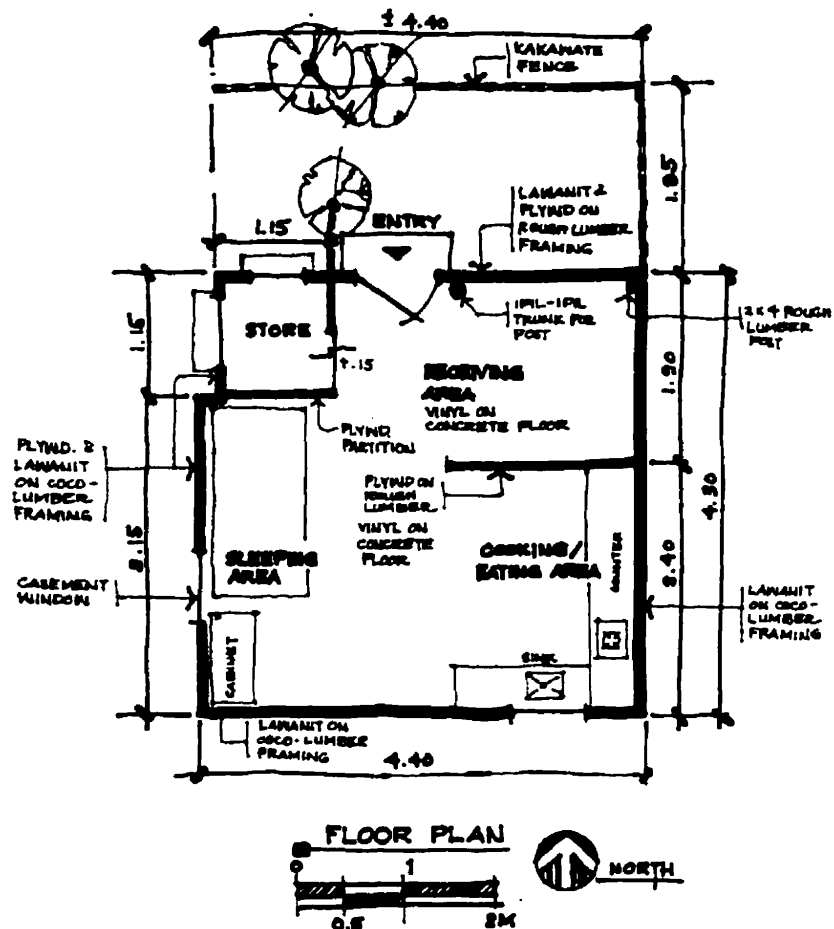


Fig. A.77 Exterior view of the house.



Fig. A.78 Exterior view of the house.

Respondent name: **Anna Abit** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
44	30 / F	Married-SP	3	School bus driver-HH	125.00/mo.	10 yrs.

