# HOUSING AND EMPLOYMENT IN LIMA, PERU

Summary Report (P-8)

by

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February 1981

This study has been sponsored by the Office of Urban Development, Bureau for Development Support, Agency for International Development, in accordance with Contract AID/DS-otr-C-0012.

ACKNOWLEDGEMENTS

This report and the seven others on which it is based had the help of many people. Above all, gratitude is due to the hundreds of households and dozens of construction workers and building firms who answered lengthy questionnaires. These surveys were organized by Norma Lucía Botero and by the Technical Office of Manpower Studies, General Bureau of Employment, Ministry of Labor, under the direction of Edgar Flores Benavente, Abel Centurión, Jorge Bernedo, Mabel Gómez, Carlos Levano Fuentes, Víctor Muñoz Ugarte, William Sánchez Aybar, and Luis Sánchez Soto. They provided an error-free data tape. At the Ministry of Housing crucial information and advice was provided by Alfredo Pérez, Hilde Scheuch de Zamora, and Pedro Sarmiento Polo. Especially helpful at the Banco de la Vivienda was Federico Melo. Thanks are also due to Gladys de Aller of the Peruvian Chamber of Construction and to Rufino Cebrecos Revilla of the Pontifical Catholic University of Perú. At the Lima office of the U.S. Agency for International Development, I benefited from the experience and knowledge of Paul Vitale, Rodolfo Salinas, Alfredo Larraburre, Renán García and Robert Adler. For a variety of insights I am indebted to Mahlon Barash of the Foundation for Cooperative Housing and to Elkyn Chaparro and Mario Rothschild of the World Bank. None of the above or below are responsible for errors in any of the reports.

Without the support in Washington by William S. Miner and Michael Farbman at the Office of Urban Development, A.I.D., the project might not have been organized at all. Their advice shaped the direction of the work.

Most helpful at the Office of Housing were Peter Kimm, David McVoy, Goldie Rivkin, and others. In East Lansing I am grateful to Paul Winder for computer programming, to Kelli Sweet and Miae Evans for precision typing, to my wife and colleagues for comments on preliminary drafts, and to Jean Moeller and Charles Doane for managing the logistics of it all.

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The Housing in Development Unit of Michigan State University made exploratory studies in six countries during 1979 in order to test new ways of analyzing the employment generated by housing programs such as serviced sites, expandable core units, and upgrading of slums. The six countries were Colombia, Kenya, Pakistan, Sri Lanka, Tunisia, and Zambia.[1] A thorough application of this experience was attempted in 1980 in Lima, Peru, with the cooperation of the Ministry of Labor, the Ministry of Housing and Construction, the National Housing Bank, and the U.S. Agency for International Development. The application was centered around two principal questions:

1. What type of building program is best for attaining a reasonable standard of housing welfare by 1990?
2. How can employment effects be estimated in advance so that informal improvements, commercial building, and infrastructure production can be compared properly?

Work began in January 1980. A survey was made during May-July, and by December 1980 seven preliminary reports totalling 167 pages were ready for critical review.[2] This paper is a summary of the findings which contains some new material. It begins with a review of residential construction in the Peruvian economy, especially in the Metropolitan Area of Lima, during recent decades. A comparison of housing conditions and income distribution follows, together with a projection to 1990. Third comes an analysis of the improvement of existing housing by occupants and landlords: Who does how much and why? Fourth and last are the employment estimates from all types of residential construction. These estimates are much higher than most people would suspect.

## I. A Review of Housing in the Peruvian Economy

The most important aspect of housing policy is the rate at which land and finance are made available to different income groups. If these are accessible, labor and materials will not be major bottlenecks in a country like Peru. Housing finance has to reflect such general economic conditions as the rate of growth of national product, the level of savings and tax collection, the amount of investment in other productive sectors, and even the state of exports and size of capital inflows. Housing policies should not only focus on the characteristics of specific projects but heed the way the entire housing stock is changing. These changes are a response to both the number and the types of households, large and small, new and old, rich and poor, owners or tenants.

Population growth in Peru reached a peak in the late 1960's with 3.0 percent annually but fell to 2.8 percent a decade later. The population of the Metropolitan Area of Lima followed a similar but faster pattern: 5.1 percent during 1940-1961, 5.4 percent during 1961-1972, and 4.8 percent during the late 1970's. The share of Lima rose from a fifth to a fourth of the national population; and within Lima the share of squatters rose from less than 20 percent in the 1950's to 27 percent in 1980. Their annual rise was over 9 percent.

Since squatters mainly settle on public land, the expansion of their pueblos jóvenes depends largely on official tolerance, perhaps even tacit encouragement. Tolerance was fairly high during the military regimes of Manuel Odría (1948-56) and Juan Velasco Alvarado (1968-75). Average annual settlement in new squatter areas came to over 25,000 people under

Odría and to over 54,000 under Velasco, meaning a shift of 2.6 and 1.8 percent of the Metropolitan population each year. Migration to and expansion of older squatter areas are not included in these figures. During the intervening period of Presidents Manuel Prado and Fernando Belaunde (1956-68), new settlement formation was less -- about 17,000 people annually or about 1.0 percent of the Metropolitan population.[3] During this period an attempt was made to have settlers acquire public utilities promptly with full-cost loans instead of subsidies that might further accelerate migration to Lima. In general, the provision of water and sewerage has been efficiently managed since 1963, reaching most of the population and charging enough to cover operating and investment costs. In 1980, 73 percent of households had at least a water faucet and 62.5 percent had a toilet connected to the sewerage system.

Finance for building has been channeled through a variety of public agencies set up by successive governments. A national mortgage bank, Banco Central Hipotecario, dates back to president Augusto Leguía (1919-30). The Corporación Nacional de Vivienda (CNV) was set up under President Bustamente (1945-48) and built thousands of units. Pedro Beltrán, prime minister under President Manuel Prado, fostered a system of mutual savings and loan associations and created an Instituto Nacional de Vivienda (INV) for encouraging private (expandable) housing as the solution to the nation's "number one problem." The CNV and INV were combined in a Junta Nacional de la Vivienda (JNV) by the 1962-63 military government. A Banco de la Vivienda became the supervisor of and financial channel to the mutual associations. By 1967 appropriations to the JNV were cut by 89 percent from

the 1963 level. Meanwhile public housing projects were built that only the middle and upper middle class could afford. A Ministerio de Vivienda y Construcción was set up by Velasco in 1969 and given responsibilities for planning many aspects of the sector. Ten years later came the Fondo Nacional de Vivienda (FONAVI) which finances housing construction with funds obtained from a 4 percent payroll tax and matching contributions. Public housing is administered by the Empresa de Administración de Inmuebles del Perú (EMADI). In September 1980 a Banco de Materiales was set up to make loans for buying materials to low-income families who wish to build or to expand a small core house. As these agencies rise and decline in accordance with the general monetary situation and political priorities, housing construction expands and contracts.

Fluctuations in residential building coincided with changes in other types of construction. In good years the volume of all construction value added rose to 5 percent of national product, and in poor years it fell to 3 percent. Basically, however, it grew at the same rate as the national economy so its share has averaged around 4 percent since 1950. Housing amounted to about half the total --- or 65 percent if an estimate for selfhelp building is added.

In the Lima Metropolitan area, construction employment like other types lagged behind population growth during 1961-1972. At a 4.3 percent average annual growth rate, however, it did maintain its 7 percent share of the labor force until 1975. Afterwards with deteriorating economic conditions, the number of employed and underemployed construction workers fell from 65,000 to 50,000 in mid-1978, and their share of the labor force fell to 5 percent. During 1979-1980 construction recovered faster than

other sectors, as it always does, and employment rose by 10 percent, bringing the share to 5.5 percent of the labor force. The extent of open unemployment among construction workers fell from 11,000 in July-August of 1978 to 6,000 in April 1980.[4] The amount of uncounted selfhelp building on improvements alone was equivalent to some 20,000 additional workyears.

Like other wages in Lima, those of construction workers fell steadily in real terms during 1974-1979 until purchasing power reached a low of 60 percent of the 1973 level in June 1979. Salaries of office workers and professionals fell to 51 percent. By May 1980 wages had recovered to a 76 percent level, and salaries to 59 percent. In general, wages kept up with inflation by rising at an annual rate of 66 percent percent during the first 8 months of 1980, but construction wages lagged by rising only 40 percent in nominal terms.

A survey of payrolls of enterprises employing 10 or more workers showed that in May 1980 construction workers received 1,414 soles daily (US $4.96).[5] Our special survey posed the question directly to workers and found that the amount was only S/1,173 (US $4.12). Fringe benefits and social costs must be added to these amounts for all those enterprises that actually paid them. Included are payments for social security, a pension fund, accident insurance, a payroll tax for FONAVI (the housing fund), and other taxes, holiday benefits, and the like that can amount to 75 percent of daily wage payments in the case of construction.[6] In estimating costs in May 1980, construction firms therefore stated that the daily cost of an unskilled worker was S/2,056 (US $7.21) and that of a skilled worker S/2,200 (US $7.72). The margin of skilled over unskilled pay was thus said to be

only 7.0 percent. Experts in construction practice believed that the skill premium was closer to the 36 percent level reported by workers themselves, and that firms might well overstate their costs per worker by 90 percent, or more in the case of the unskilled. Where unemployment is intense, workers will readily sign that they have received their due, but they may have worked five days instead of three. Others may remain unduly long in the category of "new and temporary." Census reports have invariably shown that construction employment is larger than the amount shown on payrolls. Wages are lower, but employment is higher.

## II. Distribution of the 1980 Housing Stock

The way the 1980 housing stock, divided into six major categories (H0, H1...H5), was used by Lima households in six income categories (F0, F1...F5) is shown in Table 1. Each row shows what sort of housing was occupied by an income group, and each column shows how a housing type was distributed among different income groups. (For a detailed breakdown of the income distribution, see Appendix Table A-1).

