

UNITED NATIONS  
ECONOMIC  
AND  
SOCIAL COUNCIL



Distr.  
LIMITED

ST/ECLA/CONF.9/L.10  
4 July 1962

ENGLISH  
ORIGINAL: SPANISH

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LATIN AMERICAN SEMINAR ON HOUSING STATISTICS AND PROGRAMMES  
2-25 September 1962  
Copenhagen, Denmark  
Item 3.2 of the tentative programme

STATISTICAL EVALUATION OF HOUSING CONDITIONS, EXISTING  
DEFICITS AND FUTURE HOUSING REQUIREMENTS IN THE  
LATIN AMERICAN COUNTRIES

Prepared by the secretariat of the  
Economic Commission for Latin America

Sponsored by:

The United Nations  
Economic Commission for Latin America  
Economic Commission for Europe  
Statistical Office  
Bureau of Social Affairs Housing, Building and Planning Branch  
Bureau of Technical Assistance Operations  
The Government of Denmark  
The Inter-American Statistical Institute

In collaboration with:

The Latin American Demographic Centre  
The Inter-American Housing and Planning Centre



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## 1. Introduction

The purpose of this working paper is to discuss four problems of great importance in relation to the formulation of housing programmes, i.e.:

- (a) Description of national housing stock;
- (b) Measurement of housing conditions, by means of statistical indicators;
- (c) Evaluation of existing housing deficits; and
- (d) Computation of estimated future housing requirements.

Background data are presented which might permit the adoption of methodological formulae applicable in the Latin American countries. The present working paper is mainly based on the following United Nations documents:

General Principles for a Housing Census (ST/STAT/SER.M/28);

Statistical Indicators of Housing Conditions (ST/STAT/SER.M./37); and

Proposed Methods of Estimating Housing Needs (E/CN.3/274).

## 2. Description of National Housing Stock

The first problem facing those responsible for housing programmes is to determine the number of housing units existing at a given moment in the country or region under study, the nature of their structural characteristics, the facilities at their disposal, conditions of tenure and occupancy. The purpose of housing censuses is precisely to procure data of this type. Where no such censuses have been taken, estimates can be based on nationwide sample surveys.

The taking of housing censuses in Latin America is a relatively recent development. Among the region's earliest national housing censuses were those taken in Colombia, Nicaragua and Venezuela in 1940; in and about 1950, the first housing censuses were taken in Chile, Costa Rica, Cuba, El Salvador, Honduras, Mexico, Panama, Paraguay and other countries. Housing data of one kind or another, have been obtained in almost all the population censuses; but, unfortunately, the concepts applied have varied widely, and in many cases they do not afford even an approximate idea of the number of housing units existing at the time of the census. Table 1 presents the most recent data available on the total urban and rural housing stock in the Latin American countries. (Fuller information on the same

Table 1

LATIN AMERICA: HOUSING STOCK ACCORDING TO THE 1950 AND 1960 CENSUSES, OR SURVEYS AT THE NATIONAL LEVEL

Country	Population				Housing units									
	Date	Total	Urban	Rural	Total			Urban			Rural			
					Total	Private	Others	Total	Private	Others	Total	Private	Others	
Argentina	10/5/47	15 893 827	9 932 133	5 961 694	3 487 182	b/	...	...	...	...	...	...	...	...
	30/9/60	20 005 691			4 665 567	...	...	...	...	...	...	...	...	...
Bolivia	5/9/50	3 019 031	1 023 365	1 995 666	...	...	...	205 101	...	...	...	...	b/	...
Brazil	1/7/50	51 976 357	18 782 891	33 161 506	10 096 184	b/	...	49 985	3 730 368	...	...	6 315 841	...	...
	1/9/60	70 528 625			10 046 199	...	...	...	...	...	...	...	...	...
Chile a/	24/4/52	5 932 995	3 573 122	2 359 873	1 091 448	b/	...	40 371	667 000	25 188	399 258	384 075	15 183	...
	29/11/60	7 375 200	4 902 500	2 472 700	1 336 000	b/	...	10 200	...	...	...	...	...	...
Colombia	9/5/51	11 548 172	4 468 437	7 079 735	1 720 049	...	...	...	...	...	1 096 780	...	...	...
					...	...	...	...	...	...	...	...	...	...
Costa Rica	22/5/50	800 875	268 286	532 589	...	...	...	...	...	...	...	...	...	...
Cuba	28/1/53	5 829 029	3 324 628	2 504 401	1 256 594	...	...	...	...	...	463 148	...	...	...
Dominican Republic	2/10/55	2 553 025	665 919	1 887 106	550 780	...	...	103 251	80 621	68 462	401 697	366 908	34 789	...
	7/8/60	3 013 525	917 981	2 095 544	594 508	...	...	...	...	...	406 978	...	...	...
Ecuador	29/11/50	3 202 757	913 932	2 288 825	622 488	...	...	843	...	...	...	...	...	...
El Salvador	13/6/50	1 855 917	677 167	1 178 750	...	...	...	...	...	...	...	...	...	...
	2/5/61	2 501 278	981 961	1 519 317	...	...	...	...	...	...	...	...	...	...
Guatemala	18/4/50	2 790 868	696 458	2 094 410	...	...	...	...	159 205	753	...	...	...	...
Haiti	7/8/50	3 097 304	374 439	2 719 865	...	...	...	...	b/a/	...	...	...	...	...
					...	...	...	...	32 981	...	...	...	...	...
Honduras	18/6/50	1 368 605	424 453	944 152	213 011	...	...	5 065	60 149	3 590	149 272	147 797	1 475	...
	17/4/61	1 883 480	578 122	1 305 357	327 796	...	...	...	...	...	225 787	...	...	...
Mexico	6/6/50	25 791 017	10 983 483	14 807 534	5 259 208	b/	...	1 889 218	...	...	...	...	...	...
	8/6/60	34 625 903			...	...	...	...	...	...	...	...	...	...
Nicaragua	31/5/50	1 057 023	369 249	687 774	122 653	b/	...	...	45 802	...	76 251	...	...	...
					...	...	...	...	...	...	...	...	...	...

Table 1 (concluded)

Country	Population				Housing units								
					Total			Urban			Rural		
	Date	Total	Urban	Rural	Total	Private	Others	Total	Private	Others	Total	Private	Others
Panama <sup>k/</sup>	10/12/50	805 285	289 697	515 588	184 247 <sup>b/</sup>	176 960	575	...	73 717	...		103 243	...
	11/12/60	1 067 766	443 058	624 708	217 654								
Paraguay	28/10/50	1 328 452 <sup>1/</sup>	459 726 <sup>1/</sup>	868 726 <sup>1/</sup>	244 742	...	...	87 708	...	...	157 034	...	...
Peru	30/6/56	8 852 000 <sup>m/</sup>	3 727 954 <sup>m/</sup>	4 824 046 <sup>m/</sup>	1 974 400 <sup>n/</sup>	...	...	811 400 <sup>n/</sup>	...	...	1 146 000 <sup>n/</sup>	...	...
Uruguay	30/6/56	2 650 000 <sup>m/</sup>	2 136 000 <sup>m/</sup>	514 000 <sup>m/</sup>	...	...	...	...	...	...	...	...	...
Venezuela	26/11/50	5 034 838	2 709 344	2 325 494	903 175	875 704 <sup>b/</sup>	27 471	...	467 337 <sup>b/</sup>	...		408 367 <sup>b/</sup>	...
	26/2/61	7 361 703											

Sources: United Nations, Statistical Yearbook 1960; United Nations, Demographic Yearbook 1960; replies to the questionnaire for the United Nations Statistical Yearbook and Compendium of Social Statistics; And Inter-American Statistical Institute, News Bulletin, The 1960 Census of America.

Note: Three dots (...) indicate that data are not available. Data for 1960 or 1961 are provisional

a/ Population enumerated. Excluding 1 per cent adjustment for underenumeration.

b/ Occupied dwellings only.

c/ Including 31 960 persons enumerated in the States of Minas Gerais (10 461), São Paulo (7 588) and Paraná (13 911), whose statements were not taken into consideration because the material was mislaid. Excluding jungle-dwellers.

d/ Rural and urban dwellings were calculated on the basis of the findings for each department. The sum of these figures is not the same as the total given, but discrepancy is unexplained see the first source cited).

e/ The figures for 1960 were estimated on the basis of a sample representing 1 per cent of the census forms.

f/ Port-au-Prince only.

g/ Population enumerated. Excluding 4.3 per cent adjustment for underenumeration.

h/ In municipal centres.

i/ In villages and hamlets.

j/ 1940.

k/ Excluding the Canal Zone. The total includes 6 709 housing units enumerated in the zones inhabited by the indigenous population.

l/ Population enumerated. Excluding jungle-dwellers and 12 881 forms not tabulated by urban or rural sectors.

m/ Estimates.

n/ Sample survey at national level.

subject will be found in a document that is being prepared by the Inter-American Statistical Institute, under the provisional title of Resultados de los censos nacionales de habitación levantados en o alrededor de 1950, and in the United Nations Statistical Yearbook 1961.) The table reveals considerable lacunae in the data to hand, apart from the fact that they are far from recent. It will be noted that although housing censuses were taken in or about 1960 in ten countries, only in five instances are partial and provisional findings available.

Nothing can be deduced from table 1 as to Latin America's total housing stock, nor are inter-country comparisons of the relevant statistics possible. So far, the most satisfactory estimate is that prepared by the ~~III~~ Pan American Union with reference to the year 1951. According to this study, in the twenty Latin American countries there were 31 million housing units in the year in question, approximately 6 million of them in metropolitan areas, 6 million in other built-up areas and 19 million in rural areas.

The significance of total housing statistics, however, is purely relative, since an immense variety of types of housing units is to be found in all countries, and the total figures include the whole range, from the luxury flat or apartment to the rustic hut or rancho.

In order to interpret the statistics, it is necessary to ascertain the composition of these totals, i.e. to classify housing units by structural characteristics and facilities provided. It is for this reason that in the General Principles for a Housing Census, paragraph 302, a classification of housing units into ten major categories is suggested. The most important of these categories is that comprising the units defined as "private conventional (permanent) dwellings", and including houses and flats or apartments, which are the units considered most suitable for habitation on account of their structural characteristics; and, as has been pointed out over and over again, the object of housing programmes is to maintain a sufficient number of such dwellings in the various places concerned.

It is likewise important to distinguish categories which constitute a problem on account of their inherent characteristics, e.g. improvised

/housing units



housing units (callampas, barriadas, etc.) and certain kinds of multi-family housing units such as conventillos or casas de vecindad.

On the assumption that an adequate housing classification is available, which at least enables a distinction to be drawn between satisfactory and sub-standard housing units, the composition of the national housing stock could be indicated by means of a table similar to table 2, in which, for illustrative purposes, data obtained in the 1950 census of the Republic of Panama are presented.

A mere comparison of the proportional distribution of housing units and their occupants at two successive census dates, provided that the principles applied in these censuses are uniform, can shed a great deal of light on the changes that have taken place in housing conditions during the interval between the censuses. This statement is illustrated in table 3, which compares the 1952 and 1960 census data on the distribution of Chile's housing stock and of the occupants of housing units. The table shows that during the interval between the censuses there was a considerable increase in the number of conventional (permanent) dwellings (one-family houses and flats or apartments). But the number of occupants of these same housing units rose in still greater proportion. Another noteworthy point is the marked increase in housing units belonging to the third category - rooms in conventillos, ranchos, rukas or huts, improvised housing units, etc. - and their occupants. However, an exhaustive analysis of the changes in the housing situation that may have occurred in Chile would be out of place here. The sole reason for including table 3 is to exemplify how data on the housing stock can be used. (It should also be noted that the 1960 census findings are provisional, and based on a sample representing approximately 1 per cent of the census schedules.)