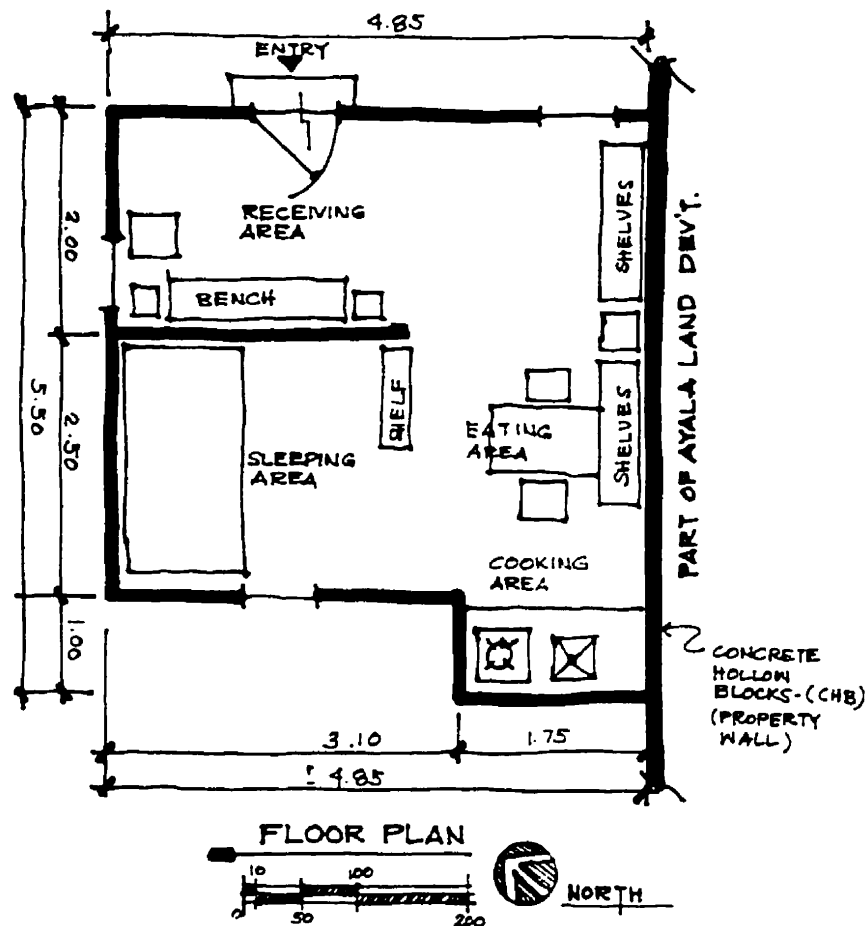


Fig. A.79 Exterior view of the house.



Fig. A.80 Exterior view of the house.

Respondent name: **Merly Abit** : SO (Structure Owner)

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
45	24 / F	Married-SP	2	Const.Labor-HH	160.00/mo.	7 yrs.

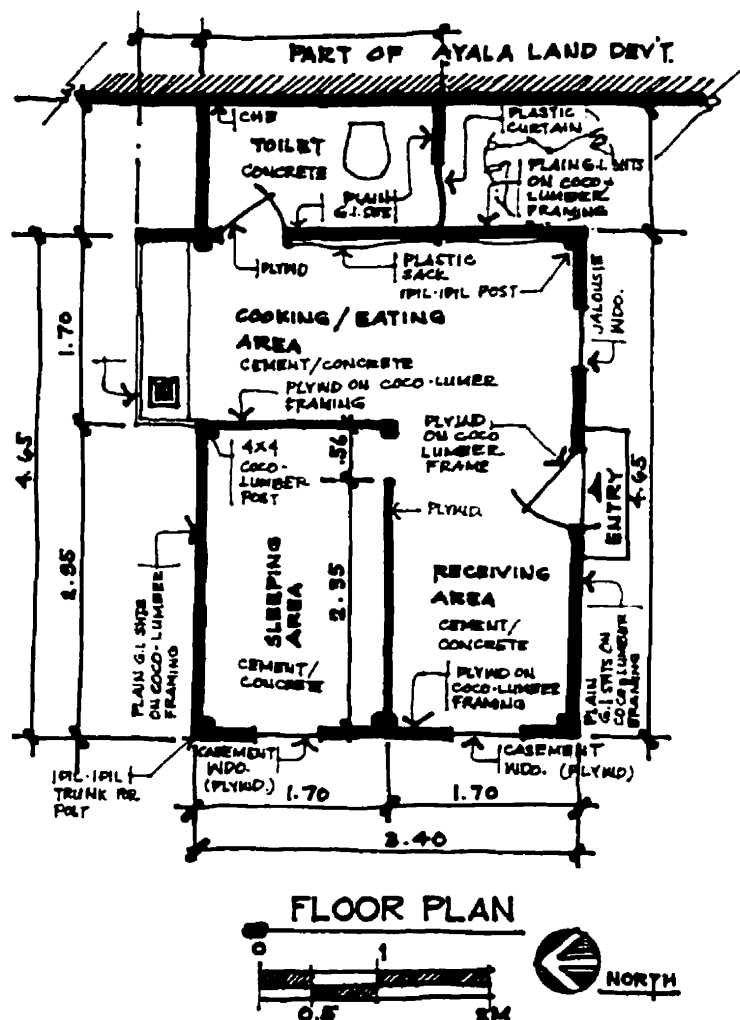


Fig. A.81 Exterior view of the house.



Fig. A.82 Interior view of the house.

Respondent name: Judy Salvacion : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
46	28 / F	Married-SP	2	Foreman/carpenter-HH	257.00/mo	1 yr.

