LOW COST HOUSING

An Evaluation of its Adequacy in

Relation to the Coloured Group in Cape Town.

A Thesis presented to the
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Urban and Regional Planning.

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SECTION I.

INTRODUCTION AND OUTLINE OF THESIS.

1.0 Housing the Coloured Group.

"No single element in urban planning outweighs in importance that of housing for the well being of the individual, the family and the community. Yet few questions in urban planning are as little understood, as subject to varying standards and as open to emotionally charged argument as that of what constitutes 'adequate' and 'inadequate' urban residential environments". (1)

Whilst housing presents a universal problem, it assumes special importance and significance for South Africa. In this country, Non-Whites constitute 81 per cent of the total population(2) and the large majority of them, who fall within the lowest income groups, are unable to provide themselves with adequate housing.

In Cape Town, the Non-White population consists largely of the Coloured group. Although Westernised and becoming increasingly urbanised, this group occupies a differentiated position, in the economic, social and political structure of Cape Town's society.

The average monthly income of a Coloured household head in 1964 was R62-03 compared to R58-03 for a Bantu household(3) (in Johannesburg) and R173 for a male White earner in the Cape Town metropolitan area in 1960.(4)

Social surveys all point to an average of roughly 50 per cent of Coloured families living below the minimum

needs / .....

(1) Editors W.L.C. Wheaton, G. Milgram and M.E. Meyerson. Urban Housing. The Free Press, New York 1966.

(2) S.P. Celliers : The Coloureds of South Africa. A Factual Survey. Banier Publishers, Cape Town 1963 p.14.

(3) Bureau of Market Research : Income & Expenditure Patterns of Coloured Households. Cape Peninsula. Research Report No. 9 Pretoria 1965 p.84

(4) Calculated from Bureau of Statistics Report on The Metropolitan Area of Cape Town : Population Census 1960. Govt. Printer Pretoria 1966 p.55-56.

needs level.[1] A high incidence of tuberculosis points to poor social conditions such as overcrowding, malnutrition, low incomes and poor hygiene.[2]

In 1963 it was estimated that a minimum number of approximately 45,000 housing units were needed for urban Coloureds in South Africa. Research in the Western Cape had shown that at least one-third of all Coloured households in towns and cities were living under unsatisfactory housing conditions.[3]

The significance of Coloured housing in the Cape Town Municipal area and the Cape Town Metropolitan area is emphasised by the demographic importance of this group. The estimated Coloured population in the municipality in 1967 was 328,210 which represented 53 per cent of the total population.[4] The projected 1970 metropolitan population, including the 01, 02 and 03 Economic Regions is 728,144 which by the year 2000 will increase to 2,601,006.[5] Based on a projected total population of 4,032,725 for all races, the Coloured population will represent 64 per cent or roughly two-thirds of the total.

(1) S.P. Celliers op cit p.28

(2) ibid p.30.

(3) ibid p.32

(4) Medical Officer of Health, City of Cape Town : Annual Report 1967 p.10.

(5) Dept. of Urban and Regional Planning, University of Cape Town, 1969.

1.1 Low Cost Housing in the Cape Town Municipal Area.

In the post war years the urgent need was to produce as many dwelling units as possible within the shortest possible time to house the large number of Coloured persons many of whom lived in peripheral shanty towns. With the accent on urgency there was no alternative but to adopt lower standards in both accommodation and construction.

During the 13 year period between 1954 and 1967 a total of 16,000 dwellings were constructed at an average cost of R850 per dwelling. About 90 per cent of these units were single storeyed and the housing estates covered approximately 2400 acres.(1)

Average gross density based on 6.41 persons per dwelling was 23.5 persons per acre.

The need to conserve land, to reduce service and transport costs and generally to contend with the problems of urban sprawl, has led to an increase in permissible densities by the State Department of Community Development which controls planning standards in these schemes. Multi-unit blocks were evolved and greater attention has been paid to layout design and external environmental quality.

At the end of 1968 the waiting list of families who had applied to the Cape Town City Council for housing was 11,055 families. Accommodation standards(2) which were adopted in 1951 still applied in 1969.

Minimum standards which included the temporary expedient(3) of using a living room as a bedroom have remained in force for 18 years and have not been reviewed in this period.

1.2 / .....

(1) S.S. Morris : Metropolis in the Making. Paper to 47th Conference of the Institution of Municipal Engineers of Southern Africa 1968.

(2) National Housing and Planning Commission : Minimum Standards of Housing Accommodation for Non-Europeans. Pretoria 1951.

(3) D.M. Calderwood and P.H. Connell : Minimum Standards of Accommodation for the Housing of Non-Europeans in South Africa. Bulletin No. 8 of the National Building Research Institute. Pretoria. June 1952 p. 4.

The importance of the internal environment was confirmed in a study by D.S. Mabin of a newly established low cost Coloured housing community in Heideveld, Cape Town. It was found that the community had generally adapted itself to a new environment and that whilst general dissatisfaction was low, the main source of dissatisfaction centred around overcrowding within the dwellings.(1)

The original State-appointed Committee which in 1949 enquired into minimum housing standards for South Africa stated that "all progressive countries are conscious of the need for establishing and maintaining the welfare and good health of their citizens, and that much of this can be achieved by ensuring proper housing conditions. Conversely, bad housing conditions, if they become general, can be one of the most disruptive influences in society ..... It is in the interest of every civilized country to set its standard of housing as high as possible within the means of its economy".(2)

The adequacy of the existing standard for low cost housing for the urbanised and Westernised Coloured group is questionable. Wittman(3) et al have commented on the adequacy of housing at Bonteheuwel, a low cost Coloured housing scheme in Cape Town, as follows:

"It has been shown that although the estate provided clean and well constructed houses with appropriate sanitation and water supply, there was not the minimum requirements of space for some of the large households.

As reported from Newcastle-on-Tyne, overcrowding and structural defects produce their own social and personal hardships, making good family life difficult. In the crowded homes of Bonteheuwel there were not only no facilities for home lessons or quiet diversion but the children were exposed

to / ....

(1) D.S. Mabin : Patterns of Low Cost Housing. Unpublished thesis presented for Masters Degree in Urban and Regional Planning at University of Cape Town 1968, p.51.

(2) D.M. Calderwood & P.H. Connell op cit p.2.

(3) W. Wittmann, A.D. Moodie, S.A. Fellingham & J.D.L. Hansen : An evaluation of the Relationship between Nutritional Status and Infection by Means of a Field Study : S.A. Medical Journal Vol. 41, 22nd July 1967, pp. 664-682.

to all the activities and disharmony of the adult lives around them with obvious effects. The converse was the case in the better ordered households of higher income families ..... As was seen in the poorest households in Bonteheuwel, the effect of overcrowding on hygiene is profound ..... By day the homes become a corridor with direct access from street to backyard; by night, the congestion and lack of privacy are extreme ..... There is little doubt that as a temporary expedient, even the smallest of these houses is an improvement on the previous homes of many of the tenants to whom a weatherproof roof, running water, a sanitation system and electric light were an innovation. As permanent homes, however, they do not contribute to social uplift".

A real danger exists that if standards for the internal environment of low cost Coloured dwellings are not improved, a proliferation of what Kenneth Rexroth(1) refers to as "aseptic slums", could well result.

CHAPTER 2 - OBJECT OF THESIS AND METHODOLOGY.

2.0 Objects and Hypotheses.

The object of this Thesis is to evaluate the adequacy of dwelling types in relation to the housing needs of that section of the Coloured population in the Cape Town Municipal area which requires subsidy.

It is hypothesized that the present standards for the provision of housing in terms of the number of rooms and room sizes are inadequate.

It is further hypothesised that these inadequacies result in overcrowded houses and sub-standard internal environments, in which a large section of the metropolitan population will be required to live permanently.

The / .....

(1) Kenneth Rexroth : Op cit p.14.

The thesis aims to test these hypotheses, and if found to be valid, to examine the causes of the inadequacies, methods of rectifying them and to evaluate the additional costs which would be incurred.

The hypotheses are tested by means of two random sample surveys:-

(a) of households who have applied to the Cape Town City Council for housing and are awaiting the allocation of a low cost dwelling

(b) of households who are resident in Bonteheuwel which is an established low cost housing scheme.

In the case of (a), the entrant population, socio-economic analyses are made and hypothetical dwelling types are allocated in accordance with the standards applicable to low cost Coloured housing. The Bonteheuwel population is also analysed to determine the adequacy of the dwelling types and as a means of gauging the needs of the entrant population over time.

2.1 Methodology.

2.1.1 Definition of the low cost Coloured housing problem.

2.1.2 Analysis and diagnosis of housing adequacy by means of socio-economic surveys.

2.1.3 Assessment of cost of additional internal space.

2.1.4 Evaluation of the adequacy of dwelling types in relation to housing needs.

2.1.5 Factors in the provision of improved housing.

2.1.6 Conclusions.

SECTION II / ....

SECTION II.

ANALYSIS AND DIAGNOSIS OF COLOURED LOW COST HOUSING.

3.0 The Coloured Housing Problem.

3.1 Historical Background to Low Cost Housing Standards.

Industrialisation leads to urbanisation and South Africa, like other countries, has witnessed the flocking to towns and cities of all sections of the population.

The trek to the cities created acute housing shortages and in the post World War II years, S.A. Governments have made a determined effort to provide assisted housing for the White, Bantu, Coloured and Asiatic groups.

From 1946 to 1956, 4 per cent of the Government's capital expenditure was devoted to housing and up to 1960 the following number of Government Non-White housing units were erected.(1)

Bantu	298,247
Coloured	48,085
Asiatic	8,022

Emphasis has been on the elimination of the shortage of White and Bantu housing but recent reports indicate that the Coloured housing programme is to be accelerated.(2)

Prior to 1947, no uniform requirements for standards of accommodation existed and reliance was placed on various legislative enactments, public health acts, local government ordinances and township ordinances to control government housing.

In / .....

(1) H.T. Andrews et al : South Africa in the Sixties : The South African Foundation, Cape Town, 2nd Edition 1965 p.22

(2) Circular No. 6 dated 30th June, 1969, from Dept. of Community Development advises local authorities that R155.8 million is to be allocated during the period April 1970 to April 1973. This represents an increase of nearly 50 per cent on recent actual

In 1947 the National Housing and Planning Commission requested the S.A. Council for Scientific and Industrial Research to undertake and co-ordinate research on housing standards. The recommendations arising from these studies were re-examined by a Joint Committee of the National Housing and Planning Commission, the Native Affairs Department and the National Building Research Institute and culminated in the adoption in 1951 of the "Minimum Standards of Housing Accommodation for Non-Europeans".(1) These standards are presently used in the design of low cost Coloured housing schemes.

Plans for standardised dwelling types were also issued by the National Housing and Planning Commission. Typical plans of one, two, three and four room units which conform to these standards are shown in appendix 5.

3.2 Income limit as a determinant of dwelling type in Coloured low cost housing schemes.

3.2.1 Sub-Economic Group.

The State Department of Community Development makes sub-economic loans available to local authorities for the housing of Coloured families when the income of the head of the family is not in excess of R60 per month.(2) Prior to 1967, this figure was R50 per month. These loans are repayable over 40 years at ¾ per cent interest.

Professor Batson(3) in a socio-economic survey of the Coloured population in Cape Town, carried out in 1955, found that the gross household income of 40 per cent of the Coloured community was less than R50 per month. The Department

of / .....

(1) National Housing and Planning Commission : "Minimum Standards of Housing Accommodation for Non-Europeans". Pretoria, July 1951.

(2) State Dept. of Community Development Housing Code : Pretoria. October 1964 Chapter XI B, Section 6 as amended.

(3) Prof. E. Batson : Cape Town Housing Survey 1955 : General Report on a sample survey of Housing Conditions in the Municipality of Cape Town. University of Cape Town, 1956.

of Community Development has estimated that 60 per cent of the Coloured community fall within the sub-economic group whilst the analysis in Table 6 indicates that 46 per cent of families in the Cape Town municipal area who are awaiting entry into housing schemes fall within this category.

An analysis of Table 8 shows that the average sub-economic income for purposes of calculating rent[1] is of the order of R43 per month. If, in accordance with the Housing Code, rentals are not to exceed 20 per cent of this income, average rentals must not exceed R8-60 per month or R1-98 per week. These rentals determine the cost of the dwelling types and hence their space provisions.

3.2.2 Economic Group.

The State Department of Community Development makes economic loans available for the housing of Coloured families whose incomes are in excess of R60 per month, but not in excess of R225 per month. These loans are available for letting schemes on condition that every house is capable of sale. This excludes the provision of row houses and confines housing to detached and semi-detached dwellings. Loans are repayable over 30 years at the following interest rates:-

Income Group	Rate
R60 - R95	3 per cent
R95 - R130	5 per cent
R130 - R225	6 per cent.

3.3 Residential Location.

In terms of the report of the Joint Town Planning Committee on the Cape Flats, the Coloured group will be housed in the area bounded by the Cape Flats railway line in the west, the railway to Bellville in the north, the railway to Faure in the east and the Strandfontein-Macasser coastline in the south.

Housing / ....

(1) Housing Code : op cit : Chapter XI B Section 2. The monthly income of the head of the family is supplemented by half the income of each child or boarder in the household with a maximum of R12 per person.

Housing for the Coloured population will form the major share of the housing supply problem in the immediate future. Because of the low per capita income of the Coloured people, most housing will be erected by the local authorities, particularly for lower income groups, for many years.(1)

3.4 The need for assisted housing.

A critical factor in the provision of housing is that houses are large, complicated, durable and consequently expensive. No simple cheap method has been found to house people in our complex developed societies. As a result the amount of capital or resources embodied in a house is very large compared with its daily output of shelter.(2)

As a consequence government action is commonly required to ensure an adequate supply of housing to maintain socially acceptable standards and to provide the finances. At the same time, the opportunity cost of housing must be weighed against the needs of other sections of the economy.

Housing is different from other economic goods in many ways. Compared with other household purchases, a house is extremely costly. The capital cost of a new social dwelling in many European countries is about four times the annual earnings of an adult male industrial worker.(3) In Cape Town, a 3 bedroom house in an economic Coloured home-ownership scheme costs R6,300(4) which is nine times the average annual wage of the head of a Coloured household (see Table 6).

The / .....

(1) Cape Flats : Preliminary Statement Joint Town Planning Committee of the Cape and Stellenbosch 6th February, 1969, page 17.

(2) Sherman J. Maisel : Introduction to The Economic Problems of Housing : Edited by A.A. Nevitt : St. Martins Press, New York, 1967 p.(xii).

(3) J.B. Cullingworth : "Housing and the State : The Responsibilities of Government" in The Economic Problem of Housing : St. Martins Press, New York, 1967.

(4) City Engineer's Department, Cape Town, 1969.

The cost of single residential home-ownership is clearly beyond the financial capacity of most of the Coloured population. At the family level, large payments towards the capital costs of housing means less income available for other consumption goods.

In low income groups, two choices are available. A household may either choose housing which is sub-standard or be deprived of essential commodities such as food and clothing. Either choice results in risks of both physical and mental ill-health to the family.(1) Health problems can be transmitted to the community which is also called upon to bear social costs such as delinquency, deviance and the economic costs of low productivity.

Social and political barriers limit the earning capacity and economic advancement of the Coloured group. These problems do not lend themselves to short term solutions and the need for assisted housing is likely to remain in the foreseeable future. The provision of low cost housing should therefore not be regarded as a palliative to ease a temporary housing problem. On the contrary, the infrastructure and the mix of dwelling types needs to be planned to meet the long term needs of a large section of the Coloured community. As stated earlier, houses tend to be extremely durable. Unless considerable care is taken with their planning, future generations will live with the results of current mistakes.

Housing for the Coloureds in the low income group must therefore be considered as a social good whose consumption should be subsidised. It is also a collective good whose impact extends far beyond the family circle.

The cost of housing the large numbers of Coloured families who require assistance is beyond the financial ability of local authorities and this function therefore requires to be undertaken by the State.

Assisted / ....

(1) Sherman J. Maisel : op cit p. xiii.

Assisted housing in the public sector of the economy can enjoy economies due to co-ordinated locations and cost advantages made possible by mass construction and simplified housing types. In addition downward movements of cost curves become possible as a result of expenditures on planning and research.

3.5 Demographical Characteristics of the Coloured Group.

The 1960 census revealed that the Coloured population formed 9.4% of the South African total. During the period 1951-1960, the average percentage annual increase in Coloured population was 3.20 which represented the highest growth rate for any race group in S.A. Corresponding percentage growth rates for other race groups were as follows:

Whites	1.60
Africans	2.48
Asians	2.82

The average for all groups, including Coloureds was 2.38.(1)

The high rate of natural increase in the Coloured group indicates that the group is in that phase of its demographic evolution which has a high birth rate and a low death rate, giving rise to the well known population explosion.

The age structure of the group is characterised by a broad base of children. According to the 1960 census, 32.6% of the Coloured population consisted of children under 10 years of age. Compared to 22.3% for White, the number of Coloured children is 46% higher.

Long term population growth when expressed graphically, usually takes the form of a logistic curve. In terms of the theory of demographic transition, the logistic curve associates population growth with economic development.

Commencing / ....

(1) D. Hobart Houghton : The South African Economy : Oxford University Press, Cape Town 1965, p.35.

Commencing with an agrarian peasant economy, (high birth rate and high death rate) the population passes through a stage of economic development (lowering death rate and smaller birth rate) in which the drop in birth rate lags behind the decrease in death rate.

The percentage population growth rates during the period 1911 to 1960 for the various race groups in S.A. were as follows:(1)

	1911-1921	1921-1936	1936-1946	1946-1951	1951-1960
Whites	1.76	1.86	1.70	2.18	1.60
Africans	1.57	2.29	1.73	1.79	2.48
Coloureds	0.37	2.32	1.89	3.51	3.20

It would seem from these figures that whilst the White population has reached a stage of maturity in respect of population growth rates, other race groups are at various stages along the road to maturity.

The Coloured population appears to be hovering at the stage where further large reductions in death rate are not likely to occur while the birth rate has not yet started to decrease significantly.

Birth rates, death rates and rates of natural increase from 1960 to date are tabulated below. Birth rates and rates of natural increase showed a decline between 1965 and 1967. These rates, however, were based on estimated populations, using the 1960 Population Census as a datum, derived by the Medical Officer of Health, Cape Town. The next ten yearly census will be taken in 1970 and the estimated population totals used in the tabulation will require revision. The trend in natural increase should therefore be treated with reserve until the 1970 population

figures / .....

(1) D. Hobart Houghton, op cit. p.35.

figures become available.

Year	Birth Rate Percent	Death Rate Percent	Natural Increase Rate Percent
1960	4.2	1.1	3.1
1961	4.3	1.1	3.2
1962	4.3	1.0	3.2
1963	4.1	1.1	3.0
1964	4.2	1.0	3.2
1965	4.2	1.1	3.1
1966	4.0	1.0	3.0
1967	3.8	1.0	2.8

In terms of the theory of demographic transition this situation will remain until such time as the economic status of the Coloureds shows a marked improvement. Factors such as "job reservation", lower educational levels, cultural traits of alcoholism and low productivity, mitigate against rapid economic development and a prolonged period of high natural increase and hence large family size can be anticipated.

3.6 Urbanisation of the Coloured Group.

For historical reasons, the Western Cape has been the traditional homeland of the Coloured race. This group has constituted the major non-skilled labour force, particularly in rural areas where it was mainly employed in agriculture.

The rapid rate of industrial and economic expansion of South Africa has resulted in a radical re-distribution of population.

Where farming mechanisation has been practicable a de-population of the platteland and a drift to the towns has occurred. This phenonmenon manifested itself in peripheral shanty towns on the outskirts of Cape Town. Slums of the worst type occurred as part of the process of urbanisation of the Coloured group.

In / .....