The size of private housing units is a particularly useful item of information. Census data should include the number of square metres of floor space in housing units, as well as the number of rooms. But the former figure is very difficult to obtain, and in almost all the censuses taken only the latter has been recorded. The importance of the information in question derives from the principle that there should be a correlation between the classification of housing units by number of rooms and the

Table 2

REPUBLIC OF PANAMA: HOUSING UNITS, HOUSEHOLDS AND OCCUPANTS, BY TYPE OF  
HOUSING (CENSUS TAKEN ON 10 DECEMBER 1950)

Classification of housing units	Number of housing units	Number of households		Occupants of housing units in each category	
		Private	Collective	Number	Percentage
Over-all totals	184 244 <u>a/</u>	183 669 <u>b/</u>	575	805 285 <u>a/</u>	100.0
Official totals	183 669	183 669 <u>b/</u>	-	792 073	98.4
<u>1.1.0. Private housing units</u>	169 121 <u>d/</u>	169 121 <u>d/</u>	-	-	-
1.1.1. Conventional (permanent) dwellings	-	-	-	-	-
1.1.2. Rustic (semi-permanent) housing units	-	-	-	-	-
1.1.3. Mobile housing units	-	-	-	-	-
1.1.4. Improvised housing units	-	-	-	-	-
<u>1.2.0. Collective housing units</u>	575	-	575	13 212	1.6
1.2.1. Hotels, rooming houses, and other lodging houses	113	-	113	1 964	0.2
1.2.2. Institutions (convents, hospitals, etc.)	240	-	140	8 406	1.1
1.2.3. Camps	200	-	200	1 828	0.2
1.2.4. Multi-family housing units ( <u>conventillos</u> , etc.)	-	-	-	-	-
Others	122	-	122	1 014	0.1
<u>2.0.0. Housing units not intended for habitation but in use for the purpose</u>	3 829	3 829	-	-	-
2.1.0. Permanent structures intended for non-residential purposes	-	-	-	-	-
2.2.0. Others	-	-	-	-	-

a/ Including 6 709 housing units enumerated in the zones inhabited by the indigenous population.

b/ Including 51 059 casas de vecindad.

c/ Including 48 654 indigenous inhabitants.

d/ Excluding 10 719 vacant and closed housing units which were not classified by type.

Table 3

CHILE: HOUSING UNITS AND THEIR OCCUPANTS, BY TYPE OF HOUSING (CENSUSES  
TAKEN ON 24 APRIL 1952 AND 30 DECEMBER 1960)

Type of housing.	1952			1960 <sup>a/</sup>		
	Number of housing units	Occupants		Number of housing units	Occupants	
		Number	Percent- age		Number	Percent- age
<u>Total</u>	<u>1 091 446</u>	<u>5 932 995</u>	<u>100.0</u>	<u>1 336 000</u>	<u>7 351 500</u>	<u>100.0</u>
One- family house or apartment	763 616	4 200 011	70.8	973 100	5 420 800	73.7
Apartment or room in a house, <u>casa</u> <u>de cité</u> , room in a school, factory, workshop, etc.	157 743	646 873	10.9	156 300	670 000	9.1
Room in a <u>conventillo</u> , rustic housing unit ( <u>ranchito</u> , <u>ruca</u> or hut), improvised housing unit, etc.	129 716	645 333	10.9	196 400	1 044 100	14.2
Collective housing units, other catego- ries, and types on which no data are available	40 371	440 778	7.4	10 200	216 600	3.0

Sources: National Statistical and Census Service, Censo de vivienda de 1952; and a memorandum on a 1 per cent sample of the 1960 census.

a/ Provisional figures, estimated on the bases of a sample representing approximately 1 per cent of census forms.

/classification of

classification of families or private households by number of members. Clearly, if most housing units consist of only one or two rooms while most families or private households are composed of four or five members, the result will be overcrowding; and this is exactly what happens in the majority of the Latin American countries, as can be seen from table 4, which presents a breakdown of dwellings by number of rooms, with reference to selected Latin American countries for which data are available and certain European countries included for purposes of comparison. The conclusion is obvious. Housing units in Latin America are too small in relation to the size of private households or family groups; more than half of them have only one or two rooms,<sup>1/</sup> so that there is bound to be overcrowding.

It is important to point out that methods of enumerating the number of rooms in dwellings vary widely. One source of discrepancy is the inclusion or exclusion of the kitchen. This alone suffices to account for considerable variations in the average number of rooms per unit.

Special attention should be drawn to the fact that once the housing unit has been defined in terms of its structural characteristics, it is important to obtain statistical data on its size, measured in square metres or by number of rooms (a room should have a minimum floor space of 4 square metres and a minimum height of 2 metres, according to the United Nations definition, and the usual housing standards imply an average floor space of 15-20 square metres for each room). It would be very useful if the Latin American Seminar on Housing Statistics and Programmes were to discuss the various methods of computing the number of rooms in housing units, with a view to reaching agreement on a procedure that might be satisfactory for all the countries of the region.

Occupancy is another basic aspect of the question on which data must be collected in housing censuses or by means of special surveys. Particular interest attaches to two ways of measuring occupancy: (a) by the number of private households occupying the existing housing stock; and (b) by the number of individual persons living in the units concerned.

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<sup>1/</sup> Brazil is an exception in this respect.

Table 4

NUMBER OF PRIVATE DWELLINGS OCCUPIED, AVERAGE NUMBER OF ROOMS PER DWELLING AND PERCENTAGE BREAKDOWN OF OCCUPIED PRIVATE DWELLINGS BY NUMBER OF ROOMS, FOR SELECTED AMERICAN AND EUROPEAN COUNTRIES, 1950

Country	Number of occupied dwellings	Average number of rooms per dwelling			Total <u>a/</u>				Urban <u>a/</u>				Rural <u>a/</u>			
		Total	Urban	Rural	1-2 rooms	3-4 rooms	5-6 rooms	7 rooms or over	1-2 rooms	3-4 rooms	5-6 rooms	7 rooms or over	1-2 rooms	3-4 rooms	5-6 rooms	7 rooms or over
Argentina <u>b/</u>	3 487 182	2.5	...	...	62.7	27.4	7.2	2.7	...	...	...	...	...	...	...	...
Brazil	10 046 199	4.5	...	...	12.5	44.1	28.7	14.7	...	...	...	...	...	...	...	...
Chile <u>c/</u>	1 091 446	...	...	...	50.8	31.1	18.1 <sup>d/</sup>	...	47.1	30.9	21.9 <sup>d/</sup>	...	57.3	31.4	11.3 <sup>d/</sup>	...
Colombia <u>e/</u>	1 720 049	3.4	4.6	3.3	39.5	38.6	12.7	9.2	21.4	33.9	20.5	24.2	41.2	38.8	11.6	8.3
Costa Rica <u>f/</u>	51 286 <sup>g/</sup>	...	3.8	...	...	...	...	...	28.6	40.2	19.9	11.3	...	...	...	...
Cuba <u>h/</u>	1 212 301	3.2	3.2	3.0	37.9	45.4	13.3	3.4	39.5	39.5	16.6	4.4	35.1	55.5	7.7	1.6
Ecuador	621 645	...	...	...	83.2	11.5	5.3 <sup>d/</sup>	...	...	...	...	...	...	...	...	...
El Salvador	139 874 <sup>g/</sup>	...	2.0	...	...	...	...	...	85.0	9.6	3.1	2.4	...	...	...	...
Guatemala <u>i/ f/</u>	152 175 <sup>g/</sup>	...	2.4 <sup>j/</sup>	...	...	...	...	...	69.1 <sup>j/</sup>	19.1 <sup>j/</sup>	6.8 <sup>j/</sup>	5.3 <sup>j/</sup>	...	...	...	...
Haiti <u>f/ k/</u>	32 941 <sup>gk/</sup>	...	2.3	...	...	...	...	...	74.9	16.4	5.6	3.1	...	...	...	...
Mexico <u>l/</u>	5 259 208	1.9	...	...	84.4	11.4	2.7	1.4	...	...	...	...	...	...	...	...
Panama <u>m/</u>	166 241	2.0	2.1	1.8	82.1	14.2	2.9	0.8	77.2	16.5	4.9	1.5	85.8	12.5	1.4	0.3
Dominican Republic	430 652	2.8	3.4	2.5	52.8	35.7	8.0	3.5	40.4	34.6	15.0	10.0	57.1	36.1	5.6	1.2
Venezuela	875 704	2.8	3.5 <sup>n/</sup>	...	53.7	31.8	9.3	5.1	44.2 <sup>n/</sup>	28.8 <sup>n/</sup>	15.1 <sup>n/</sup>	11.9 <sup>n/</sup>	...	...	...	...
Canada <u>e/ o/</u>	3 409 295	5.3	5.2	5.6	6.7	29.7	39.2	24.4	5.6	31.9	43.1	19.5	8.7	26.0	32.4	32.9
United States	42 826 281	4.7	4.6	4.8	10.4	36.7	38.1	14.8	10.6	37.1	39.7	12.6	10.2	36.0	35.0	18.8
Denmark <u>p/</u>	1 380 010	4.4	4.1	5.1	4.3	57.5	28.9	9.4	5.9	64.3	24.8	5.0	0.8	43.0	37.5	18.8
Spain	6 291 590	4.1	4.3	3.9	20.7	42.3	26.1	10.9	18.5	38.8	30.5	12.2	22.5	45.2	22.5	9.8
France <u>q/</u>	13 401 540	2.9	2.8	3.3	40.5	44.5	11.8	3.1	45.6	42.3	9.8	2.3	33.2	47.7	14.8	4.3
Greece <u>e/</u>	1 708 000	2.4	2.5	2.3	63.9	29.5	5.4	1.2	60.7	31.4	6.6	1.3	67.5	27.6	4.0	0.9
Italy <u>e/</u>	10 756 121	3.3	...	...	42.3	38.4	13.3	6.1	...	...	...	...	...	...	...	...
Portugal <u>q/</u>	22 274 499 <sup>a/</sup>	3.6	...	...	32.9	43.5	15.4	8.2	...	...	...	...	...	...	...	...
United Kingdom <u>e/</u>	13 783 845	4.6	4.6	4.6	7.3	40.9	44.0	7.8	7.4	40.4	45.0	7.2	7.2	42.7	40.3	9.8
Sweden <u>t/</u>	2 101 800 <sup>g/</sup>	3.1	2.9	3.5	37.6	47.1	11.6	3.7	45.2	43.6	8.7	2.6	28.0	51.6	15.3	5.1

Source: United Nations, Statistical Yearbook 1960.

a/ These percentages were calculated on the basis of the number of dwellings in which the number of rooms was known. They are affected by the definition of a dwelling used in the census. Collective housing units are not taken into account. Kitchens are counted as rooms.

b/ 1947.  
c/ 1952.  
d/ Five or over.

e/ 1951.  
f/ 1949.  
g/ Urban dwelling only.

h/ 1953.  
i/ Data relate to the housing space occupied by families (household-dwelling concept).  
j/ Including buildings occupied by non-family groups.  
k/ Port-au-Prince only.  
l/ Including collective housing units.

m/ Kitchens are not counted as rooms. In the computation of the percentages, no account is taken of the 2 140 dwellings whose occupation density is unknown, the 2 544 dwellings not divided into rooms or the housing of indigenous tribes.

n/ Federal District. Including 5 178 dwellings in rural areas.  
o/ The data relate to family groups.

p/ 1945.  
q/ 1954. Data relate to dwellings used as their main residence by private families, and are based on a 5 per cent sample.  
r/ Kitchens are not counted as rooms. The average figure and the percentages relate to one-family dwellings, which represent 81 per cent of the total.

s/ Total number of dwellings.  
t/ 1945.