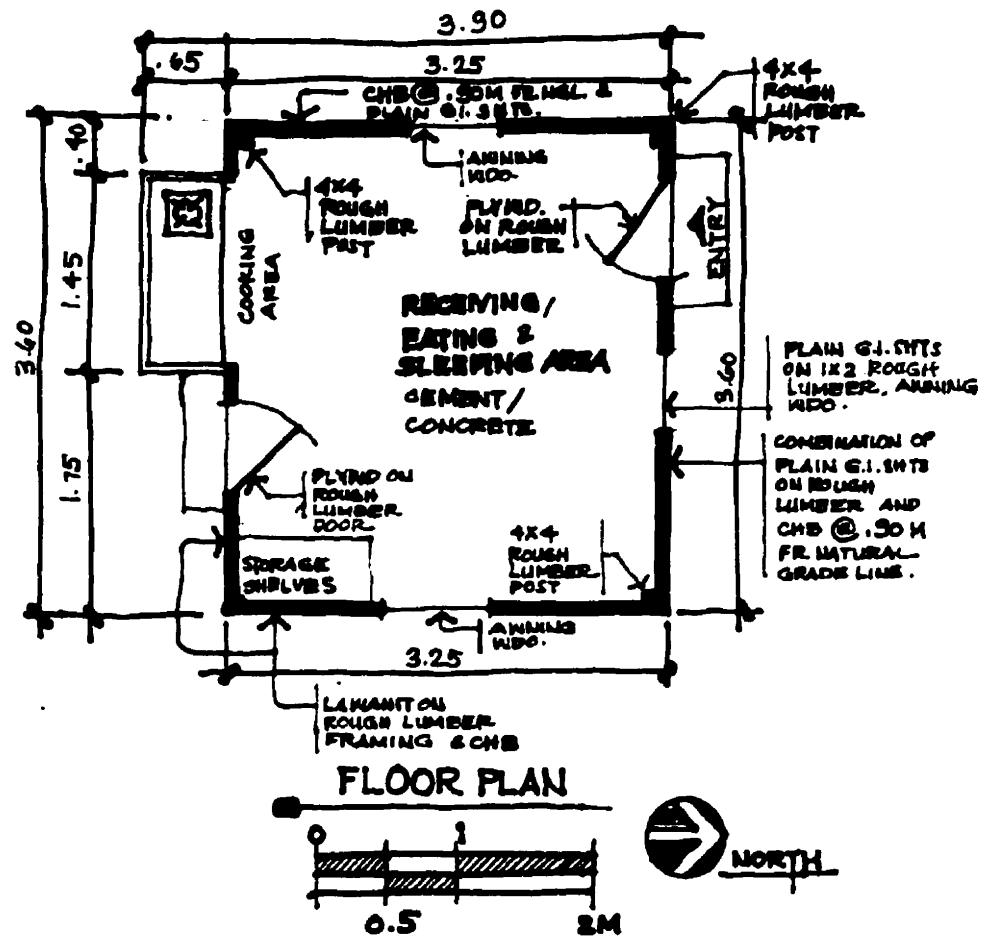


Fig. A.83 Exterior view of the house.



Fig. A.84 Exterior view of the house.

Respondent name: Lupeng Abiya : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
47	45 / F	Married-SP	4	Bus Conductor-HH/Laundrywoman	117.00/mo.	1 yr.