In 1963 it was estimated that 63 per cent of the Coloured population was urbanised compared to 80 per cent of that of Whites.(1)

Population projections indicate that for the Coloured group the national average rate of natural increase will be maintained while rural areas decant their natural increase at a rate which will increase steadily as opportunities for employment reduce in rural areas and the pull of the Cape Town metropolitan area accentuates with increase in size.

The projected Coloured populations for the Cape Town Metro area until the year 2000 are as follows:(2)

Year	Coloured Population
1970	728,144
1975	902,498
1980	1,119,187
1985	1,386,944
1990	1,715,900
1995	2,117,837
2000	2,601,006

The population increase of the Coloured group during the next 30 years is therefore expected to be of the order of 2,000,000 persons. Assuming an average household size of 6.0, approximately 330,000 additional dwelling units will be required during this period, many of which may well have to be constructed in the form of low cost housing.

In the shorter term, the projected population for 1980 shows an increase of roughly 400,000 persons which on the basis of 6.5 persons per household will require an addition of 62,000 housing units, the vast majority of which are likely to require state subsidy.

3.7 / ....

(1) S.P. Celliers, op cit p.17.

(2) Department of Urban and Regional Planning - University of Cape Town, 1969.

3.7 The high capital cost of housing.

As stated in paragraph 3.4, the capital cost of a new dwelling in many European countries is about four times the annual earnings of an adult male industrial worker. In the least industrialised countries of Europe, the relative cost of a dwelling is even greater, rising in some cases to over ten times the annual average earnings.(1) In America where real incomes are high, the cost of a dwelling is less than three times the average annual income of its purchasers.(2)

Nevertheless even at this favourable average cost/wages ratio, annual charges (including maintenance) must not be higher than 7% of the capital cost if the proportion of income to be devoted to rent is not to exceed 20 per cent. In countries where the cost/wages ratio is four, the annual charges have to be 5 per cent or less of the capital cost if housing is not to account for no more than a fifth of income. In most European countries for this requirement to be met, interest rates would have to be about 2 to 3 per cent.(3)

The corresponding cost/wages ratios for the Coloured population in the Cape Peninsula are shown tabulated below. The income groups were derived from the sample survey conducted by the Bureau of Market Research in 1963/1964.(4)

The cost of dwelling was taken at R6300 which is the present cost of a three bedroomed house in the Cape Town City Council's home-ownership schemes.

Income / ....

(1) Economic Commission for Europe. Financing of Housing in Europe, United Nations, Geneva 1958.

(2) Economic Commission for Europe, op cit p.40.

(3) J.B. Cullingworth, op cit p.24

(4) Bureau of Market Research : Income and Expenditure Patterns of Coloured Households in Cape Peninsula. Pretoria 1965. Table 11.

Income Group of Household Head Rands per Month	Percentage	Cumulative Percentage	Average Cost/Wage Ratio
0-59.99	57.4	57.4	17.5
60-99.99	25.2	82.6	6.6
100-139.99	12.6	95.2	4.4
140-200+	4.6	100.0	3.1

The analysis shows that if rentals are not to exceed 20 per cent of the wage of the household head, over 95 per cent of the Coloured population require assisted housing.

The position in relation to gross household income is as follows:

Gross Household Income Rands per month	Percentage	Cumulative Percentage	Average Cost/Wage Ratio
0-59.99	31.3	31.3	17.5
60-99.99	29.0	60.3	6.6
100-139.99	20.6	80.9	4.4
140-219.99	15.1	96.0	2.9
220-340+	3.8	100.0	1.9

This analysis reveals a considerable upward shift in income when compared to household head's income but still shows that over 80% of households could not afford the cost of a conventional home.

It is commonly suggested that the cost of a house, including land should not be more than twice or three times the annual income.(1) On this basis only 4 per cent of households could afford to provide themselves with a suburban type 3 bedroom house.

3.8 / ....

(1) Charles M. Haar. Federal Credit & Private Housing : The Mass Financing Dilemma, p.8.

3.8 Future trends in housing costs.

In the United States which is highly industrialised and where productivity is high, residential construction costs have increased far more than all consumer prices.(1) Whilst real income per capita more than doubled itself between 1890 and 1950, the price of housing in America increased more than twice as fast as the composite price of all items entering the G.N.P.(2) Apparently gains in productivity which are responsible for keeping the increase in consumer prices below the increase in wage rates, have been nearly totally lacking in house building.(3)

In England the cost of a 900 sq.ft. local authority house rose from R3,914 in 1962 to R4,538 in 1964 i.e. by 7.7 per cent per annum.(4) In Israel the cost-of-living index rose from a datum of 100 in 1950 to 413 in 1963 whilst building costs rose to 661.(5)

Prices in Cape Town are following similar trends. The building cost of a single dwelling three bedroom house in the Cape Town City Council's home-ownership schemes is increasing at the rate of 6 per cent per annum.

The annual rise in the South African Consumer Price Index has averaged 2.4 per cent since 1958, whilst rent and home owner's costs have averaged 3.2 per cent.(6) Real wages of Coloureds employed in private secondary industry in 1959 showed an increase of only 0.7 per cent per annum over the previous ten year period.(7)

If / ....

(1) Meyerson, Terrett & Wheaton : "Housing and the National Economy" : Article in Urban Housing Edited by Wheaton, Milgram and Meyerson : The Free Press New York, 1966, p.17.

(2) Jack Guttentag : Comment on "Housing : Has there been a downward shift in Consumers' Preferences" by L. Winnick. In Urban Housing, op cit. p.163

(3) Jack Guttentag : Ibid p.163.

(4) J.B. Cullingworth : Housing and Local Government. Geo. Allen & Unwin Ltd. London, 1966, p.150

(5) Nadav Halevi : "Housing in Israel" in The Economic Problems of Housing, op cit p.219.

(6) Bureau of Statistics : Vol. 3 No. 2, June 1969. Pretoria.

(7) H.T. Andrews et al. op cit p.186.

If present trends continue, an ever widening gap between incomes and housing costs will face the majority of the Coloured population in the foreseeable future. Until such time as average real income reaches the R130-R225 income group, assisted housing will be necessary. At present only 6.8 per cent of breadwinners fall into this income category and even when gross household income is considered this figure rises to only 16.7 per cent of those households which are awaiting entry into the Cape Town City Council's housing schemes.(1)

3.9 The low cost Coloured housing problem.

The problem is to house a large population, many of whom at present live in poverty; a population which has a classically large birth rate, large family size and which to an overwhelming extent is not financially capable of providing its own housing.

This large population must be housed quickly and within the means of the national economy. If one takes the "Per Capital National Product of 55 Countries : 1952-1954" issued by the United Nations as a yardstick, South Africa with an estimated income of 300 U.S. Dollars per head is roughly on a par with Cuba, Malaya and Italy and half way between the Highest (U.S.A.) and the lowest (Uganda).(2)

South Africa is therefore not wealthy and it is the task of the planner to bridge the gap between the community needs and its ability to pay for its housing.

In South Africa the problem is recognised as a national one and funds are provided by the central government to local authorities at economic and sub-economic rates of interest to provide housing. The National Housing and Planning Commission

was / ....

(1) See paragraph 3.7.

(2) United Nations. Statistical Papers, Series E, No. 4 Per Capita National Product of Fifty-five Countries 1952-1954, United Nations.

was constituted for the purpose of providing housing on a national basis and standards have been laid down by the State Department of Community Development.

The main objectives in planning housing areas can be summarised as follows:-

(a) to provide sufficient living space within and around houses, to meet the needs of families of different sizes and compositions;

(b) to arrange the houses and to control the space between them so as to secure an optimum environment;

(c) to ensure adequate and conveniently located community services;

(d) to locate the housing conveniently in relation to the urban areas as a whole.

In tackling the Coloured housing problem State housing policy has been to spread the available resources thinly over as wide an area as possible in an effort to house as many families as possible.

This thesis examines that part of (a) which relates to sufficient living space within the dwelling and questions the adequacy of the space provision of the Minimum Standards of Housing Accommodation for Non-Europeans(1) to which housing schemes are designed.

4.0 Analysis of Housing Parameters.

4.1 Socio-economic structure of families entering housing schemes.

4.1.1 Sample Survey.

A sample survey was made of families awaiting allocation of housing by the Cape Town City Council.

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(1) Minimum Standards of Housing Accommodation for Non-Europeans published by the National Housing & Planning Commission Pretoria, July 1951.

A systematic random sample of 516 families was selected from the records of applications, the particulars of which are kept up-to-date. The sample represented 5% of the applicant population.

With this sample size the reliability of a sample proportion at 95% confidence level is $\pm$ 4.3 per cent (see Appendix 1).

4.1.2 Age Structure.

The age structure is represented by the frequency distribution shown in Table I and the Population Pyramid in Figure 1. Figure 1 also shows the comparison between the applicant population and the Cape Town Metropolitan Coloured population at the time of the 1960 Population Census.(1)

The applicant population shows marked differences in the 5 - 9 years group as well as in the 25-29 years and 30-34 years age groups. In all these categories, the applicant population shows larger proportions than the metropolitan population. In the older age groups from 45 years to 75 years, the proportions are smaller than those of the metropolitan population.

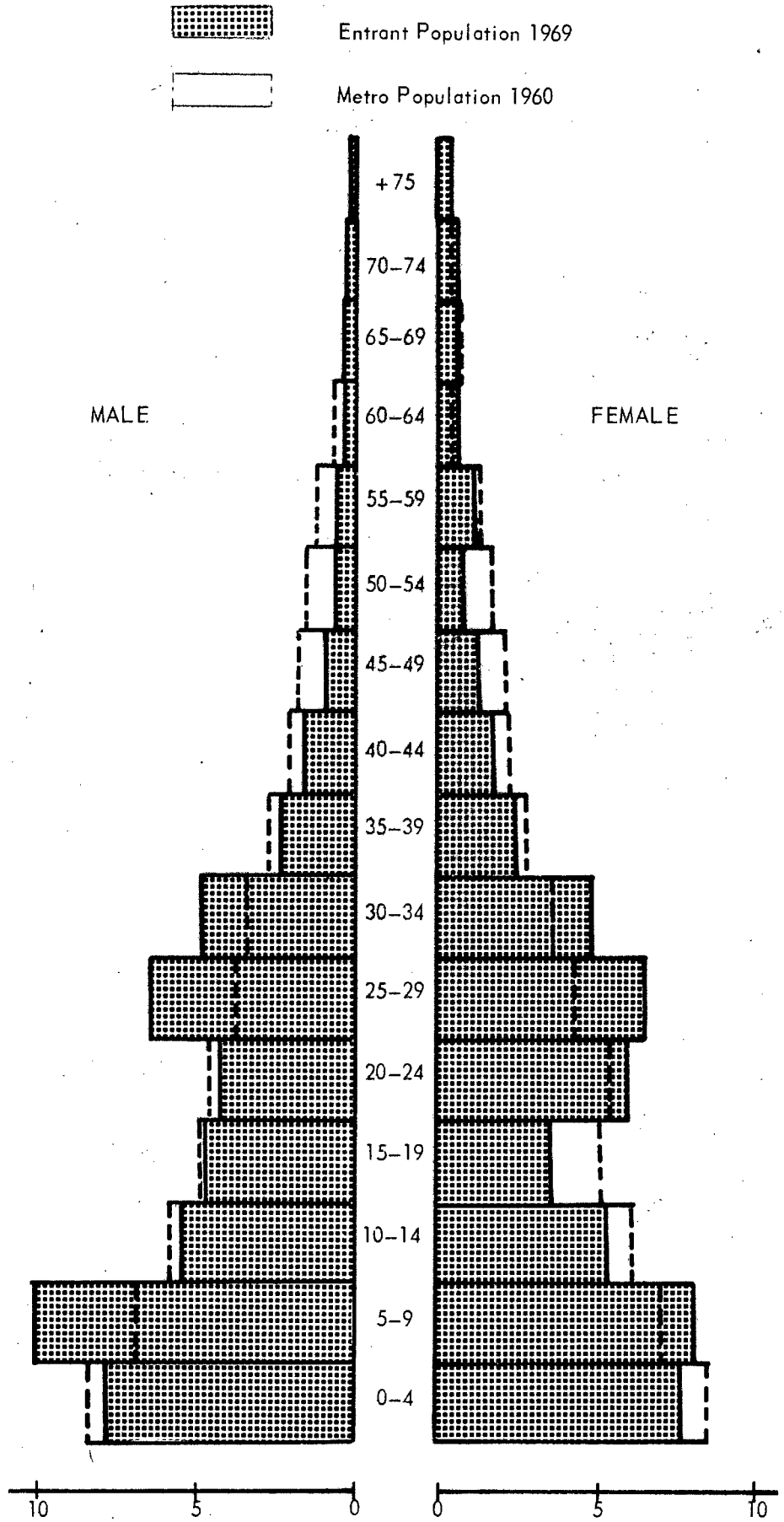
Table I shows that 43.6 per cent of the entrant population are between 0-14 years and that 53.6 per cent are in the 15-60 age group. The latter group is considered responsible for supporting the community's children. The ratio of the two groups is 1.2:1. For comparison, the corresponding ratio in the countries of Europe and North America is about 2.5:1 or one child of up to 15 years to 2.5 persons between 15 and 60 years of age.(2)

The / ....

(1) Republic of South Africa : Bureau of Statistics : Population Census 6th Sept. 1960 : Vol. 2, No. 1 Report on the Metropolitan Area of Cape Town. Government Printer, Pretoria, 1966.

(2) Walter D. Harris, Hans A. Hossé and Associates: Housing in Honduras : Dept. of Social Affairs, Pan American Union, Washington D.C., 1964, p.12.

ENTRANT POPULATION: PERCENTAGE OF AGE GROUPS AND SEXES 1969.



Sources: Table 1 and Cape Town Metro. 1960 Census

FIGURE 1

The high proportion of Coloured children represents a heavy burden on the economically active members of the family and complicates the problem of saving which is necessary to provide one's own adequate housing. It also leads to the mother working and encourages the accommodation of older relatives, to look after the younger children in the mother's absence.

Table 2 shows a statistical comparison in age groups of the entrant population and that of the Coloured Metropolitan population as determined during the 1960 Census.

By means of a statistical Chi-square test, the entrant population was found to differ significantly at both 95 per cent and 99 per cent confidence levels from the metro population. The entrant population is thus not representative of the total population but is a particular section of it which over time will undergo structural changes in its age grouping and this will affect it's housing needs.

Families entering a housing scheme are seen to be relatively young with a broad base of children and a broad band in the fertile 25-34 age group.

Family size is likely to increase and as dwelling types are allocated according to family size at the time of entry, overcrowding due to additional births is probable. The large 5-9 years of age group is also significant since in terms of the Slums Act of 1934, persons over ten years of age and of opposite sexes are not permitted to share the same bedroom.

4.1.3 Household Size.

The frequency distribution of household sizes is shown in Table 3 and in Figure 2. The distribution shows a wide range in size from 1 to 18.

The mean family size is 4.96 with a standard error of $\pm$ 0.11 i.e. the mean family size lies between 4.74 and 5.18 at 95 per cent confidence level. This figure accords well with that found in a sample survey of the European and

Coloured /

Coloured population of the municipality resident in private households in Cape Town in the latter half of 1955 carried out by Prof. E. Batson of the University of Cape Town. The average household size of Coloured families was found to be 4.95 and that of Europeans to be 3.18.[1] The mean of 4.96, however, is low when compared to later studies which included families living in low cost housing schemes. The Bureau of Market Research in a survey conducted in 1963/1964 in the Cape Peninsula found the Coloured family size to be 5.3 and household size to be 5.8.[2]

From the results of a sample survey of size 120 by W. Wittmann et al[3] in 1965 in the Bonteheuwel low cost housing scheme, the average household size was calculated to be 6.96 whilst D.S. Mabin[4] in a study of Heideveld low cost housing scheme found the average to be 6.20.

The low average household size confirms that entrant families have not reached maturity and supports the hypothesis that after being housed in low cost housing schemes the household size will increase substantially.

4.1.4 Household Structure.

Table 4 and Table 5 show the number of extended households i.e. those which contained members additional to the parents and their children or stepchildren. A large proportion (37.4 per cent) of families were found to be extended, the average extension being 1.47 persons per extended family. Extended families increased the average household size by 0.4 persons. The survey revealed that mothers-in-law formed the largest proportion of extended members, and were present in 12 per cent of households.

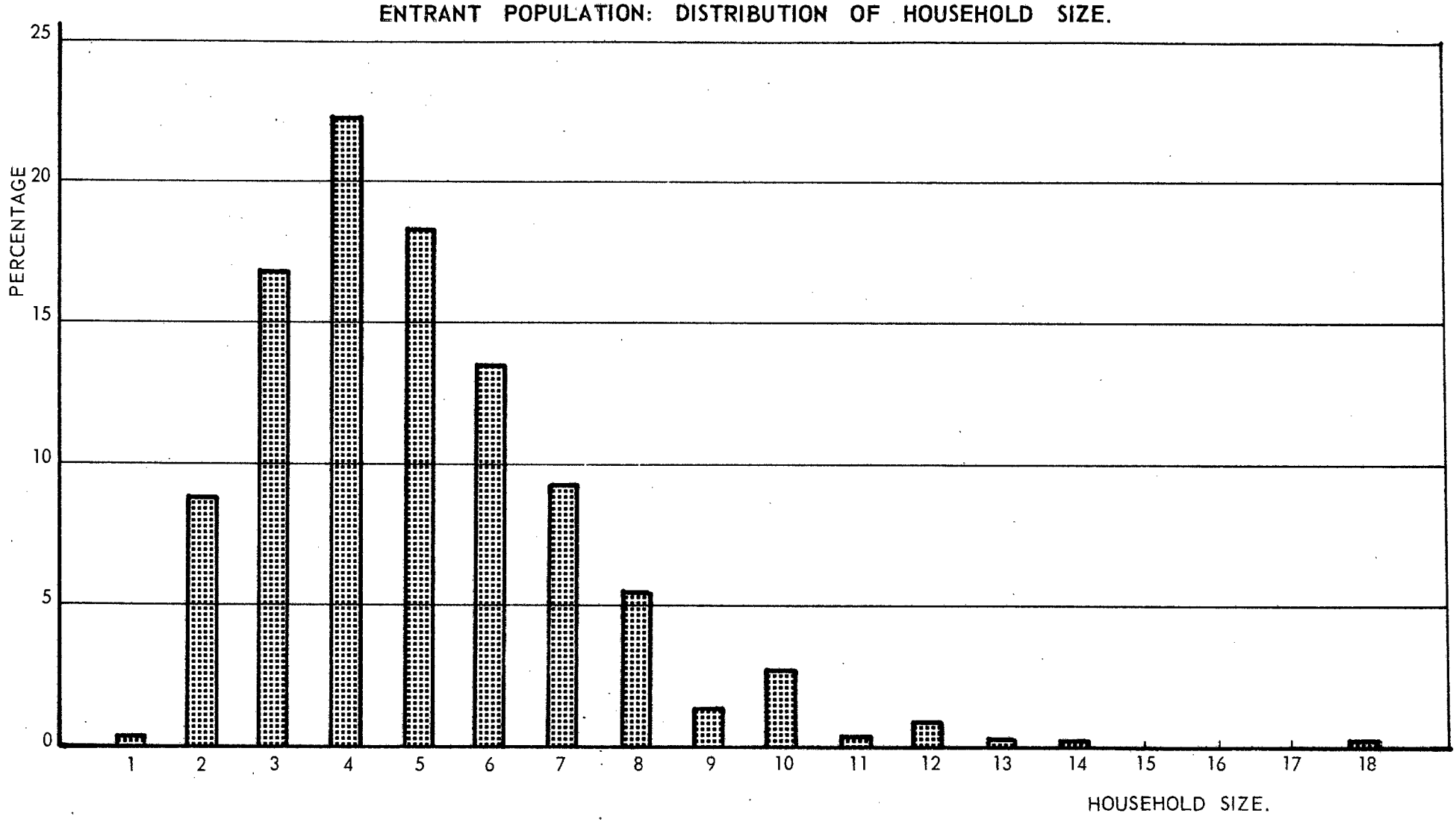
This / .....