The division of the housing stock into six categories -- temporary, substandard, minimal, basic, good, and excellent -- is a standard approach that has been used in studying the housing of other countries. Physical characteristics of each housing type are given in the first seven rows of Table 2. They involve materials, space and access to utilities. Within each category are a number of sub-types. For example, classified as "sub-standard" H1 are both adobe huts with latrines and with water from public standpipes as well as rooms in tenements for families that must share sanitary facilities with others. Note that temporary housing H0 is larger and on a bigger site than H1 housing. With inferior materials it is easier to build

Table 1. Distribution of the 1980 Housing Stock and Net Additions since 1970. (Thousands of units and percentages.)

| Dwellings / Households Monthly Income | $H_0$ Temporary | $H_1$ Sub-standard | $H_2$ Minimal | $H_3$ Basic | $H_4$ Good | $H_5$ Excellent | $\Sigma_F$ |
|---|---|---|---|---|---|---|---|
| Thousands of 1980 Soles | | | | | | | |
| $F_0$ 15 or less | 24.2 (2.7) | 6.3 (.7) | 4.5 (.5) | .9 (.1) | | | 36.8 (4.1) |
| $F_1$ 15.1 - 28 | 63.7 (7.1) | 21.5 (2.4) | 16.1 (1.8) | 10.8 (1.2) | 1.8 (.2) | .9 (.1) | 113.7 (12.7) |
| $F_2$ 28.1 - 50 | 113.0 (12.6) | 64.6 (7.2) | 67.3 (7.5) | 45.7 (5.1) | 30.5 (3.4) | 10.8 (1.2) | 332.8 (37.1) |
| $F_3$ 50.1 - 90 | 36.5 (4.1) | 38.6 (4.3) | 33.2 (3.7) | 60.1 (6.7) | 45.7 (5.1) | 26.9 (3.0) | 241.4 (26.9) |
| $F_4$ 90.1 - 162 | 11.7 (1.3) | 5.4 (.6) | 15.2 (1.7) | 19.7 (2.2) | 34.1 (3.8) | 44.0 (4.9) | 130.1 (14.5) |
| $F_5$ Over 162 | | | 2.7 (.3) | 2.7 (.3) | 12.6 (1.4) | 25.1 (2.8) | 42.2 (4.7) |
| $\Sigma_H$ Total | 249.5 (27.7) | 136.3 (15.2) | 138.1 (15.4) | 139.9 (15.6) | 125.6 (14.0) | 107.6 (12.0) | 897.0 (100.0) |
| 1970 Stock | 96.3 | 102.0 | 119.0 | 124.6 | 79.3 | 45.3 | 566.5 |
| Net Addition, 1970 - 1980 | 153.2 (46.4) | 34.3 (10.4) | 19.1 (5.8) | 15.3 (4.6) | 46.3 (14.0) | 62.3 (18.9) | 330.5 |

Source: Percentage distribution from the survey of 1,167 household carried out during June 10 - July 3, 1980, by the Office of Technical Manpower Studies, Dirección General del Empleo, Ministerio de Trabajo, Lima. Since the average household size was 5.53, and the population of the Lima Metropolitan Area was 4.96 million, there must have been 897 thousand households.

a bigger shack; and on the outskirts of the city families usually squat on a parcel large enough to accomodate a few chickens and goats. As others move in, some of the land is sold and a more solid but smaller house is built.

In general, value of the site was around 30 percent of the total value of the dwelling. From the extreme northern, southern, or upland outskirts of Lima to the central business district, land values rose by a factor of a thousand -- from 200 to over 200,000 soles (US $0.70 - $700) per square meter in early 1980.

In Lima owner occupants at the F1 level, receiving about S/19,000 (US $67) monthly, typically seemed willing to acquire H1 dwellings worth 20 times their income. The proportion gradually rose until households earning S/167,000 (US $586) were willing to pay for dwellings worth 30 times their income. To make preferred housing double in value, rising 100 percent, income only had to rise 80 percent. The ratio of these two percentages would be an income elasticity of demand equal to 1.25 if all other characteristics of households were unchanged in the six ranges.

## A Comparison with 1970

The distribution of housing and incomes in 1980 may be compared with that of 1970. The median level was already at the boundary between the F2 and F3 ranges: S/50,000 or US $175. Of course, there had been only 566,500 households in 1970, compared with 897,000 in 1980. As in 1980, a certain number of F3 and F4 households lived above the diagonal of the Table and many F1, F2, and F3 households lived below. Income distribution was somewhat worse than in 1980 with both more F5 households at the high

Table 2 -- Characteristics of Major Housing Types

| Housing Type | H0 Temporary | H1 Substandard | H2 Minimal | H3 Basic | H4 Good | H5 Excellent | Mean of Sample (median) |
|---|---|---|---|---|---|---|---|
| 1. Wall materials | Many inferior: straw mats, adobe, quincha, refuse. | Some inferior: adobe, wood. | All good materials: fired bricks, reinforced concrete, concrete blocks, dressed stone. | | | | |
| 2. Roof materials | Same. | Wood, metal or asbestos sheets. | All good materials: reinforced concrete, clay tiles, some asbestos cement sheets. | | | | |
| 3. Water source | River, well, water wagon, standpipe, neighbor sells. | Public standpipe, tap shared with others. | All have piped water on the premises. | | | | |
| 4. Sanitary facilities | None or latrine. | Latrine, WC shared with others. | All have flush toilets connected to the sewerage system or modern septic tanks | | | Two or more bathrooms. | |
| 5. Rooms, number | 1-2 | 2-3 | 2-3 | 3-4 | 4-5 | 5 and more | 3.5 (3.0) |
| 6. Typical floor space, $m^2$ | 45 | 37 | 45 | 75 | 120 | 200 | 104 |
| 7. Typical value of structure per $m^2$. 1980 soles, thous. | Below 5 | 9 | 16 | 20 | 26 | 28 | --- |
| 8. Typical value of structure without the site, 1980 soles, millions. | Below .3 | .3 | .7 | 1.5 | 3.1 | 5.6 | --- |
| 9. Typical area of site, $m^2$ | 185 | 60 | 75 | 120 | 170 | Over 200 | 148 |
| 10. Typical value of the site per $m^2$, 1980 soles, thousands. | Below 1 | 2.5 | 4 | 5 | 7 | Over 10 | --- |

Table 2 (cont'd) -- Characteristics of Major Housing Types

| Housing Type | H0 Temporary | H1 Substandard | H2 Minimal | H3 Basic | H4 Good | H5 Excellent | Mean of Sample (median) |
|---|---|---|---|---|---|---|---|
| 11. Typical site value, 1980 soles, millions | Below .1 | .15 | .3 | .6 | 1.2 | Over 2 | --- |
| 12. Rental range, 1980 soles, thousands | Below 1 | 1-2 | 2-4 | 4-8 | 8-16 | Over 16 | 6.0 (2.2) |
| 13. Value range, 1980 million soles. | Below .3 | .3-.6 | .6-1.2 | 1.2-2.4 | 2.4-4.8 | Over 4.8 | 2.8 (1.0) |

Source: Survey of 1,167 household carried out during June 10 - July 3, 1980, by the Office of Technical Manpower Studies, Dirección General del Empleo, Minsterio de Trabajo, Lima; Cartilla de Instrucciones para la Declaración Jurada de Autovaluo (Lima: Consejo Provincial de Lima, 1980); and personal interviews with experts.

end and more F1 and F2 households at the low end, but housing conditions were somewhat better in 1970.[7]

Not counting additional vacant units, the net addition to the housing stock during the 1970's had been 330,500 units worth about 700 billion 1980 soles (US $2.5 billion). Table 3 shows the distribution of the additions. About one-third of the additions were good and excellent H4 and H5 housing and represented 85 percent of housing investment. Nearly half of the new housing was in the lowest H0 category and amounted to no more than 5 percent of the value built. Many of the new units were built to replace old ones that were demolished. The tables show only the net effect.

During the 1970's the share of H2 and H3 housing fell from 43 to 31 percent of the housing stock. While the rest of the stock nearly doubled during the decade, rising by 97.0 percent, H2 and H3 housing rose by only 13.2 percent. In terms of value, only about seven percent of net additions to the dwelling stock were in this range although it was appropriate for nearly two-thirds of the population. It is no wonder that prices and rents in the H2-H3 range had a tendency to rise 20 percent faster than the average of the housing stock.

Because of failure to encourage enough H2 and H3 building, the share of small temporary and substandard units, often without adequate public utilities, rose from 35.0 percent in 1970 to 42.9 percent in 1980.

At the high end of the scale is housing worth more than S/2.4 million (US $8,400) or renting for over S/8,000 (US $28) monthly. The share of such dwellings rose from 22 to 26 percent during 1970-80. Indeed, the rise was concentrated among excellent H5 units worth over S/4.8 million.

Table 3

Types, Number, and Cost of Dwelling Units that were Net Additions to the Occupied Housing Stock during 1970-1980.

| Housing Type | Distribution of Additions (percent) | Net Additions (thousands) | Cost per Unit (1980 Soles) | Total Cost (1980 Soles, billions) | Distribution of cost (percen |
|---|---|---|---|---|---|
| H0 | 46.4 | 153.2 | 250,000 | 38.3 | 5.4 |
| H1 | 10.4 | 34.3 | 500,000 | 17.1 | 2.4 |
| H2 | 5.8 | 19.1 | 1,000,000 | 19.1 | 2.7 |
| H3 | 4.6 | 15.3 | 2,000,000 | 30.6 | 4.4 |
| H4 | 14.0 | 46.3 | 3,500,000 | 162.1 | 23.0 |
| H5 | 18.9 | 62.3 | 7,000,000 | 436.1 | 62.0 |
| Total | 100.0 | 330.5 | (Average: 2,130,000) | 703.3 | 100.0 |

Note: Cost includes site preparation and infrastructure but not pure land value.

Source: See Tables 1 and 2.

## Housing Targets for 1990

What sorts of housing will have to be built if reasonable targets are to be attained by 1990? If population grows at 4 percent annually, the Lima Metropolitan area will reach 7,342,000 in 1990. If average household size remains 5.53 persons, then 1,328,000 dwellings will be required in addition to vacant units that facilitate movement. If households "undouble" at a rapid pace, still more will be needed.

If housing is neither subsidized nor unduly taxed or controlled, whatever is built is what people are expected to rent at market prices or to buy with cash or loans that cover inflation plus a competitive rate of interest. If household incomes grow at 2.5 percent annually during 1980-1990, and if the distribution around the median remains unchanged, then families will fall as shown into the categories of column 7 of Table 4. Only 10.6 percent will earn S/28,000 or less (at 1980 prices), compared with 16.8 percent in June 1980. Over S/99,000 will be earned by 32.4 percent, compared with the former 19.2 percent. Around sixty percent will remain in between, but that will be sixty percent of a much larger total. Row 7 shows the housing stock that will be needed. Note that it is identical to column 7.

The housing that can be sold or rented is not the same as that which needs to be built since much of the existing stock will remain for another decade. Let us assume that all remains. For every dwelling that deteriorates, another is upgraded, so that what remains are net results. What has to be built, then, is the difference between demand and the remaining stock. Row 8 is subtracted from row 7 to yield row 9. A total of 676,700 units has to be built in the H2-H5 categories, meaning 51 percent of the total number needed. Table 5 shows the breakdown and cost of the needed construction.