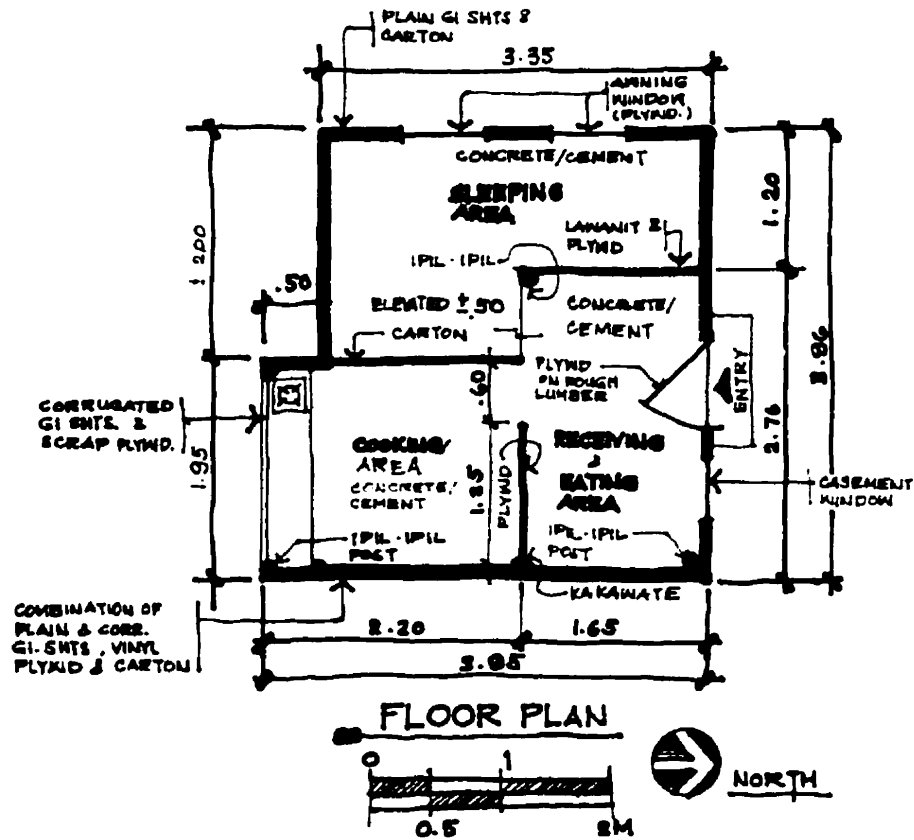


Fig. A.85 Exterior view of the house.

Respondent name: Arnold Capellano : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
48	28 / M	Married-HH	1	Const.Labor	142.00/day	13 yrs.

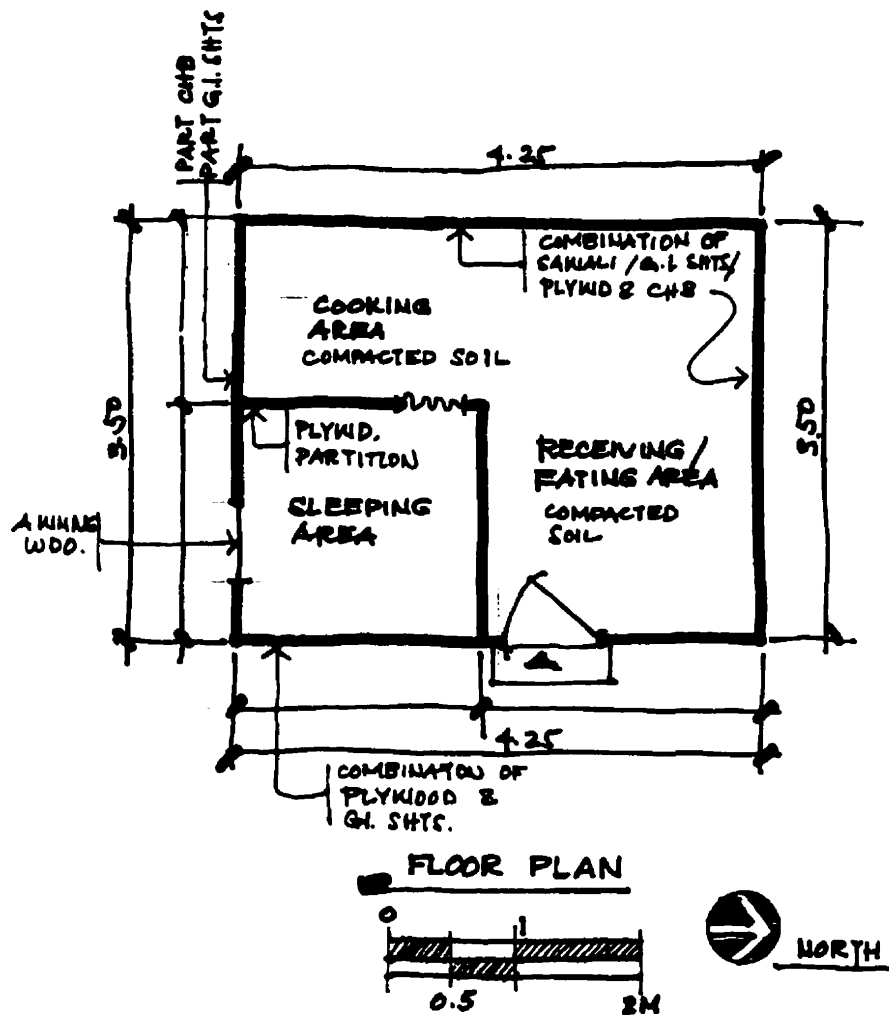


Fig. A.86 Exterior view of the house.