The first method involves a good many complications (for discussion of the relevant procedures applicable, see ST/CEPAL/CONF.9/L.11). A count of the number of occupants of housing units is simpler, and this is the practice usually adopted in housing censuses, whether they are taken in conjunction with population censuses or separately.

Occupation density as a means of assessing housing conditions is particularly useful when applied to conventional (permanent) dwellings. It is important, however, whatever the case under consideration - shanty town or apartment building - inasmuch as the index of crowding shows how far it is difficult for families and their individual members to enjoy privacy. Since it is obvious, however, that housing conditions in units regarded as sub-standard on account of their structural characteristics must in any event be highly unsatisfactory, there is no point in attempting enumeration of the rooms or enclosures to be found on premises that may have been built of waste materials such as cardboard, wooden boards or tins. Thus, the measurement of occupation density is significant only in relation to conventional (permanent) dwellings and perhaps to rustic housing units. This is why, in General Principles for a Housing Census, cross-tabulation of the number of rooms and number of occupants is recommended only in the case of "conventional (permanent) dwellings". Table 5, which presents data for Brazil obtained in the census taken on 1 July 1950, illustrates tabulations of this kind.

The statistical groups whose frequencies show the number of housing units in which occupation density reaches two or more persons per room have been marked off in table 5, where it will be seen that only small dwellings are likely to be overcrowded, inasmuch as an occupation density exceeding two persons per room in a dwelling with five or more rooms means that the private household or family living in it must comprise ten or more members; and such families are uncommon.

Since overcrowding constitutes one of the principal housing problems, census data indicating its magnitude and significance should be collected. Information of this kind can be obtained from a table similar to table 5, in which, for instance, statistical groups whose frequencies showed occupation densities of three or more persons per room might be marked off

Table 5

**BRAZIL: BREAKDOWN OF PRIVATE DWELLINGS BY NUMBER OF ROOMS AND NUMBER  
OF OCCUPANTS BASED ON CENSUS TAKEN ON 1 JULY 1950**

Number of occupants per private dwelling	Total number of private dwellings occupied	Number of rooms per occupied dwelling							No data available
		1	2	3	4	5	6	7 or over	
Total	10 046 199	273 236	969 016	2 033 371	2 347 783	1 702 153	1 156 259	1 461 955	102 426
1	503 044	92 734	128 308	121 768	74 006	34 747	19 133	20 287	12 061
2	1 198 411	61 931	203 302	333 515	280 757	147 210	81 245	77 060	13 391
3	1 500 893	43 044	191 262	390 320	382 558	220 854	127 251	131 908	13 696
4	1 525 456	29 240	154 600	350 570	397 029	255 906	154 154	172 216	11 741
5	1 371 779	18 856	109 533	280 669	351 070	253 130	159 565	188 836	10 120
6	1 147 664	11 726	74 059	206 495	286 091	223 148	152 429	184 413	9 303
7	902 910	7 167	47 227	142 426	213 521	184 824	132 308	167 131	8 306
8	700 343	4 101	29 354	94 933	154 171	145 877	114 610	149 379	7 918
9	461 382	2 152	15 705	53 501	93 215	96 497	79 988	114 302	6 022
10 or over	734 317	2 285	15 666	59 174	115 365	139 960	135 576	256 423	9 868

Note:

= Dwellings with two or more occupants per room.

/in the

in the same way as for housing units with two persons per room or over. The ratio of the sum of these frequencies to the total number of units would indicate the percentage of the latter in which occupation densities were higher than those considered acceptable. Such data have been obtained in some Latin American censuses, the findings of which have been compiled and published by the United Nations Statistical Office in its Statistical Yearbook. Table 6 presents a summary of these findings in respect of the Latin American countries for which data are available. Selected European countries, Canada and the United States are also incorporated in the table for reference purposes. It should be noted, however, that exact comparisons are impossible, owing to the many divergencies in the concepts used in the collection of data.

Arrangements for the supply of drinking water and the disposal of human wastes are matters of special interest, since they represent the most essential elements in public hygiene or environmental sanitation. The availability of such facilities is important for the preservation of health, irrespective of the structural quality of the housing units. In international and regional recommendations for housing censuses, therefore, stress has been laid on the desirability of obtaining data on the drinking water supply system in relation to housing units of all types. In this context, it is of special interest to ascertain whether piped water is laid on from a public distribution network, since this is recognized to be the safest way of keeping the water uncontaminated, and, by safeguarding it from pollution, averting the risk of transmission of certain diseases sometimes aptly described as of hydric origin. The situation as regards the availability of piped water forms part of the information sought in almost every housing census. In some cases, however, the interpretation placed upon the data has been that housing units are provided with a piped water system when their inhabitants have access to water from the public distribution network, whether the installation is their own or not. This misinterpretation has led to the conclusion that according to the census data obtained as described, there really was a much larger proportion of housing units with drinking water laid on than was in fact the case. In other instances, any and every source of "running" water is regarded as



Table 6

OCCUPATION DENSITY OF PRIVATE DWELLINGS AND PERCENTAGE WITH THREE OR MORE  
PER ROOM, IN SELECTED AMERICAN AND EUROPEAN COUNTRIES, 1950

Country	Average number of persons per room			Percentage of dwellings with three or more persons per room		
	Total	Urban	Rural	Total	Urban	Rural
Argentina (1947)	2.2	...	...	35.5	...	...
Brazil	1.1	...	...	4.1	...	...
Colombia (1951)	2.7	...	...	26.7	...	...
Costa Rica (1949)	...	1.3	...	...	...	...
Chile <u>a/</u> (1960)	1.7	...	...	27.4	...	...
Ecuador	...	...	...	44.7	...	...
El Salvador	...	2.9	...	...	...	...
Guatemala (1949)	...	3.1	...	...	43.1	...
Panama <u>b/</u>	2.5	2.2	2.7	46.2	36.1	53.8
Dominican Republic (1955)	1.7	1.3	1.9	22.9	15.0	25.9
Canada (1951)	0.7	0.7	0.8	1.0	0.4	2.0
United States	0.7	0.7	0.8	0.9 <u>c/</u>	...	...
Denmark <u>d/</u> (1955)	0.7	0.7	0.7	0.1	0.1	0.0
Spain	1.1	...	...	13.6	...	...
France <u>e/</u> (1954)	1.0	1.0	1.0	5.7	5.7	5.7
Greece (1951)	1.8	...	...	30.2	26.1	34.8
Italy (1951)	1.3	...	...	14.6	...	...
United Kingdom (1951)	0.8	0.8	0.8	1.1 <u>f/</u>	1.1 <u>f/</u>	1.2 <u>f/</u>

Sources: United Nations, Statistical Yearbook 1960; and replies to the questionnaire for the United Nations Statistical Yearbook and Compendium of Social Statistics.

a/ Data obtained by means of a 1 per cent sample of census schedules.

b/ Excluding kitchens. No account is taken in the calculation of the 2 140 dwellings whose occupation density is unknown, the 2 554 dwellings not divided into rooms and the housing units of the indigenous population.

c/ Non-agricultural dwellings.

d/ Excluding 6 990 one-roomed housing units without kitchens.

e/ Data relate to the dwellings used as their main residence by private families, and are based on a 5 per cent sample.

f/ Data relate to households.

a drinking water supply, which means, of course, that in the pertinent category the enumerators might sometimes include housing units with access to irrigation and drainage dykes or to water flowing through open trenches of any other kind. With these reservations, the information obtained in housing censuses is useful, even when it does not permit of inter-country comparisons. Table 7 presents in summarized form the existing data on water supply systems, collected in the course of the censuses taken in the Latin American countries in 1950. In addition, it shows the percentages of dwellings with flush toilets, bath installations, gas and electricity. As in the preceding tables, selected European countries are also included for reference purposes. It should be noted that the significance of the information embodied in this table varies greatly according to the country concerned, and that it is included with the primary intention of showing what data are available and, therefore, the extent of the lacunae, as well as the obvious inconsistencies which emerge when the figures for the different countries are compared. It would be very useful and desirable for the participants in the Latin American Seminar on Housing Statistics and Programmes to discuss ways and means of improving this type of information.

The type of tenure or occupancy of housing units is another item of information very commonly obtained in housing censuses; it indicates the proportion of housing units occupied by their owners, by rent-paying tenants, by squatters and by other categories of occupants. It is affirmed that the proportion of housing units not occupied by their owners is an indicator of the population's potential interest in buying houses of their own. The interpretation of such data is bound to vary from one country and area to another, and it would be helpful if the participants in the Seminar were to discuss their utility in different circumstances. This is an item of information which has been included in all the censuses taken in the region, and an exhaustive analysis of its value is therefore advisable. Table 8 presents a percentage breakdown of private dwellings in the Latin American countries by tenancy, on the basis of the data obtained in the 1950 censuses.

Table 7

PERCENTAGE OF DWELLINGS WITH PIPED WATER, SYSTEM FOR THE DISPOSAL OF HUMAN WASTES, BATH FACILITIES, GAS AND ELECTRICITY, IN SELECTED AMERICAN AND EUROPEAN COUNTRIES BASED ON 1950 CENSUSES