Table 4. Hypothetical Distribution of Housing and Households in Metropolitan Lima in 1990. (Thousands of Units and Percentages).

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|---|---|
| Dwellings / Households Soles per month | $H_0$ Tempo-rary | $H_1$ Sub-standard | $H_2$ Minimal | $H_3$ Basic | $H_4$ Cood | $H_5$ Excel-lent | $\Sigma_F$ |
| 6/1980 thousands | | | | | | | |
| 1.) $F_0$ 15 and less | 27.3 (2.1) | | | | | | 27.3 (2.1) |
| 2.) $F_1$ 15.1 - 28 | | 112.8 (8.5) | | | | | 112.8 (8.5) |
| 3.) $F_2$ 28.1 - 50 | | | 333.0 (25.1) | | | | 333.0 (25.1) |
| 4.) $F_3$ 50.1 - 90 | | | | 423.9 (31.9) | | | 423.9 (31.9) |
| 5.) $F_4$ 90.1 -162 | | | | | 273.7 (20.6) | | 273.7 (20.6) |
| 6.) $F_5$ Over 162 | | | | | | 157.3 (11.8) | 157.3 (11.8) |
| 7.) $\Sigma_H$ | 27.3 (2.1) | 112.8 (8.5) | 333.0 (25.1) | 423.9 (31.9) | 273.7 (20.6) | 157.3 (11.8) | 1,328.0 (100.0) |
| 8.) Remaining $H_j$ | - | 136? | 138.1 | 139.9 | 125.6 | 107.6 | 651.3 |
| 9.) Build, $D_j$ | | | 194.9 (28.8) | 284.0 (42.0) | 148.1 (21.9) | 49.7 (7.3) | 676.7 (100.0) |

Note: The population of the Lima Metropolitan Area is projected to grow at 4.0 percent annually to 7.342 million. Average household size remains 5.53. Income per housheold grows at 2.5 percent annually, bringing the median level to 64,000 soles of 1980 (US$ 225) monthly. Distribution around the median is unchanged. The target is to have the average household in each income range on the diagonal of the matrix, which has been set up to reflect revealed preference for monthly payments of rent or investment in owner-occupied housing.

Table 5 -- Types, Number, and Cost of Dwelling Units that Need to be Built during 1980-90 to Provide Housing Appropriate for Household Income Levels.

| Housing Type | Distribution of Need (percent) | Number Needed (thousands) | Cost per Unit (1980 Soles) | Total Cost (1980 Soles, billions) | Distribution of Cost (percent) |
|---|---|---|---|---|---|
| H2 | 28.8 | 194.9 | 1,000,000 | 194.9 | 12.0 |
| H3 | 42.0 | 284.0 | 2,000,000 | 568.0 | 34.9 |
| H4 | 21.9 | 148.1 | 3,500,000 | 518.0 | 31.8 |
| H5 | 7.3 | 49.7 | 7,000,000 | 347.9 | 21.4 |
| Total | 100.0 | 676.7 | | 1,629.2 | 100.0 |

Note: Cost includes site preparation and infrastructure but not pure land value.

The total cost of 1.629 trillion soles or 163 billion annually for ten years -- US $572 million per year -- seems astronomical. It is 150 percent more than was spent on these housing types during 1970-1980. Government cannot hope to generate that much finance directly. Yet for a population of seven million, it comes to only some 11,000 monthly soles (US $39) per household -- one sixth of average income in 1980. It is an amount that is well in line with shares that households are willing to spend on housing as a convenience and an asset. Of course, maintenance and operating expenses of the existing housing stock have to be added to these totals. Yet it is an amount that is so large that it will probably not be generated if anything impedes the development of new sites, the mobilization and security of savings, the chance to upgrade and expand old houses, and the right to rent or sublet at market prices. The scale of what is needed and what is possible is so large that government will be fully challenged in providing the infrastructure, perhaps some core units, and in removing obstacles and insecurity everywhere else.

Failure to encourage enough building, as seemed to be the case during the 1970's, ironically does not mean that households will have more funds for other uses. A shortage of housing will drive up the price of the existing stock so that a larger share of income is paid for less housing. Particularly affected during the 1970's, as already stated, were H2 and H3 housing for which the supply rose relatively less and prices relatively more. The higher prices were not allowed to stimulate a sufficient supply response, and a consequence of that was less construction employment, less income and multiplier effects, and finally less ability to pay for new housing.

It is likely that in 1990 around 10 percent of households will continue to earn less than S/28,000 (US $98) monthly. In absolute numbers, this may be a slight decline from the 150,000 households in the lowest ranges in 1980. For them anything better than substandard housing would require an open or disguised subsidy. If that is not provided, many will have to replace part of the deteriorating substandard or temporary housing stock with equivalent new units.

If all 140,000 households are provided with a serviced site, materials, and foundations for a core house, the cost would be very high. At S/400,000 (US $1,400) per site and core, the total comes to $5.6 billion annually (US $196 million). Nevertheless, if there are to be housing subsidies, this is where they should go and in a manner consistent with providing earning opportunities, not just housing.

## III. Upgrading: Improvements and Additions

Making additions and improvements to housing is an important economic activity in Lima. The vast majority of owner-occupants add rooms, plaster and paint, install better windows and doors, and improve plumbing facilities. During their mean time of ownership of 11 years, they have raised the value of their dwellings by over one-third.[8]

The average owner-occupied dwelling of 128$m^2$ was built with five onsite workdays per square meter and incorporates about 640 workdays. Of these, 152 workdays are in additions and improvements. They represent a 31.1 percent addition to the original 488 workdays.

The best practical way to measure improvement is by the number of types that were made and by the effect of changes on total value, holding

other elements constant. Adding a room and interior plastering and painting were the most popular types of improvement in Lima during 1960-1980. In addition many of the poor rebuilt their houses entirely, while most above the median income level changed their sanitary facilities in a major way. Improvement was a continuing activity, not one that stopped after three or four years.

Some kind of improvement or expansion of the dwelling had been made by 81.6 percent of 1980 owner occupants. Half had made more than three types of improvement, and a quarter more than five types.

| Types of Improvement | Percentage | Percentage below $50,000 monthly income |
|---|---|---|
| None | 18.4 | 17.0 |
| 1 - 2 | 30.2 | 30.0 |
| 3 - 5 | 25.6 | 29.1 |
| 6 or more | 25.8 | 23.9 |

As can be seen in Table 6, seventeen types of improvement have been identified. Only one percent of households reported improvements that did not fit into these categories. The table shows what percentage of occupants have made each type of change, and a further breakdown divides the sample into those below and above the median income level. The average household (counting only improving households) made four or five types of changes.

The longer a household occupies a dwelling, the more types of improvement it will make. Households that had been in a place only 1-2 years averaged two types of improvement after the initial building, while those who had been there over a decade averaged 4.7 types of improvements. This steady rate of improvement by all income groups contradicts the opinions of those who believe that after reaching a certain level, perhaps H2,

Table 6 -- Percentage of Owner-Occupants Making Different Types of Improvements

| Type of Improvement | Total Sample n = 724 | Monthly Income 50,000 soles or less n = 377 | Monthly Income Over 50,000 soles n = 347 |
|---|---|---|---|
| A. Basic | % | % | % |
| 1. Reconstruct the house | 30.2 | 40.1 | 19.6 |
| 2. Room(s) added | 41.9 | 46.7 | 36.6 |
| 3. Wall materials changed | 25.3 | 30.5 | 19.6 |
| 4. Roof materials better | 17.0 | 16.4 | 17.6 |
| B. Utilities | | | |
| 1. Water facilities better | 25.4 | 27.1 | 44.6 |
| 2. Toilet better | 26.7 | 22.5 | 56.0 |
| 3. Kitchen improvements | 26.0 | 21.5 | 30.8 |
| C. Finishes | | | |
| 1. Interior plastering and painting | 39.4 | 27.6 | 52.2 |
| 2. Floor improvements | 30.1 | 28.4 | 32.0 |
| 3. Windows and doors improved | 29.4 | 23.6 | 35.7 |
| 4. Outside plastering | 19.6 | 18.3 | 21.0 |
| 5. Interior ceiling finished | 11.5 | 8.5 | 14.7 |
| D. Site Changes | | | |
| 1. Grading | 20.2 | 29.2 | 10.4 |
| 2. Adding fill | 12.2 | 18.0 | 6.6 |
| 3. Fence or wall | 10.4 | 6.9 | 14.1 |
| 4. Garden | 9.9 | 6.1 | 14.1 |
| E. Other | 1.2 | 1.1 | 1.4 |

dwellings in new settlements will not improve further but will deteriorate into new slums.[9] On the contrary, failure to provide enough H2 and H3 units during the 1970's made these more valuable and raised the incentive to produce them through expansion and selfhelp.

In Pueblos Jóvenes, the average household added 1.4 rooms, or rebuilt the house entirely, making four or five types of improvements altogether (See Appendix Tables A-2, A-3, A-4.) In the rest of the Lima Metropolitan Area, families added 1.1 rooms, and the average number of improvement types was also four or five. The greatest adders and improvers were those in popular urbanizations. Deterioration occurred primarily in that part of the new housing stock that had been converted to rental use.