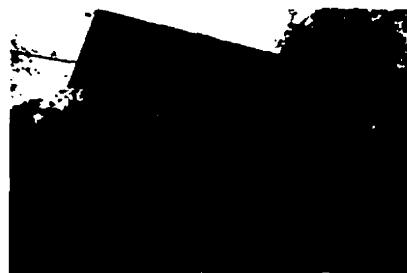


Fig. A.87 Exterior view of the house.

Respondent name: **Estelita Ramos** : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
49	27 / M	Married-SP	2	Const.worker	8.00/day	4 yrs.

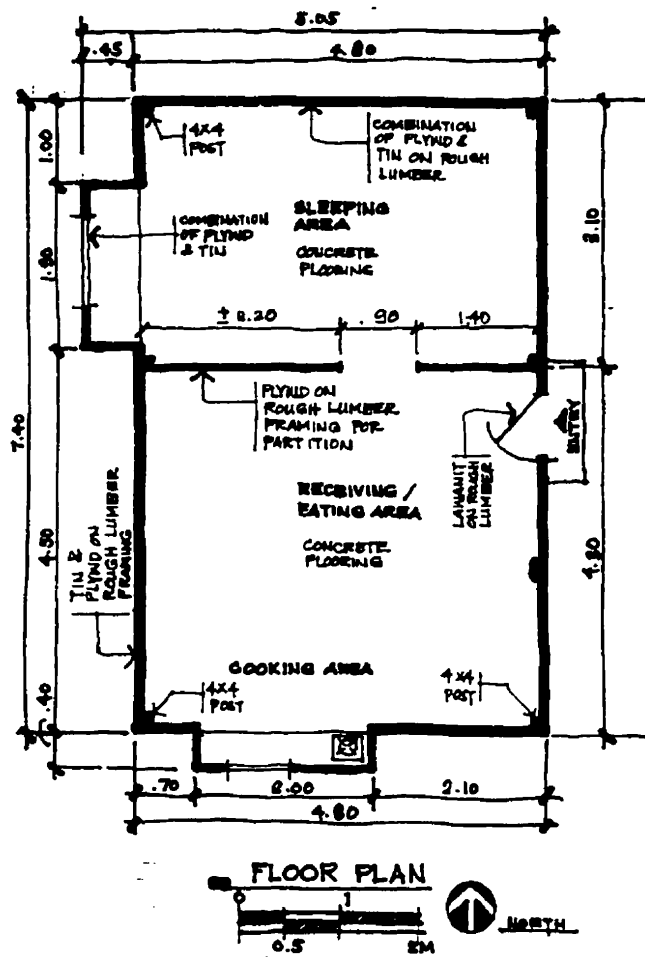


Fig. A88 Exterior view of the house.

Respondent name: Rosalinda Angeles : SO (Structure Owner).

R.No.	Age/Gender	Status	Children	Occupation	Income (Cdn\$)	Tenure
50	31/ F	Married-SP	5	Welder-HH	7.00/day	4 yrs.

APPENDIX 2 :

The sample questionnaire

Street: _____

Respondent No. 99

Blk .No. _____

Date: _____

Plot No. _____

SOCIO-ECONOMIC PROFILE

Name: _____

Age: _____

Sex: ☐ Male
☐ FemaleHead of the family
☐ yes ☐ no

Occupation: _____

Status:

No. of Family Members: _____

Income: _____

☐ Single

Dependents:

Place of

☐ Married

Age _____ 6

Origin: _____

☐ Separated

Sex _____ F

No. of years in present

No. of Family Member

location: _____

contributing income: _____

DOMESTIC RESPONSIBILITY

Water Source:

Electricity Source:

Gas Supply:

Cost / Month:

Cost / Month:

Cost / Month:

Type of Sanitation:

Expenditure for housing:

SURVEY SHEET sample							Page No.			
Street		BlokNo.		Lot No.						
HOUSING PROFILE				Type				Age:		
				Mode of construction						
Elements	Sub-structure	Columns	Beams	Roof Truss	Floor	Walls	Roof	Doors	Windows	Cost
Mode										
Builder										
No.of workers										
Origin of workers										
Tools										
Construct period										
Times repaired										
Cost										
Remarks									Total Cost	

SURVEY SHEET sample						Page No.				
Street		location plan Photograph/sketch								
Block No.										
Lot No.										
Built-up area	No. of floors									
HOUSING PROFILE				Type				Age:		
				Building Materials						
Elements	Sub-structure	Columns	Beams	Roof Truss	Floor	Walls	Roof	Doors	Windows	Cost
Material										
Size										
Source										
Mode of transport										
Reason for choice										
Times replaced -										
Cost										
Remarks									Total Cost	

BIBLIOGRAPHY

Alonzo, R. P. (Contributing Ed.). (1991). The informal sector in the Philippines. In A. L. Chickering & M. Salahdine (Eds.), *The silent revolution: The informal sector in five Asian and near eastern countries* (pp. 39-70). California: ICS Press.

Alsayyad, N. (1993). Culture and squatting: A comparative analysis of informal developments in Latin America and the Middle East. *Open House International*, 18(2), 37-47.

Angel, S. (1983). *Land for housing: A Reader*. Nairobi, Kenya: UNCHS

Angel, S., Archer, R. W., Tanphiphat, S. & Wegelin, E. (1983). *Land for housing the poor*. Bangkok, Thailand: The Craftsman Press.

Åstrand, J. (Ed). (1996). *Construction in developing countries: A guide for the planning and implementation of building projects*. Stockholm, Sweden: The Swedish Mission Council.

Barker, G. E. (1976). *Construction techniques: Modular exploration of technology series*. New Jersey, Englewood Cliffs: Prentice Hall.

Bhatt, V., & Hanigan, J. (1996). *Urban upgrading*. Montréal: Minimum cost housing group, McGill University. (<http://ww2.mcgill.ca/mchg/mchg>).

Betz, M. J., McGowan, D., & Wigand, R.T. (Eds). (1984). *Appropriate Technology: Choice and development*. North Carolina, USA: Duke Press Policy Studies.

Board on Science and Technology for International Development (BOSTID) of the National academy of sciences, & Nitrogen Fixing Tree Association (NFTA). (2000). *Leucaena: Promising forage and tree crop for the tropics*. Washington, D.C.: New Forests Projects. (www.newforestsproject.com/treemth.html).

Bourdier, J. P., & Alsayyad, N. (Eds). (1989). *Dwellings, settlements, and tradition: Cross cultural perspectives*. Lanham: University Press of America.

Brion, H. (1985, February). *An overview of the potentials and utilization of coconut wood*. Paper presented at the UNIDO-sponsored International seminar on coconut wood processing and utilization, Lucena, Philippines.

Brion, H. (1985, February). *Industrial scale processing of coco wood*. Paper presented at the UNIDO-sponsored International seminar on coconut wood processing and utilization, Lucena, Philippines.

Cabral, S. Del R., (1992). *Garbage housing in informal settlements*. (Masters Thesis, McGill University), Montreal: McGill University.

Cardoso, A. (1983). *The Illegal housing sector in Portugal - "Barrios Clandestinos"*. Geographical papers. London and Rugby: George Oners Ltd.

Central Intelligence Agency, USA. (1990) *Philippines* [Map], Inset: Metropolitan Manila. Washington, D.C.: USA.

Chickering, A. L., Salahdine, M. (Eds). (1991). *The silent revolution: The informal sector in five Asian and near eastern countries*. San Francisco, California: International Center for Economic Growth.

Doxiadis, C. (1968). *Ekistics: An introduction to the science of human settlements*. New York: Oxford University Press.

Erklens, P. & Van der Meuler, G. (1996). *Urban Habitat: The environment of tomorrow, focusing on infrastructural and environmental limitations*. Faculty of Architecture, Delft: Eindhoven University of Technology.

Gilbert, A., & Gugler J. (1992). *Cities, poverty and development: Urbanization in the third world*. Oxford, New York: Oxford University Press.