Country	Area	Percentage of dwellings with facilities specified						
		Piped water		System for disposal of human wastes a/		Bath facilities	Gas	Electricity
		Inside the dwellings	Inside or outside the dwellings	Flush toilet a/	Any type			
Argentina (1947)	Total	...	46.7	...	...	...	5.8	59.7
Bolivia	Urban	13.8b/	46.5e/	13.4d/	37.3e/	...	...	...
Brazil	Total	...	15.6	...	33.0	...	...	...
	Urban	...	39.5	...	71.3	...	...	60.0
	Rural	...	1.4	...	10.4	...	...	3.6
Colombia (1951)	Total	25.6	28.4	21.0	32.4	19.4	...	25.5
	Urban	62.3	66.1	...	...	...	...	63.5
	Rural	5.1	7.3	...	...	...	...	4.2
Costa Rica (1949)	Urban	94.5	97.9	32.5	96.5	80.5	...	81.6
Cuba (1953)	Total	38.9	55.2	40.4	74.4	42.8	...	55.6
	Urban	57.7	78.9	59.5	91.7	62.4	...	82.9
	Rural	6.7	14.6	7.7	44.8	9.2	...	8.7
Chile (1952)	Total	...	48.1	41.8	...	35.6	...	5.5
	Urban	...	73.2	62.4	...	51.3	...	77.4
	Rural	...	4.5	6.1	...	8.7	...	14.9
(1960)	Total	...	56.1f/	44.8f/	...	...	...	...
Ecuador	Total	11.2b/	...	...	...	...	...	...
El Salvador	Urban	39.8	94.5	66.2	...	35.8	...	39.1
Guatemala (1949)	Urban	...	33.8	29.4	61.7	19.4	...	38.6
Haiti (1949)	Urban g/	41.9	58.1	...	...	...	...	27.1
Mexico	Total	17.1	43.4	...	...	...	...	...
Honduras (1949)	Total	10.5	...	13.6	17.3	8.4	34.9	8.0
	Urban	32.1	...	22.2	31.3	24.0	48.7	24.7
	Rural	1.9	...	10.2	11.7	2.2	29.3	1.3
Panama	Total	...	44.4	37.5	61.2	...	...	...
	Urban	...	92.7	83.5	97.8	...	...	...
	Rural	...	9.2	3.9	34.5	...	...	...
Dominican Republic	Total	5.2	16.6	4.4	90.4	...	...	13.2
	Urban	18.1	57.2	15.9	97.4	...	...	46.1
	Rural	0.7	2.7	0.5	88.0	...	...	1.9
Venezuela	Total	30.2	50.6	21.8	41.1	37.2	...	40.3
	Urban	51.3	80.9	38.4	67.5	...	...	68.9
	Rural	6.0	15.9	2.9	11.0	...	...	8.8
Canada (1951)	Total	74.0	...	h/	h/	60.8	21.2	87.0
	Urban	94.1	...	...	...	89.2	31.4	99.3
	Rural	39.5	...	...	...	22.3	3.8	65.9
United States	Total	81.6	83.9	h/	h/	71.2	54.5	92.1
	Urban	95.3	97.2	...	...	87.0	70.0	97.2
	Rural	56.9	59.9	...	...	42.8	26.6	83.0
Spain	Total	34.2	...	h/	h/	9.2	5.3	80.5
	Urban	58.9	...	...	...	17.1	...	86.4
	Rural	13.2	...	...	...	2.5	...	73.8
France <sup>1/</sup> (1954)	Total	58.4	61.5	h/	h/	10.4	66.1	93.0
	Urban	75.4	79.7	...	...	14.9	77.6	95.4
	Rural	34.3	35.0	...	...	4.0	49.8	89.5
Greece (1951)	Total	12.1	66.4	h/	h/	2.7	...	28.7
	Urban	23.0	75.0	...	...	5.1	...	53.2
	Rural	0.6	57.3	...	...	0.1	...	2.9
Denmark (1955)	Total	...	...	h/	h/	39.4	80.2	98.4
	Urban	100.0	100.0	...	...	47.8	90.1	99.5
	Rural	63.5	...	...	...	21.9	59.6	96.3

Table 7 (concluded)

Country	Area	Percentage of dwellings with facilities specified						
		Piped water		System for disposal of human wastes		Bath facilities	Gas	Electricity
		Inside the dwellings	Inside or outside the dwellings	Flush toilet a/	Any type			
United Kingdom j/ (1951)	Total	94.5	...	h/	h/	62.4	...	...
	Urban	97.9	...			64.5	...	...
	Rural	79.9	...			53.6	...	...
Sweden (1945)	Total	67.0	68.7 k/	h/	h/	27.6 l/	22.1	93.7
	Urban	88.5	90.5 k/			43.4 l/	39.4	99.6
	Rural	39.3	40.8 k/			7.2 l/	0.0	86.2

Sources: As for table 6.

a/ For private or communal use.

b/ Dwellings with private water supply.

c/ Dwellings with water supply.

d/ Dwellings with private sanitary facilities.

e/ Dwellings with sanitary facilities.

f/ Provisional data.

g/ Port-au-Prince only.

h/ This information is not given in the United Nations Statistical Yearbook 1960.

For the Latin American countries census data were used (taken from the replies to the United Nations questionnaire).

i/ Data relate to dwellings used as their main residence by private households, and are based on a 5 per cent sample.

j/ Data relate to Great Britain.

k/ Water supply facilities inside or outside the dwelling, but inside the building.

l/ Excluding shower rooms and saunas.

Table 8

LATIN AMERICA: OCCUPIED PRIVATE DWELLINGS BY TENANCY OR TYPE  
OF OCCUPANCY. 1950 CENSUS

Country	Area	Number of dwellings	Percentage occupied by			
			Owner	Tenant	Other	No data
Argentina	Total	3 487 182	37.3	62.7	...	...
Bolivia	Urban	205 101 <u>a/</u>	23.5	52.5	...	24.0
Brazil	Total	10 046 199	52.1	23.1	23.8	1.0
	Urban	3 730 368	46.2	47.0	6.0	0.8
	Rural	6 315 831	55.6	9.0	34.2	1.2
Colombia	Total	1 720 049	67.1	25.3	7.6	...
Costa Rica	Urban	51 286	39.6	50.9	9.5	...
Cuba	Total	1 212 301	37.2	36.5	22.9	3.4
	Urban	764 365	32.0	54.9	9.2	3.9
	Rural	447 936	46.2	5.2	46.1	2.5
Chile	Total	1 051 075 <u>a/</u>	32.0	40.6	27.4	...
	Urban	667 000 <u>a/</u>	28.9	58.5	12.6	...
	Rural	384 075 <u>a/</u>	37.3	9.7	53.0	...
Ecuador	Total	621 645	58.9	22.4	18.0	0.7
El Salvador	Urban	133 874 <u>a/</u>	38.4	53.5	8.0	0.1
Guatemala	Urban	152 175	55.7	34.3	10.0	...
Honduras	Total	204 447	82.6	11.3	6.1	...
	Urban	58 219	63.0	30.4	6.6	...
	Rural	146 228	90.5	3.6	5.9	...
Panama	Total	166 241	57.8	35.7	6.5	...
	Urban	70 101	17.5	77.9	4.6	...
	Rural	96 140	87.2	5.0	7.8	...
Dominican Republic	Total	430 652 <u>b/</u>	70.8	15.0	13.7	0.5
	Urban	110 039 <u>b/</u>	40.2	50.4	8.8	0.6
	Rural	320 613 <u>b/</u>	81.2	28.9	15.4	0.5
Venezuela	Total	875 704	68.2	24.8	7.0	<u>c/</u>

Source: Replies to the questionnaire for the United Nations Statistical Yearbook and the Compendium of Social Statistics.

a/ Total housing units (including unoccupied).

b/ Including collective housing units.

c/ Included under "other type of occupation".

### 3. Measurement of Housing Conditions by Means of Statistical Indicators

As pointed out in the document Statistical Indicators of Housing Conditions (ST/STAT/S.M/31), actual housing conditions should be measured by means of a few statistical indicators which reflect the extent of compliance with certain requirements considered essential to the protection of the privacy of families and their members, the protection of individuals against certain environmental risks and the availability of such indispensable elements as drinking water. The following indicators selected by the United Nations reflect these conditions:

#### Basic indicators:

1. Percentage of the population living in dwellings.
2. Percentage of occupied dwellings with three or more persons per room (overcrowding).
3. Percentage of occupied dwellings with piped water.
4. Percentage of occupied dwellings with toilets.

#### Supplementary indicators:

1. Percentage of the population living in sub-standard housing units (e.g. those classified as "rustic", "improvised" or "not intended for habitation").
2. Average number of persons per room in occupied dwellings.
3. Percentage of occupied dwellings with flush toilets (urban).
4. Percentage of occupied dwellings with toilets other than flush.

These indicators serve two important purposes in the formulation of housing programmes: they determine the level of living at the time of the census, indicating the extent to which certain conditions essential to habitability are met, and they provide an objective basis for calculating the need for new dwellings. The significance and interpretation of each indicator is analysed in the document Statistical Indicators of Housing Conditions, and sections IV and V of the present paper discuss methods of estimating housing deficits and needs which are essentially based on calculating the number of dwellings which will have to be built in order to maintain or modify some of the aforementioned indicators.

/The changes

The changes which have occurred in housing conditions can also be evaluated by means of these indicators, provided always that at least two censuses are available and that the same methods have been used in both censuses. The data obtained by the ten countries in the region which have taken a second or third housing census in 1960 may possibly indicate whether housing conditions have improved or deteriorated. The available indices seem to show that the situation has worsened in a number of countries.

Statistical indicators of housing conditions in the Latin American countries, together with other economic and level-of-living indicators, are given in table 9. The very scanty data available show that housing conditions in the area leave much to be desired and that much information is lacking. It will be noted that basic indicators cannot be calculated even for countries which have taken housing censuses, because the principles followed or the form in which the data have been tabulated and published preclude calculation of the indicators. In view of the pressing need for measuring levels of living in the field of housing, and the lack of statistics, recourse is often had to partial estimates and indirect evaluations of housing conditions based on subjective appreciations which may lead to erroneous conclusions. It would therefore be desirable for the participants in the Seminar to propose a plan of action designed to obtain without delay the basic statistical data (censuses or national housing surveys) needed to measure actual conditions and the changes which will take place in the next five or ten years.

#### 4. Evaluation of Existing Housing Deficits

An evaluation of housing deficits can be made on the basis of very varied criteria. The one chiefly used at present consists in evaluating the number of dwellings which would have to be built in order to give the population a level of living - as far as housing is concerned - regarded as satisfactory by the population concerned, that is to say, the number of additional dwellings needed to provide adequate accommodation for the people currently living in housing units which, because of their structural characteristics, ought to be considered unsatisfactory, and to reduce the

/Table 9

Table 9

INDICATORS<sup>a/</sup> OF HOUSING CONDITIONS IN LATIN AMERICAN COUNTRIES AROUND 1950.<sup>b/</sup> (THE TABLE ALSO INCLUDES FOR EACH COUNTRY:  
NATIONAL PER CAPITA INCOME, LIFE EXPECTANCY AT BIRTH, PERCENTAGE OF  
ILLITERATES AMONG THE POPULATION OVER 15 YEARS OF AGE)

Country	Indicator N° 1				Indicator N° 2						Indicator N° 3		
	Basic		Supplementary		Basic		Supplementary				Basic		
	Percentage of population living in dwellings b/			Percentage of population living in sub-standard c/ housing units	Percentage of dwellings occupied with three or more persons per room			Average number of persons per room in occupied dwellings			Percentage of occupied dwellings with piped water inside the dwelling or if outside within 100 metres		
	Total	Urban	Rural		Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Argentina	...	...	...	...	35.5	...	...	2.2	...	...	46.7	...	...
Bolivia	...	...	...	...	...	...	...	...	...	...	...	...	...
Brazil	...	...	...	...	4.1	...	...	1.1	...	...	15.6	46.5	1.4
Chile	68	70	65	21.7 <sup>b/</sup>	27.4	...	...	1.7	...	...	48.1	73.2	4.5
Colombia	...	...	...	...	25.7	...	...	2.7	...	...	28.4	66.1	7.3
Costa Rica	...	...	...	...	...	...	...	...	1.3	...	...	97.9	...
Cuba	...	...	...	...	...	...	...	...	...	...	55.2	78.9	14.6
Ecuador	55	...	...	...	44.7	...	...	...	...	...	...	...	...
El Salvador	24	59	20	...	...	...	...	...	2.9	...	...	54.5	...
Guatemala	40	65	20	...	...	43.1	...	...	3.1	...	...	33.8	...
Haiti	...	...	...	...	...	...	...	...	...	...	...	58.1	...
Honduras	68	80	62	...	...	...	...	...	...	...	...	...	...
Mexico	...	...	...	...	...	...	...	...	...	...	43.4	...	...
Nicaragua	...	...	...	...	...	...	...	...	...	...	...	...	...
Panama	...	39	...	...	46.2	36.1	53.8	2.5	2.2	2.7	44.4	92.7	9.2
Paraguay	...	...	...	...	...	...	...	...	...	...	...	...	...
Peru	...	...	...	...	...	...	...	...	...	...	...	...	...
Dominican Republic	...	55	...	...	22.9	15.0	25.9	1.7	1.3	1.9	16.6	57.2	2.7
Uruguay	...	...	...	...	...	...	...	...	...	...	...	...	...
Venezuela	53	76	27	42.6 <sup>b/</sup>	...	...	...	...	...	...	50.6	80.9	15.9