## Rental Deterioration

Mainly owner-occupied dwellings, not rented units, are improved by those who live there. Owned dwellings therefore improve with age for about twenty years while rented units deteriorate. The average owner-occupied dwelling aged 16-20 years was worth 156 percent more than the average such dwelling aged 1-5 years. By contrast a comparably older rental unit would have lost 48 percent of its value. Even if materials, space, sanitary facilities, etc. are held constant, a ten-year-old rental unit will rent for 31 percent less than a five-year-old unit. The effect is partly due to the disincentive of rent control to landlords who might carry out maintenance or improvements.

| Years of Occupancy by the Current Household | Monthly, rent thousand soles, mean | Mean Value of Non-rented units, million soles |
|---|---|---|
| 1-2 | 6,255 | 2.53 |
| 3-5 | 5,375 | 2.42 |
| 6-10 | 4,754 | 2.41 |
| Over 10 | 2,888 | 2.91 |

Rent control means inability to charge what a dwelling is worth in the eyes of some potential occupants. It is difficult to raise the rent more than a nominal amount on current tenants. The longer a dwelling has been rented to a particular household, the lower rent is likely to be, and the less likely is it that this household will move. Years of deteriorations, especially in recent times, may, however, lead the occupants to believe that they are getting less than they are paying for. Among all current tenants, 67.9 percent said that the landlords were bad and never made any repairs or maintenance at their own expense. Another 15.7 percent found them poor, doing very little. Those who had been tenants in the past but were now owners had found them bad only 49.8 percent of the time and poor in 19.6 percent of cases. Past tenants had found landlords satisfactory or better in 30.2 percent of cases; but only 16.0 percent of current tenants now found them that good. The aggrevation of rent controls as prices rise has inevitably affected the volume of private rental construction and conversion. Note also the steady decline of rental income as a percentage share of gross domestic product:[10]

1950-51 -------- 8.9
1955-56 -------- 7.9
1960-61 -------- 7.3
1965-66 -------- 6.4
1970-71 -------- 6.1
1975-76 -------- 5.9

The share of rental units in the Peruvian housing stock fell from 84.9 percent in 1940, to 69.1 percent in 1961, and 39.1 percent in 1972. In our 1980 Metropolitan Lima sample it was 29.2 percent. Among sample households of owners, only 3.3 percent (24) said that they had financed additions by taking in lodgers or tenant families in rooms, apartments, or houses on the lot where they lived. They were two-thirds of sample landlords. Nineteen percent of sample tenants said they lived on the same site as their landlords. Only four households claimed that rent from tenants living on the same site was their primary source of income, more important than all other sources combined. No doubt rent control in time of inflation has discouraged additions and improvements for earning this type of income. If renting is not a secure and profitable activity, the rental stock of housing will continue to deteriorate. Note that in Lima the average value of owned housing of S/2.8 million (US $9,800) was comparatively high: 3.25 times the annual income of occupants. The average rent of S/6,020 (US $21) was low, however: only 9.8 percent of the monthly income of tenants.

## Characteristics of Upgrading Households

The average owning household in 1980 consisted of six members: Two or three children under 18 and three or four adults. Two of the adults were workers, and 7.5 percent were unemployed. Their combined monthly income from all sources averaged S/71,900 (US $252). Mean age of the head was 47 years, and the family had lived in the dwelling for 11 years, as mentioned above. During this period they had expanded its size from 92 to 128 square meters for a 1980 improvement of about S/770,000 (US $2,700) and thus brought its value to S/2.6 million (US $9,100). Two

persons per room was typical, but a fifth of households (average size, 6.9 persons) considered themselves too crowded, and two or three people were willing to move out if they could find an affordable separate dwelling.

Since almost all owners make improvements, the process is not strongly associated with differences in income. Poor households, it is true, can afford to make fewer improvements; but they can also afford less housing to begin with and therefore want to make more improvements. The net result is that the poor make different types of improvement -- those types that bring a rudimentary shack to a minimal level of size and quality. They level the site, bring in fill, change the walls and roof, and plaster the inside.

Especially interesting is that, given income, those poor with access to a sewer system connection will make three times as many types of improvement as those without. That connection not only makes sanitary improvements physically possible, but it may also be the critical factor that gives a household pride and confidence in the value of a particular site. With all other characteristics of a house unchanged, access to the public sewerage system will raise dwelling value by 50 percent. If it is then rebuilt with permanent instead of temporary, makeshift materials, its value will quadruple. Thus infrastructure provision has a strong employment multiplier.

A leading characteristic of the poorer households who live in worse housing is that they are younger. Average age of the household head in the lowest two housing categories is 44 years, and in the lowest two income categories, 45 years. In the highest income and housing categories, average age is 50 years.

Income and the life cycle stage of the household are obviously correlated. What matters in this connection is the number of working adults. The highest compared with the lowest income range has only twice as many adults per household but three times as many employed workers. In fact, their average number is exactly three. By housing category the pattern is less pronounced with the number of employed workers per household rising from 1.6 to 2.3 from the lowest H0 to the highest H5 range.

Essentially, if a household grows, especially with additional adults, rooms are likely to be added. A fall in the birth rate in Peru will probably not lower the incentive to improve dwellings for about 18 years, that is, until the decline lowers the growth rate of the adult population.

## Paying for Improvements

About 92 percent of improvements and expansions were financed without loans, and 64 percent of changes were made with selfhelp labor. Households below the median income level had carried out three quarters of their improvements by paying cash for the materials and doing the work themselves. Above the median income level, somewhat more than half of the improvements had been made by selfhelp, but some of these had been completed before the household had reached the median income level. Most households well above the median will pay cash for the materials and hire a group of workers for the job. The credit that paid for about 8 percent of improvements came mainly from a variety of formal sources, not from materials suppliers or friends and relatives. Credit was somewhat more important below than above the median income level. In Pueblos Jovenes 73 percent of improvements were made with selfhelp, and 96 percent of these had no credit or loans for the materials. Selfhelp improvement was even more

important in popular urbanizations, about 80 percent. Of these 97 percent had neither credit nor loans for the materials. (See Appendix Table A-5).

Of interest is not only how improvements were actually financed in the past, but how they might be paid for in the future. Respondents were asked if any members of their families would be available for work on community projects, digging trenches, carrying materials, and the like, if payment were only in building materials that could not be resold but had to be installed on their own dwellings. Seventy-two percent said they would.

Respondents were also asked, "Were it possible, would you mortgage your house to obtain money for an addition or an improvement?" Among owners 18.0 percent said, yes. No doubt, on the less severe terms of the Banco de Materiales, many more will borrow to expand.

Improvements raise dwelling value, not just in line with their cost, but primarily in accordance with the willingness of others to pay that much more for an improved unit. To determine value, we simply asked, "If you were going to sell your dwelling today, at what price do you believe that you could sell it?" Throughout the world, such estimates have been found remarkable accurate. In Lima they primarily reflect the quality of the dwelling structure, and the neighborhood, not distance. Mainly at the high end of the value scale did distance assume importance. With all other characteristics the same, a dwelling that makes these workers travel twice as long to their jobs will be worth 15 percent less. On the average, high income workers travel 25 minutes to work. They would travel 50 minutes, if they could purchase an identical S/7.2 million (US $25,000) house for only S/6 million (US $21,000).

In general, double the distance would cost a dwelling only 10 percent of its value if the type of neighborhood were the same. Variations in neighborhood with other characteristics unchanged are such that an identical dwelling will be worth 86 percent more if the surroundings are conventional instead of a Pueblo Joven. (The underlying econometrics is a hedonic price analysis.)

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| | |
|---|---|
| Pueblo Jóven | 100 |
| Substandard, subdivided | 148 |
| Popular urbanization | 152 |
| Standard urbanization | 165 |
| Conventional | 186 |
| Luxury residential | 230 |

## IV. Employment Estimates

The only complete way to measure the labor needed for building any dwelling is to have someone at the site counting the hours that others are working. That method is expensive and not helpful if the amount of future employment is already supposed to be one of the justifications for beginning the project. In making bids, contractors and small builders usually use rules of thumb or past experience in estimating labor costs. They seldom know how many hours of skilled and unskilled time were actually worked in the past, nor to what extent these apply to the new design. They think of cost, component by component, in a general way. In Lima in 1980 it appeared that in going from minimal to intermediate housing the cost per square meter first rose at an increasing rate, followed by a decreasing rate of increase in going from good to excellent housing. It appears that in the intermediate

range, households sought improvements in the quality of materials, finishes, and fixtures; but that, once having attained high quality, they shifted toward buying more space. From minimal to excellent housing, as can be seen in Table 2, line 7, value per square meter rises in increments of 25%, 30%, and 7%. Floorspace rises in increments of 67%, 60%, and 67%. Basically, the two elements combined to double the value of the structure from one category to the next. Obviously, these figures reflect demand, as well as supply conditions.

## Wage Levels and Employment

Labor needed to produce these dwelling types (including numerous subcategories) depends on the technique of building and the relative prices of inputs. Sometimes improvements in technique will change employment even though all input prices and wages have remained the same. More often, a disproportionate rise in the cost of one input will lead to its partial replacement by other inputs that have remained cheaper. What the responses to price and wage changes are (the elasticity of substitution) will depend on the physical and organizational alternatives in building. To a great extent, these alternatives are not developed until the builder is actually confronted by new price and wage pressures.

In order to obtain a reliable base for 1980 employment figures, we asked experienced estimators in three different Peruvian organizations to give us costs per component for a standard Tunisian core housing plan which we had used in other countries. It consists of 24.9 $m^2$ and has a flat roof supported by reinforced concrete posts and a collar beam. There is a small kitchen with a sink, and in the bathroom a toilet is connected to a septic tank. Another estimate was for 34.4 $m^2$ Peruvian core house that added a shower and an extra washbasin. The floor plans are in the appendix.

Noteworthy is that the Tunisian core house could be built at a lower cost in Peru than in any of the other five countries. According to Peruvian builders, it could also be built with fewer onsite workers (101 workdays); but information from workers suggests that 154 would be needed, 17 more than in Medellín, Colombia. This discrepancy is due to the tendency of Peruvian builders to claim that they are paying the high legal wages and fringe benefits, which the workers dispute. On the other hand, the workers say that the differential paid to skilled workers is higher than builders state and that a larger proportion of unskilled workers is used in construction. The differences between the two types of sources can be seen in column 6 of Table 7. This matter has already been discussed in the first section.

In general the information from workers on pay and pay differentials is probably more reliable, but in this report we shall use the lower estimates of employment generation given by builders. As a result, all estimates in the remainder of this report, though perhaps surprisingly high, should nevertheless be regarded as conservative. For example, for the 34.4 $m^2$ Peruvian core house, data from workers would suggest that the labor content is 224 workdays, but we shall use the 132 workdays reported by builders.