(1) Prof. Edward Batson : Cape Town Housing Survey 1955. University of Cape Town, 1956, p.2.

(2) Bureau of Market Research : Income & Expenditure Patterns Cape Peninsula. Pretoria, 1965, p.3.

(3) W. Wittman et al : An Evaluation of the Relationship between Nutritional Status and Infection by Means of a Field Study : S.A. Medical Journal Vol. 41, 22nd July, 1967, pp. 664-682.

(4) D.S. Mabin : op cit p.16



Source: Table 3.

FIGURE 2

This is a feature of the composition of Coloured households. This phenomenon is attributable to the relative absence of orphanages, homes for the aged, the prevalence of illegitimate births, shortage of low income housing and low earning power of working class Coloureds. The presence of a mother-in-law also permits the mother to become economically active.

Seven per cent of the families contained stepchildren, indicating re-marriage of one or both parents.

The household structure indicates family instability with 8 per cent of the total population living in homes of relatives. At the same time it displays a trait of the Coloured population to accommodate parents and other relations[1] and points to the need to consider this as a factor in the provision of housing for the Coloured group.

4.1.5 Income Structure.

In terms of the Housing Code[2] housing is allocated on the basis of the family head's earnings; if it is less than R60 per month sub-economic housing is allocated. Rent calculations are based on the wage earner's income plus one half of the income of every other member of the household with a maximum of R12 per month. The income of a wife is not included.

Tables 6, 7 and 8 show the distribution of household heads' incomes, gross household incomes and incomes calculated for the determination of rent.

The weighted mean income of heads of families is R70.2 with a standard error of R1.8 i.e. mean incomes lie between R66.6 and R73.8. The Bureau of Market Research corresponding figure for 1963/64 was R62.03.[3]

The / ....

(1) S.P. Celliers, op cit p.25

(2) Housing Code : Issued by Dept. of Community Development. Chapter XIB, Clause 6 as amended.

(3) Bureau of Market Research, op cit p.84.

A bedroom in a sub-economic 3-room dwelling at Bonteheuwel.

"The presence of a mother-in-law permits the mother to become economically active."

The mean gross household income is R89.50 with a standard error of R2.03. The corresponding Bureau of Market Research figure for 1963/64 was R96.92 with a standard error of 1.78.(1) The mean income for rent determination purposes is R71.70.

The analysis reveals that the inclusion of half the wages of member of the household, other than that of the wife, with a maximum of R12 per month per member, does not increase the mean income of household heads to a large extent.

Average gross household income, however, in which the wife's wage is included, shows a marked increase. This indicates the significant contribution to household income of working wives and stresses the necessity for grandparents or other relatives to live in the home to care for children both of whose parents may be economically active.

The distribution of incomes in categories used for rental assessments are as follows:-

Income Category	Household Head Income %	Cum. %	Gross Household Income		Rental Income	
			%	Cum. %	%	Cum. %
0-59	46.1	46.1	28.5	28.5	43.8	43.8
60-94	37.2	83.3	36.2	64.7	38.9	82.7
95-129	9.9	93.2	18.6	83.3	10.6	93.3
130-225	6.8	100	16.7	100	6.7	100

In terms of the above tabulation, 46.1 per cent of households awaiting entry into housing schemes would be allocated sub-economic housing.

The increase in average gross household income suggests that tenants with more than one earner per household could possibly afford a higher rental for an increased standard in dwelling type or for increased space within the dwelling.

Gross / ....

(1) Bureau of Market Research, op cit p.13.

Gross income, per se, however is not necessarily a reliable index of ability to pay rent as household size is also a complementary factor.

A socio-economic index was therefore calculated in which income and household size were combined as an indicator of the rent-margin applicable to each household (see paragraph 4.1.7).

4.1.6 Rent as a Proportion of Income.

The Housing Code stipulates that rent should not exceed 20 per cent of family income.(1) As stated previously this income is taken as that of the household head plus one half of the income of each wage earner with a maximum of R12 per month per additional wage earner. Earnings of the wife are excluded.

The origin of the rent-income ratio of 20 per cent, which is universally adopted, is unknown. Chester Rapkin attributes it to a familiar "folklore" belief that one months' rent should approximate one weeks' salary. 12 weeks' salary out of 52 weeks earnings yields a ratio of 23 per cent.(2)

For the purpose of examining the relationship between incomes and rentals, hypothetical dwelling types were allocated to the sample households awaiting entry into housing schemes in accordance with the standards of the National Housing and Planning Commission.(3)

The hypothetical distribution of dwelling types and income groups, as determined for rental purposes is shown in Table 9.

Average rentals for sub-economic and economic dwellings are shown in Table 10. Sub-economic rentals in low cost

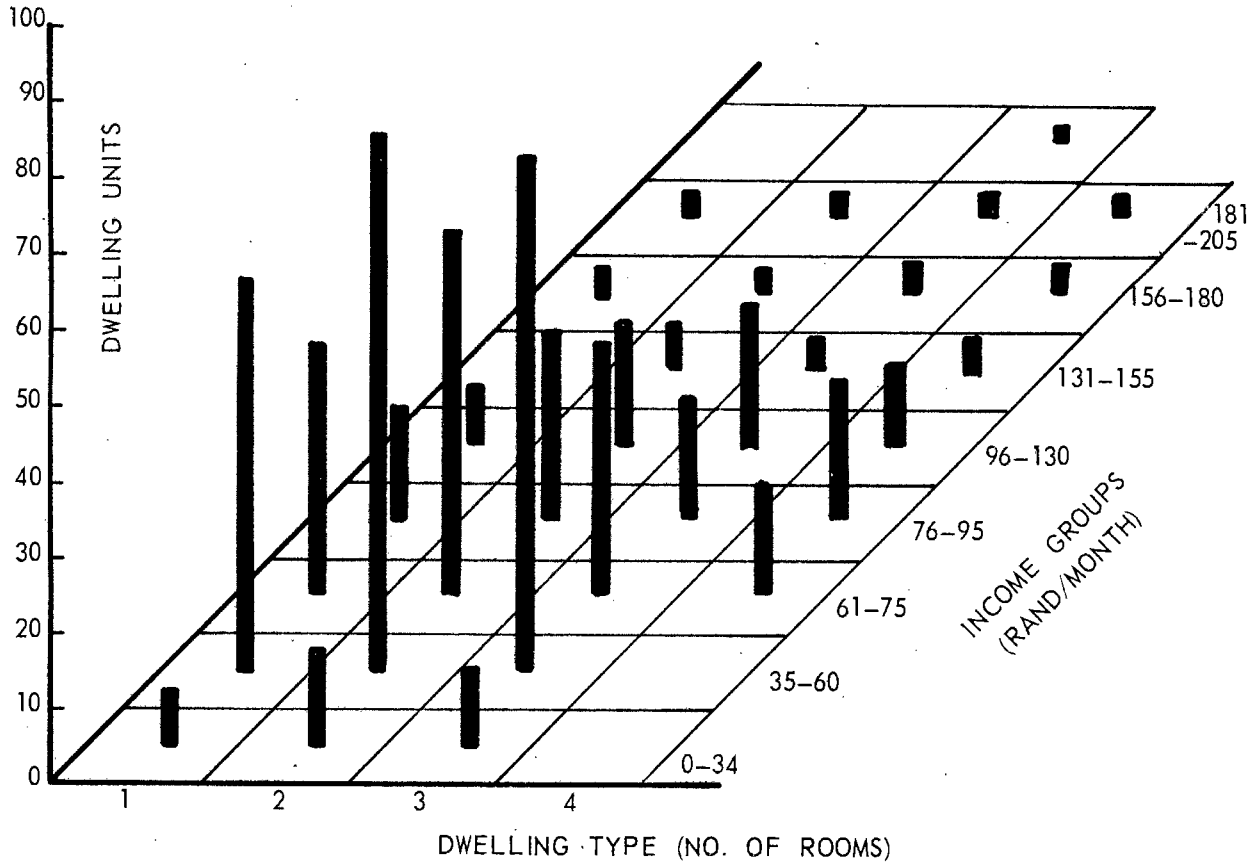
Coloured / ....

(1) State Dept. of Community Development : Housing Code : Pretoria 1964, p.56.

(2) Chester Rapkin : Rent Income Ratio : In Urban Housing op cit, p.168.

(3) National Housing & Planning Commission : Minimum Standards of Housing Accommodation for Non-Europeans Pretoria, 1951.

ENTRANT HOUSEHOLDS
DISTRIBUTION OF DWELLING TYPES AND INCOME GROUPS
(SAMPLE OF 516 HOUSEHOLDS)



Notes: (1) Incomes are those determined for rental purposes.

(ii) Dwelling types are allocated in accordance with Minimum Standards of the National Housing and Planning Commission.

Source: Table 9.

FIGURE 3

Coloured housing schemes are assessed on the basis of an interest rate of ¾ per cent and a redemption period of 40 years. Economic rentals are determined on the basis of a 30 year redemption period, with interest rates varying as follows:- (1)

Income per Month	Interest Rate
R60-R94	3 per cent
R95-R129	5 per cent
R130-R225	6 per cent.

The relationship between income groups and dwelling types are shown in figure 3 which is derived from Table 9. It indicates that 62 per cent of households fall within the R35 - R75 income group. The hypothetical distribution of dwelling types would be as follows:

One-room	Two-room	Three-Room	Four-Room
23.6 per cent	35.5 per cent	30.2 per cent	10.7 per cent

Figure 4 shows the relationship between actual rentals and maximum rentals, income groups and dwelling types for sub-economic housing. It shows that in the R0-R34 per month income group, actual rentals exceed the maximum permissible amount and that this group cannot even afford sub-economic housing. This group comprises 5.6 per cent of families awaiting entry. In the R35-R60 group, rentals are well below the maximum of 20 per cent of income.

Figure 5 shows the distribution and relationship between housing types, rents and selected income groups for economic housing. It indicates a housing characteristic that rentals are regressive in relation to income. In the R61-R130 income groups, rentals for 2, 3 or 4 foomed houses constitute an increasing proportion of income and in the case of 4 roomed houses, the rentals exceed the maximum desirable

rent / ....

(1) Based on information furnished by City Treasurers Department, Cape Town City Council, 1969.

ENTRANT HOUSEHOLDS: SUB-ECONOMIC:
RENT/INCOME RATIOS IN RELATION TO DWELLING TYPES.

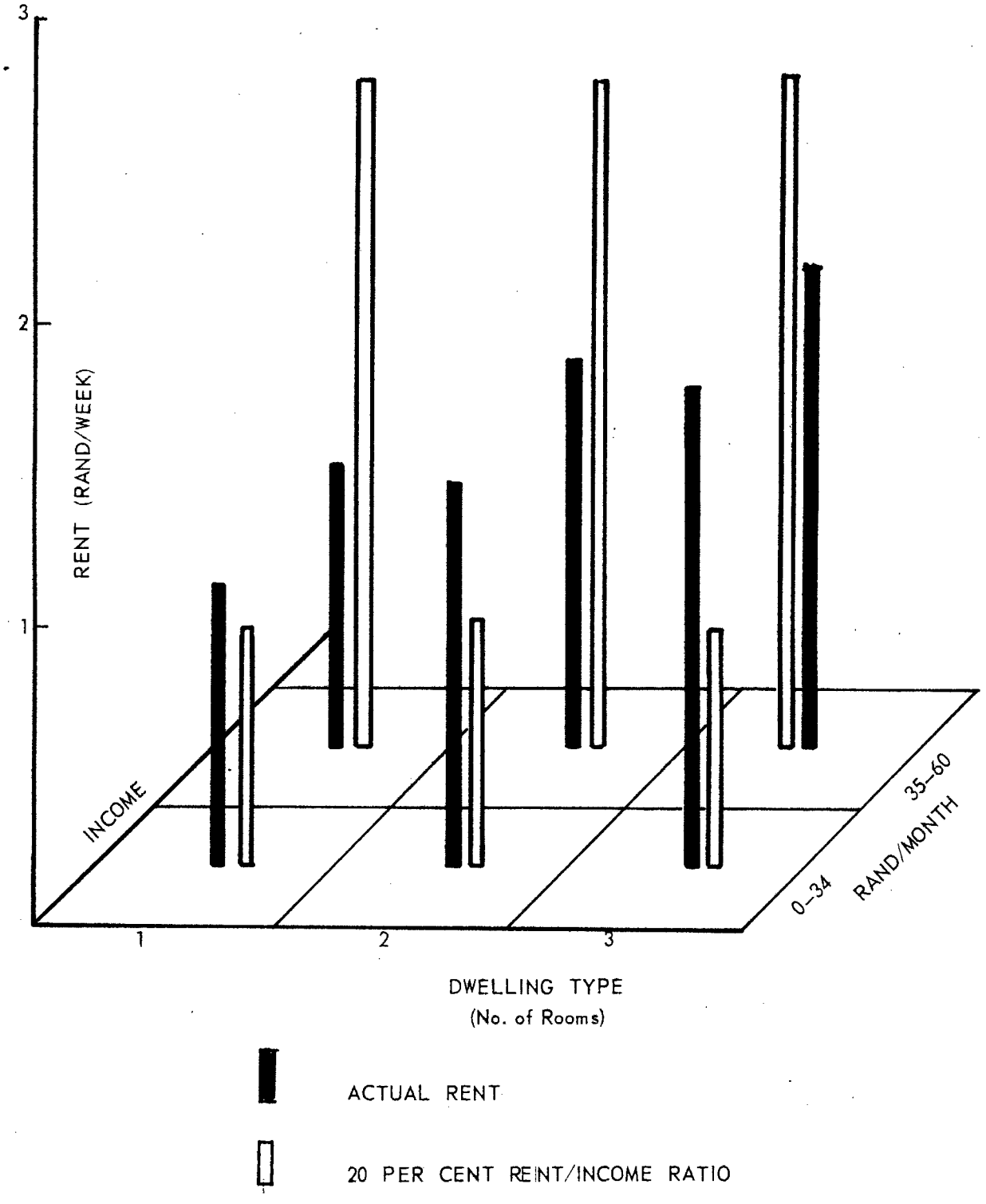


FIGURE 4

rent of 20 per cent of income. Only those families whose "rental" income exceeds R112 per month can afford the rental of a 4 roomed dwelling.

Table 8 shows that only 12.1 per cent of all households have "rental" incomes in excess of this amount.

Table 9 indicates that of the households who would be allocated four-room dwellings 28 per cent would be required to pay rentals in excess of 20 per cent of their "rental" income.

A comparison of Figure 4 and Figure 5 show that families in the sub-economic group and earning just below R60 per month, pay a low percentage of income as rental whereas in the economic group, those families earning just above R60 per month pay a much higher proportion. This suggests that the barrier of R60 per month between the sub-economic and economic groups should be raised to approximately R75 per month to relieve the rent burden of the latter group.

4.1.7 Socio-economic Index.

The ability to pay rent depends on income and household size and the available income per person per day gives a measure of the rent margin of the household.

Socio-economic indices I_1 and I_2 were therefore calculated for applicant households as follows:-

$$I_1 = \frac{\text{Head of family income - Rent}}{\text{Household Size}}$$

$$I_2 = \frac{\text{Gross family income - Rent}}{\text{Household Size}}$$

In each case Rent was calculated as 20 per cent of income and the indices were determined for 100 households chosen by means of a systematic random sample. The distribution of the indices are shown in the form of frequency polygons in Figure 6.

The / .....

ENTRANT HOUSEHOLDS: ECONOMIC: RENT/INCOME RATIOS IN RELATION TO DWELLING TYPES

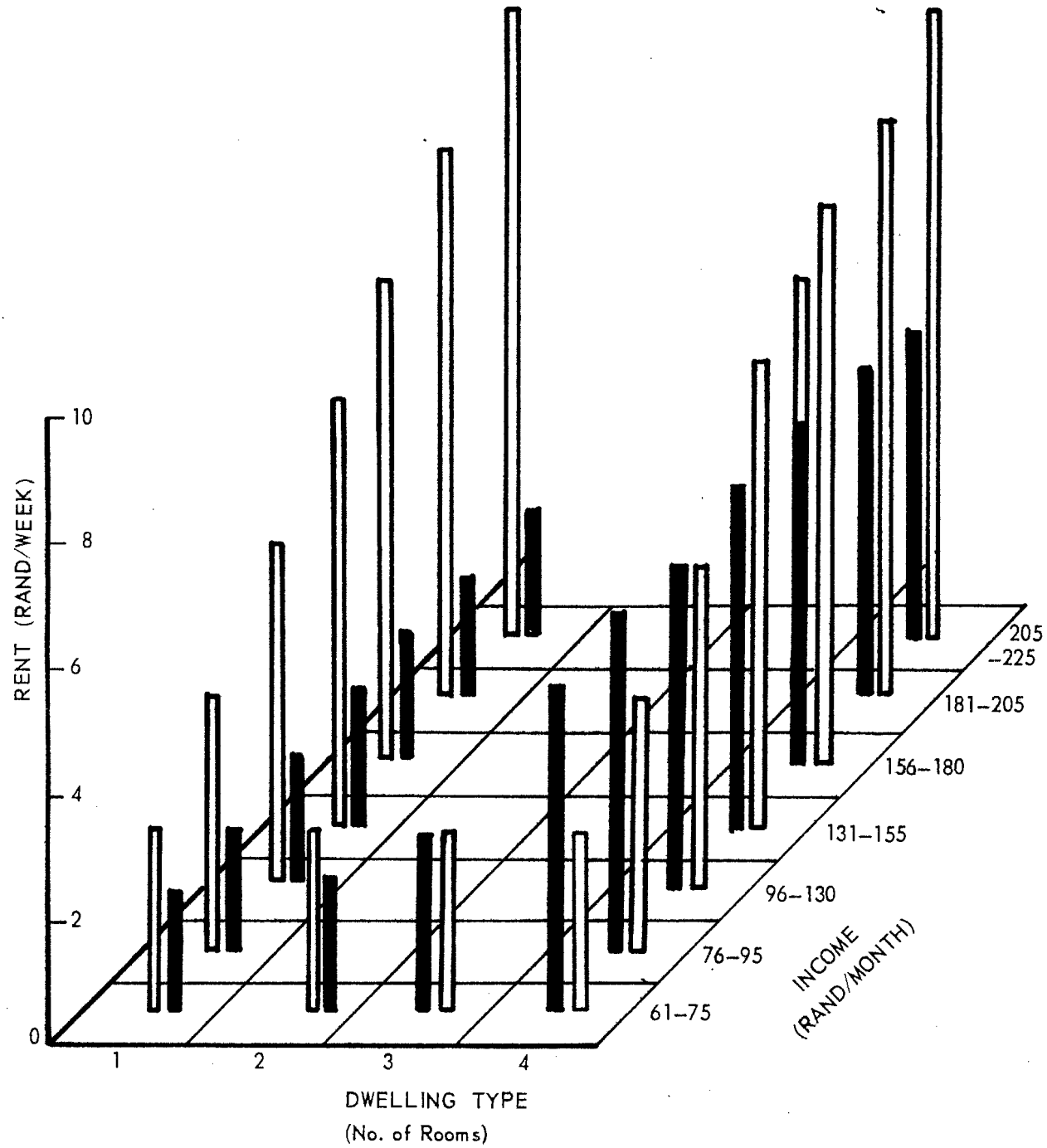


FIGURE 5

The distribution of the index for gross household income suggests that entrant households could be classified into four grades of socio-economic status. These grades and the available income per head per day are as follows:

GROSS INCOME INDEX.