Table 9 (concluded)

Country	Indicator 4							National per capita income (income groups) e/	Life expectancy at birth f/ Male Female		Percentage of illiterates among the population over 15 years of age g/ Total Male Female		
	Basic			Supplementary A		Supplementary B							
	Percentage of occupied dwellings with toilets			Percentage of oc- cupied dwellings with flush toilets		Percentage of occupied dwellings with toilets other than flush							
	Total	Urban	Rural	Urban	Total	Urban	Rural						
Argentina	...	...	...	...	...	...	...	360 - 575	56.9	61.4	13.6	12.1	15.2
Bolivia	...	...	...	13.4	...	...	...	- 100	49.7	49.7	67.9	57.6	77.2
Brazil	33.0	71.3	10.4	...	...	...	...	100 - 200	39.3	45.5	50.5	45.1	55.7
Chile	...	...	...	62.4	...	...	...	350 - 575	49.8	53.9	19.6	17.8	21.3
Colombia	32.4	...	...	...	11.4	...	...	100 - 200	48.81/		37.7	35.0	48.2
Costa Rica	...	96.5	...	32.5	...	64.0	...	200 - 350	54.7	57.1	20.6	19.9	21.4
Cuba	74.4	91.7	44.8	59.5	34.0	32.2	37.1	350 - 575	50.71/	56.41/	22.1	24.2	20.0
Ecuador	...	...	...	...	...	...	...	100 - 200	50.4g/	53.7g/	44.2	37.9	50.3
El Salvador	...	...	...	66.2	...	...	...	...	49.9	52.4	59.0	55.2	62.6
Guatemala	...	61.7	...	29.4	...	32.3	...	...	43.8	43.5	70.6	65.6	75.6
Haiti	...	...	...	...	...	...	...	...	32.6		89.3	87.0	91.4
Honduras	17.3	31.3	11.7	22.2	3.7	9.1	1.5	100 - 200	44.1/	46.1/	64.8	62.9	66.7
Mexico	...	...	...	...	...	...	...	200 - 350	37.9	39.8	42.5	39.0	45.8
Nicaragua	...	...	...	...	...	...	...	100 - 200	55.1/		61.6	62.0	61.3
Panama	61.2	97.8	34.5	83.5	23.7	14.3	30.6	200 - 350	60.4	63.1	30.1	29.1	31.0
Paraguay	...	...	...	...	...	...	...	100 - 200	52.1/		34.2	24.5	42.9
Peru	...	...	...	...	...	...	...	100 - 200	46.1		57.6	45.0	69.3
Dominican Republic	90.4	97.4	88.0	15.9	86.0	81.5	87.5	100 - 200	44.1/		57.1	55.3	58.9
Uruguay	...	...	...	...	...	...	...	350 - 575	64 - 66 1/		...	...	...
Venezuela	41.1	67.5	11.0	38.4	19.3	29.1	8.1	575 - 1000	52.81/		46.7	41.9	51.5

a/ The indicators are those included in the United Nations International Definition and Measurement of Levels of Living (E/CN.3/270/Rev.1 - E/CN.5/353), New York, 1961, and Statistical Indicators of Housing Conditions (ST/STAT/SER.M/37), New York, 1962.

b/ By "dwellings" is meant "conventional (permanent) dwellings" as defined in paragraph 304 of the United Nations General Principles for a Housing Census (ST/STAT/SER.M/28), New York, 1958.

c/ Sub-standard housing units include "rustic", "improvised", "not intended for habitation", etc., as defined in the Principles.

d/ The data included in this table are a summary of those presented in separate tables throughout the document. The observations made in the latter also apply to this table.

e/ Report on the World Social Situation, United Nations (E/CN.5/346/Rev.1/ST/SOA/42), New York 1961.

f/ Source: Demographic Yearbook 1960, United Nations (Sales No: 61.XIII.1).

g/ Quito.

h/ Including a proportion of private households living together.

i/ Percentage of population living in ranchos.

j/ Unofficial estimates.

density of occupation so as to eliminate overcrowding and promiscuous living. The following types of housing units, described in paragraph 302 of the General Principles for a Housing Census, are considered inadequate or unsatisfactory:

- 1.1.4. Improvised housing units
- 1.2.4. Multi-family housing units (long houses, casas de vecindad, etc.)
- 2.2.0. Housing units not intended for habitation but in use for the purpose (barns, garages, caves, etc.)

To the above should be added a portion of the housing units classified in categories covering units which may be satisfactory, together with others possibly having the same structural characteristics but completely inadequate. These groups are the following:

- 1.1.2. Rustic (semi-permanent) housing units
- 1.1.3. Mobile housing units (trailers, boats, wagons, etc.):
- 1.2.3. Camps (lumber, mining, military, etc.)

These housing units are part of the national housing stock, and they are regarded as unsatisfactory because their structural characteristics are not acceptable. To them should be added (permanent) conventional dwellings which, though structurally adequate, may have fallen into such a state of dilapidation that they must be replaced by others as being beyond repair.

Another component of the housing deficit is the number of dwellings which will have to be built to provide separate quarters for individuals, family groups and households now living together - sharing conventional dwellings with other family groups - who would like to live alone, provided that these secondary private households want and are able to afford separate dwellings.

In order to obtain a full estimate of the deficit, an evaluation must also be made of the number of dwellings which would have to be added to the national stock in order to eliminate overcrowding and thus to reduce the average density of occupation.

The deficit might be estimated according to the method proposed in paragraphs 38-52 of document E/CN.3/274, but it would be desirable for uniform principles to be adopted in calculating the deficit in each

Latin American country. Determination of the housing deficit or shortage in Latin America has been a matter of concern to regional and national agencies. The Pan American Union, in a study published in 1954 <sup>2/</sup> - perhaps the most complete study undertaken on housing conditions in the region - estimates the housing deficit in Latin America in 1951 at 19 million dwellings, a situation resulting from "houses that are not in keeping with human dignity and that should be demolished." <sup>3/</sup> Estimates have also been made of current deficits in ten countries (see table 10) but no comparison between them can be made because they were obtained by different methods and are based on very different standards with respect to the conditions which a dwelling must meet in order to be considered satisfactory. The estimated deficit for Chile, for example, ranges between 45 000 and 447 000 dwellings depending upon the basic assumptions adopted. To be able to estimate the housing deficits on a uniform basis, there would have to be a measure of uniformity in tabulating the essential aspects of the results of housing censuses, and uniform standards applicable to every country. This cannot be done under present conditions.

The method applied to obtain the estimates shown in table 10 was not the same in every country. In some cases, the estimates include provisions to reduce the density of occupation, while in others the estimate covers the number of housing units which will have to be replaced. Moreover, some estimates fail to include an estimate of the number of conventional dwellings which must be replaced.

In order to have a uniform basis for estimating actual housing deficits in the various countries, an agreement would have to be reached on the method to be used in calculating the components of the deficit mentioned earlier.

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<sup>2/</sup> Problems of Housing of Social Interest, Pan American Union, Washington D.C., 1954, page 27.

<sup>3/</sup> It should be pointed out that there is a serious problem of interpreting housing statistics and studies, not only in Spanish but also in English and French. For example, what is referred to in the Pan American Union document as "present shortage" is called "present housing needs (shortage)" in document E/CN.3/274. The Pan American Union also uses the terms "deficit due to deterioration" and "demographic deficit" for the dwellings needed to replace present dwellings in a state of disrepair and to absorb the population increment.

Table 10

DWELLINGS: SHORTAGE OR DEFICIT AROUND 1950, ACCORDING TO CALCULATION  
MADE IN RESPECT OF TEN COUNTRIES AND OF LATIN AMERICA AS A WHOLE

Region or country	Year	Number of dwellings needed		Percentage in relation to the present number of housing units	
<u>Latin America</u>	1951	19 448 600		63.6 a/	
Metropolitan areas		2 673 400		33.3 b/	
Urban areas		1 608 200			
Rural areas		15 167 000		85.7 c/	
<u>Argentina</u>					
Total	1955	1 200 000		...	
<u>Brazil</u>	1950	3 000 000		29.9	
<u>Colombia</u>	1951	800 000		42.7	
Urban areas		300 000		45.3	
Rural areas		500 000		41.2	
<u>Chile</u>	1952	45 000 - 447 000		4.1 - 40.8	
Urban areas		19 000 - 230 000		2.7 - 33.2	
Rural areas		26 000 - 217 000		6.5 - 54.4	
<u>Ecuador</u>	1960	517 700		...	
Urban areas		343 000		...	
Rural areas		228 700		...	
<u>El Salvador</u>	1950	337 062		...	
Urban areas		148 798		...	
Rural areas		188 264		...	
<u>Guatemala</u>	1950	435 000		77.4	
Urban areas		35 000		24.5	
Rural areas		400 000		95.4	
<u>Mexico</u>	1957	232 529		4.4	
<u>Perú</u>	1956	728 700		37.2	
Metropolitan areas		146 200		40.3	
Urban areas		180 400			
Rural areas		401 100		35.0	
<u>Venezuela</u>	1958	128 444		14.7	

Sources: Latin America: Problems of Housing of Social Interest, Inter-American Economic and Social Council, Pan American Union, Washington D.C., 1954.

Argentina: Desarrollo económico de Argentina, ECLA 1959. United Nations Publication, Sales No 59. II. Q.3, Vol.1, page 36.

Carlos Leonidas Acevedo, El Problema de la vivienda en Argentina, Technical Assistance Board, 1957. (Unpublished study in the Latin American Section of the Bureau of Technical Assistance Operations, United Nations, New York).

Brazil: Luis Carlos Mancini, Problemas de habitação Rural. Algumas indicações sobre uma política de habitação. Semana de orientação do curso de extensão, Rio de Janeiro, 19-23 August. Edições SIA 1960.

Colombia: Una política de vivienda para Colombia. Primer Seminario Nacional de Vivienda. Instituto de Crédito Territorial. 1955.

Chile: Resumen del programa de desarrollo económico de la CORFO. Décima Parte, Oficina de Informaciones del Senado. Boletín de Información Económica, No.14, 1 January 1961.

Ecuador: Informe final del primer Seminario nacional de vivienda de interés social, Ambato, 12-20 December 1959. Ministry of Social Welfare and Labour. Instituto de la Vivienda, Quito, Ecuador.

Table 10 (concluded)

El Salvador: Estudio sobre la vivienda en El Salvador, United Nations, Technical Assistance Programme, Document ST/TAA/K/ El Salvador/9, New York 1954.

Guatemala: Anastole A. Solew, Housing in Guatemala, Pan American Union, Washington D.C., October 1950.

Mexico: Reply to the United Nations questionnaire based on estimates made by the Dirección General de Estudios Económicos de la Secretaría de Industria y Comercio, November 1960.