Table 7 -- Cost of Construction and Characteristics Related to Employment Generation for a Standard 24.9m$^2$ Dwelling, August 1979; Lima, June 1980.

| | 1. Colombo Sri Lanka | 2. Rawalpindi Pakistan | 3. Lusaka Zambia | 4. Tunis Tunisia | 5. Medellín Colombia | 6. Lima Peru | 7. Mean, Six Countries |
|---|---|---|---|---|---|---|---|
| 1. Cost of Construction, C, US$ | 3,117 | 3,482 | 5,107 | 4,253 | 3,794 | 2,852 | 3,768 |
| 2. Daily pay, $w_u$, of unskilled workers, according to: | | | | | | | |
| a. Workers | .94 | 1.92 | 3.05 | 4.17 | 3.30 | 4.35 | 2.97 |
| b. Builders | 1.02 | 2.00 | 3.80 | 4.70 | 4.24 | 7.21 | 3.83 |
| 3. Ratio of skilled to unskilled wages, p, according to: | | | | | | | |
| a. Workers | 1.713 | 1.818 | 1.898 | 1.808 | 2.786 | 1.356 | 1.897 |
| b. Builders | 2.125 | 2.300 | 2.000 | 1.654 | 2.975 | 1.070 | 2.021 |
| 4. Unskilled workers employed per skilled worker, q, according to: | | | | | | | |
| a. Workers | 1.50 | 1.73 | 1.50 | .48 | 1.46 | 1.70 | 1.40 |
| b. Builders | 1.31 | 1.53 | 1.62 | 1.37 | 2.11 | .74 | 1.45 |
| 5. Ratio labor costs to total cost, r, | .150 | .185 | .198 | .314 | .205 | .265 | .220 |
| 6. Employment generator, $\phi = \frac{r(1+q)}{(p+q)}$ | | | | | | | |
| a. Worker-based | .117 | .142 | .146 | .203 | .119 | .234 | .160 |
| b. Builder-based | .101 | .121 | .143 | .246 | .125 | .255 | .165 |
| 7. Workdays for the dwelling, according to: | | | | | | | |
| a. Workers | 388 | 258 | 244 | 207 | 137 | 154 | 231 |
| b. Builders | 309 | 210 | 192 | 223 | 112 | 101 | 191 |

Table 8 shows how onsite workdays per dwelling rise from 101 for the smallest core unit to 1,105 for a 200 $m^2$ luxury residence. If the indirect labor content of materials is added, according to the findings of Rufino Cebrecos Revilla, employment goes from 152 to 1,602 workdays. On a per square meter basis, onsite employment falls from 4.0 workdays to 3.6 and then rises back to 5.5. It rises the most at the intermediate level where quality rises faster than space. This pattern is best observed by looking at incremental employment generation, as follows.

The change from the smallest core to that of 34.4 $m^2$ and to the minimal 45 $m^2$ unit is mainly one of additional space. Since the cost of plumbing can be distributed over more square meters, the cost per square meter actually falls. The initial unit requires 4.0 workdays per square meter, but the marginal increments only take 3 workdays per square meter. After that the marginal changes cost 5.0 and 5.7 workdays per extra square meter, followed by a leveling off.

## Employment in Expansion or Upgrading

Even harder to observe than formal construction employment on new dwellings is that in expansion or upgrading. Such employment may proceed piecemeal over a long period of time and be partly carried out by the household. More days than permanent building workers would need may have been worked by the household, but the difference should not be counted as the equivalent of real employment. It is time spent on learning or leisure.

If the value of an improvement or expansion is not known, one can assess employment generated by using the additional floor space that has been produced. If the house is at the minimal level, extra floorspace

Table 8

Employment Generation in Different Housing Types, Lima, Peru, 1980

| Category | 24.9m² Core | 34.4m² Core | 45m² Minimal | 75m² Basic | 120m² Good | 200m² Excellent |
|---|---|---|---|---|---|---|
| 1. Difference in floorspace compared with the next smaller type, m². | - | 9.5 | 10.6 | 30.0 | 55.0 | 80.0 |
| 2. Percentage change in value per m² of floorspace. Compared with next smaller type, %. | - | -2.9 | -1.4 | 25.0 | 30.0 | 7.7 |
| 3. Onsite workdays per m² of floorspace. | 4.0 | 3.8 | 3.6 | 4.2 | 5.2 | 5.5 |
| 4. Ratio: Change in onsite workdays to change in m² of floorspace. (Marginal workdays). | - | 3.0 | 3.0 | 5.0 | 5.7 | 6.0 |
| 5. Onsite workdays per dwelling. | 101 | 132 | 162 | 315 | 624 | 1105 |
| 6. Ratio, indirect materials employment to onsite employment. | .40 | .40 | .40 | .40 | .45 | .45 |
| 7. Ratio change in materials employment to change in m² of floorspace. | - | 1.2 | 1.2 | 2.0 | 2.8 | 2.7 |
| 8. Indirect employment, in materials, workdays. | 40.6 | 52 | 65 | 125 | 281 | 497 |
| 9. Sum, onsite and indirect materials employment, workdays. | 152 | 182 | 227 | 437 | 906 | 1,602 |

Source: Floorspace and values of the different housing types (without the site) were observed in June and July 1980. Workdays per square meter were analyzed in detail for the two core housing types. It is assumed that the extra workdays for additional square meters rise in proportion to the marginal square meter cost. The ratios of materials to onsite labor come from Rufino Cebrecos Revilla, Construcción de Vivienda y Empleo (Lima: Publicaciones CISEPA, Pontificia Universidad Catolica, Documento de Trabajo 35, April 1978), p. 39. These estimates can vary by plus or minus 25 percent in accordance with the volume and techniques by particular enterprises.

generates 3 onsite workdays per extra square meter. If it is at the "good" level, it generates 5-6 workdays per extra square meter. If one only knows the number of rooms that have been added, one has to assume that they are of average size for that quality range unless there is information to the contrary. Note that at the "good" and "excellent" level-materials are somewhat more labor-intensive than at lower levels. (Table 3, line 6).[11]

With this approach, we found that the average poor household, earning less than 15,000 soles monthly (US $53), generated 54.6 workdays of upgrading (See Table 9). The average rich household, receiving more than S/162,000 (US $568) monthly, generated 292.2 days of upgrading labor. The weighted average for six income and six housing levels was 152 workdays. Since that is the average, one can multiply it by the number of households, divide it by the number of years, and make an estimate of the share of the labor force active in upgrading. It is a small share of total employment, but a large -- possibly one-third -- share of construction labor.

In 1980 some 556,500 households out of 897,000 in Lima were owner-occupants, and if each had generated 152 equivalent workdays in improvements, that makes a total of 84.6 million workdays or 338,000 workyears. Spread over 11 years, the improvements therefore created about 31,000 jobs per year, an amount equivalent to 2.2 percent of the labor force. Note that only .7 percent was formal construction labor. In normal times, the Lima area had 70,000 construction workers, 7.2 percent of the labor force. Uncounted selfhelp labor brings the total to 90,000 workers. Thus the formal and informal upgrading work on owner-occupied dwellings easily came to 33 percent of construction labor. An additional 13,000 jobs were created in

TABLE 9 Number of Rooms, Rooms Added, Floorspace, Floorspace Added, and Workdays on the Additions. Owner-occupants by Income Range, Lima, 1980.

| Households monthly income (Thousands of 1980 soles) | Average No. of Rooms Added | Current No. of Rooms | Floorspace Added, $m^2$ | Current Floorspace, $m^2$ | Workdays per added $m^2$ | Workdays per addition |
|---|---|---|---|---|---|---|
| F0 15 or less | .56 | 2.56 | 18.2 | 83.0 | 3.0 | 54.6 |
| F1 15.1- 28 | .91 | 2.62 | 27.9 | 80.4 | 3.0 | 81.3 |
| F2 28.1- 50 | 1.33 | 3.36 | 38.2 | 96.5 | 3.9 | 150.3 |
| F3 50.1- 90 | 1.02 | 4.27 | 29.2 | 122.4 | 4.5 | 132.6 |
| F4 90.1-162 | 1.11 | 5.31 | 37.2 | 181.3 | 5.2 | 196.9 |
| F5 Over 162 | 1.00 | 7.17 | 45.9 | 330.4 | 5.9 | 292.2 |
| Weighted Mean | 1.12 | 4.02 | 35.7 | 127.8 | 4.3 | 152.1 |

Source: Survey of 724 owner-occupants in Lima, Peru, June 10-July 3, and a cost analysis of floor plans by three contracting organizations.

Note: The percentage change in floorspace is assumed to equal the percentage change in number of rooms. The workdays/$m^2$ reflect the mix of housing types (H0, H1...H5) that households were actually occupying. (See Table 1.)

building materials production for upgrading and in the inputs into building materials, etc.

## Infrastructure Employment

To the employment generated by dwelling construction and improvement must be added that needed to build the infrastructure. Infrastructure cost and employment can vary greatly with the nature of the terrain, climate, density of settlement, as well as the type and quality level of the specifications. In the Lima Metropolitan Area in 1980 specifications tended to be rather lavish even for simple serviced sites intended for core housing. Streets were broad and equipped with sidewalks and curbs; electric lines had to be underground. As a result, costs were high: S/637,000 (US $2,284) per lot in June 1980. Trunk lines and distant reservoirs or generating stations are not included in these estimates. With aerial electrical lines, simpler streets and walks, less gardening, and better layouts, infrastructure cost per lot could fall by half and approach the 1980 equivalent of US $1,000.

Employment per lot would also fall with lower costs, but an increased number of lots would generate more building and improvement employment. In general, the amount of employment in infrastructure tended to be roughly proportional to the expenditure regardless of the specifications. If the equivalent of US $1 millionwere spent, according to workers employment generation would be 39,000 workdays; and according to contractors 24,000 workdays. The difference depends on whether a daily wage including fringe benefits of S/2,055 or US $7.21 for unskilled labor is actually paid; or whether daily labor costs are only S/1,240 or US $4.35. The possibilities for mechanization are sufficiently great and yet costly that its use will vary directly with wage levels. Of course, the differential for skilled workers also plays a part in factor substitution.

A quick way to estimate employment in infrastructure is to multiply the amount to be spent by 0.17 and to divide that by the unskilled wage rate including fringe benefits. Employment in building core housing can be found by multiplying the expenditure by 0.23 and dividing that by daily labor costs.[12] A given volume of spending will create 35 percent more jobs if devoted to building instead of infrastructure. Whether workers' or employers' figures are used does not affect this proportion; but the relative amount of employment generation can be quite different from that in other countries with different wage levels.

A 34.4 $m^2$ core house in June 1980 would have cost S/1.24 million (US $4,360) and taken 132 workdays according to builders. Infrastructure cost for such a unit should have been much less than the amount given above, S/637,000 (US $2,284), which was 52 percent as much as the house and would have required 54 workdays.

In building, an investment of about S/1.7 million (US $6,000) was needed to generate a workyear (275 days) of onsite construction employment (using a S/1,400 daily labor cost -- US $4.92). For infrastructure, in 1980 S/2.0 million (US $7,000) had to be spent for an onsite workyear. In either case if labor costs including fringe benefits approached the legal S/2,140 (US $7.50) daily, one-third of the employment would be lost for any given expenditure.

## V. Conclusion

Answers to the two questions with which we began have been suggested by the May-June 1980 surveys of households and construction workers, by the study of building costs, and by the examination of other reports on the Peruvian economy and on housing in the Metropolitan Area of Lima.