Rands/head/week	Average Cents/head/day	%	Cum. %
0-1.9	14	15	15
2-3.9	43	47	62
4-7.9	86	30	92
8-10	136	8	100
		100	

In 1965 W. Wittman et al in their Bonteheuwel study found that the poverty level below which the bare necessities of everyday life could not be supplied was 25 cents per head per day; the adequacy level capable of supplying somewhat more than the bare necessities was 40 cents per head per day.(1) Allowing for an annual increase of 2.4 cents per annum in the Consumer Price Index(2), the corresponding amounts for 1969 would be 27.5 cents and 44 cents respectively. The latter figure corresponds closely to the mid-point of the R2-R3.9 income group.

Based on a 20 per cent rent/income ratio, the analysis indicates that 15 per cent of incoming households would be below the poverty line and that only 38 per cent would be above the adequacy line.

These results reveal the limitations to any increase in rentals. For approximately two thirds of the population, an increased rental above the 20 per cent level would mean a deprivation of other essential commodities of living.

Figure 4 / ....

(1) W. Wittman et al. op cit, p.668

(2) Bureau of Statistics. Vol. 3 No. 2 June 1969, Pretoria.

ENTRANT HOUSEHOLDS: INDICES OF SOCIO-ECONOMIC STATUS
DISTRIBUTION OF INCOME IN RAND/HEAD/WEEK
(SAMPLE OF 100 HOUSEHOLDS)

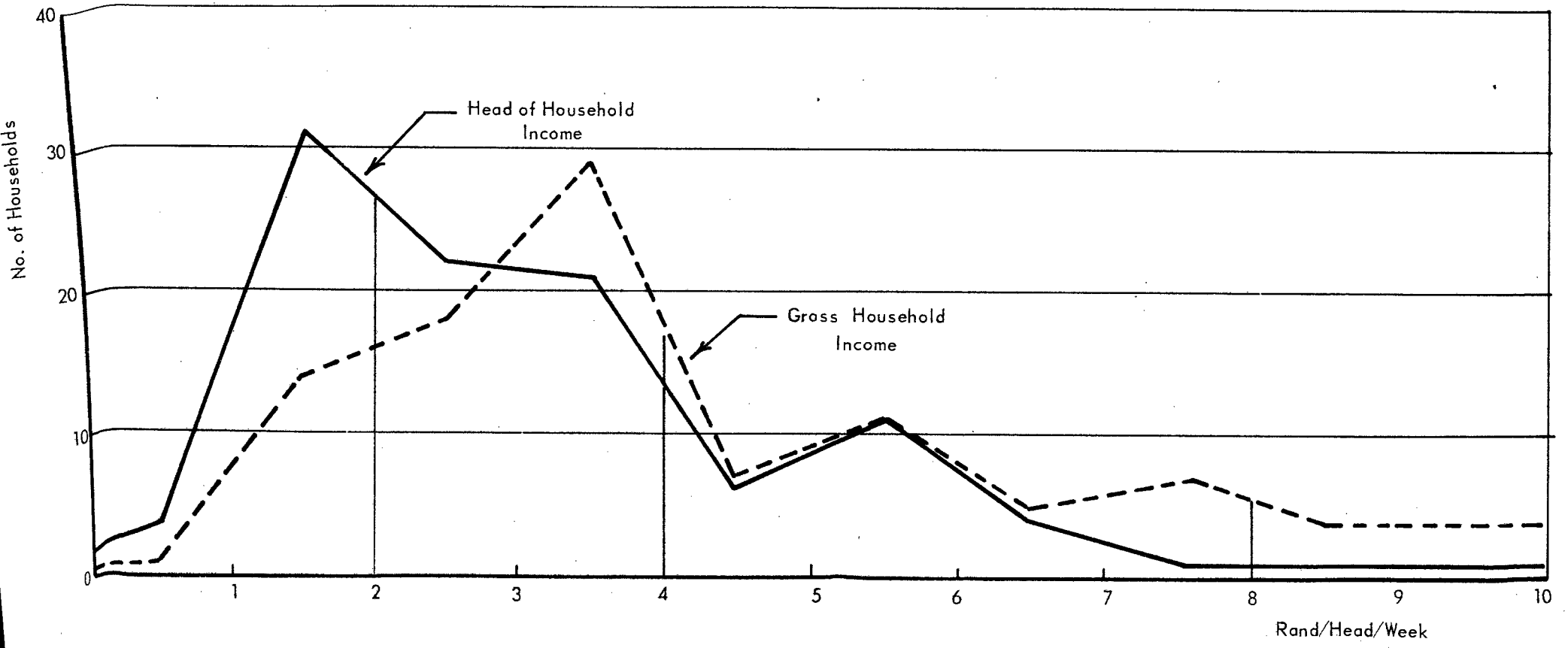


FIGURE 6

Figure 4 and Figure 5 show that on average, rent/income ratios are below the desirable maximum of 20 per cent. However, in considering marginal incomes for the purpose of assessing rent, allowance should be made for transport costs to places of employment.

In Cape Town, low cost Coloured housing schemes have peripheral locations, approximately 10 miles from the city centre. Travelling costs for economically active members of the household are appreciable and can in fact exceed the rental of the dwelling. Transport costs were not taken into account in assessing the above socio-economic indices and the percentage above the adequacy line, quoted above, could well be on the high side.

Wittman's study revealed that the families living above the level of income adequacy were building up stable homes and raising healthy and well cared for children. The families living below a level of adequacy showed progressively poorer physical health and social adjustment as income decreased.

It appears therefore that if additional accommodation is to be provided, a large proportion of the tenants would not be able to afford it and that other sources would have to be found to fund the increased expenditure.

4.1.8 Income in relation to Household Size.

"Sub-Economic" or "Economic" low cost housing is allocated according to the income of the head of the household and in accordance with the household size.

The practice in Cape Town is to allocate more accommodation in the case of economic housing, the status and circumstances of the applicant being given consideration.(1) In the case of sub-economic housing, allocations are made strictly in accordance with the standards of the National Housing and Planning Commission, with a maximum of 2 bedrooms, a living room, plus a dining room/kitchen.(2)

It / ....

(1) Housing Manager, Cape Town City Council, 1969.

(2) National Housing & Planning Commission. Minimum Standards of Housing Accommodation for Non-Europeans.

It was pertinent therefore to investigate whether income and household size were independent. This was done by means of the following contingency table.

Household Size	Income of Household Head Per Month		Total Households
	$\leq$ R60	$\geq$ R60	
$\leq$ 5	169	171	340
$\geq$ 6	78	98	176
TOTAL HOUSEHOLDS	247	269	516

$$\chi^2_{obs} = 1.1$$

$$\chi^2_{crit.,\ 0.95} = 3.96$$

A Chi-Square test validates the hypothesis that the income of the household head is independent of the household size. As the household contains extended family members, a contingency table was prepared for the number of children per family and the income of the household head as follows:

Number of Children	Income of Household Head		Total Households
	$\leq$ R60	$\geq$ R60	
$\leq$ 5	183	192	375
$\geq$ 6	64	77	141
TOTAL HOUSEHOLDS	247	269	516

$$\chi^2_{obs} = 0.04$$

$$\chi^2_{crit,\ 0.95} = 3.96$$

This test also shows independence at the 95 per cent confidence level.

These tests indicate that households which have a small "head of household" income do not necessarily have a small size. Thus, other than on financial grounds of inability to pay a high rental, there is no valid reason for "sub-economic" households to be allocated less housing than corresponding "economic" households.

When / .....

When household size is tested against gross income, the following contingency table results:

Household Size	Gross Household Income		Total households
	$\leq$ R60	$\geq$ R60	
$\leq$ 5	135	209	344
$\geq$ 6	53	119	172
TOTAL HOUSEHOLDS	188	328	516

χ^2_{obs} 4.03 $\chi^2_{crit, 0.95}$ = 3.96

This analysis shows that gross household income and household size are dependent at the 95 per cent confidence level. Larger households tend to have larger gross incomes and this suggests that gross household income rather than the income of the head of the household might be a more rational index for the allocation of dwelling type. Gross household income however may not be stable, particulary if the wife is required to give up work during periods of pregnancy and early child rearing.

5.0 Adequacy of Housing Allocation.

5.1 Housing Allocation in terms of Department of Community Development Standards.

The minimum standards for Non-European housing are as follows:(1)

No. of Persons Accommodated	Type of Dwelling	Room Areas in Sq.ft.			
		Main Bedroom	Bed-rooms	Dining Kitchen	Living Sleeping
2 - 3	1 Room unit	-	-	70	110
4 - 5	2 Room unit	118	-	80	115
6 - 7	3 Room unit	118	94	90	120
8 - 9	4 Room unit	118	94	100	125
10 - 11	5 Room unit	118	94	110	130

(a) / .....

(1) National Housing & Planning Commission : op cit p.3

(a) A "person" is defined as anyone over the age of 1 year.

(b) A "Room" is one which is used for sleeping or living. The dining room/kitchen, bathroom or store are not counted as rooms.

(c) Areas given are net inside room walls.

(d) Bedrooms may be 5 sq.ft. less in area if built-in cupboards are provided.

(e) The combined dining room/kitchen and living/sleeping room areas comprise the "living" space in the house.

(f) The living/sleeping room is designed to serve the dual purpose of a bedroom for two persons and a general living space.

The Housing Code(1) stipulates that sub-economic housing is to be allocated as follows:

No. of Persons Accommodated	Number of Rooms
2 - 3	1
3 - 5	2
more than 5	3

In Cape Town, sub-economic housing is allocated strictly in accordance with the requirements of the Housing Code. Economic housing has generally been restricted to a maximum dwelling type of 3 rooms with slightly more accommodation being allocated than in the case of sub-economic housing; allowance is made for income group, family structure and general socio-economic status.

The rental of a 4 room dwelling exceeds 20 per cent of incomes less than R112 per month and only limited numbers of this dwelling type have been provided in certain housing schemes.

In / ....

(1) Dept. of Community Development : op cit p.56 (a)

In terms of the above standards, sub-economic households which comprise more than 7 members, are allocated less housing than the recommended minimum standard.

If no 4 room units would be provided, the hypothetical allocation of housing to households awaiting entry into housing schemes would be as shown in Table 12. This allocation would result in an occupancy rate of 2.28 persons per room (Dining room/kitchen excluded) and an average space per person of 66.1 sq.ft. (Dining room/kitchen included). The hypothetical distribution of sub-economic dwelling types is shown in Table 13. This allocation would result in an occupancy rate of 2.23 persons per room and an average space per person of 67.5 sq.ft.

These occupancy rates compare well with the figure of 2.21 given by Calderwood and Connell(1) for Non-European low cost housing in South Africa.

When a maximum of 4 room units are allocated for economic households, the distribution of dwelling types would be as shown in Table 9. This would result in an average occupancy rate of 2.28 and an average space rate of 68.4 sq.ft. per person.

The above occupancy rates are extremely high when compared with the rates existing in Europe in 1939 and 1947, listed below.(2) Only Hungary and Greece exceeded the South African figure for its Non-Europeans.

Occupancy / ....

(1) D.M. Calderwood & Paul H. Connell : Minimum Standards of Accommodation for the Housing of Non-Europeans in South Africa : Bulletin No. 8 of N.B.R.I. Pretoria, June 1952.

(2) J.L. Crane and E.T. Paxton : "World Wide Housing Problem" Town Planning Review, April, 1951.

Occupancy Rates	Persons per room	
	1939	1947
United Kingdom	0.72	0.76
Eire	1.16	1.21
Denmark	1.12	1.14
Norway	1.10	1.18
Sweden	1.48	1.39
Netherlands	1.32	1.46
Belgium	0.95	0.98
France	1.09	1.13
Poland	1.76	1.78
Austria	1.56	1.69
Hungary	2.55	2.63
Switzerland	1.00	1.01
Italy	0.89	0.96
Greece	1.96	2.50

In addition to high occupancy rates, the space rates per person determined above are low. These compare unfavourably with post-war space rates in America, England and New Zealand which were as follows:(1)

Persons Housed	Sub-Economic Cape Town Sq.ft./Person	America Sq.ft./ Person	England Sq.ft./ Person	New Zealand Sq.ft./ Person.
2	94	182	202	221
3	63	152	158	168
4	78	125	129	136
5	63	122	117	120
6	70	108	104	107
7	60	109	99	100
8	53	101	92	93

These analyses confirm that both sub-economic and economic dwelling types have few rooms for the household sizes to be accommodated and that the sizes of the rooms are small. Comparison with the countries listed above point to the inadequacy of the dwelling types provided in the low cost housing schemes.

5.2 / .....

(1) D.M. Calderwood & P.H. Connell, op cit p 6

5.2 Immediate overcrowding.

The adequacy of housing must be examined in terms of immediate requirements as well as the changing requirements over time.

An analysis of overcrowded households in relation to hypothetical dwelling units allocated is shown in Table 11. This analysis is based on the requirements of the Slums Act No. 53 of 1934 i.e. that sexes of persons other than married couples may not be mixed if one of the persons is 10 years of age or older; that each person over 10 years of age is to be provided with 400 cu.ft. of free air space and with not less than 40 sq.ft. of floor space and that children less than 10 years of age shall be provided with 200 cu.ft. of free air space and 20 sq.ft. of floor space. The analysis is based on the presumption that families in the economic group requiring 4 roomed houses will be able to bear the cost of the rental.

The Housing Code does not fully meet the requirements of the Slums Act in separating sexes and only allows additional accommodation for opposite sexes over 12 years of age.

In estimating the hypothetical overcrowding, therefore, opposite sexes over 10 years of age were separated and children under ten years of age were allocated accommodation together with the parents.

Floor to ceiling height in Council housing is 8'6" and the volume of space is therefore below the minimum of 400 cu.ft. per person which the Slums Act requires. The latter requirement was obviously based on a floor to ceiling height of 10. ft.

Lowering of the ceiling height from 10 ft. to 8'6" would not appear to be of any significance. A scientific investigation carried out in South Africa into the effect of ceiling height on ventilation and indoor temperatures was unable to find substantiation of any adverse affects of the

lower / ....

lower height.(1) The results indicated that thermal conditions, ventilation, lighting and acoustic characteristics within a house would not be significantly affected if ceilings were lowered to 8 feet. Studies in Australia, India and Israel support these conclusions.(2)

The analysis in Table 11 indicates that on entry into the housing scheme, 3.2 per cent of sub-economic dwelling types would be overcrowded in terms of the Slum's Act; 6.7 per cent of economic dwelling types would be overcrowded and an average of 5.0 per cent of all dwelling types would be overcrowded.

5.3 Future Overcrowding.

Household size will vary over time due to the following factors:-

(a) Births
(b) Influx of relatives
(c) Married couples living in parental home
(d) Married children leaving parental home
(e) Deaths
(f) Influx of boarders or other families.

Low cost dwelling types are allocated to households in terms of minimum accommodation standards. Little or no space is allowed for future expansion and an increase in household size will invariably result in overcrowding. This problem can best be overcome by providing sufficient flexibility in the dwelling type or by providing a sufficient variety of dwelling types to accommodate changes in household size.

This implies a readiness on the part of the household to change its dwelling type. An adequate mix of dwelling types should preferably be provided within a housing scheme(3) or at least within the housing stock.

A / ....

(1) S.J. Richards : Minimum Ceiling Heights in South Africa National Building Research Institute Bulletin No. 15, Jan. 1957

(2) S.J. Richards : Environmental Hygiene in Housing : The Indoor Physical Environment : C.S.I.R. Reference No. RD.44, Pretoria 1963, p.214.

(3) Families are reluctant to move from the existing communities (see paragraph 6.0, p.51)

A small surplus of dwelling units is also necessary to facilitate movements of families.

5.3.1 Births and Deaths : Natural Increase.

The Coloured birth rate is the highest of all races in the Cape Town Municipal area.(1) The comparative figures of live birth rates for Whites and Coloureds shown below indicate that the Coloured birth rate was more than twice that of Whites in 1967. It shows a steady decrease, albeit a small one since 1965, undoubtedly due to an increase in the number of Coloured mothers using birth control methods. This trend, however, should be treated with caution as it is only over a 2 year period and is based on populations which are estimated from the 1960 census. Nevertheless it is significant that the number of live births in 1966 and 1967 were lower than in preceding years.(2)

	Live Birth Rate (Per 1000 Population				
	1963	1964	1965	1966	1967
Whites	18.4	18.7	17.4	18.8	18.9
Coloureds	41.0	41.7	41.8	39.5	38.5

The Population Pyramid shown in figure 1 suggests that incoming families consist largely of parents in the 25-34 year age group with a large proportion of children in the 0-9 years group. The average number of children per family is small (2.72) and coupled with a high birth rate, an increase in average family size can be expected.

The Coloured rate of natural increase i.e. the difference between birth and death rate shows a fall from 30.4 per 1000 in 1963 to 28.3 per 1000 in 1967. As in the case of declining birth rate, this trend should be regarded with caution as populations are estimated from the 1960 census. Confirmation of a declining natural increase rate must await the 1970 Population Census.

A / ....

(1) Medical Officer of Health : The City of Cape Town Annual Report 1967, p.15.

(2) Idem, p.15.

A distinguishing feature of the Coloured population is the high death rate among children. The deaths of Coloured children in the 0-1 age group constitute 24.6 per cent of all male deaths and 22.9 per cent of all female deaths.(1) Infant mortality rates showed a steady decrease during the period 1963-1967.(2) This factor lends further support to the hypothesis made earlier that family size is likely to increase.

5.3.2 Influx of Relatives.

As stated in 4.1.4 no less than 37.4 per cent of all families had one or more additional members other than parents or their children. This figure is well above average for the Coloured population and above the percentage of extended families at Bonteheuwel.(3)

There is no reason to expect the number of extended families to decrease once a community moves into a new township. On the contrary, the increasing life span, the larger proportion of aged people, lack of financial means and lack of institutions for the aged are all factors likely to encourage parents to live with their children and thus increase the household size.

5.3.3 Married Children.

In the sample survey of 516 families there was little evidence of married children living with parents; only eleven cases were recorded of children and grandchildren living with parents.

A survey carried out of all homes in Bonteheuwel in July, 1969, revealed that 10.7 per cent of houses accommodated more than one family.

The prevalence of multiple households is attributed to a shortage of housing, but economic factors also influence the situation.

5.3.4 / ....

(1) Medical Officer of Health, City of Cape Town, op cit, p.18.

(2) Ibid, p.24.

(3) See paragraph 5.4.4.

5.3.4 Effects of changing age structure of household.

As discussed in 4.1.2 the age structure of applicants awaiting entry into housing schemes shows a large percentage of children in the 5-9 age group. Within 5 years of entry into a housing scheme these children will exceed 10 years of age and will therefore tend to create overcrowding due to the necessity to segregate the sleeping accommodation of opposite sexes above this age.

5.4 Socio-economic structure of households in an existing housing scheme : Bonteheuwel.

5.4.1 Sample Survey.

The changes in the socio-economic structure of entrant families over time, were examined by means of a sample survey of families living in Bonteheuwel Housing Scheme. This assumes that the socio-economic structure of the Bonteheuwel community when entering the housing scheme during 1961-1964 was similar to that of families now awaiting housing accommodation.

Bonteheuwel is a low cost housing scheme which is situated on the Cape Flats approximately 9 miles from the centre of Cape Town. It was constructed by the Cape Town City Council during 1961 and 1964 and houses approximately 35,000 persons in 5,200 dwelling units.

It was chosen for the purposes of comparison with incoming families as its families had aged sufficiently to show trends in socio-economic changes; it also contained four-room dwelling types which were not generally available in other schemes. A systematic random sample survey of 277 households, which represented 5.3 per cent of the total population of 5,200 households was obtained from records kept in the estate offices at Bonteheuwel. The records were compiled in June 1969. The sample size gives a reliability of 5.9 per cent at 95 per cent confidence level (see appendix 1).

The survey revealed that the average period of occupation of dwellings was 6.1 years.

5.4.2 / .....

5.4.2 Age Structure.

Figure 7 and Table 14 show the age structure of the male and female population. Unauthorised second families in single households were excluded from the analysis as their presence might have been due to the shortage of houses and hence the doubling of households may only be a temporary phenomenon.