Grimes, O. F. (1976). *Housing for low-income urban families: Economics and policy in the developing World*. London: John Hopkins University Press.

Hardoy, J. E., & Satterthwaite, D. (1981). *Shelter need and response: Housing, land and settlement policies in seventeen third world nations*. Toronto: John Wiley and Sons.

Hariharan, S. V. (1991). *Informal sector*. Jaipur: Printwell

Hardoy, J. E., & Satterthwaite, D. (1989). *Squatter citizen: Life in the urban third world*. London: Earthscan publications ltd.

Hall, N. (1996). Coping with typhoons in the Philippines: Builders and farmers tell their story, *Basin News*, 12, 17-19.

Hillier, B., & Hanson J. (1984). *The social logic of space*. Cambridge: Cambridge University Press.

Jagannathan, N. V. (1987). *Informal markets in developing countries*. New York, Oxford: Oxford University Press.

Jocano, F. L. (1975). *Slum as a way of life: A study of coping behavior in an urban environment*. Quezon City, Philippines: University of the Philippines Press.

Juppenlatz, M. (1970). *Cities in transformation: The urban squatter problem of the developing world*. Queensland: University of Queensland Press.

Koenigsberger, O. (1982). Overview: Policies and practices, past and present trends. In *Open House International*, 7(4), 50-53.

Lacquian, A. (1970). *Administrative measures for the improvement of slums and uncontrolled settlements*. Colombia: United nations.

Landaeta, G., & Larsson, S. (1987). *Roofs in the warm-humid tropics of South-East Asia*. Lund, Sweden: LCHS Publication.

Las Pinas City Government. (1999). Las Piñas City home page. [Http://member.axti.com/neil/](http://member.axti.com/neil/)

Las Piñas City Government, Planning office. (1998). Aerial photograph of Sitio Pugad Lawin. [Photograph]. Las Piñas City: Las Piñas City Government

Las Piñas City Government, Planning office. (1998). Base map of Las Piñas City. [Map]. Las Piñas City: Las Piñas City Government

Lloyd, P. (1979). *Slums of hope?: Shanty towns of the third world*. Great Britain: Penguin Books Ltd.

Madhava, Rao, A. G., Ramanchada Murthy, D. S., & Annamalai, G. (Eds). (1984). *Modern trends in housing in developing countries*. London: E. and F.N. Spon.

Mahadevia, N. (1981). *Management of materials of construction in slums: A case study of Ahmedabad*. Ahmedabad, India: (Unpublished).

Mosterio, A. (1985, February). *The need for an industrial utilization of coconut wood*. Paper presented at the UNIDO-sponsored International seminar on coconut wood processing and utilization, Lucena City, Philippines.

National Bookstore. (1983). *Republic of the Philippines: Provincial and regional map*. Manila: National Bookstore Inc.

National Housing Authority. (1994). *Primer: Fast facts on Philippine housing and population*. Metro Manila, Philippines: NHA

Navarro, R. (1994). *Improving sanitation in coastal communities with special reference to Puerto Princessa, Palawan province, Philippines*. (Masters Thesis). Montreal: McGill University.

Obudho, R. A., & Mhlanga, C. (1988). *Slum and squatter settlements in sub-saharan Africa: Towards a planning strategy*. New York: Praeger Publishers.

Okpala, D. (1992). House production systems and technologies in developing countries: A review of the experiences and possible future trends and prospects. *Habitat Intl.* 16(3) 9-32. Great Britain, UK: Pergamon Press.

Pahl, R. E. (1970). *Patterns of Urban Life: The social structure of modern Britain*. Great Britain: Spottiswoode, Ballantyne and Co.

Pandya, Y. (1988). *Slum houses as a user responsive product: A case study, Indore, India*. (Masters Thesis). Montreal: McGill University.

Pawley, M. (1975). *Garbage Housing*. England: Architectural Press.

Pearlman, J. (1974). *Government Policy toward Brazilian favela dwellers*. (Working paper no.243). San Francisco: Fifth national meeting of the Latin American studio association.

Philippine News and Features. (1997, January 12). UN body asks RP to explain squatter demolitions. *Philippine Daily Inquirer*. p. 4.

PFDA (Parshwanath Foundation for Development Analysis). (n.d.) *Slum upgradation: A strategic choice*. India: PFDA.