1. A reasonable standard of housing welfare can only be attained by a building program that allows all types of construction to be carried on with whatever resources the owners and occupants can save over a decade or two. The building of minimal and basic units should not be neglected, as it was during the 1970's; but with rising incomes, nearly 200,000 new good and excellent units will also be needed. At all levels many better dwellings will have to be created through expanding and improving the existing housing stock. This upgrading process has already had conspicuous importance in Lima and is fortunately being supported by new lending programs. At the same time, that part of the existing housing stock that is rented cannot be allowed to deteriorate until it disappears. Whoever saves and builds for tenants makes a contribution to housing welfare and requires incentives that can withstand inflation. Outright subsidies should be limited to the poorest households and be provided in the form of infrastructure and loans for buying materials at less than cost. Streets, water, sewerage disposal, and electricity are necessary components that have been provided competently in recent decades. Their expansion must now continue at a lower cost that more households can afford.

2. Employment effects can be estimated in advance by recognizing that Peruvian building has been efficiently organized and that workhours per square meter, etc., will not change unless wages and fringe benefits (adjusted for inflation) change. If wages rise relative to the price of other building inputs, construction employment will fall. The high level of Peruvian wages compared with those of five other countries explains why less labor is used in Lima than elsewhere for a building of standard design. In addition, the relation between wages of skilled and unskilled workers explains the proportion

in which these two categories of workers are used. A formula has been developed for estimating future employment in terms of the changing levels of wages and the skill differential.

During relatively prosperous years in Lima, about 33,000 workers have been formally employed in residential building. If the annual volume of selfhelp improvement had also been formally built, an additional 20,000 workers would have been counted. Thus defined, selfhelp building has generated more than a third of the employment for building dwellings. In this sense about 62 percent of construction employment was residential. That comes to 5.6 percent of the employed labor force. Not included are the workers making the infrastructure, perhaps an additional six or seven thousand work years annually.

Housing and employment problems in developing countries have often been regarded as partially or wholly insoluble. Housing investment is erroneously seen as a subtraction from more productive uses of capital. More housing therefore means less income growth and less capacity to afford housing. At the same time, more employment opportunities in housing construction are believed to accelerate migration in a way that leaves more people unemployed after the program is over.

The experience of Peru suggests that this pessimism is out of place. Problems exist because 43 percent of the 1980 Lima housing stock must be classified as substandard or worse and because more than 400,000 additional households must be accommodated during the 1980's. But solutions also exist: Housing programs can mobilize savings that would be less productive or not available at all for other uses. With flexible savings institutions and a realistic approach toward landlords and tenants, employment opportunities

in this sector, including work in upgrading, should rise steadily, leaving workers with better incomes than they would have had elsewhere, which is what really matters. A generation of experiments has made Peru a leader in dealing with urban expansion. No doubt other countries will continue to learn from imaginative programs tried first in the Metropolitan Area of Lima.

## FOOTNOTES

[1]The six country studies were under the supervision of Norma Botero (Colombia), Davindar Lamba (Kenya), Ehsan Ahmed (Pakistan), Nimal Gunatilleke (Sri Lanka), Ridha Ferchiou (Tunisia), and Manenga Ndulo (Zambia). See W. Paul Strassmann, "Government Policy and the Improvement of Low-cost Housing in Seven Cities, 1979" (East Lansing: March, 1980) and "Employment in Core House Building: A Comparison of Estimates from Six Cities in Six Countries" (East Lansing: May, 1980). Financial support came from the Office of Urban Development, Bureau of Development Support, Agency for International Development. See also, W. Paul Strassmann, The Transformation of Housing: Upgrading in Cartagena, Colombia (Washington: The World Bank, forthcoming).

[2]Data were collected by Norma Botero and by the Technical Office for Manpower Studies, General Bureau of Employment, Ministry of Labor, Lima, Peru. A randomly selected sample of 1,167 households in all parts of the Metropolitan area of Lima was interviewed with a questionnaire that contained 76 items. The reports are:

1. "Background and Overview of Recent Trends."
2. "Description of a Sample of Households Surveyed."
3. "Income and Housing in the Metropolitan Area of Lima, Peru, 1970-1980-1990."
4. "Urban Infrastructure and Employment in Peru."
5. "Employment Generation through Building Core Housing in Peru."
6. "Employment Estimation with Limited Information about Building and Upgrading: An Illustration from Peru."
7. "Shelter Improvement in Lima, Peru."

[3]David Collier, Squatters and Oligarchs: Authoritarian Rule and Policy Change in Peru (Baltimore: Johns Hopkins University Press, 1976), p. 49. During 1962-63, partly during the Godoy-Lindley military government, an additional 35,200 people formed settlements.

[4]Informes Ocupacionales (Lima: Dirección General del Empleo, Ministerio de Trabajo, November 1980), Table 14.

[5]Sueldos y Salarios: Encuestas de Establecimientos (Lima: Dirección General del Empleo, Ministerio de Trabajo, December 1980), Table 3. According to Table 5, Enterprises with 10 - 24 workers, the smallest ones surveyed, paid average wages of only S/1,108 (US $3.89).

[6]For fringe benefits and the rates allowed on piecework, see Jorge Palma Martinez, Guía Práctica del Trabajador en Construcción Civil del Peru (Lima: Palma, 1980). Also "Tablas de Porcentajes de Leyes Sociales en Edificación," Camara Peruana de Construcción (mimeographed) Lima, 1980.

[7]The Gini coefficient for income distribution was .430 in 1971-1972 according to Carlos Amat, León Chavez, Hector León, Estructura y Niveles de Ingreso Familiar en el Peru (Lima: Ministerio de Economía y Finanzas, 1977). About four years earlier a Gini of .480 was reported in Adolfo Figueroa, "Estructura del Consumo y Distribución de Ingresos de Lima Metropolitana," Programa ECIEL, Serie de Estudios Económicos, No. 1, Departamento de Economía, Pontífica Universidad, Católica del Peru. The Gini found in our 1980 survey was .417. A lower Gini implies greater equality.

[8]This section is based on W. Paul Strassmann, "Shelter Improvement in Lima, Peru," (East Lansing: November 1980) 47 pp. plus appendix, 17 tables. It contains a number of detailed breakdowns, stock-user cross-tabulations, regressions, and hedonic price indices for owners and tenants.

[9]Abelardo Sánchez León, Raul Guerrero de los Ríos, Julio Carderón Cockburn, Luis Olivera Cardenas, Tugurización en Lima Metropolitana (Lima: Desco, Centro de Estudios y Promoción del Desarrollo, 1979. Writing from a Marxist perspective, the authors assert that without a social transformation, "slumification of the new settlements will be a permanent and increasingly acute problem." (p. 159). They concede, however, that they have made a "qualitative" rather than "quantitative analysis". (p. 14) The book nevertheless contains interesting accounts of specific neighborhoods which sometimes contradict the basic thesis. For example, the authors recognize that former squatter areas of San Martin de Porres have developed into middle class neighborhoods. (pp. 135-36).

[10]Oficina Nacional de Estadística, Cuentas Nacionales del Peru, 1950-1978 (Lima, May 1978).

[11]Rufino Cebrecos Revilla, Construcción de Vivienda y Empleo (Lima: Documentos de Trabajo No. 35, Departamento de Economia, Pontifica Universidad Católica del Peru, April 1978).

[12]For an elaboration of this procedure, see W. Paul Strassmann, "Employment Generation Through Building Core Housing in Peru," and "Urban Infrastructure and Employment in Peru," (East Lansing, November 1980).

## APPENDIX

## GUIDELINES FOR ESTIMATION

### Derivation

With the assumption of separability, we shall derive the employment generator, $\phi$, using the three ratios:

| | |
|---|---|
| $r = W/C$, | the wage bill, W, in total costs, C. |
| $p = w_s/w_u$, | the ratio of skilled to unskilled wages. |
| $q = N_u/N_s$, | the number of unskilled workers employed for every skilled worker. |

The wage bill, W, is equal to the daily wage rate, including fringes, w, times the number of workdays, N, of each type of worker---skilled, s, and unskilled, u.

$$W = w_s N_s + w_u N_u \tag{2}$$

Using the second two ratios above, we can simplify matters by expressing everything in terms of the wages of unskilled workers, $w_u$, and the number of skilled workers, $N_s$, since $w_s = w_u p$ and $N_u = N_s q$.

$$W = w_u N_s (p + q) \tag{3}$$

We now have the employment of skilled workers for a given wage bill.

$$N_s = \frac{W}{w_u(p + q)} \tag{4}$$

Using the ratio, r, or $W = rC$, skilled employment can be related to the cost of the project,

$$N_s = \frac{rC}{w_u(p + q)} \tag{5}$$

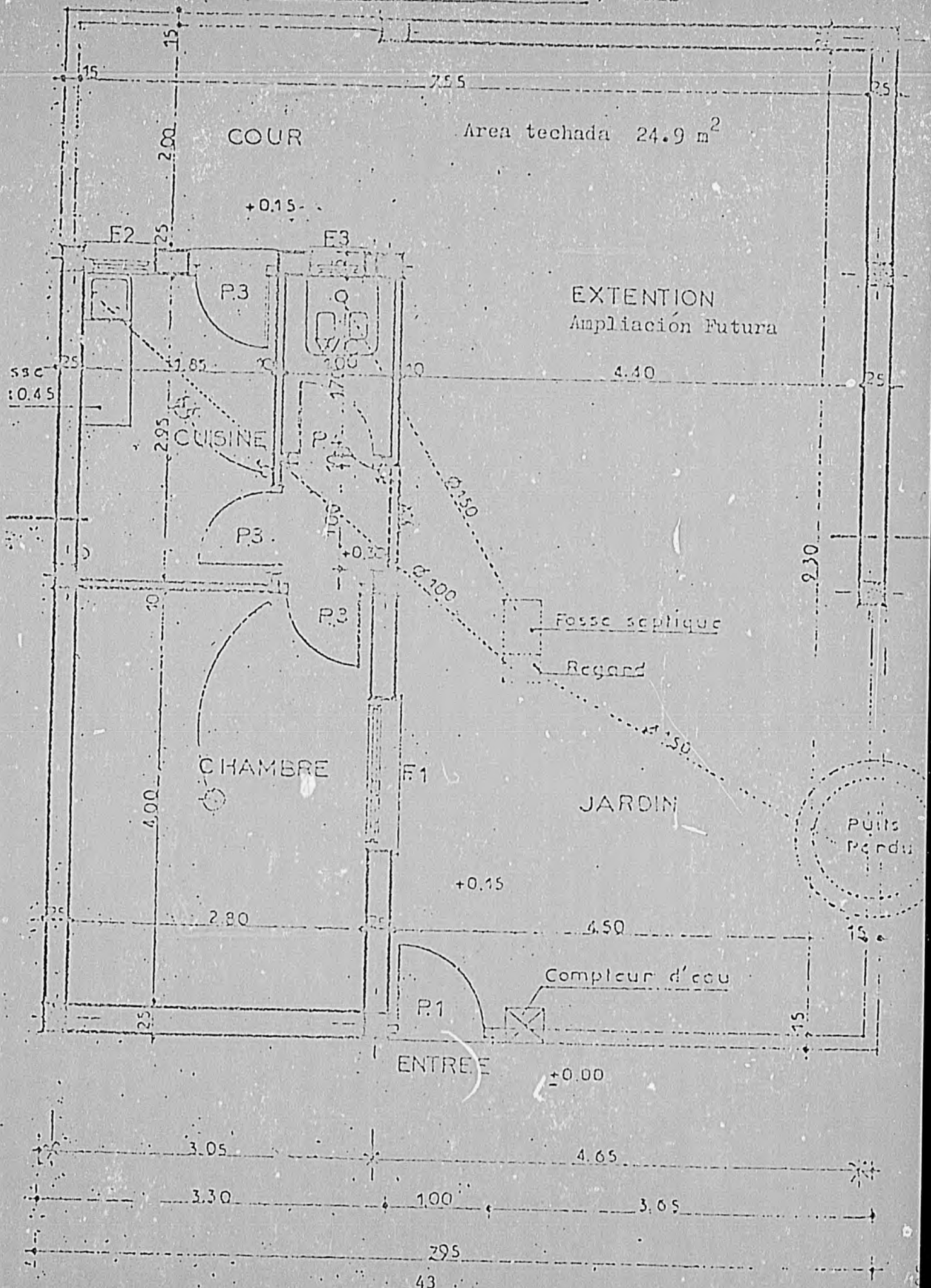
Since the number of unskilled workers is equal to $qN_s$, total employment, $N = N_s(1 + q)$, or