When compared to applicant families awaiting entry into the scheme, it is noted that the 0-4 years age group has shrunk and that the groups 5-9 years, 10-14 years and 15-19 years have increased; shrinkages in the 25-29 years and 30-34 year groups have occurred and thereafter the percentages in the older groups above 35 years of age have increased.

These results appear consistent with a community which on average is 6.1 years older. The fewer children in the 0-4 age group reflects a decreasing birth rate among the mothers who are now 6.1 years older whilst the broad bands of children in the original population show an upward movement into the higher age groups. Extensive shrinkage in the 20-34 year groups indicates the exit of married couples from the community. Increases in the age groups above this reflect that the original married couples have remained in the housing scheme and that little filtering to new residences outside Bonteheuwel has taken place.

Figure 7 shows that the population has taken on a two tier pattern. The lower tier comprises a broad base of children and a small percentage in the marriageable 20-29 year age group; the second tier consists of older people in the 30-75 year range.

The ratio of persons 15-60 years to children 0-14 is 0.92:1 (see Table 14). This ratio is a low one and shows a decrease from the ratio of 1.2:1 which was determined for entrant families in paragraph 4.1.2. The burden on the economically active section of the community therefore appears to increase. The trend will therefore be towards lower rent margins, an increase in working mothers and an inflow of older relatives to care for children in the mothers' absence.

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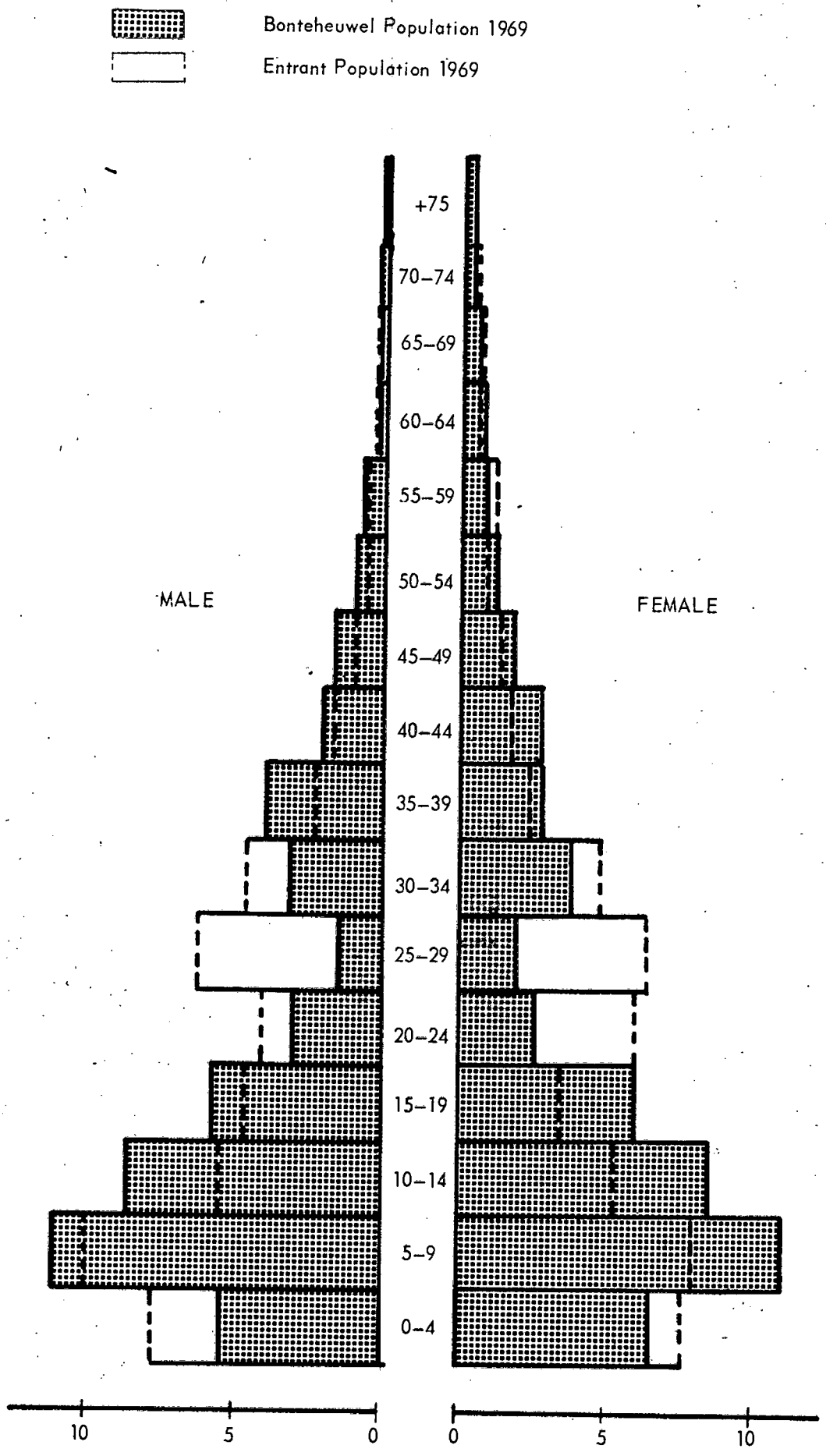
BONTEHEUWEL POPULATION: PERCENTAGE OF AGE GROUPS AND SEXES 1969
(Excludes Second Families and Lodgers)



Sources: Tables 1 and 14

FIGURE 7

The large proportion of children could therefore result in increased household size.

The change in population distribution over time suggests a growth in the community which would reach a peak and thereafter diminish due to the decreasing number of children. Additional accommodation would therefore be required within a relatively short period and sufficient variety of housing types would be required to meet the fluctuation of space requirements of families which change with time.

5.4.3 Household Size:

The frequency distribution of Household Size is shown in figure 8 and Table 15. The average household size was found to be 6.91 which compares with W. Wittman's[1] figure of 6.96 which he observed at Bonteheuwel in 1965. The standard error was 0.19 and the mean household size was therefore between 6.53 and 7.29 at 95 per cent confidence level.

The range in size was 16 and this points to a need for a large variety of dwelling types.

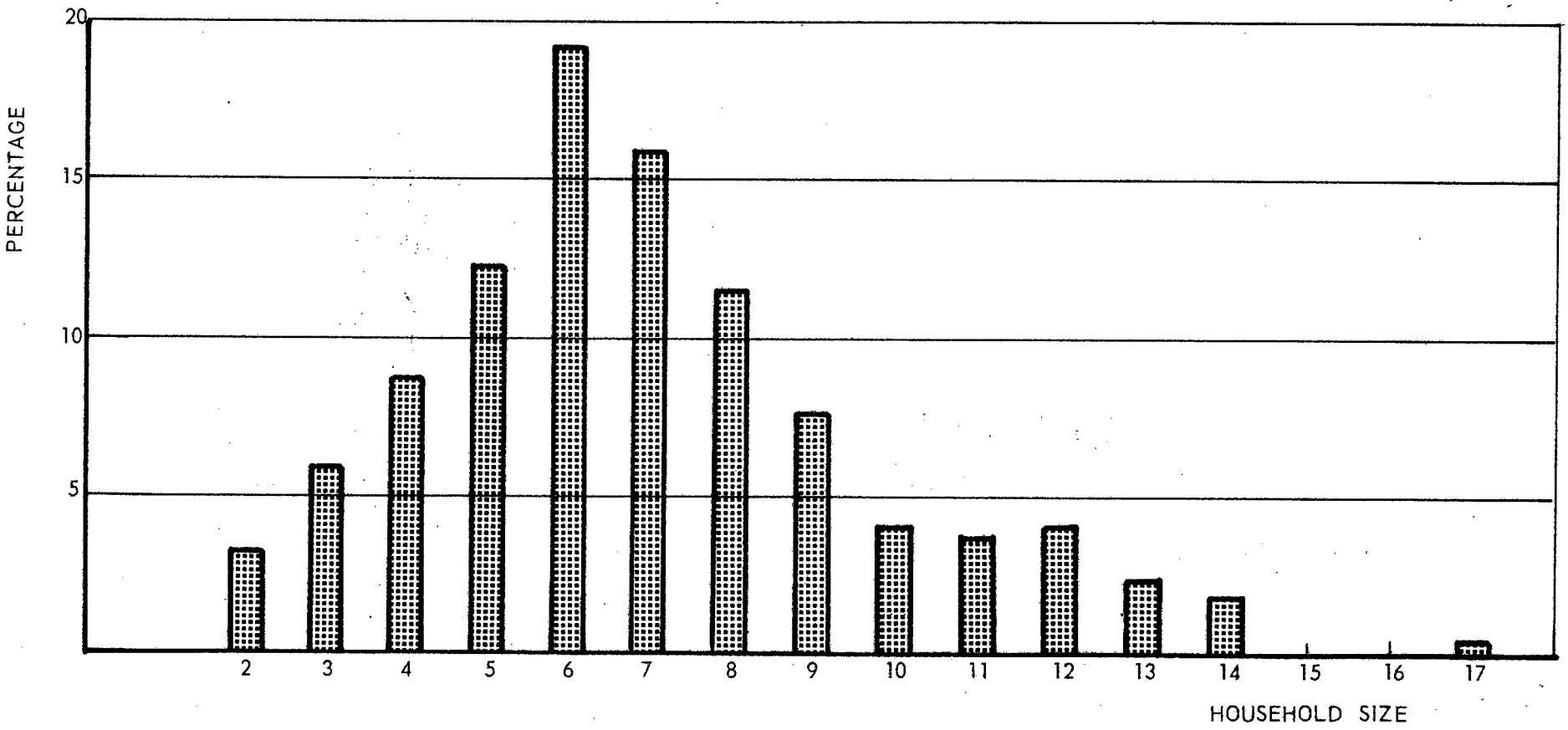
The average household size of 6.91 represents a growth of 39.3 per cent over the average size of 4.96 of entrant families. Portion of this large increase is due to the occupation of houses by double families which is discussed below. An analysis was therefore made of household size, excluding the second family in a dwelling. A comparison of household sizes is as follows:

Household Type	Household Size (Single families)	Household Size (including Double families)
Sub-Economic	6.59	6.91
Economic	6.56	6.90

Single / .....

(1) W. Wittman et al, op cit pages 664-682.

BONTEHEUWEL POPULATION 1969: DISTRIBUTION OF HOUSEHOLD SIZE



Source: Table 15

FIGURE 8

Single family households show an increase of 32.5 per cent over the size of entrant households and this validates the earlier hypothesis that entrant families are young and that they will grow.

Wittman's determination of household size of 6.96 which was made in 1965 i.e. 4 years after the first families moved into the scheme indicates that the growth of household size is rapid and that it occurs within the first few years of entry. Families only recently settled in houses are likely to be reluctant to endure the disruption of moving (presuming larger homes were available and within their economic means) and hence additional space above the minimum standards would be required to accommodate the growth in household size. Early growth was confirmed by Mabin's[1] study of Heideveld in 1968 where the average household size was found to be 6.20 after 2 years of occupation.

5.4.4 Household Structure.

The extended families were found to comprise 27.4 per cent of all families. Although this figure is lower than the percentage of extended families in the incoming families, it is still high and indicates the need for additional space and privacy for members of the household who are generally older and whose interests would conflict with those of children.

The percentage of extended families compares well with that quoted by Celliers[2] who reports that research shows that about one-quarter of all Coloured families have such additional members of their households. He attributes the phenomenon to factors such as the relative absence of orphanages and homes for the aged, the prevalence of illegitimate births - especially amongst young unmarried females - the relative shortage of low-income housing and the low earning power of the working class Coloured. He

also / ....

(1) D.S. Mabin : op cit p.16

(2) S.P. Celliers : op cit p.25

also remarks, that irrespective of the reasons for additional household members it seems to be a fairly general phenomenon which forms part of the family structure of the Coloured population.

Allowance should accordingly be made in the size of dwelling types for what appears to be a feature of the normal social structure of the Coloured group.

5.4.5 Household mobility.

The movement of families to new residences is reflected in Table 16 which shows the percentage of dwellings which were occupied each year since 1961. As the Bonteheuwel housing scheme was completed in 1964, the occupation of dwellings during the years 1965 - 1969 represents household movements within the scheme.

The average change in occupancy was 4.0 per cent per annum.

5.4.6 Doubling of Households.

A hundred per cent survey of dwellings in low cost housing schemes carried out by the Cape Town City Council in 1969 revealed that approximately 10 per cent of the units were occupied by families or lodgers who were not related to the tenant families.

The following is an analysis of multiple families and lodgers extracted from the results of the survey.

Scheme	Percentage of Doubled houses	Average Size Tenant family	Average Size of household
Kewtown	13.5	4.43	8.16
Bonteheuwel	10.7	5.74	8.57
Heideveld	6.6	5.42	7.83
Manenberg	7.5	5.63	7.71

As expected the analysis indicates a high average of doubled households. The average family size of the tenant family is however well below average.

The / ....

The Kew Town scheme which is approximately 14 years old reveals a small average family size and indicates that these families are past their maximum size and are now shrinking. This suggests that the original families now have surplus accommodation but that due to a reluctance to move or insufficient suitable accommodation into which they could be moved, they remain in their original dwellings.

The analysis shows that doubling occurs in households which on average are below average household size for the community and that the size of the second family or number of lodgers is small.

The incidence of doubling appears to increase roughly with age of the housing scheme, the housing schemes listed above being in chronological order of date of completion.

Doubling is generally attributed to a shortage of housing, but it is also associated with low income. Doubling is most common among young adults and is more common among Non-Whites than Whites.(1)

5.5 Housing Allocation in Bonteheuwel.

The allocation of accommodation to families in Bonteheuwel was analysed as a means of determining the effects of structural changes in household composition over time, on the dwelling type. This analysis enabled comparisons to be made with the analysis of the hypothetical distribution of dwelling types to households entering a housing scheme.

The adequacies of the dwelling types were tested in terms of two indices suggested by Watts(2) as a means of assessing housing needs : viz. dwelling occupancy rates and overcrowding.

5.5.1 Dwelling type in relation to household size.

The relationships between household size, dwelling type and number of households are shown in Tables 17, 18 and 19.

Separate / .....

(1) D.L. Foley et al : Housing Trends and Related Problems : California Housing Studies : University of California, Berkeley 1963, p.152.

(2) H.L. Watts : The Assessment of Housing Needs : National Building Research Institute Bulletin No. 23

Separate analyses were made for sub-economic dwellings; economic dwellings and combined dwellings. The analyses were further broken down for tenant families and doubled families to enable the extent of housing adequacy to be measured if doubled families were provided with their own housing.

The analyses reveal large average household sizes and large occupancy rates for both economic and sub-economic dwellings as well as for the combined township. The omission of second families and lodgers reduces the averages slightly but averages remain high. The occupancy rates and household sizes are as follows:

	Sub-Economic		Economic		Combined
	Single House-holds.	Incldg. Doubled Households	Single House-holds	Incldg. Doubled Households	House-holds
Household Size	6.59	6.91	6.56	6.90	6.91
Occupancy Rate (Persons/Room)	3.12	3.28	2.33	2.45	2.74

The high occupancy rates are indicative of overcrowding and the worst overcrowding can therefore be expected in the sub-economic dwellings which have the highest occupancy rates.

The occupancy rate of 2.74 persons per room for the combined township shows an increase of 20.1 per cent over that of 2.28 persons per room for entrant households. The occupancy rate of 3.28 for sub-economic housing shows an increase of 47.0 per cent over sub-economic entrant families (see Tables 12 and 13).

The space rate for sub-economic housing shows a reducttion from 67.5 sq.ft. per person for entrant families to 46.0 sq.ft. per person i.e. 31.8 per cent less floor space is available; economic dwellings show a reduction from 68.4 sq.ft. to 58.3 sq.ft. per person whilst the overall reduction is from 66.1 sq.ft. to 53.2 sq.ft. per person (see Tables 12 and 13).

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The average space per person is lowest for sub-economic housing. This index also points to worst overcrowding in this type of housing.

It is noted that average household size is almost the same for both economic and sub-economic housing. The higher occupancy rates and lower space rates per person reflects the fact that households in the lower income categories, irrespective of their needs, are allocated less housing than those in the economic categories.

5.5.2 Overcrowding in Bonteheuwel.

The extent of overcrowding was determined by applying the minimum housing standards[1] to the distribution of dwelling types and household sizes shown in Tables 17, 18 and 19.

The analysis of the overcrowded dwellings which is shown in Table 21 reveals that 62.3 per cent of sub-economic dwellings and 38.8 per cent of the economic dwellings are overcrowded. In terms of the whole township, 48.7 per cent of the dwelling units are overcrowded and the distribution of these overcrowded units is shown in figure 9.

In the sub-economic dwellings, 73.8 per cent of residents live in overcrowded conditions; in the economic units 55.2 per cent of persons are overcrowded and the corresponding percentage for the whole township is 63.0.

Table 21 also shows that overcrowding in the dwelling types is inversely proportional to the number of rooms except in the case of four-room dwellings which show a larger percentage of overcrowding than three-room dwellings.

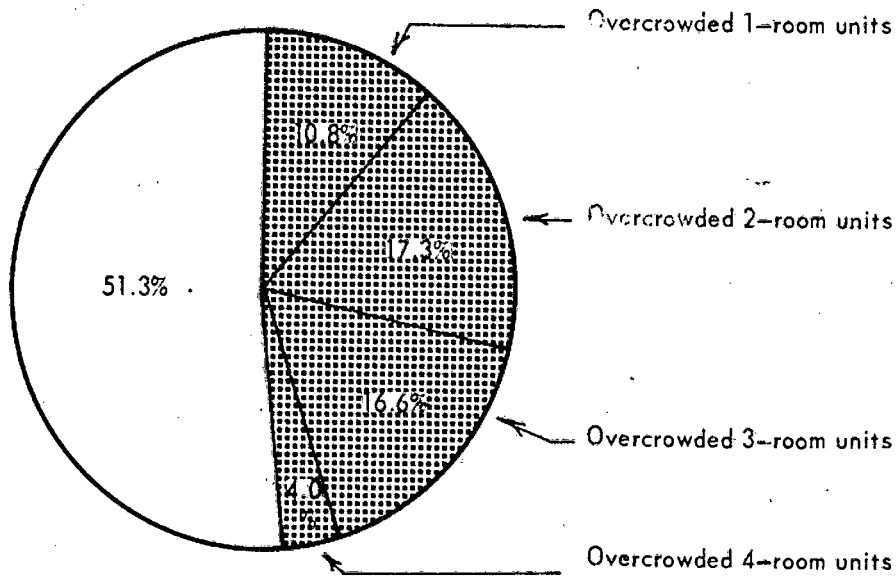
The United Nations has expressed the opinion that three or more persons per room would be considered overcrowded "under any circumstances".[2] In terms of this standard,

the / ....