Peru: Informe sobre la vivienda en el Perú, Comisión para Reforma Agraria y Vivienda, Lima 1958.

Venezuela: Aspectos del problema de la vivienda en Venezuela, Cuaderno de Información Económica, C.V.F., Caracas 1957.

- a/ The number of units used to calculate this percentage includes estimates of the number of housing units for Bolivia, Costa Rica, El Salvador, Haiti and Uruguay.
- b/ The number of units used includes estimates for Argentina, Ecuador, Haiti, Mexico and Uruguay.
- c/ The number of units used includes estimates for Argentina, Bolivia, Costa Rica, El Salvador, Ecuador, Haiti, Mexico and Uruguay.

There seems to be a tacit agreement to regard as unacceptable the types of housing units included in groups 1.1.4., 1.2.4. and 2.2.0. as described in paragraph 302 of General Principles for a Housing Census. What is still lacking, however, is a tabulation of housing census data in accordance with the classification proposed by the United Nations.

Some standard or guideline will have to be adopted so that an objective assessment can be made of the proportion of housing units included in groups 1.1.2., 1.1.3. and 1.2.3. which ought to be considered unacceptable. These groups include units which, while structurally similar, differ in quality and could therefore be easily subdivided.

A uniform standard will have to be adopted to determine the proportion of conventional (permanent) dwellings which ought to be replaced because they have fallen into such a state of dilapidation as to be beyond repair. The recommendations contained in the report on the Urban Renewal Symposium convened by the Economic Commission for Europe in June 1961 might be useful for this purpose.<sup>4/</sup>

The evaluation of the number of dwellings which must be built to eliminate overcrowding in existing conventional (permanent) dwellings can be based on several working assumptions. The first step is to determine the number of persons now living in conventional dwellings who could live in other dwellings, i.e. the number of new households which could be formed if additional dwellings were available at suitable rentals and in convenient areas. It is a recognized fact that there are individuals, family groups or households in every country living together with other households who want a home of their own. If such a movement took place the average density of occupation (persons per room) in existing conventional dwellings would automatically be reduced. Hence it will be necessary to calculate the extent of this reduction and to determine whether the density achieved is satisfactory or whether even lower averages should be attained.

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<sup>4/</sup> Report on the Urban Renewal Symposium organized by the Housing Committee of the United Nations Economic Commission for Europe and held in Geneva in June 1961. ST/ECE/HOU/4. (See Chapter III and Appendix III.)

A basic element in determining additional deficits is the figure to be decided upon as the average occupation density target to be aimed at under the housing programme. A value must be fixed for this indicator in order to be able to determine the present deficit in relation to that value. It might perhaps be useful to consider whether one single level for density of occupation of dwellings could be adopted in the urban and rural areas of Latin American countries. What target or level should be set, for example, to be achieved by 1975?

Table 6 shows that the average number of persons per room in Latin America is as a rule fairly high, much higher, naturally, than the averages noted in most European countries. Considering that the target will be fixed in relation to conventional (permanent) dwellings only - houses and apartments - with due regard for the fact that such dwellings are similar in all parts of the world and that only part of the population lives in them (perhaps between 50 and 80 per cent in Latin American countries) the density of occupation observed in the European countries around 1950 might usefully be taken as a target within reach of the Latin American countries by 1975. This is an arbitrary yardstick but it might be a useful one failing anything better. This arbitrary target would have an approximate value of 1.0 persons per room. The potential number of private households can only be determined by means of special inquiries decidedly difficult to carry out. When population censuses have used a private household concept distinct from that of the housing unit, thus admitting the possibility of several households occupying one and the same unit, it is feasible to count the number of units occupied by two or more households, i.e. the number of private households sharing dwellings. This number may be considered a component of the housing deficit. It should be recognized, however, that a certain proportion of these households may be perfectly content to share their dwellings with other households, in which case it would be too much to say that every private household wants a separate dwelling. Special inquiries will have to be made in order to achieve a more accurate estimate of this figure.

Another group requiring special consideration is that of dwellings which at the time of the census were overcrowded, i.e. which had three or more persons per room. This situation must be considered unacceptable and an estimate must therefore be made of the number of dwellings needed or, better still, the number of rooms needed to eliminate overcrowding. In fact, this means that an estimate must be made of the number of rooms which, in theory, should be added to the dwellings at present overcrowded in order to reduce their density of occupation to limits regarded as tolerable. While the arithmetical operation is simple and has been indicated in paragraph 44 of document E/CN.3/274, two working hypotheses must be established: (a) the maximum tolerable density; (b) the average number of rooms per dwelling in new dwellings to be built for the purpose of eliminating overcrowding.

For the first hypothesis, an arbitrary figure of, say, two persons per room might be fixed. This would mean that the maximum permissible occupancy level would be two persons for one-room dwellings, four persons for two-room dwellings, six persons for three-room dwellings, etc. (These might be a suggestion for a more complicated tolerance scheme, similar to those adopted in some European countries, which take into account the composition of households, the age and sex of the children, etc., but this does not seem practical in Latin American countries.) For the second hypothesis, an average of three rooms per dwelling might be fixed. This is an arbitrary figure in line with the average number of persons per household in Latin America (five) and with an average density of occupation halfway between the present density of 2.2 and the 1975 target of 1.0.

The average of three rooms per dwelling may serve to show that very small dwellings are not suitable because an undue proportion of such dwellings inevitably tends to produce an unduly high density.



### 5. Computation of Estimated Future Housing Requirements

As section 4 shows, there is no statistical method by which a satisfactory assessment can be made of present housing needs or deficits, let alone future requirements; the attitudes and ambitions of peoples with respect to housing are bound to change with time, and the standards that apply today will undoubtedly prove inadequate in thirty or forty years. Nevertheless, there are clear indications that housing conditions are deteriorating, both in most Latin American countries and in many others in under-developed regions, because not enough family dwellings are being built to absorb the population growth and to replace existing housing; and this has led national and international bodies to try to establish how many housing units would have to be built to ensure, as a minimum, the maintenance of existing standards, or to raise them to a given level. Experience in this field shows that useful results can be obtained, and the United Nations Statistical Office has prepared a note entitled Proposed Methods of Estimating Housing Needs (E/CN.3/274) in which, as the title indicates, practical procedures are suggested for calculating housing needs.

Estimates of housing needs can serve as a guide to the future prospects of the development or expansion of industries and services relating to the production of building materials and the installation of communal services. In particular, such estimates can be used to assess future needs for timber production, since housing construction absorbs a large proportion of total consumption. For example, it has been estimated that in Europe in 1950, 20 per cent of sawnwood was used in the construction of new housing,<sup>5/</sup> and that in 1953-55 housing construction absorbed 40 per cent of industrial wood in the countries of the Far East region.<sup>6/</sup> Similar information is not yet available for the Latin American countries,

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5/ United Nations Economic Commission for Europe, and Food and Agriculture Organization, Trends in Utilization of Wood and its Products in Housing (United Nations Publication, Sales No: 1957.II.E.4), p.1.

6/ United Nations Economic Commission for Asia and the Far East, and Food and Agriculture Organization, Timber Trends and Prospects in the Asia-Pacific Region (E/CN.11/533), p.28.

but it is obvious that in this region also housing construction absorbs a high proportion of the total consumption of wood and also of other building materials.

The main factor in determining future housing needs is population growth, and the basic statistical units used are (a) the conventional family dwelling, or "conventional (permanent) dwelling", and (b) the family group or "private household". These units have been defined, in the recommendations and principles for population and housing censuses drawn up by the United Nations Statistical Commission, as follows:

- (a) "A dwelling is a room or suite of rooms and its accessories in a permanent building or structurally separated part thereof which by the way it has been built, rebuilt, converted, etc., is intended for private habitation and is not, at the time of the census, used wholly for other purposes." <sup>7/</sup> (For example, houses and apartments.)
- (b) "A private household should be defined as a person who lives alone in a separate housing unit or who as a lodger, occupies a separate room or rooms ... but does not join with any of the other occupants of the housing unit to form part of a multi-person household ... or ... a group of two or more persons who combine to occupy the whole or part of a housing unit and to provide themselves with food or other essentials for living. ..." <sup>8/</sup>

Estimates of housing needs are generally confined to the calculation of the number of dwellings of the type defined under (a) that must be built to enable each private household as defined under (b) to have a type (a) dwelling and gradually to replace existing dwellings that fall into disuse. It should be noted that estimates of this kind do not include provision for accommodation for the population living at the date of the last census in collective housing units (hotels, institutions, camps, etc.) or for replacing rustic living quarters (huts), improvised housing (shanties, callampas) and other irregular forms of housing.

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<sup>7/</sup> United Nations, General Principles for a Housing Census (ST/STAT/SER.M.28), paragraph 304.

<sup>8/</sup> United Nations, Principles and Recommendations for National Population Censuses (ST/STAT/SER.M/27, paragraph 407.

As indicated in section 4 of the present paper, housing, together with food, health and education, is one of the components of the population's level of living, and as such can be measured by statistical indicators such as the percentage of the population living in type (a) housing and the average number of persons to a room in such housing. Since estimates of the number of new dwellings required are based on such indicators, they do not relate to the market demand for housing, nor, as a rule, to the possibility of meeting or exceeding the requirements.

In the note prepared by the Statistical Office of the United Nations Proposed Methods of Estimating Housing Needs (E/CN.3/274, paragraph 36) the following outline is given of the components of future housing needs:

- (i) The number of dwellings required to house the population increase at some future date;
- (ii) The number of dwellings required to replace losses from the housing stock;
- (iii) The number of dwellings required to allow for a reserve of vacant dwellings.

The minimum need may be taken as the number of dwellings required to be built each year to absorb the demographic growth - of new private households - in accordance with the housing standards prevailing at the time of the last census, and gradually to replace existing housing. This would imply that the percentage of the population living in conventional (permanent) dwellings, that is, in houses and apartments, remained constant, and likewise the average number of persons to a room. However, there would be some progress as a result of the gradual replacement of existing dwellings by new dwellings, which would undoubtedly be better built and equipped, but the minimum needs thus estimated would include no provision for building conventional dwellings to accommodate those living in huts, shanties or natural shelters.

Some methods that can be used in evaluating the components of future housing needs are discussed below.

Number of dwellings needed to absorb the population increase

The number of dwellings needed to absorb the population increase can be determined by two methods, which may be termed the direct and indirect methods.

The basic problem is how to estimate the number of new private households or family groups that will be formed in future years. Once this figure has been arrived at, the number of new dwellings required to accommodate such households can be determined by assuming that the new households should have, as a minimum, housing conditions equal to the standards existing at the time of the last census. However, the estimate can also be made on the assumption that housing conditions are to improve to a certain level to be expressed in terms of the indicators of housing conditions, such as the percentage of the population living in conventional (permanent) dwellings, the average number of persons to a room, and so forth.