$$N = \frac{r(1 + q)}{(p + q)} \cdot \frac{1}{w_u} \cdot C \text{ and } \qquad \phi = \frac{r(1 + q)}{(p + q)} \tag{6}$$

$$N = \phi \cdot \frac{1}{w_u} \cdot C \tag{7}$$

The first term of (6) relates the three ratios to one another and is the generator, $\phi$. The second term is the reciprocal of the unskilled wage rate. Together these two constitute a multiplier that relates the total cost of a project, C, to the employment, N, that is generated. Because of the possibility of inflation, the term with the ratios, $\phi$, is likely to be more stable than the other two. But r and q may vary with the type of project, i, and should actually be expressed as $r_i$ and $q_i$.

FIGURE A-1 LOGEMENT EVOLUTIF, TUNIS




PLAN

FIGURA A-2

# NUCLEO BASICO

Area techada 34.40 m2

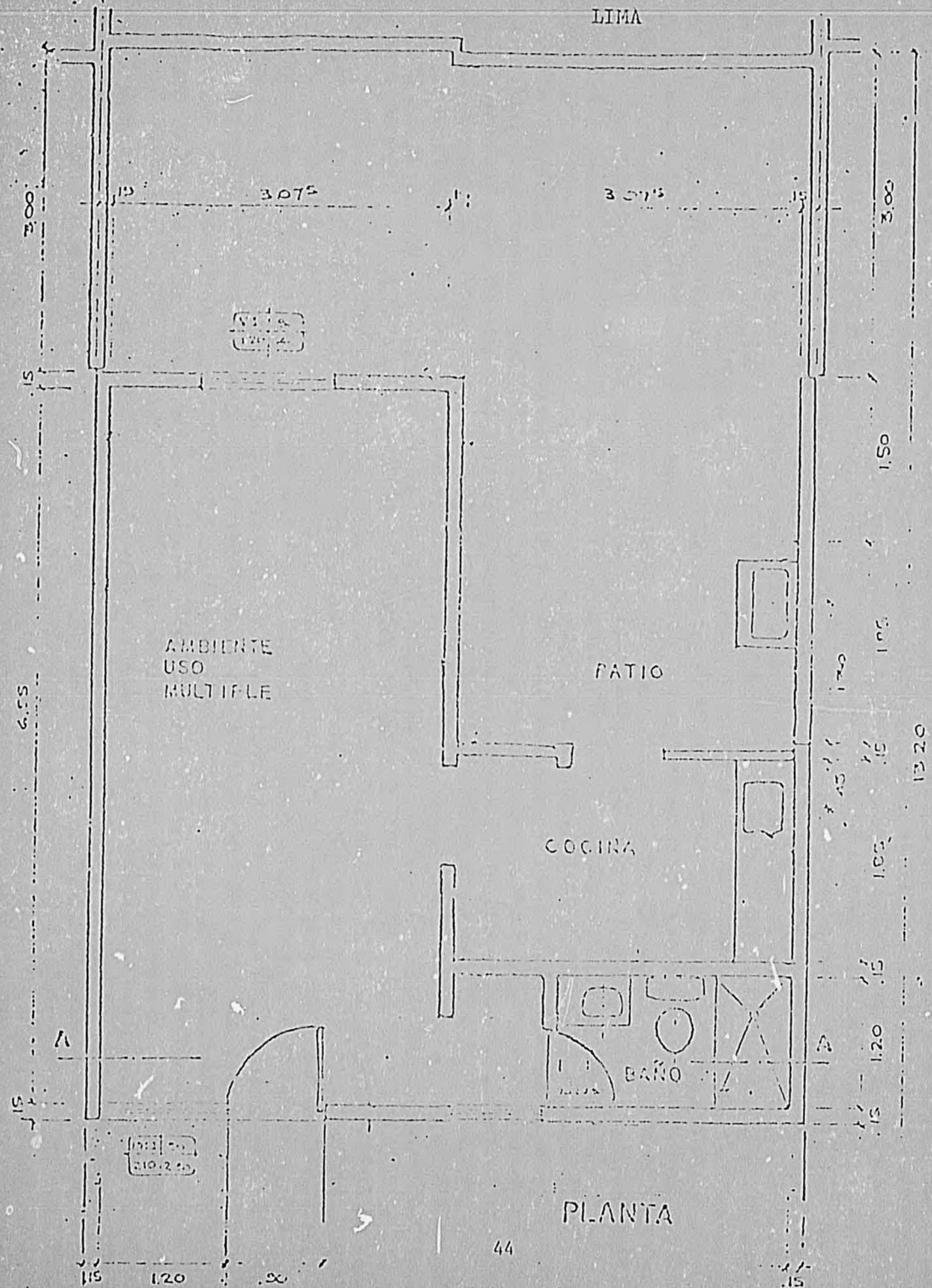


Table A-1 -- Income Distribution in the Metropolitan Area of Lima, Peru, June, 1980.

| Income per Month, Thousands of Soles | Percentage of Households | | |
|---|---|---|---|
| $X \leq 10$ | 2.3 | Mean | 66.977 |
| 10.1 - 20 | 5.7 | Standard error | 1.990 |
| 20.1 - 30 | 17.1 | Standard deviation | 67.986 |
| 30.1 - 40 | 15.2 | Median | 49.888 |
| 40.1 - 50 | 13.7 | Mode | 30.000 |
| 50.1 - 60 | 9.5 | Minimum | 2.000 |
| 60.1 - 70 | 6.2 | Maximum | 1,200.000 |
| 70.1 - 80 | 5.8 | Kurtosis | 85.901 |
| 80.1 - 90 | 5.4 | Skewness | 6.945 |
| 90.1 - 100 | 6.1 | Gini | .417 |
| 100.1 - 120 | 3.4 | Mean, Owner-occupants | 71,900 |
| 120.1 - 140 | 2.5 | Mean, tenants | 61,200 |
| 140.1 - 160 | 2.5 | | |
| 160.1 - 180 | 1.5 | | |
| 180.1 - 200 | 1.2 | | |
| 200.1 - 250 | .5 | | |
| 250.1 + | 1.5 | | |
| | 100.0 | | |

Source: Survey of 1,167 households carried out in Lima during June 10 - July 3, 1980, by the Technical Office of Manpower Studies, General Bureau of Employment, Ministry of Labor.

Note: At this time US $1.00 = 285 soles.

Table A-2 -- Characteristics of Households and Dwellings by Type of Neighborhood, Metropolitan Lima, May-June 1980.

| | 1. Luxury[c] Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jovenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| 1. Number (%) | 76 (6.5) | 330 (28.3) | 113 (9.7) | 191 (16.4) | 116 (9.9) | 315 (27.0) | 1,167 (100.0) |
| 2. Income, S/thousands | 142.7 | 77.8 | 72.5 | 57.2 | 53.3 | 43.6 | 67.0 |
| 3. Household size, No. | 4.8 | 4.7 | 5.2 | 6.0 | 5.1 | 6.2 | 5.4 |
| 4. Adults, No. | 3.8 | 3.2 | 3.3 | 3.2 | 3.1 | 3.2 | 3.2 |
| 5. Age of Head | 52.4 | 47.0 | 44.1 | 42.5 | 45.7 | 43.6 | 45.3 |
| 6. Employed, No. | 2.1 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.8 |
| 7. Value[b], S/millions (n = ) | 10.20 (55) | 3.72 (149) | 2.97 (86) | 2.39 (166) | 1.46 (48) | .74 (291) | 2.63 (805) |
| 8. Rent S/thousands (n = ) | 11.19 (19) | 4.68 (176) | 3.35 (26) | 4.28 (23) | 2.58 (66) | 2.50 (19) | 4.41 (341) |
| 9. Floorspace $m^2$ | 246 | 109 | 98 | 109 | 65 | 87 | 104 |
| 10. Site Area $m^2$ | 301 | 107 | 144 | 173 | 120 | 152 | 148 |
| 11. Rooms, No. | 5.79 | 3.49 | 3.90 | 3.68 | 2.72 | 2.97 | 3.51 |
| 12. Rooms added (owners) | .44 | .99 | .71 | 1.82 | .54 | 1.38 | 1.20 |

Table A-2 (cont'd) -- Characteristics of Households and Dwellings by Type of Neighborhood, Metropolitan Lima, May-June 1980.

| | 1. Luxury[c] Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| 13. Improvements, No. (owners) | 3.3 | 5.4 | 3.0 | 5.5 | 4.4 | 4.4 | 4.5 |
| 14. Years at Site | 12.2 | 12.5 | 7.6 | 9.5 | 13.8 | 10.4 | 11.0 |

Source: May - June 1980 Housing Survey.

Notes:
a. Includes 26 unclassified households.

b. No value was indicated by 21 households, including some of the 82 free users.

c. The six categories are standard Peruvian Concepts that cannot be translated simply. In Spanish they are 1. Residencial; 2. Convencional; 3. Urbanizaciones no populares; 4. Urbanizaciones populares; 5. Quintas, callejones, corralones, and rancherias, 6. Pueblos Jóvenes - the squatter settlements. See Abelardo Sanchez Leon, et. al., Tugurización en Lima Metropolitana (Lima: Desco, 1979) pp. 41 - 42, 60 - 62.