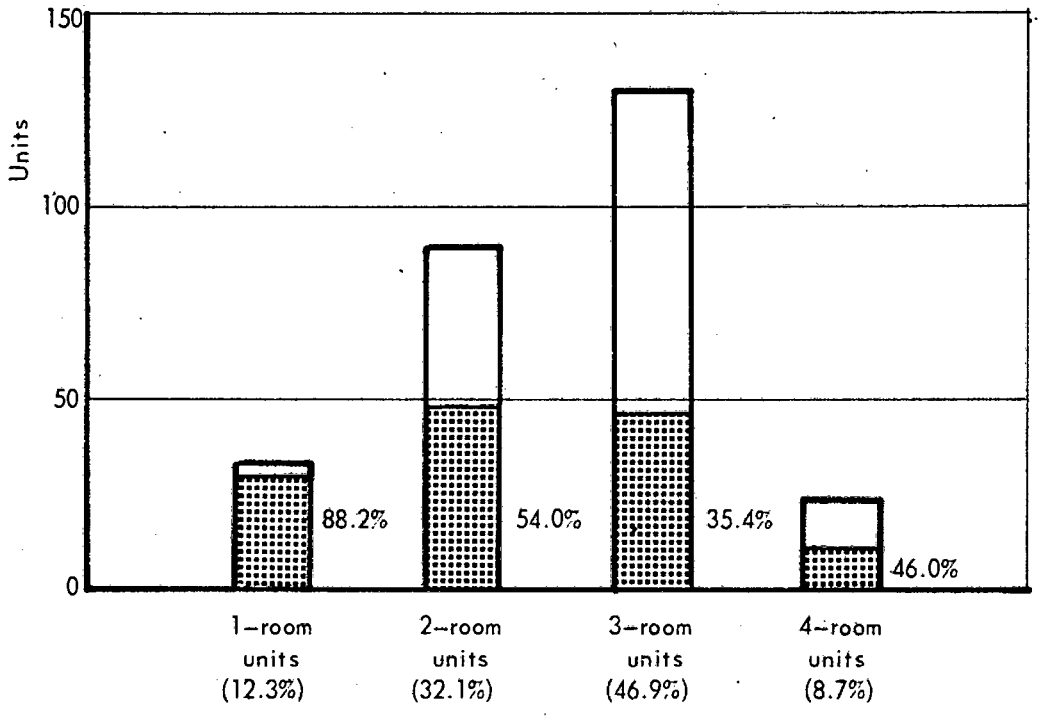
(1) See paragraph 5.1 p.33.

(2) United Nations, Economic Commission for Asia and the Far East Seminar on Housing Statistics and Programmes for Asia and the Far East : Methods of Estimating Housing Needs : p.48.

BONTEHEUWEL: OVERCROWDED DWELLING UNITS 1969



Total Units:	277 (100%)
Not Overcrowded:	142 (51.3%)
Overcrowded:	135 (48.7%)



Source: Table 21

FIGURE 9

the extent of overcrowding in Bonteheuwel was analysed in Table 22. This analysis shows that 44.4 per cent of all dwelling units in the township are overcrowded and that 51.1 per cent of all persons live in overcrowded conditions.

The application of either standard reveals an excessively large degree of overcrowding. More than half of the population of Bonteheuwel live in overcrowded conditions; in terms of the standards of the National Housing Commission, this proportion rises to nearly two-thirds of the population.

The large extent of overcrowding is also evident from an analysis of household size and dwelling type. Table 19 indicates that whereas 44.4 per cent of dwellings comprise one and two rooms, only 17.7 per cent of the households have a size of four or less; only 8.6 per cent of the dwellings comprise four rooms whereas 34.3 per cent of households have eight to seventeen members.

Floor space rates for different dwelling types are as follows:

Dwelling Type	Floor Area sq.ft.	Av. Household Size	Floor Space per person sq.ft.
1 Room	188	6.85	27.4
2 "	315	5.75	54.8
3 "	422	7.25	58.2
4 "	531	9.41	56.4

NOTE: The dining room/kitchen is excluded in dwelling type but included in floor area per dwelling.

The floor space rates for 2, 3 and 4 room dwellings are fairly uniform; the rate of 27.4 sq.ft. for the 1 room dwelling type is extremely low and well below the minimum of 40 sq.ft. per person prescribed by the Slums Act of 1934. All the 1 room dwellings do not necessarily contravene this Act as the minimum allowance for children under 10 years of age is 20 sq.ft. per person.

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BONTEHEUWEL

A Sub-Economic 1-Room dwelling : the kitchen is used as a second bedroom.

The above analyses validate the hypothesis that the majority of dwelling types are inadequate.

5.5.3 Distribution of dwelling types.

Overcrowding could be due, partly, to a maldistribution of dwelling types and household sizes. Changes in household size over time will not be uniform; overcrowding and undercrowding may result and by a re-allocation of dwellings, overcrowding could possibly be alleviated.

The proportionate distribution of dwelling types in relation to household sizes in Bonteheuwel was therefore determined for analysis purposes. The following analysis is based on the requirements of the Minimum Standards of the National Housing Commission:

Household Size	Percentage of all households	No. of Rooms per dwelling	Percentage of Existing dwelling
2-3	9.0	1	5.6
4-5	20.9	2	25.1
6-7	35.4	3	49.8
8-9	19.1	4	19.5
≥ 10	15.6	5	-
	100.0		100.0

The analysis shows that there is a need for 5 room dwelling types to accommodate 15.6 per cent of households which have 10 or more members. The provision of this dwelling type and a re-distribution of the other dwelling types could largely obviate the overcrowding in Bonteheuwel.

In rapidly growing households, frequent moving could have disruptive social effects; economic costs would also be considerable for low-income families. It may therefore not be practicable to re-distribute families.

6.0 / .....

6.0 Housing Supply.

Overcrowding and "doubling" in low cost Coloured housing schemes are often ascribed to the shortage of available housing. The previous analyses, however, showed that average doubling of families represented only 8.9 per cent of all families in Kew Town, Bonteheuwel, Heideveld and Manenberg. Of larger importance is the long list of families awaiting provision of a council house. At the end of 1968, 11,055 families were awaiting entry into low cost housing schemes.

The demand for new housing is determined by the formation of new households. In the absence of a known correlation factor between these two rates of growth, it seems reasonable and practical to assume that households increase at the same rate as the population.(1)

In calculating the required supply of dwellings to meet future demands, allowance must also be made for reasonable replacement needs caused by progressing deterioration of the housing stock or by slum clearance.

These two components, population growth and replacement, provide the basis for calculating future needs and their relationship can be expressed in the formula(2)

$$N_t = DR_t + (D + \frac{DR_t}{2}) \frac{t}{L}$$

N = number of dwellings needed

t = time period for which the needs are calculated (in years)

D = number of dwellings in existence (housing stock) at the beginning of time period (t)

R = geometric growth of population for time period (t)

L = average technical life of the dwellings (in years).

Based / ....

(1) W.D. Harris, H.A. Hossé & Associates : Housing in Honduras: op cit p.82.

(2) Guido Dandri "Una Formula Semplice per il Fabbisogno Edilizio" Corriere dei Constructorri, vol. 42, No. 7, February 14, 1963

Based on a Coloured population of Cape Town in 1967 of 328,210[1] and a growth rate of 3.2 per cent[2] per annum the estimated 1969 Coloured population is 349,552. Using an average household size of 5.8 persons, the estimated number of existing dwellings is 60,250 which is D in the above formula. Taking L as 50 years, the number of dwellings needed in the next 5 years (t) has been calculated at approximately 16,700 houses.[3] If the current shortage of approximately 12,000 houses is added to this figure the requirements during the next 5 years is 28,700 dwelling units i.e. 5,740 new units are required annually.

These calculations do not take specific account of additional units required as a result of the evacuation of Coloured families from White areas under Group Area legislation but allowance has been made for replacing 2 per cent of the housing stock annually. Decreasing household size would increase the number of units required annually.

On the basis that only those families where the household head's income is in excess of R130 per month will be able to arrange their own housing needs, it is estimated that of the 5,740 new dwelling units required annually, 95 per cent[4] of these will need to be supplied by the local authority in the form of low cost housing. This requirement amounts to 5,450 units per annum.

In addition surplus units must be provided to facilitate moving to appropriate dwelling types as their household structure changes. It has been stated that during the first decade of marriage, the average family makes some two-thirds of all the moves it will make during its entire history.[5] Peter Rossi cogently summarizes why this should be so:

"The / .....

(1) Medical Officer of Health, Cape Town, Annual Report 1967, p.10.

(2) D. Hobart Houghton, op cit p.35

(3) See Appendix 2.

(4) Estimate based on Bureau of Market Research Income Distribution, op cit. Table XXIII, p.54.

(5) Janet Abu - Lughod and Mary Mix Foley : The Consumer Votes by Moving : Urban Housing. op cit p.182.

"The housing needs of a young household are most likely to be out of balance, as it was with its actual housing. This is the period in the family's life cycle when the greatest amount of change in household size and composition takes place. It is also the period in which the household, because of the financial demands made upon it by these rapid changes in size and composition is least likely to be able to bring housing into line with its needs". (1)

The City Housing Manager of the Cape Town Municipality has found a reluctance on the part of families to move out of a housing scheme but less opposition to moving within the scheme. Surplus housing units in each scheme are required to enable families to move.

If an additional 5% of units are provided, a total of approximately 5,720 dwelling units would be required annually.

The number of low cost dwelling units for Coloureds built in 1967 was 1,625(2) and thus a greatly accelerated programme is required to satisfy the demand.

6.1 Marginal costs of additional floor space.

A breakdown of rental composition for recently completed sub-economic and economic dwelling units is shown in Table 23. In the case of economic dwellings approximately 50 per cent of the rental is due to the capital costs of the building work, the balance being due to costs of land, services, administration, water, electricity and loss of rentals. In the case of sub-economic housing, only 18 per cent of the rental is attributable to building costs.

Marginal rentals are therefore not directly proportional to marginal capital costs of additional floor space.

The / ....

(1) Peter H. Rossi : Why Families Move : A Study in the Social Psychology of Urban Residential Mobility : New York : The Free Press 1955 p.72.

(2) City Engineer, Cape Town : Annual Report for year ending 31st December 1967, p.4.

The building cost in Cape Town for low cost housing is approximately R1.75 per sq.ft.(1) On this basis the addition of one extra room of 120 sq.ft. to each dwelling in Bonteheuwel would have increased the building costs for the whole scheme, which comprises 5,116 dwelling units and which cost R5.5 million during 1961 - 1964 by approximately 20 per cent (see Appendix 3).

If, for example, the floor space of a dwelling was increased by 50 per cent, economic rentals would increase by 25 per cent; sub-economic rentals would increase by 9 per cent. Maximum increases in rent/income ratios would be 5 per cent and 1.8 per cent for economic and sub-economic households respectively. Rentals are subsidised by the State in the case of households in the sub-economic category and in the economic categories R60 - R129 (see paragraph 4.1.6). Thus although the rent increases to tenants for additional floor space would be marginal, additional subsidy would be required from the State.

SECTION III.

SYNTHESIS : EVALUATION OF HOUSING ADEQUACY IN RELATION TO HOUSING NEEDS.

7.0 Housing Criteria.

7.1 The nature of housing needs.

Housing needs are derived largely from subjective considerations. This subjectivity makes it practically impossible to arrive at an absolutely objective and satisfactory solution.

In South Africa, where economic and industrial development has been rapid, social changes have resulted and housing standards for non-Whites have become subject to relatively rapid and radical changes. The differences between low and high standards give rise to "needs".

The / ....

(1) Information from City Engineer's Department, Cape Town 1969.

The desire for better housing occurs simultaneously with a general desire for better living conditions, both of which are caused to a large extent by economic development and growing urbanisation.

The gap between the new or higher standards achieved by the economically successful and the old or lower standards of those who did not share in the progress of the country tends to widen, and if not filled may produce serious social, and also political repercussions.(1)

Measuring housing needs thus depends very much on agreement and acceptance of a basic minimum standard, which in turn is dependent on discretionary and subjective considerations of what is regarded to be adequate or sufficient in a given society.

7.2 Housing Standards.

Meagre accommodation standards are socially undesirable; generous standards are expensive to implement.

Where public housing is to be provided as the alternative to unacceptable housing conditions, society undertakes a financial burden in order to free certain of its members from intolerable living conditions.(2) Housing standards involve degrees of probability that some undesirable results will ensue - fire, accident, ill health, insanity; or on the other hand, that favourable results will develop - contentment, health, aesthetic satisfaction. Houses are built for people and the basic test of housing quality lies in the effects upon people. It should follow therefore that the judgements of housing situations, of space and space arrangements are only valid when related to the people and families who are exposed to them.(3)

Whilst / ...

(1) W.D. Harris, H.A. Hossé and Associates : op cit p.77.

(2) R.U. Ratcliff : "Housing Standards and Housing Research" : Land Economics Vol. 28 (Nov. 1952) pp. 328-331.

(3) Ibid, p.p.328-331.

Whilst almost all countries have laws regulating the clearance of buildings which are judged to be unfit for human habitation, the relationship between housing standards and physical or mental health is not readily established.(1)

Housing standards besides meeting the requirements of shelter and good health, should also provide for the proper social functioning of the family. Indoor environmental conditions, in addition to providing adequate thermal conditions, ventilation, lighting and noise protection, should also cater for the family's comfort and convenience. In servantless units and with only parents to care for children, sufficient space should be provided for mechanized aids to housework as well as furniture. In families with large numbers of children, conflicts of interest between children and adults could be avoided by providing separate living spaces for each age group. In an era of rising living standards and sophisticated communications media, separate play space, quiet study area and greatly expanded storage space are desirable.

Changing family structure results in changing needs and prompts the use of flexible plan arrangements. Either sufficient variety of dwelling types should exist so that families can move to new accommodation or the interior space should be convertible by means of movable partitions (2) or by other means. Flexible duplex houses were built over 25 years ago in New York. The two storey building contained on four-roomed flat and one two room flat on each floor separated by a stairwell. These could be used as two or four room units, or combined to make six, eight, ten or twelve room units as needs varied.(3) Recently a builder in San Antonia, Texas, reported that he had under construction five "flexabilt" houses which were designed to "meet the needs of families from newlywed days through old age".(4)

The / ....

(1) Lionel Needleman : The Economics of Housing : Staples Press London 1965, p.196.

(2) B.P. Spring : "Advances in House Design" in Design & Production of Houses. McGraw Hill New York, 1959, p.64-68.

(3) The Committee on the Hygiene of Housing, American Public Health Association "Guiding Policies" in Urban Housing : Edited by W.C.C. Wheaton et al. The Free Press New York 1966, pp.226-230.

(4) Ibid, p.229.

Bonteheuwel : The living room of a 4-room economic dwelling.

"..... Sufficient space should be provided for mechanized aids to housework as well as furniture."

The increased leisure people have today requires the provision of living room for the family for the pursuit of hobbies and entertaining. Rising levels of education and a friendlier attitude towards intellectual pursuits makes places for reading, study and quiet contemplation desirable.

New modes of living call for more space and more differentiated space. This view was confirmed by the Parker Morris Committee of investigation into British standards of internal housing design. The Committee considered the need for more space as the first priority and recognised that in addition to the need for a place where the family can gather together, there must be room in every home for activities demanding privacy and quiet.(1)

7.2.1 Trends in Housing Standards.

In applying minimum standards for housing accommodation allowance should be made for changing standards over time. This is of particular importance due to the durability of housing.

In the past, as living standards have risen, so the demand for more living space per person has increased. In England, the area of a local authority three-bedroomed house in 1919 was 787 sq.ft.; by 1958 it had risen to over 900 sq.ft.(2) In the United States, with an average real income about double that of the United Kingdom the average size of a non-farm house built in 1956 was probably over a third larger than the average British house.(3)

Holm in a study in Stockholm(4) confirms the increase in demand for additional space and higher standards as income increases. Mabin in his study of a low cost housing scheme

at / ...

(1) Ministry of Housing and Local Govt. : Homes for Today & Tommorrow : Her Majesty's Stationery Office London, 1961, p.2.

(2) United Nations : Government Policies and the Cost of Building. United Nations 1959, part 1, p.5.

(3) L. Needleman : op cit p.37

(4) P. Holm : A Disaggregated Housing Market Model : Published in The Economic Problems of Housing : St. Martins Press, New York 1967, p.37-52.

at Heideveld, Cape Town, showed that if larger incomes were available, the preference would be towards larger suburban dwelling types.

In South Africa the State's Economic Development Programme for 1966-1971 is based on a growth rate for the real Gross Domestic Product of 5.5 per cent per annum. At this growth rate, the real net national income is expanding at an annual rate of 5.15 per cent, being equal to a growth rate of 2.7 per cent per annum in real income per person.(1) This will result in real incomes more than doubling by the turn of the century i.e. within the life span of dwellings now being constructed and within the loan redemption periods for sub-economic housing viz. 40 years.

Low cost Coloured housing, now being built to minimum standards could thus become obsolete well before it required replacement due to physical deterioration. In the long term, it might therefore be more economical to redeem a higher initial capital expenditure over a longer period for a consumer good which will enjoy a longer period of demand.

A higher and more refined "bedroom standard"(2) is now being used in England. This allocates bedrooms on the following basis:

(i) Each married couple and each unmarried person aged 21 or more in the household is given one bedroom;

(ii) Persons aged 10-20 of the same sex are paired off and a bedroom given to each pair;

(iii) Any person aged 10-20 not so paired off is then paired with a child under 10 years of age of the same sex and given a separate bedroom. If no pairing with a child under ten years is possible such a person is still given a separate bedroom.

(iv) / ....

(1) Department of Planning : Economic Development Programme for the Republic of South Africa 1966-1971 : Govt. Printer Pretoria 1966 p. (xi).

(2) J.B. Cullingworth, op cit p. 224.

(iv) Any remaining children under 10 years of age are then paired irrespective of sex and a bedroom given to each pair;

(v) Any remaining child is given a separate bedroom.

This standard has no statutory basis but is being acted on in a voluntary manner.

7.2.2 Overcrowding Standards.

As stated in paragraph 5.2 overcrowding in South Africa is determined by the Slums Act No. 53 of 1934.

In England overcrowding was defined by Statute in 1935 in regard to mixing of sexes and floor area. The minimum permissible floor area is 55 sq.ft.(1) per person which is 37.5 per cent higher than the South African minimum of 40 sq.ft. per person.

7.3 The cost of providing additional internal space.

7.3.1 Long term costs.

The cost of additional internal space is marginal and is comparitively cheap. It is not loaded with heavy overheads such as plumbing and equipment, and so may amount to much less than the average per square foot.(2) The Parker Morris Report(3) draws attention to the fact "that additional space is an important long term investment, for if a house or flat is large enough it can usually be brought up-to-date as it gets older; but if there is not enough space, the improvements can be impossible, or at least unduly expensive. Houses are being built at the present time which not only are too small to provide adequately for family life but also are too small to hold the possessions in which so much of the new affluence is expressed ..... Such places cannot be expected to meet the needs of their occupiers today, still less to hold their value in the long term".

These / ....

(1) J.B. Cullingworth, op cit p.223.

(2) Ministry of Housing and Local Government : Homes for Today and Tomorrow : Her Majesty's Stationery Office, London 1961, p.2.

(3) Ibid, p.2.

These remarks are particularly pertinent to low cost Coloured housing. Additional space, particularly in the form of additional rooms is required to alleviate the gross overcrowding; it would also provide the additional flexibility which is needed to accommodate early structural changes in household composition.

Lack of space could lead to early obsolescence in an age of rising economic standards. These long term costs together with other hidden social costs should be taken into account when assessing the opportunity costs of additional dwelling space.

7.3.2 Short term costs.

Housing funds are made available by the State to local authorities for utilisation on a non-profit basis.

Rentals are determined to cover the following expenses:

(i) interest and redemption of advance for building costs and services

(ii) interest and redemption of advance for land

(iii) contribution to maintenance and renewal funds. The maximum is 1½ per cent of the cost of the dwelling.

(iv) fire insurance

(v) administrative costs

(vi) reserve for loss of rentals

(vii) other expenses.

The above costs are all pared to a minimum and increased rentals must either be borne by tenants or subsidised by the State. Increased subsidies could be paid direct to the local authority or a longer redemption period for repayment of a housing loan could be offered.

Alternatively, higher minimum wage rates could be laid down for Coloured employees. The economic advancement of the Coloureds is discussed in more detail in paragraph 9.1 as a means of enabling Coloured households to provide themselves with improved housing.

The / .....

at which approximate income, interest is shown in home ownership.(1) Because there has been no large increase in housing productivity there is an increasing gap between real wages and housing costs.