Methods of estimating the future number of private households are discussed in document ST/ECLA/CONF.9/L.7, which deals with housing censuses as a statistical tool for the establishment of house-building programmes. Suffice is to say here that one method of estimating the future number of private households consists essentially in assuming that the heads of private households represent a constant proportion of the population in certain large groups classified by age, sex and civil status. Thus, for example, it is assumed that the proportion of married men under forty who are heads of families or private households will remain constant, or will vary slightly in accordance with certain working hypotheses, in the years since the previous census. The assumption of a constant value is based on the experience of certain European countries and of the United States, where these proportions have remained constant for a long period. In England and Wales, for example, an estimate for 1951 made on the basis of the proportion of heads of families recorded in the 1931 census differed from the results of the 1951 census by only 0.3 per cent.<sup>9/</sup>

Thus if population projections by sex and age are available, separately for urban and rural areas, it is possible to calculate the number of new private households by applying to each population group the proportion of heads of families corresponding to that group. Consequently in applying this method it is necessary to have tabulations of the population at the date of the last census by civil status, age and sex,

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9/ Report of the Housing Census 1951, H.M. Stationery Office, London.

and in addition, population projections based on the same classification, for urban and rural areas.

The main drawback of this method is that it assumes a constant value for the percentages of the population represented by heads of families, although it is recognized that these percentages are bound to change in under-developed countries, because of a number of social and economic factors. The proportion of single women aged 40-49, for example, who are now heads of families should be higher than ten years ago because improved economic and educational conditions should tend to make it easier for members of this group to establish separate households than it was in the past. Statistics available for Latin America do not make it possible to determine the changes that have actually occurred in this respect.

Because of the difficulty of obtaining the information required for the application of the direct method, even cruder procedures may be used. Thus it can be assumed that the average number of persons per private household will have remained constant since the last census and will remain unchanged during the period for which the housing programme is being drawn up, or alternatively that this average will change in a given direction. This method is based on the experience of many countries for which the data indicate that the average size of private households changes slowly over a long period and that it tends to decrease within a certain range (an assumption that is to some extent consistent with the assumption of a constant value involved in the direct method).

Thus if a projection is available of the total population, taking urban and rural areas separately, the number of private dwellings at a future date can be estimated by means of two arithmetical calculations. The first consists of calculating what portion of the total population is expected to live in conventional (permanent) dwellings at a future date by applying the percentage recorded at the last census to the result of the population projection for the date in question. The second consists of dividing the population of future occupants of conventional dwellings by the average number of persons per private household assumed for the date in question, so as to obtain the number of private households that will require a corresponding number of dwellings. Comparison of the total

/number of

number of private households at a future date with the corresponding number at the previous census will give the number of new private households that will require new dwellings, and the number of these dwellings can be estimated in the light of considerations similar to those indicated in the case of the direct method.

Number of dwellings required to replace losses from the housing stock

The number of dwellings required to replace housing that falls into disuse during the period in question can also be estimated by a direct method and an indirect method.

The direct method consists in estimating, by direct field surveys made either during a census or as part of a special investigation, the number and type of dwellings that will need replacing during the period covered by the programme, either because of their age or because they are in a bad state of preservation. (It should be noted that this applies only to replacement of conventional (permanent) dwellings, and does not include the replacement of such other types of housing as collective or improvised housing units.)

On the basis of the data collected on these lines, it might be determined, for example, that dwellings built before 1900 should be replaced say, within a period, of ten, twenty or thirty years, according to the economic outlook. However, in Latin America it is difficult, if not impossible, to make a direct determination of the number of dwellings that should be replaced, and thus recourse must be had to an indirect method. This consists of assuming that the replacement of conventional (permanent) dwellings should take place annually in a constant proportion determined on the basis of an assumption as to the average life of such housing units and their distribution by age. If, for example, a trapezium distribution is assumed, with an average life of fifty years, there would have to be an annual replacement rate for conventional (permanent) dwellings of 2 per cent.

For practical reasons it is preferable to adopt a uniform assumption as to the rate of replacement of dwellings that can be applied to all Latin American countries. In the estimates made by the Economic Commission for Latin America an average life of fifty years has been assumed for urban

/dwellings and

dwellings and seventy-five years for rural dwellings, but other figures can be used if the information available makes it advisable to amend this working hypothesis.

The two indirect methods described above can be combined in establishing an index of future housing needs, expressed in terms of new dwellings per thousand inhabitants, which can be very useful in making rough calculations on the need for new housing when the only data available are a projection of the total population and assumptions as to the percentage of the population in conventional (permanent) dwellings, the annual replacement rate for such dwellings, the annual demographic growth rate and the average number of persons in a private household. Table 11 indicates the values of this index in relation to the variables referred to, and an explanation of the method of calculating these indices is given below. (In the following explanation the same symbols are used as in document E/CN.3/274.)

Indirect method of estimating minimum <sup>10/</sup> future housing construction needs <sup>11/</sup>

Minimum housing needs can be calculated by the following formula (see E/CN.3/274, paragraph 55-79):

$$(1) \quad D_{(5+6)t} = D_{5t} + D_{6t}, \text{ where: } D_{(5+6)t} = \text{minimum housing needs in year } t$$

$D_{5t}$  = new dwellings needed to absorb the population growth experienced in year  $t$

$D_{6t}$  = new dwellings required to replace those that fall into disuse in year  $t$  through age, demolition, destruction through catastrophe, or change of use

<sup>10/</sup> The minimum needs are considered to be the number of dwellings that need to be built to absorb the population growth (in urban and rural areas separately) in accordance with the housing standards that prevailed at the time of the last census. This number does not allow for the possibility of absorbing the deficit existing at the time of the last census.

<sup>11/</sup> This calculation relates only to conventional (permanent) dwellings, such as houses and apartments. No account is taken here of other housing units such as rustic, improvised (shanties) or collective housing units.

Table 11

NEW DWELLINGS REQUIRED PER THOUSAND INHABITANTS IN ACCORDANCE  
WITH GIVEN VALUES OF THE VARIABLE INDICATED  
(AT FIVE PERSONS TO A DWELLING)

Percentage of the population in conventional permanent dwellings	Annual replacement rate of housing stock	Number of additional housing units required per thousand inhabitants									
50.0	1.0	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	
	1.5	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	
	2.0	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	
	2.5	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	
80.0	1.0	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	
	1.5	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	
	2.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	
	2.5	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	
90.0	1.0	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	
	1.5	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	
	2.0	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	
	2.5	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	
100.0	1.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	
	1.5	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	
	2.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	
	2.5	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	
Annual demographic growth rate: (Percentage)		1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	

$$/(2) D_{5t} = f_t \times \frac{PG_t}{S_{Ht}}$$



$$(2) \quad D_{5t} = f_t \times \frac{PG_t}{S_{H_t}}, \text{ where: } f_t = \text{proportion of the population living in conventional permanent dwellings, and which it is desired to maintain constant, as a minimum.}$$

$PG_t$  = population increase during year  $t$

$S_{H_t}$  = average number of occupants per conventional (permanent) dwelling which it is desired to maintain constant as a minimum standard, and which is assumed as equal to the average size of a private household

If  $D_o$  represents the total number of conventional (permanent) dwellings at the last census, it will be found that

$$(3) \quad f_o = \frac{D_o \times S_{H_o}}{P_o} = f_t = \frac{D_t \times S_{H_t}}{P_t} = \text{constant}$$

$$\text{Hence: } D_{5t} = \frac{D_t \times S_{H_t}}{P_t} \times \frac{PG_t}{S_{H_t}} = D_t \times \frac{PG_t}{P_t}$$

If  $p_r$  represents the geometric rate of population growth, also considered as constant, we obtain:

$$(4) \quad D_{5t} = D_t \times p_r$$

In view of the almost total lack of data on demolition, destruction and changes in the use of housing, it can be considered that dwellings have a certain average life that involves all these factors and that renewal is undertaken annually and gradually at a constant rate  $O_r$ . Hence:

$$(5) \quad D_{6t} = D_t \times O_r$$

Replacing the partial values  $D_{5t}$  and  $D_{6t}$  we obtain the following expression for calculating the minimum housing requirements:

$$/(6) \quad D_{(5 + 6)t}$$

$$(6) \quad D_{(5+6)_t} = D_t (p_r + O_r)$$

The above expression leaves  $D_t$  as an unknown, but  $D_t$  can be expressed in a simple form in view of the assumptions made, viz.

$$(7) \quad D_t = D_o (1 + p_r)^t$$

and replacing  $D_t$  in the above expression we get:

$$(8) \quad D_{(5+6)_t} = D_o (p_r + O_r) (1 + p_r)^t$$

From the foregoing two expressions of the minimum housing needs can be obtained, which are of practical value in cases where complete statistics are not available.

These are (a) the minimum number of dwellings required per thousand inhabitants, and (b) the required index of annual increase in housing construction.

The "minimum" number of dwellings required per thousand inhabitants is determined in relation to the proportion ( $f_o$ ) of the population that occupied conventional (permanent) dwellings at the last census, the average size of the private household ( $S_H$ ), and the rates of annual demographic growth ( $P_r$ ) and annual replacement of housing ( $O_r$ ) as indicated below:

$$(9) \quad \frac{D_{(5+6)_t}}{P_t} \times 1000 = \frac{D_o (p_r + O_r) (1 + p_r)^t}{P_o (1 + p_r)^t} \times 1000 = \frac{f_o}{S_{H_o}} (p_r + O_r) \times 1000$$

The values of this index are tabulated in table 11.

The index of the "minimum" annual increase in the construction of new housing, taking account both of absorption of the population growth and of the replacement of the housing stock, can be expressed as follows:

$$(10) \quad \frac{D_{(5+6)_{t+1}}}{D_{(5+6)_t}} = 1 + p_r$$

/The above

The above expression (10) indicates that annual housing construction should increase in the same proportion as the population in order to maintain existing housing standards, provided that the "minimum" number of housing units required ( $D_{(5 + 6_t)}$ ) has been worked out for the base year.

6. Estimates of Minimum Requirements in respect of Annual Construction of Dwellings in the Latin American countries in 1950-60 and 1975

Using the formulae explained in section 5, calculations were made of the minimum annual requirements in the period 1950-60 for urban and rural areas separately, on the basis of the demographic growth rates given in the Economic Bulletin for Latin America, Vol. V, Statistical Supplement, 1960. In addition an average life of fifty years is assumed for conventional (permanent) housing units in urban areas, and sixty-seven years for those in rural areas, that is, replacement rates of 2 per cent in the first case and 1.5 per cent in the second. The total estimates were obtained by adding the estimates made separately for the urban and rural areas. The results of these calculations and the sources of the data are given in table 12.

This table shows that in Latin America a minimum of some 960 000 dwellings would have had to be built annually during the period 1950-60 in order to absorb the population growth and meet replacements needs: 630 000 in urban areas and 330 000 in rural areas. These totals were obtained by adding the separate estimates made in each country for urban and rural areas. The figures represent a total of 5.5 housing units per thousand inhabitants: 8.6 in urban areas and 3.3 in rural areas.