Rapoport, A. (1969). *House form and culture* (Foundations of Cultural Geography Series). P. Wagner (ed). Englewood Cliffs, New Jersey: Prentice Hall.

Relf, C., (1984). *Guidelines for the development of small-scale construction enterprises*. Geneva: International Labour Office

Roberts, B. (1978). *Cities of Peasants: The Political economy of Urbanization in the Third World*. London: Edward Arnold Ltd. (First published in 1973).

Robinson, A. (Ed). (1979). *Appropriate technologies for third world development: Proceedings of a conference held by the International Economic Association at Tehran, Iran*. New York: St. Martins Press.

Roseland, M. (1998). *Toward sustainable communities: Resources for citizens and their governments*. Gabriola Island, B.C.: New Society Publishers.

Rybczynski, W., Bhatt, V., Alghamdi, M., Bahamman, A., Niskier, M., Pathare, B., Pirani, A., Puri, R., Raje, N., & Reid, P. (1984). *How the other half builds. Vol. 1: Space*. (Research paper no. 9). Montreal: McGill University, Centre for Minimum Cost Housing.

Rybczynski, W. (1977). Stopping the five gallon flush. In N. Wilkinson (Ed.) *Open House International*, 1988, 13, 1. (pp. 24-27).

Sambo, L. (1996, November). The urban development and housing act of 1992: Housing backlog's major problem is funding. *Construction Management Magazine*. 13(11), 29-32.

Schmidt, E. (Ed). (1989). *Squatters' struggles and housing policies in Asia: Experiences from five countries in Southeast and South Asia*. Dortmund: IRPUD (Institut für Raumplanung Universität Dortmund).

Schutt, P. (1993). *Leucaena leucocephala*. In *Enzyklopädie der Holzgewächse. Handbuch und Atlas der dendrologie*. (Vol.III-4, pp.1-9). Loose leafs, Landsberg am Lech: Ecomed.

Soto, H. De. (1989). *The other path: The invisible revolution in the third world*. New York, N.Y. Harper and Row, Publishers

Stone R. L. (1973). *Philippine Urbanization: The politics of public and private property in greater Manila*. Detroit: Northern Illinois, Center for Southeast Asian Studies.

Samal, K. C. (1990). *Urban Informal Sector: An exploration of the informal sector in a small city of Orissa*. Delhi, India: Manak Publications

Tannerfeldt, G. & SIDA (Swedish International Development Cooperation Agency. (1995). *Towards an urban world: Urbanization and development assistance*. Stockholm: SIDA.

Tipple, A. G. (1994). A matter of interface: The need for a shift in targeting housing interventions. *Habitat int'l*. 18(4), 1-15.

Turner, B. (Ed). (1988). *Building community: A third world case book*. London: Building community books.

Turner, J. F.C. (1976). *Housing by People: Towards Autonomy in building environments*. New York: Pantheon Books.

United Nations. (1971). *Improvement of slums and uncontrolled settlements* (Report of the Interregional seminar on the Improvement of slums and uncontrolled settlements, Medellin, Colombia, February 15-March 1, 1970. New York: United Nations

United Nations. (n.d.). *United Nations ad-hoc experts group seminar on Improvements of slum & squatter settlements*. New York: United Nations

UNCHS (United Nations Centre for Human Settlements). (1980). Overview on building codes and regulations in developing countries. *UN seminar of experts on building codes and regulations in developing countries (1980 March 17-24)*. Tällberg and Stockholm: Swedish Council for Building Research.

Valenciano, A. (April, 1999) *Sheltering the poorest of the poor in the Philippines: The National Housing Authority's role in the national shelter program*. Paper presented at the Architecture and Development course held at the Lund Centre for Habitat Studies, Lund University.

Vega, V. (1997, January 15). Squatters, demolition men clash. *Manila Bulletin*. pp 1 & 8).

The World Bank. (1993). *Housing: Enabling markets to work. With technical supplements*. Washington D.C.: The World Bank

Willoughby, K, (1990). *Technology choice: A critique of the appropriate technology movement*. London: Westview Press Boulder and San Francisco Intermediate Technology Publications.

Zeilinski, Z.A. (1969). *The role of pre-fabrication in low-cost housing: techniques for the reduction of the costs of materials and labour*. New Delhi: National Buildings organization.