In addition low incomes generally show a smaller increase over time than middle or upper incomes. The gap between skilled and unskilled wages, or as it is usually in practice in this country, between White and Non-White remuneration, has tended to widen.(2) This income differential appears to be universal and it is reported from America that between 1952 and 1961 the median income of public housing households increased by 13 per cent whilst the national median income gained by 44 per cent.(3)

Thus an ever increasing number of Coloured families will require low cost housing in both the short and long terms. As was stated previously at the end of 1968 there were 11,055 families awaiting the allocation of housing in the Cape Town municipal area and approximately 4,500 applications are being received annually.(4)

In terms of Group Areas legislation, many Coloured families will be required to move out of White areas into low cost housing schemes, thus increasing the short term demand for this type of housing.

The total short term demand over the next five years is estimated at 25,000 to 30,000 low cost dwelling units. This includes the present backlog of approximately 12,000 units.

8.1 / ....

(1) Information from City Engineer's Department, Cape Town.

(2) H.T. Andrews et al : op cit p.185

(3) The Editors of the Journal of Housing : Housing of Low Income Families : In Urban Housing op cit p.243.

(4) Information from City Housing Manager Cape Town City Council.

8.1 The need for larger internal space.

8.1.1 Changes in household size.

The sample surveys of households awaiting entry into housing schemes and Bonteheuwel households respectively, confirmed the growth of household size, and both surveys revealed a large range in family size. As was seen in paragraph 5.4.3, household size increased from 4.96 to 6.91 i.e. an increase of 39.3 per cent.

Approximately 10 per cent of households contained "doubled" families or lodgers. When allowance was made for these additional members, net household size reduced to 6.58. This still shows a large increase of 32.5 per cent over the average entrant household size.

The large band of persons in the fertile 25-34 age group of entrant households suggests that growth in household size will be rapid.

It is evident therefore that the allocation of housing on the basis of household size at the time of entry into a housing scheme and in accordance with minimum standards, is unsatisfactory. Within a comparatively short period gross overcrowding was found. There is evidence from the population pyramid of Bonteheuwel that in the longer term the proportion of children will decrease, and that family size may shrink; this could lead to undercrowding.

The survey of "doubled" households in Kew Town suggests that with shrinking family size there is a tendency for additional families or lodgers to share the accommodation with smaller families.

Flexibility in design is required to accommodate variations in household size and a sufficiently large variety of dwelling types is needed to meet the demands of the large range of household sizes. A larger number of rooms and more floor space are required to accommodate short term increases in household size.

8.1.2 / .....

8.1.2 The extent and effects of overcrowding.

Overcrowding and lack of space can have a significant influence on family relationships by exposing one or another of the members of the family to a new social environment.(1) Sub-standard living conditions induce members out of the house to recreational facilities, if these are available, or possibly to the street corner gang or the shebeen.

Overcrowding denies the occupants privacy or an atmosphere for contemplation; it produces social and personal hardships and makes good family life difficult. Its effect on hygiene is profound.(2) Overcrowding is in fact one of the factors in theevolution of a slum.

The gross overcrowding, both in terms of high occupancy rates and space per person, which was revealed in Bonteheuwel should therefore be viewed in a serious light.

In terms of the National Housing Commission's Minimum Standards for Non-Europeans, approximately one half of all homes in Bonteheuwel were overcrowded and nearly two-thirds of all residents of the township lived in overcrowded conditions. In the sub-economic units, almost three quarters of persons lived in overcrowded conditions. In terms of United Kingdom standards, the extent of overcrowding would be considerably higher.

Room occupancy rates at Bonteheuwel averaged 2.74 persons per room. This compares with a figure of 2.7 for the U.S.S.R. in 1961, reported by Charles Abrams.(3) It has also been stated that 71 per cent of all housing erected there in 1957 was built to a standard pattern whilst the percentage rose to 90 in 1959.(4) Space provided for living was almost uniformly small. Most urban residents lived in one room of a communal apartment with a common kitchen.

To / ....

(1) J.P. Dean : Housing Design & Family Values : In Urban Housing : op cit p.136.

(2) W. Wittman et al : op cit p.678.

(3) Charles Abrams : Man's Struggle for Shelter in an Urbanizing World : M.I.T. Press Cambridge Massachusetts, 1964 p.278.

(4) Jack C. Fisher : Planning the City of Socialist Man. Journal of the American Institute of Planners Vol. XXVIII No. 4 Nov. 1962. p.262.

BONTEHEUWEL

"Substandard living conditions induce members out of the house ....."

To alleviate overcrowding, additional rooms are needed to reduce room occupancy rates and floor space per person. Larger rooms would also be required to equate floor space rates to overseas standards of Western countries.

8.1.3 Household Structure.

The extended family was found to be a feature of the Coloured household structure. Three generation families of children, parents and grandparents were present in many families.

An increasing percentage of deaths at ages over 55 years[1] indicates that a larger proportion of aged parents and relatives will require housing. Lack of income and facilities for the Coloured aged are likely to result in increasing numbers of relatives living with children or other younger relatives.

Low incomes make it necessary for many mothers to become economically active and as stated in paragraph 4.1.4, this factor also encourages the presence of relatives in the households to care for children.

Extended families have a wider range in ages and interests. Separate space is required to separate the old from the young, particularly where there are large numbers of children. This characteristic of household structure is therefore another factor requiring a larger number of rooms.

8.1.4 Distribution of dwelling types.

The analysis of the Bonteheuwel dwelling types and household sizes showed that the introduction of 5 room units was needed for households of 10 or more members. These households constituted 15.6 per cent of the total.

A better distribution of dwelling types could alleviate overcrowding. Table 20 shows that in terms of the National Housing Commission's Minimum Standards, there is under-crowding as well as overcrowding.

This / ....

(1) Medical Officer of Health : City of Cape Town op cit p.10.

This points to the need for periodic redistribution of dwelling types to match changed household requirements. If necessary the local authority should be equipped with the necessary powers to enforce movements of families. To reduce hardship, compensation should be paid to families who are required to move.

8.2 Income as a limiting factor in the allocation of dwelling space.

The analyses showed that the two key parameters in low cost housing were large household size and low incomes.

The socio-economic indices showed that for 62 per cent of entrant families, rent margins excluding transport costs were limited to 20 per cent of income. Average household size of Bonteheuwel families showed an increase of 39.3 per cent over entrant families and the ratio of persons 15-60 years to children 0-14 years showed a decrease from 1.2 to 0.9 i.e. 25 per cent. Rent margins will thus decrease as a larger proportion of income will be required for food, clothing and other basic necessities. In addition, due to peripheral locations, transportation costs to the central city area were high. It is evident that the large majority of households in low cost housing schemes would not be able to pay higher rentals and that in such cases the costs of increased space should be borne by means of additional subsidy.

The analysis also revealed the inadequacy of allocating housing on the basis of income. This leads to sub-economic households being more grossly overcrowded than economic households.

Consideration should be given to assessing individual rentals on the basis of the available rent margin for each household i.e. charging what "the traffic can bear", and allocating dwelling types in accordance with household size and composition. This form of price discrimination would result in a re-distribution of incomes amongst tenants. This could, however, be considered as fair and reasonable as tenants who would subsidise others are themselves being subsidised by other sections of the community.

The / ....

The administration of such a scheme would be more complex than the existing practice but it would lend rationality to the allocation of dwelling types.

8.3 The supply of adequate housing.

The major priority in the supply of housing is to meet the annual demand for assisted housing and to eliminate the backlog within as short a time as possible.

It was estimated that the present construction rate needs to be increased more than three-fold to eliminate the backlog within 5 years. This accelerated programme requires a larger allocation of resources in the form of finance and manpower. Administrative procedures need streamlining to minimise the time required for approval of housing schemes and the allocation of funds. The latter require the approval of State departments and Provincial authorities and are time consuming.

On the basis of constructing 6,000 dwelling units per annum, the increased annual capital costs of providing an additional room of 100 sq.ft. to each unit would be of the order of R1.05 million rand and the increased State subsidy would be approximately R27,500 per annum.(1)

If "doubling" was eliminated and if one room was added to each dwelling unit, it is estimated that average room occupancy in Bonteheuwel would be reduced from 2.74 persons per room to 1.96 persons per room. Overcrowding would be reduced as follows:-

Existing Overcrowded Units		Estimated Overcrowded Units with one additional room.	
Sub-Econ.	Econ.	Sub-Econ.	Econ.
62.3 per cent	38.8 per cent	36.0 per cent	15.0 per cent

The above figures relate to the existing household and dwelling type distribution. The easing of overcrowding could be effected by a redistribution of dwellings once sufficient units were available for this purpose.

A / ....

(1) See Appendix 4.

A re-distribution of dwellings and households in Bonteheuwel could then be made as follows:

House-hold Size	Percentage of Households	No. of Rooms in terms of Min. Standards	Existing Distribution of Dwelling Types.	New Distribution of Dwelling Types Percentages.
2-3	9.0	1	5.6	5.6 (2 Room) + 3.4 (3 Room) = 9.0
4-5	20.9	2	25.1	20.9 (3 Room) = 20.9
6-7	35.4	3	49.8	0.8 (3 Room) + 34.6 (4 Room) = 35.4
8-9	19.1	4	19.5	15.1 (4 Room) + 4.0 (5 Room) = 19.1
≥ 10	15.6	5	-	15.6 (5 Room) = 15.6
	100.0		100.0	100.0

This re-distribution would eliminate overcrowding in terms of existing South African standards. Additional flexibility would also be introduced to accommodate changes in household size and structure.

The utility of the additional capital costs could only be maximised if periodic surveys of household structure were made and families induced to move when necessary.

9.0 Factors in the solution of the low cost housing problem.

The problems and pointers to the solution of low cost housing are summarised in the following report.(1)

> "Is it wise to build low cost small houses, at the same time producing overcrowding? Neither high rents nor overcrowding are desirable. However, it is considered that high rents ..... are more damaging to a household than overcrowding. Therefore, if the policy decision has to be made whether to build

larger / ....

(1) H.L. Watts : Survey of the Housing Requirements of Coloureds in Towns of the Western Cape. National Institute of Personnel Research 22/62. C.S.I.R. 1962.

"larger houses with higher rents, which will reduce overcrowding, or low cost houses which will produce overcrowding, the latter course is undoubtedly the lesser of the two evils to choose. Ultimately overcrowding must be eradicated. This will involve raising income levels (and so rent-paying ability), improving standards and patterns of living, perhaps decreasing family sizes, and the construction of a greater number of larger dwellings."

This report equates low cost housing with inevitable overcrowding and expresses a contentious opinion that the latter is preferable to the payment of higher rentals. This would depend on the degree of both and the income group of the tenant.

Overcrowding need not be inevitable and could be eliminated by the provision of larger dwelling units for which higher rentals could be paid in some cases and larger State subsidies in others.

The real and lasting solution to overcrowding, however, lies in the economic advancement of the Coloured group. The provision of adequate housing will in the long term depend on the economic uplift of this section of the population.

9.1 Economic Advancement.

The Coloured population can be likened to an underdeveloped country which suffers from "vicious circles of poverty".(1) The essential notion is that poverty itself may be one of the major obstacles to economic growth and development. Because the Coloured group is poor, it does not develop economically; because it does not develop economically, it remains poor.

Capital formation and expenditures on housing requires the foregoing of other essential commodities of living. Low wages and large families make saving difficult, if not impossible for the large majority of Coloured households.

Economic / ...

(1) Richard T. Gill : Economic Development : Past and Present Prentice Hall Inc. 1967, p.30.

Economic advancement will in the first instance require planning on a national and regional level to ensure sufficient job opportunities for the economically active members of the rapidly increasing Coloured population. This could pose problems in the Western Cape where a lack of natural resources and an adverse railway rating tariff has hampered the development of basic manufacturing industries.

A measure of decentralisation of industry or the creation of border industries may become necessary to ensure employment for the large projected Coloured labour force; alternatively, emigration to other industrial centres may have to be encouraged.

A serious barrier to economic advancement is the State colour-bar legislation which was enacted for secondary and tertiary industry. A Job Reservation clause was written into section 77 of the Industrial Conciliation Act with the object of securing certain occupations for a specific group or groups whose "economic welfare" may need safeguarding.(1) Job Reservation is justified as a means of defending the standards of living of higher paid workers against competition from workers who have a much lower standard of living.(2)

Economic advancement is required to enable a larger percentage of families to acquire their own housing and to permit an upward social mobility of Coloured families. This would encourage a filtering process whereby better quality housing could be obtained by the upper income groups and the vacated housing could be occupied by middle income groups. Larger incomes are necessary for this self generating re-distribution of dwelling types to occur.

Unless the Coloured population is allowed to sell its labour in a free market, the proportion of families requiring low cost housing may well increase in the future due to the widening gap between housing costs and real wages. Increasing proportions of the community and an increasing population will compound the amount of State subsidy required to house the Coloured population.

9.2 / ....

(1) H.T. Andrews et al : op cit p.183

(2) Ibid, p.184.

9.2 Education.

Education at all levels is necessary to equip the economically active section of the population for skilled occupations. Education is a concomittant requirement of economic growth.

In the Cape Province, schooling for Coloureds is free but not generally compulsory as it is for Whites.(1)

The demand for higher education is a function of job opportunities. Simon Kuznets, a distinguished American economist has remarked that economic incentives become reduced as incomes rise very high.(2) It is suggested that the converse also holds true. Unless skilled and highly paid jobs are available, little incentive will exist for Coloured students to avail themselves of higher educational training.

Education in family planning is also required to reduce the high birth rate which is a root cause of the Coloured housing problem. The examples of other countries should be studied. In India, a Family Planning Programme was instituted to lower the birth rate and it was anticipated that R214 million would be spent on it during 1965-1970.(3) In Japan, the birth rate has been substantially reduced by the use of legalised abortion.(4)

A third need for education is to reduce the incidence of alcoholism and thereby increase productivity of Coloured adult males. Almost one third of all convictions of Coloureds in 1960 was for drunkenness and other offences against liquor laws; approximately one tenth of all crimes other than drunkenness itself were committed by persons whilst under the influence of liquor.(5)

9.3 / .....

(1) H.T. Andrews et al, op cit p.91.

(2) Richard T. Gill, op cit p.34.

(3) Government of India Planning Commission, Fourth Five Year Plan - Resources, Outlays and Programmes 1965, p.58.

(4) Richard T. Gill, op p.98.

(5) S.P. Celliers, op cit p.35.

9.3 Government subsidies.

Housing is a collective good whose impact extends far beyond the family circle.(1) It is thus a social good whose consumption should be subsidised.

Government needs to intercede in the provision of Coloured housing because private enterprise and private philanthropy are unable or unwilling to meet the need.

It is evident from the analyses of income structure and overcrowding that additional subsidy is required to permit the construction of larger dwelling units.

The total amount of subsidy is limited by the shape of the nations' income distribution. If taxation is increased by an undue amount to provide additional State subsidy, the economy could be slowed down due to lack of incentive due to low returns on investments. The Coloured group could possibly lose more from a smaller national income than they would gain from taking an increased share of it. An equitable balance is required.

The South African system of subsidising low cost housing through loans at interest rates below those which the State itself borrows is standard practice in Western Europe and the United States.(2)

At present R35 million is being spent annually on the provision of Coloured housing, this representing ½ per cent of the Gross Domestic Product. The Minister of Community Development recently announced that R52 million was to be allocated annually.

These increases indicate the Government's determination to wipe out the backlog of Coloured housing. They do not, however, represent any change in housing standards which were instituted in 1951 and which are inadequate.

9.4 / ....

(1) A.A. Nevitt, op cit p. (xvii)

(2) Lionel Needleman, op cit p.173.

9.4 Flexibility of dwelling types.

Flexibility and variety in dwelling types are necessary to accommodate the large range in household sizes and to meet the changing demands of household size and composition. Flexibility has been introduced into low cost housing schemes in Cape Town by designing row houses and semi-detached houses in such a manner that smaller units can be converted into larger ones by means of minimal structural alterations. It is significant, however, that to date, no conversions have been carried out.(1)

Suggestions have also been made that the design of the dwelling type should provide for the future addition of an extra room as in the case of the Greek nuclea dwelling shown in appendix 6.(2)

Alterations and additions, however, involve abortive expenditure and are not conducive to mass production building methods which are vital to low cost housing.

The optimum solution would therefore appear to lie in the provision of sufficient variety of dwelling types within the housing mix as discussed in paragraph 4.3.

The design of the housing mix is therefore of prime importance for the optimum utilisation of the housing stock; an effective match of dwelling types and households can considerably alleviate overcrowding as was found in the case of Bonteheuwel.

Research in this field appears necessary. In the absence of the market mechanism, the determination and proportioning of dwelling types needs to be based on scientific analyses of the changing socio-economic needs of the people to be housed.

10.0 / .....

(1) Information from City Engineer's Department, Cape Town.

(2) D.M. Calderwood and Paul H. Connell, op cit. p.14.

10.0 Summary and Conclusion.

10.1 Inadequate dwelling types.

The hypotheses enunciated in paragraph 2.0 have been validated. The dwelling types were found to be inadequate in terms of room occupancy and space rates per person when measured in terms of international standards.

Because dwelling types were limited to a maximum of four rooms in the case of households with incomes in excess of R60 per month and to three rooms when the income was less than R60, a certain amount of overcrowding occurred when families first moved into a low cost housing scheme.

These households were "young" and likely to show increases in size within a short period. This was confirmed in the Bonteheuwel survey where the analysis disclosed a large degree of overcrowding. This overcrowding, which was measured in terms of South African standards for low cost Non-White housing, was found to have reached serious proportions.

In the sub-economic group, 4 and 5 room units were required to alleviate overcrowding; in the economic group the provision of 5 room units was necessary.

It was evident that the allocation of dwelling types on the basis of initial household size was not satisfactory. The minimal space provided in the first instance did not provide the flexibility needed to accommodate short term changes in household size and structure.

Household sizes ranged from 2 to 18 members and overcrowding invariably occurred where the size was in excess of 10 members. These households constituted approximately 12 per cent of the Bonteheuwel community.

Nearly all one-room units occupied by sub-economic families in Bonteheuwel were found to be overcrowded. The continued allocation of this dwelling type can only be justified if overcrowded housing is to be accepted as an inevitable concommittant of low cost housing.

10.2 / ....

10.2 Inadequate Incomes.

Economically speaking, Coloured families occupying low cost dwellings were seen to be "double cursed" with low incomes and large numbers of children. Peripheral locations of the housing estates aggravated the position as transport costs to job opportunities reduced the available margins for housing expenditure.

Only a small fraction of the Coloured Community could afford to purchase its own housing. Approximately 80 per cent of Coloured households in the Cape Peninsula had gross incomes less than R140 per month at which approximate income level home ownership became feasible (see paragraph 3.7). Only 12 per cent of entrant households had "rental" incomes in excess of R112 per month at which income category the rental/income ratio would not exceed 20 per cent for a 4 room dwelling.

The bulk of the Coloured population therefore required assistance and because of its demographic characteristics and the high capital costs involved, Coloured housing was a problem that could only be solved at national level.

Average household income levels were low, reflecting the low skills of the Coloured population. There was evidence that the rate of increase of Coloured real incomes was below the national average for Whites whilst capital costs of housing were increasing faster than the cost of other items of consumer expenditure.

The gap between incomes and housing costs was therefore widening and the need for assisted housing would remain in the foreseeable future.

10.3 Government Policy.

A high rate of natural increase and rapid urbanisation, had resulted in a backlog of Coloured dwelling units. Government policy was found to consist of spreading its resources thinly, in the form of dwellings constructed to minimum design standards, over as large an area as possible.

Because / ....

Because housing yields poor investment returns in contrast to returns by industry and commerce, the allocation of funds for housing lagged in a rapidly expanding economy. Recent Ministerial announcements indicated that more funds were to be allocated for housing but there was no indication that planning standards were to be reviewed or improved. In fact, the Government has urged local authorities to make more use of its standard plans for dwelling types to conserve manpower resources and to expedite housing schemes.(1)

10.4 The Coloured Housing Dilemma.

Coloured housing policy tended to treat the symptoms of the problem rather than to root out the basic causes.