The estimates of the number of dwellings for 1975 were made by using the index of dwellings per thousand inhabitants calculated for each country and each urban and rural area separately, and the totals were obtained by addition. The calculations were made on the basis of two main assumptions, the first being that in the year 1975 the housing standards prevailing in 1950 would be maintained and that the average number of persons in a private household would also remain the same. This means that the proportion of the population living in conventional (permanent) dwellings would also

Table 12

LATIN AMERICA: MINIMUM ANNUAL HOUSING CONSTRUCTION NEEDS; AVERAGE ESTIMATES FOR 1950-60

Country	Area	Population			Minimum needs		Percentage of population in conventional dwellings	Average number of persons per dwelling
		1950 Thousands	1960	1950-60 Annual growth rate percentage	Number of dwellings	Index per thousand inhabitants		
Latin America	T	155 423	199 195	2.5	960 833	5.5	67	5.1a/
	U	61 366	91 103	4.0	630 153	8.6	69	4.8a/
	R	94 057	108 092	1.4	330 680	3.3	60	5.3a/
Argentina	T	15 942b/	20 998	2.1g/	146 807	7.7	90d/	4.4
	U	9 977b/	14 203	2.8g/	114 860	9.1	90d/	4.4d/
	R	5 965b/	6 795	1.0g/	31 947	4.9	90d/	4.4d/
Bolivia	T	3 019	3 709	2.1	12 765	3.8	50d/	5.0d/
	U	1 013	1 381	3.1	6 133	5.1	50d/	5.0
	R	2 006	2 328	1.6	6 632	3.0	50d/	5.0d/
Brazil	T	51 976	65 862	2.4	239 319	4.0	50	5.1
	U	16 021	24 134	4.2	128 613	6.4	51d/	4.9
	R	35 955	41 728	1.5	110 706	2.8	50d/	5.3
Colombia	T	11 459e/	14 771	2.9f/	75 989	5.8	65d/	5.8
	U	4 416e/	7 066	5.4f/	52 545	9.3	90d/	6.4
	R	7 043e/	7 705	1.0f/	22 844	3.1	50d/	5.6
Costa Rica	T	801	1 144	3.8	8 960	9.2	90d/	5.3d/
	U	232	415	6.0	4 645	14.3	90d/	5.0
	R	569	729	2.5	4 315	6.6	90d/	5.5d/
Cuba	T	5 508	6 819	2.2	48 995	7.9	90d/	4.6
	U	2 713	3 731	3.3	36 181	11.3	90d/	4.2
	R	2 795	3 088	1.0	12 754	4.3	90d/	5.4
Chile	T	6 295g/	7 634	2.5h/	39 110	5.7	68	5.3
	U	3 771g/	5 007	3.6h/	33 510	7.3	70	5.0
	R	2 524g/	2 627	0.5h/	5 600	2.2	65	5.9
Ecuador	T	3 197	4 287	3.0	19 643	5.2	55	5.1
	U	885	1 468	5.2	9 210	7.8	55d/	5.1d/
	R	2 312	2 819	2.0	10 433	4.0	58d/	5.1d/
El Salvador	T	1 868	2 396	2.5	8 817	4.1	47	5.0d/
	U	517	829	4.8	7 056	10.4	77	5.0
	R	1 351	1 567	1.5	1 761	1.2	20	5.0d/
Guatemala	T	2 805	3 755	3.0	12 894	3.9	40	4.9
	U	674	1 157	5.2	9 412	10.1	65	4.6
	R	2 131	2 598	2.2	3 482	1.5	20	5.0
Haiti	T	3 112	3 726	1.8	13 172	3.8	50d/	4.5d/
	U	312	633	7.3	4 903	10.4	50d/	4.5d/
	R	2 800	3 093	1.0	8 269	2.8	50d/	4.5d/
Honduras	T	1 428	1 932	3.1	9 685	5.8	68	5.6
	U	247	492	7.1	4 583	12.8	80	5.6
	R	1 181	1 440	2.0	5 102	3.9	62	5.6
Mexico	T	25 826	34 626	3.0	188 708	6.2	64d/	4.9
	U	11 003	17 423	4.7	125 422	8.8	64d/	4.9d/
	R	14 823	17 203	1.5	63 286	3.9	64d/	4.9d/
Nicaragua	T	1 060	1 465	3.3	5 391	4.3	50d/	5.9
	U	298	536	6.1	3 040	7.3	50d/	5.4
	R	762	929	2.0	2 351	2.8	50d/	6.2
Panama	T	797	1 052	2.8	4 887	5.3	50d/	4.5
	U	337	491	3.8	3 037	7.3	50d/	4.0
	R	460	561	2.0	1 850	3.6	50d/	4.8
Paraguay	T	1 397	1 624	1.5	4 255	2.8	50d/	5.4
	U	388	564	3.8	2 458	5.1	50d/	5.4
	R	1 009	1 060	0.5	1 797	1.7	50d/	5.5
Peru	T	8 521	10 857	2.5	51 049	5.2	...	...
	U	2 973	4 418	4.0	25 228	6.8	...	...
	R	5 548	6 439	1.5	25 821	4.3	...	...

/Table 12 (concluded)

Table 12 (concluded)

Country	Area	Population			Minimum needs		Percentage of population in conventional permanent dwellings $f_o$	Average number of persons per dwelling $S_{Ho}$
		1950 Thousands	1960	1950-60 annual growth rate percent- age	Number of dwellings	Index per thousand inhabitants $I_t$		
Dominican Republic	T	2 131	2 845	2.9	11 867	4.7	50d/	4.9
	U	458	806	5.8	5 516	8.7	50d/	4.5
	R	1 673	2 039	2.0	6 351	3.4	50d/	5.1
Uruguay	T	2 407	2 760	1.4	17 424	6.7	90d/	4.4d/
	U	1 893	2 246	1.7	15 831	7.6	90d/	4.4d/
	R	514	514	0.0	1 593	3.1	90d/	4.4d/
Venezuela	T	4 974	6 933	3.4	41 756	7.2	72	5.3
	U	2 430	4 259	5.8	37 970	12.0	82	5.3
	R	2 544	2 674	0.5	3 786	1.5	41	5.4

Sources: Population - Economic Bulletin for Latin America, Vol. V, Statistical Supplement, November 1960.

Minimum requirements - Censuses and various national sources (see Appendix I)

$f_o$  was calculated by means of the formula:

$$f_o = \frac{S_{Ho} \times I_t}{P_r + Q_r}$$

a/ Weighted average of the various national averages for the number of persons to a housing unit.

b/ 1947.

c/ Annual rates for 1947-60.

d/ Hypothesis.

e/ 1951.

f/ Annual rates for 1951-60.

g/ Figures for 1952.

h/ Annual rates for 1952-60.

/remain the

remain the same. Secondly, it was assumed that in 1975 all countries would have attained a better standard of housing and that by that time 95 per cent of the population would be living in conventional (permanent) dwellings. In addition it was assumed that the average number of persons in a private household would have been reduced by then to four in urban areas and five in rural areas.

To meet the conditions involved in the first assumption, the number of conventional dwellings would have to increase by 1975 by the same proportion as the total population; the estimates of the minimum number of dwellings were obtained merely by increasing the requirements calculated for 1950 by the same proportion as the population (see formula 10).

In making the calculation on the basis of the second series of assumptions, the index for the number of new dwellings per thousand inhabitants was first calculated, and these indices were applied to the population projections worked out for 1975. The results of these calculations are given in tables 13 and 14.

According to the data in table 13, the minimum housing needs for Latin America in 1975 will be in the neighbourhood of 1.8 million dwellings, representing an increase of 65 per cent over the requirements in 1955.

According to table 14 the assumed improvement in housing standards would involve an increase in requirements compared with the previously estimated minimum, mainly because an increase in the housing stock leads to a corresponding increase in replacement requirements, and because it has been assumed that there would be a reduction in the average size of families, leading to a larger number of housing units in relation to the total population. According to table 14, an annual construction rate of about 2.6 million dwellings would be required in 1975 if the housing standards assumed in the calculation were attained. This also implies that it would be necessary to build about nine houses per thousand inhabitants, thirteen per thousand in urban areas and five per thousand in rural areas.

Table 13

MINIMUM HOUSING CONSTRUCTION REQUIREMENTS IN 1957 ON THE ASSUMPTION THAT  
THE 1950 HOUSING STANDARDS ARE MAINTAINED

Country	Number of dwellings			Ratio between the 1955 and 1975 populations		
	Total	Urban	Rural	Total	Urban	Rural
<u>Latin America</u>	1 775 042	1 397 166	437 876	1.67	2.01	1.43
Argentina	213 494	174 504	38 990	1.42	1.52	1.22
Bolivia	21 379	12 486	8 893	1.59	2.04	1.35
Brazil	433 542	284 431	149 111	1.64	2.21	1.35
Colombia	159 204	131 334	27 870	1.77	2.50	1.22
Costa Rica	18 741	11 665	7 076	1.92	2.51	1.64
Cuba	78 996	63 433	15 563	1.50	1.75	1.22
Chile	69 797	63 611	6 186	1.60	1.90	1.10
Ecuador	36 955	21 444	15 511	1.75	2.33	1.49
El Salvador	19 785	17 416	2 369	1.69	2.47	1.35
Guatemala	30 160	24 984	5 176	1.81	2.65	1.49
Haiti	27 906	17 816	10 090	1.54	3.63	1.22
Honduras	18 943	11 366	7 577	1.70	2.48	1.49
Mexico	378 449	293 206	85 243	1.80	2.34	1.35
Nicaragua	11 172	7 678	3 494	1.82	2.52	1.49
Panama	8 974	6 224	2 750	1.74	2.05	1.49
Paraguay	7 664	5 679	1 985	1.48	2.31	1.10
Peru	96 338	61 556	34 782	1.74	2.44	1.35
Dominican Republic	26 346	16 911	9 435	1.88	3.07	1.49
Uruguay	21 402	19 809	1 593	1.20	1.25	1.00
Venezuela	95 795	91 613	4 182	1.83	2.42	1.10

Table 14

MINIMUM HOUSING CONSTRUCTION REQUIREMENTS IN 1975 <sup>a/</sup>

Country	New dwellings required			Index per thousand inhabitants		
	Total	Urban	Rural	Total b/	Urban c/	Rural c/
<u>Latin America</u>	<u>2 626 625</u>	<u>1 888 587</u>	<u>738 038</u>	<u>9.0</u>	<u>12.7</u>	<u>5.2</u>
Argentina	222 485	184 618	37 867	8.2	9.6	4.8
Bolivia	48 831	32 238	16 593	9.2	13.5	5.7
Brazil	633 549	336 180	297 369	6.6	10.0	5.7
Colombia	254 794	211 858	42 936	11.2	15.4	4.8
Costa Rica	19 360	11 334	8 026	10.6	14.7	7.6
Cuba	79 906	62 698	17 208	8.7	11.2	4.8
Chile	109 574	98 816	10 758	10.1	12.4	3.8
Ecuador	63 344	37 924	25 420	9.8	14.3	6.7
El Salvador	35 991	24 825	11 166	10.1	15.4	5.7
Guatemala	63 353	39 923	23 430	10.7	16.6	6.7
Haiti	50 385	33 148	17 237	9.7	20.1	4.8
Honduras	25 815	12 830	12 985	9.2	14.4	6.7
Mexico	587 365	464 769	122 596	11.0	14.5	5.7
Nicaragua	23 864	15 489	8 375	10.5	15.2	6.7
Panama	16 125	11 066	5 059	10.2	13.3	6.7
Paraguay	20 634	16 294	4 340	9.3	15.2	3.8
Peru	170 865	124 980	45 885	10.4	15.0	5.7
Dominican Republic	52 401	34 056	18 345	11.4	18.3	6.7
Uruguay	20 946	19 455	1 491	6.7	7.4	2.9
Venezuela	127 038	116 086	10 952	11.8	14.7	3.8

a/ Assuming that 95 per cent of the population live in "conventional permanent family dwellings" and that the average size of household is four persons in urban areas and five in rural areas.

b/ Calculated as the ratio between the total requirements (obtained by adding urban and rural requirements) and the total population.

c/ Calculated by means of formula (9).



Annex I

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