Table A-3 -- Utilities and Tenure of Dwellings by Type of Neighborhood, Metropolitan Area Lima, May-June, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| Water | % | % | % | % | % | % | % |
| 1. Two or more bathrooms | 46.1 | 16.7 | 15.9 | 6.3 | 1.7 | 1.9 | 11.4 |
| 2. One bathroom | 48.7 | 51.5 | 61.9 | 55.5 | 49.1 | 23.5 | 45.1 |
| 3. Own tap, no shower | 1.3 | 7.3 | 9.7 | 12.6 | 16.4 | 35.2 | 16.5 |
| (sum, 1-3) | (96.1) | (75.5) | (87.5) | (74.4) | (67.2) | (60.6) | (73.0) |
| 4. Shared tap | 3.9 | 20.9 | 7.1 | 8.9 | 27.6 | 6.7 | 13.3 |
| 5. Water truck | 0 | 0 | .9 | 12.6 | 0 | 22.2 | 8.1 |
| 6. Other | 0 | 3.6 | 4.5 | 4.1 | 5.2 | 10.5 | 5.8 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Sanitation | | | | | | | |
| 7. Sewerage system connection | 94.7 | 73.6 | 79.6 | 66.0 | 58.6 | 36.2 | 62.5 |
| 8. Septic tank | 0 | .3 | 4.4 | 2.1 | 2.6 | 4.1 | 2.3 |
| 9. Shared facilities | 5.3 | 20.6 | 6.2 | 7.9 | 30.2 | 1.6 | 11.9 |
| 10. Latrine | 0 | .9 | 6.2 | 19.9 | 5.2 | 41.0 | 15.7 |
| 11. None | 0 | 3.6 | 3.5 | 4.2 | 3.4 | 16.2 | 7.0 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Tenure | | | | | | | |
| 12. Percent Owner-occupants | 65.8 | 35.5 | 70.8 | 77.0 | 40.5 | 87.0 | 62.0 |
| 13. Percent of Owner-occupants who are landlords | 8.0 | 12.8 | 2.5 | 4.8 | 12.8 | 1.1 | 5.5 |

Table A-3 (cont'd) -- Utilities and Tenure of Dwellings by Type of Neighborhood, Metropolitan Lima, May-June, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| 14. Owners, clear title, | 48.7 | 26.4 | 29.2 | 62.8 | 31.0 | 84.8 | 50.3 |
| 15. Owner, mortgaged | 15.8 | 4.8 | 24.8 | 6.3 | 4.3 | 2.2 | 7.0 |
| 16. Hire-purchase | 1.3 | 4.2 | 16.8 | 7.9 | 5.2 | 0 | 4.7 |
| 17. Rented | 26.3 | 53.6 | 23.0 | 12.0 | 56.9 | 6.0 | 29.4 |
| 18. Lent free by family | 3.9 | 3.6 | 3.5 | 9.4 | .9 | 4.1 | 4.5 |
| 19. Other | 3.9 | 7.3 | 2.7 | 1.5 | 1.8 | 2.9 | 4.1 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 20. Number | 76 | 330 | 113 | 191 | 116 | 315 | 1,167 |

Source: May-June 1980 Housing Survey.

Notes: a. Includes 26 unclassified households.

Table A-4 -- Percentage of Owner-occupants Making Different Types of Improvements in Different Types of Neighborhoods, Lima, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| A. Basic | % | % | % | % | % | % | % |
| 1. Reconstruct the house | 6.0 | 9.4 | 10.0 | 37.4 | 12.8 | 49.3 | 30.2 |
| 2. Room(s) added | 24.0 | 31.6 | 25.0 | 55.1 | 21.3 | 51.5 | 41.9 |
| 3. Wall materials changed | 6.0 | 13.7 | 8.8 | 38.8 | 19.1 | 32.8 | 25.3 |
| 4. Roof materials better | 4.0 | 12.8 | 8.8 | 30.6 | 8.5 | 17.9 | 17.0 |
| B. Utilities | | | | | | | |
| 1. Water facilities better | 12.0 | 14.5 | 12.5 | 32.0 | 21.3 | 33.2 | 25.4 |
| 2. Toilet better | 24.0 | 27.4 | 18.8 | 33.3 | 21.3 | 25.9 | 26.7 |
| 3. Kitchen improvements | 22.0 | 23.9 | 26.2 | 40.8 | 12.8 | 21.2 | 26.0 |
| C. Finishes | | | | | | | |
| 1. Interior plastering and painting | 56.0 | 50.4 | 43.8 | 47.6 | 38.3 | 25.2 | 39.4 |
| 2. Floor improvements | 22.0 | 28.2 | 17.5 | 44.9 | 17.0 | 30.3 | 30.1 |
| 3. Windows and doors improved | 26.0 | 29.1 | 27.5 | 41.5 | 23.4 | 24.8 | 29.4 |
| 4. Outside plastering | 6.0 | 23.1 | 10.0 | 25.9 | 19.1 | 20.1 | 19.6 |
| 5. Interior ceiling finished | 4.0 | 10.3 | 11.2 | 23.1 | 2.1 | 28.9 | 11.5 |

Table A-4 (cont'd) -- Percentage of Owner-occupants Making Different Types of Improvements in Different Types of Neighborhoods, Lima, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| D. Site Changes | | | | | | | |
| 1. Grading | 2.0 | 1.7 | 2.5 | 20.4 | 4.3 | 39.8 | 20.2 |
| 2. Adding fill | 2.0 | .9 | 2.5 | 13.6 | 4.3 | 23.7 | 12.6 |
| 3. Fence or wall | 12.0 | 13.7 | 21.2 | 10.2 | 6.4 | 6.6 | 10.4 |
| 4. Garden | 14.0 | 12.0 | 13.7 | 16.3 | -- | 5.8 | 9.9 |
| E. Other | 4.0 | 0.9 | 1.2 | 2.7 | -- | 0.4 | 1.2 |

Table A-5 -- Improvement Financing. Percentage Distribution, Metropolitan Lima, May-June, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| | % | % | % | % | % | % | % |
| 1. Selfhelp, cash for materials | 30.9 | 47.8 | 54.9 | 77.1 | 72.3 | 69.8 | 61.4 |
| 2. Selfhelp credit for materials | -- | -- | -- | 0.7 | -- | 0.7 | 0.3 |
| 3. Selfhelp loans for materials | -- | 0.9 | 4.9 | 2.0 | 1.2 | 2.5 | 1.9 |
| 4. Cash for labor and materials | 61.8 | 48.2 | 36.6 | 11.8 | 25.3 | 18.3 | 30.6 |
| 5. Loans from friends or relative for all work | | 0.9 | -- | 0.7 | 1.2 | 1.9 | 1.0 |
| 6. Loans from credit institutions for all work | 7.3 | 1.8 | 3.7 | 7.2 | -- | 5.6 | 4.2 |
| 7. Other | -- | 0.4 | -- | 0.7 | -- | 1.1 | 0.6 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: May-June 1980 Housing Survey.

Note: a. Includes 26 unclassified households.

The percentage distribution of housing among different types of neighborhoods within the seven major sectors of Metropolitan Lima can be seen in Table A6. Thus we see in line 6 that the Southern districts are more than 70 percent Pueblos Jóvenes, while they do not quite reach 50 percent in the North (line 5). Since the North has a population about one-third higher, even without including Rimac, the numbers in Pueblos Jóvenes in the two extremes of the city are actually about the same. Unlike the South, the North also has many "popular urbanizations" -- low-cost housing developments promoted by cooperatives and the like. These can also be found East of the center, especially in San Juan de Lurigancho. Together, North and East have 80 percent of popular urbanizations, while North and South have 68 percent of Pueblos Jóvenes. Fifty-eight percent of substandard, subdivided housing are found in the central districts and in Callao, but even here they make up only a minority (16%) of the stock. For the city as a whole, that category comes to 10 percent. Forty percent of the housing stock is in conventional neighborhoods and in standard urbanizations, types that are especially characteristics of the districts that extend from San Luis to San Miguel. Beyond these, mainly along the coast, are the four high-income districts that have more than half (53%) of the Lima area's luxury residential housing although it actually makes up only somewhat more than a third of the housing within the four districts.

Table A-6 -- Distribution of Housing in Seven Sectors of the Metropolitan Area of Lima Among Six Types of Neighborhoods, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| | % | % | % | % | % | % | % |
| 1. Center: Cercado de Lima, Rimac, Breña, la Victoria. | 0.7 | 51.7 | 10.9 | 0 | 21.8 | 14.3 | 100.0 (25.2) |
| 2. Callao: Cercado de Callao, Bellavista, La Perla, Carmen de la Legua. | 6.1 | 28.9 | 9.6 | 23.5 | 12.2 | 21.7 | 100.0 (9.9) |
| 3. High-income: Miraflores, San Isidro, Barranco, Surco. | 37.4 | 7.5 | 18.7 | 5.6 | 19.6 | 11.2 | 100.0 (9.4) |
| 4. Intermediate: Jesus Maria, Lince, Magdalena, Pueblo Libre, San Luis, San Miguel, Surquillo. | 15.4 | 54.8 | 17.6 | 3.2 | 9.0 | 0 | 100.0 (17.1) |
| 5. North: San Martin de Porras, Independencia, Comas, Carabayllo | 0 | 0 | 7.9 | 43.5 | 1.4 | 46.8 | 100.0 (18.5) |

Table A-6 (cont'd) -- Distribution of Housing in Seven Sectors of the Metropolitan Area of Lima Among Six Types of Neighborhoods, 1980.

| | 1. Luxury Residential | 2. Conventional | 3. Standard Urbanization | 4. Popular Urbanization | 5. Substandard, Subdivided | 6. Pueblos Jóvenes | 7. All[a] |
|---|---|---|---|---|---|---|---|
| 6. South: Chorillos, San Juan de Miraflores, Maria del Triunfo. | 0 | 15.7 | 5.7 | 0 | 8.2 | 70.4 | 100.0 (13.6) |
| 7. East: El Agustino, Ate, San Juan de Lurigancho. | 0 | 10.4 | 4.3 | 50.4 | 4.3 | 30.4 | 100.0 (9.9) |
| All | 6.7 | 28.9 | 9.9 | 16.7 | 10.2 | 27.6 | 100.0 (100.0) |

Source: May-June 1980 Housing Survey.

Note: Figures in parentheses in the last column indicate the percentage distribution of housing among the seven major sectors of Lima.