Economic advancement and education were suggested as the only meaningful long term solutions to the provision of adequate housing. The former was necessary to enable Coloured families to provide their own housing and to set in motion an "invasion and succession" process during which the lower income groups could occupy the discarded homes of higher income groups. The market mechanism would also ensure the provision of a balanced mix of dwelling types within the housing stock. Education was necessary to equip the Coloured population with higher skills, to reduce the high birth rate by means of family planning and to increase productivity by reducing alcoholism.

Economic advancement, however, was restricted by the application of an industrial Colour-bar whose aim it was to safeguard the living standards of sections of the White population.

A system of substantial housing subsidies was therefore provided as an alternative to self-help. These subsidies, however, were insufficient and larger subsidies were required to eliminate overcrowding and to provide additional space for privacy, contemplation, study and entertainment in the home.

10.5 / .....

(1) Dept. of Community Development : Circular Letter No. 7 of 1969 dated 16th July, 1969 addressed to Local Authorities.

10.5 Housing Mix.

A variety of dwelling types was considered to be the most effective method of accommodating households during their cycles of changes in size and structure.

The distribution of dwelling types required periodic checking and amendment by the local authority to ensure the most effective use of its housing stock. The design of the housing mix should be founded on research and socio-economic analyses of the needs of households.

10.6 Housing Supply.

It was estimated that the present production of dwelling units should be increased three to fourfold to yield approximately 6,000 dwelling units per annum during the next 5 years. This number of units was required to wipe out the backlog of 12,000 dwellings, to provide for the increase of population and to replace dwellings lost to the Coloured group through physical deterioration or on account of Group Area movements.

10.7 Rental Determination.

Indices of socio-economic status and a hypothetical determination of rent/income ratios for entrant households indicated a wide range of rent margins. The sample analysed was a small one (approximately 1%) and the results should therefore be treated with caution. The analysis indicated however, that whilst some families would be paying rentals close to the desired maximum of 20 per cent, others could pay a higher rental. The latter families may in fact be prepared to pay for larger accommodation. If rentals were based on a sliding scale in accordance with the socio-economic status of the household, additional rentals would also assist in offsetting the costs of providing larger dwelling types.

The administration of a system of differential rentals would be more costly than the present system based on income categories; its practicability requires further study.

The cut-off point between sub-economic and economic income groups, at present R60 per month should also be reviewed.

When / .....

When the income of the household head is just in excess of this amount, the rent/income ratio is high.

10.8 The standard of accommodation.

Against a background of a sound national economy, a high economic growth rate and a growing affluence of the White population, Coloured dwelling units are still being constructed in Cape Town in accordance with minimum room and space standards which were established by the State in 1951.

These standards have served their purpose by enabling the shanty slum settlements around the city's peripheral areas which mushroomed in the immediate post-war years to be eliminated within a reasonably short period.

The thesis has revealed that these standards are inadequate. They should be reviewed and upgraded before being used in the construction of vast Coloured housing schemes now being planned.

The lie must be given to Marx's view that bad housing is the product of capitalist exploitation. "The more capital accumulates in an industrial or commercial town" he wrote, "the more rapidly flows the stream of exploitable human material and the more miserable are the improvised dwellings of the labourers".(1)

In every part of the world and under all political systems, the urban revolution is bringing new challenges which are becoming increasingly involved with housing. The socio-economic structures of communities are dynamic; static housing standards cannot meet the changing needs of people.

(1) Karl Marx, Capital, Modern Library Edition, New York. Random House 1906, p.726.

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A.M.(S.A.)Mun. E.

TABLE 1.

Entrant Households : Population by Age and Sex in Percentages.

Age Group	Total	Male	Female
Total Population	100.0	50.2	49.8
0 - 4	15.3	7.8	7.5
5 - 9	17.7	9.9	7.8
10 - 14	10.6	5.6	5.0
	43.6	23.3	20.3
15 - 19	8.2	4.7	3.5
20 - 24	10.0	4.2	5.8
25 - 29	12.6	6.3	6.3
30 - 34	9.4	4.7	4.7
35 - 39	4.7	2.3	2.4
40 - 44	3.3	1.6	1.7
45 - 49	2.3	1.0	1.3
50 - 54	1.4	0.6	0.8
55 - 59	1.7	0.6	1.1
	53.6	26.0	27.6
60 - 64	0.9	0.3	0.6
65 - 69	1.0	0.4	0.6
70 +	0.9	0.2	0.7
	2.8	0.9	1.9

Sample Size : 516 Households

Number of Persons : 2,557.

TABLE 2 : AGE STRUCTURE

Comparison between Entrant Population and Coloured Metropolitan Population.

Age Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	+ 70
Observed (O)	353	412	245	191	232	291	219	99	76	54	33	40	21	23	20
Expected (E)	388	316	270	229	224	187	159	125	97	88	72	55	37	23	23
(O-E)	35	96	25	38	8	114	60	26	21	34	39	15	16	0	3
$(O-E)^2$	1225	9216	625	1444	64	12996	3600	676	441	1156	1521	225	256	0	9
$\frac{(O-E)^2}{E}$	3.2	29.2	2.3	6.3	0.3	69.5	22.6	5.4	4.5	13.1	21.1	4.1	6.9	0	0.4

$$\chi^2_{obs} = \sum \frac{(O-E)^2}{E} = 188.9$$

$$\chi^2_{0.95,14} = 23.68$$

$$\chi^2_{0.99,14} = 29.14$$

Difference between age structure of entrants and Metro population is significant at both 95% and 99% confidence levels.

TABLE 3.

Entrant Households : Distribution of Size by Percentage.

Household Size	Percentage	Cumulative Percentage
1	0.4	0.4
2	8.7	9.1
3	16.7	25.8
4	22.3	48.1
5	18.2	66.3
6	13.5	79.8
7	9.2	89.0
8	5.4	94.4
9	1.3	95.7
10	2.7	98.4
11	0.4	98.8
12	0.8	99.6
13	0.2	99.8
18	0.2	100.0

Mean Household Size = 4.96

Variance = 5.87

Standard Deviation = 2.42

Sample Size = 516

Standard Error = $\frac{2.42}{\sqrt{515}}$ = 0.11

TABLE 4.

EXTENDED FAMILIES.

Total No. Households	No. Extended Families	% Extended families
516	138	37.4

TABLE 5.

Effect of Extended Families on Household Size.

No. Extended families	Additional persons	Ave. persons per extended family	Percentage of total no. of persons	Average persons for all families
138	204	1.47	8.0	0.40

TABLE 6.

Head of Household Income Per Month.

Income Group (Rand)	Percentage	Cumulative Percentage
0-34	8.1	8.1
35-59	38.0	46.1
60-94	37.2	83.3
95-129	9.9	93.2
130-154	2.0	95.2
155-179	2.5	97.7
180-204	2.1	99.8
205-229	0.2	100.0

Mean Income = R70.2

Standard Deviation = 36.5

Sample Size = 516

Standard Error = $\frac{36.5}{\sqrt{515}} = 1.81$

Mean Income between R64.6 and R73.8 at 95 per cent confidence level.

TABLE 7.

Gross Household Income Per Month.

Income Group (Rands)	Percentage	Cumulative Percentage
0-34	4.5	4.5
35-59	24.0	28.5
60-94	36.2	64.7
95-129	18.6	83.3
130-154	6.6	89.9
155-179	4.4	94.3
180-204	3.1	97.4
205-229	1.4	98.8
230-254	0.4	99.2
255-279	0.8	100.0

Mean income = R89.5

Standard Deviation = 46.2

Sample Size = 516

Standard Error = $\frac{46.2}{\sqrt{515}} = 2.03$

Mean income between R85.1 and R93.6 at 95 per cent confidence level.

TABLE 8.

Monthly Income for determination of Rent.

Income Group (Rands)	Percentage	Cumulative Percentage
0-34	7.8	7.8
35-59	35.7	43.5
60-94	39.1	82.6
95-129	10.7	93.3
130-154	1.9	95.2
155-179	2.5	97.7
180-204	2.1	99.8
205-229	0.2	100.0

Mean Income = R71.7

TABLE 9.

Distribution of Income Groups and Hypothetical Dwelling Types. Sample of 516 Households.

Income for Rent determination	Dwelling Type No. of Rooms				No. of House-holds	Percentage of Total
	1	2	3	4		
0-34	8	12	9	-	29	5.6
35-60	52	70	69	-	191	37.0
61-75	34	49	31	15	129	25.0
76-95	16	25	17	19	77	14.9
96-130	8	16	19	11	54	10.5
131-155	1	5	3	3	12	2.3
156-180	1	3	4	3	11	2.2
181-205	2	3	3	4	12	2.3
206-229	-	-	1	-	1	0.2
	122	183	156	55	516	100.0

NOTE: Kitchens, Bathrooms, Latrines are not counted as rooms in the above analysis.

TABLE 10.

Average Weekly Rentals.(1)

Dwelling Type No. Rooms	Average Rental (Rands per week)	
	Sub-Economic	Economic
1	0.94	2.00
2	1.29	2.18
3	1.59	2.78
4	-	5.17

(1) Based on information from Housing Manager, Cape Town Municipality.

TABLE 11.

Overcrowded Entrant Households.(1)

Household Size No. of Persons	Economic Housing	Sub-Economic Housing	Total
8	5	-	5
9	3	1	4
10	5	4	9
11	2	-	2
12	2	2	4
13	-	1	1
18	1	-	1
	18	8	26

Sample households : 516

Economic Units : 269

Sub-Economic Units : 247

Overcrowding (Economic units) : 6.7 per cent

Overcrowding (Sub-Economic Units) : 3.2 per cent

Average Overcrowding (all units) : 5.0 per cent.

(1) Overcrowding determined in terms of Slums Act of 1934 (see paragraph 5.2)

TABLE 12.

All dwellings.

Hypothetical Occupancy and Space Rates :

Dwelling Type Rooms	No. of Units	Space per Unit (sq.ft.)	Total Space Sq.ft.	No. of Rooms
1	122	188	22,936	122
2	183	313	57,279	366
3	211	422	89,042	633
	516		169,257	1,121

NOTE: (i) "Room" excludes Dining/Kitchen and Bathroom

(ii) Space per unit includes Dining/Kitchen but excludes Bathroom.

No. of persons = 2,557

Average occupancy rate = 2.28 persons per room

Average space rate = 66.1 sq.ft. per person.

TABLE 13.

Sub-Economic Dwellings.

Hypothetical Occupancy and Space Rates.

Dwelling Type Rooms	No. of Units	No. of persons	Space per Unit	Total Space sq.ft.	No. of Rooms
1	62	164	188	11,656	62
2	81	342	313	25,353	162
3	104	689	422	43,888	312
	247	1,195		80,897	536

For definition of "Room" and "Space" see Notes (i) and (ii) in Table 12.

Average occupancy rate = 2.23 persons per room.

Average space rate = 67.5 sq.ft. per person.

TABLE 14.

Bonteheuwel Households : Population by Age and Sex in Percentages.

Age Group	Total	Male	Female
Total Population	100.0	49.2	50.8
0-4	11.8	5.4	6.4
5-9	22.1	11.1	11.0
10-14	16.5	8.6	7.9
	50.4	25.1	25.3
15-19	11.6	5.8	5.8
20-24	5.6	3.1	2.5
25-29	3.3	1.5	1.8
30-34	7.0	3.2	3.8
35-39	6.8	4.0	2.8
40-44	4.8	2.1	2.7
45-49	3.6	1.7	1.9
50-54	2.2	1.0	1.2
55-59	1.5	0.7	0.8
	46.4	23.1	23.3
60-64	1.0	0.2	0.8
65-69	0.9	0.3	0.6
70-74	0.7	0.3	0.4
+ 75	0.6	0.2	0.4
	3.2	1.0	2.2

Sample Size : 277 households

Number of persons : 1,804

TABLE 15.

Bonteheuwel : Distribution of Household Size by Percentage.

Household Size	Percentage	Cumulative Percentage
1	-	-
2	3.2	3.2
3	5.8	9.0
4	8.7	17.7
5	12.2	29.9
6	19.1	49.0
7	16.2	65.2
8	11.5	76.7
9	7.6	84.3
10	4.0	88.3
11	3.6	91.9
12	4.0	95.9
13	2.2	98.1
14	1.5	99.6
17	0.4	100.0

Mean Household Size : 6.91

Standard Deviation : 3.21

Sample Size : 277

Standard error : $\frac{3.21}{\sqrt{277}} = 0.19$

Mean size lies between 6.53 and 7.29 at 95 per cent confidence level.

TABLE 16.

BONTEHEUWEL. HOUSE OCCUPANCY.

Year of Occupation	No. of dwellings occupied as percentage of total.	Cumulative Percentage
1961	8.8	8.8
1962	16.6	25.4
1963	35.3	60.7
1964	19.2	79.9
1965	5.2	85.1
1966	6.2	91.3
1967	3.6	94.9
1968	4.1	99.0
1969	1.0	100.0

Scheme completed 1964.

Average change in occupancy since 1965 = 4.0 per cent.

TABLE 17.

BONTEHEUWEL :

Distribution of Sub-Economic Housing and Households.

Single Households						Doubled Households Included				
Household Size	No. of Rooms (excluding D.R/Kitchen & Bathroom)			No. of Households	No. of Persons	No. of Rooms (excluding D.R/Kitchen & Bathroom)			No. of Households	No. of Persons
	1	2	3			1	2	3		
2	1	2	-	3	6	1	2	-	3	6
3	4	3	4	11	33	3	3	3	9	27
4	3	3	3	9	36	3	2	3	8	32
5	2	5	6	13	65	2	5	4	11	55
6	7	9	11	27	162	6	9	12	27	162
7	5	5	6	16	112	4	4	6	14	98
8	6	6	7	19	152	6	7	7	20	160
9	4	1	1	6	54	6	2	1	9	81
10	1	1	1	3	30	1	1	2	4	40
11	1	-	3	4	44	1	-	3	4	44
12	-	1	2	3	36	-	1	2	3	36
13	-	-	1	1	13	1	-	1	2	26
14	-	-	2	2	28	-	-	3	3	42
	34	36	47	117	771	34	36	47	117	809
Average Household Size : 6.59 Av. Occupancy Rate : 3.12 persons per room						Average Household Size : 6.91 Av. Occupancy Rate : 3.28 persons per room				

TABLE 18.

BONTEHEUWEL — ECONOMIC HOUSING

Distribution of Dwelling Types and Households.

Single Households						Doubled Households Included				
Household Size	No. of Rooms (excluding DR/K, Bathroom)			No. of Dwellings	No. of Persons	No. of Rooms (excluding DR/K, Bath room)			No. of Dwellings	No. of Persons
	2	3	4			2	3	4		
2	7	4	-	11	22	5	1	-	6	12
3	4	3	1	8	24	4	3	-	7	21
4	12	6	1	19	76	11	5	-	16	64
5	9	12	3	24	120	9	12	2	23	115
6	6	11	2	19	114	9	14	3	26	156
7	7	21	3	31	217	6	21	4	31	217
8	3	7	1	11	88	4	6	2	12	96
9	2	7	3	12	108	2	8	2	12	108
10	2	4	2	8	80	2	4	1	7	70
11	1	2	4	7	77	1	2	3	6	66
12	-	4	2	6	72	-	5	3	8	96
13	-	2	2	4	52	-	2	2	4	52
14	-	-	-	-	-	-	-	1	1	14
17	-	-	-	-	-	-	-	1	1	17
	53	83	24	160	1050	53	83	24	160	1104
Av. Household Size : 6.56 Av. Occupancy Rate : 2.33						Av. Household Size : 6.90 Av. Occupancy Rate : 2.45				

NOTE: Households and dwellings below the dotted line are overcrowded in terms of the National Housing and Planning Commission's Minimum Standards for Non-European Housing.

TABLE 19.

BONTEHEUWEL : DISTRIBUTION OF HOUSEHOLD SIZE AND DWELLING TYPE.

COMBINED SUB-ECONOMIC AND ECONOMIC HOUSING

(Includes doubled households)

Household Size	No. of Rooms (Excldg. DR/K & Bathroom)				No. of Households	No. of Persons
	1	2	3	4		
2	1	7	1	-	9	18
3	3	7	6	-	16	48
4	3	13	8	-	24	96
5	2	14	16	2	34	170
6	6	18	26	3	53	318
7	4	10	27	4	45	315
8	6	11	13	2	32	256
9	6	4	9	2	21	189
10	1	3	6	1	11	110
11	1	1	5	3	10	110
12	-	1	7	3	11	132
13	1	-	3	2	6	78
14	-	-	3	1	4	56
17	-	-	-	1	1	17
	34	89	130	24	277	1,913
Percentage of Total Dwellings	12.2	32.2	47.0	8.6	100.0	

Average Household Size : 6.91

Average Room Occupancy : 2.74 persons per room

NOTE: Households and dwellings below the dotted line are overcrowded in terms of the National Housing and Planning Commission's Minimum Standards for Non-Europeans.

TABLE 20.

Bonteheuwel : Average Space Rates.

A. Sub-Economic Housing.

Dwelling Size	Space per Dwelling Sq.ft.	No. of Dwellings	Total Space Sq.ft.
1	180	34	6,120
2	313	36	11,268
3	422	47	19,834
		117	37,222

NOTE: Space per dwelling includes DR/Kitchen but excludes bathroom.

No. of persons = 809 (see Table 17)

Av. Space/Person = 46.0 sq.ft.

B. Economic Housing.

Dwelling Size	Space per Dwelling Sq.ft.	No. of Dwellings	Total Space Sq.ft.
2	313	53	16,589
3	422	83	35,026
4	531	24	12,744
		160	64,359

No. of persons = 1104 (see Table 18)

Av. Space/Person = 58.3 sq.ft.

C. Combined Sub-Economic and Economic Housing.

Dwelling Size	Space per Dwelling Sq.ft.	No. of Dwellings	Total Space Sq.ft.
1	180	34	6,120
2	313	89	27,857
3	422	130	54,860
4	531	24	12,744
		277	101,581

No. of persons = 1913 (See Table 19)

Av. Space/Person = 53.2 sq.ft.

TABLE 21.

Bonteheuwel : Overcrowded dwellings in terms of Minimum Standards of National Housing Commission.

Household Size	Number of Rooms								Number of Households		Number of Persons	
	1		2		3		4					
	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ
4	3								3	-	12	
5	2								2	-	10	
6	6		9	9					15	9	90	54
7	4		4	6					8	6	56	42
8	6		7	4	7	6			20	10	160	80
9	6		2	2	1	8			9	10	81	90
10	1		1	2	2	4		1	4	7	40	70
11	1		-	1	3	2		3	4	6	44	66
12	-		1	-	2	5		3	3	8	36	96
13	1				1	2		2	2	4	26	52
14					3	-		1	3	1	42	42
17								1		1	-	17
Overcrowded Units & Persons	30	-	24	24	19	27	-	11	73	62	597	609
Total No. of Units and persons	34	-	36	53	47	83	-	24	117	160	809	1104
% Overcrowding	88.2	-	66.7	45.3	40.4	32.5	-	45.8	62.4	38.8	73.8	55.2

TABLE 22.

Bonteheuwel : Overcrowded Dwellings in terms of United Nations Standards.

Household Size	Number of Rooms								Number of Households		Number of Persons	
	1		2		3		4					
	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ	Sub Econ	Econ
2		-										
3		3							3	-	9	
4		3							3		12	
5		2							2	-	10	
6		6	9	9					15	9	90	54
7		4	4	6					8	6	56	42
8		6	7	4					13	4	104	32
9		6	2	2	1	8			9	10	81	90
10		1	1	2	2	4			4	6	40	60
11		1	-	1	3	2			4	3	44	33
12		-	1		2	5		3	3	8	36	96
13		1			1	2		3	2	5	26	65
14					3			2	3	2	42	28
17						1				1	-	17
Overcrowded Units		33	24	24	12	21		9	69	54	460	517
Total No. Units		34	36	53	47	83		24	117	160	809	1104
% Overcrowding		97.1	66.7	45.3	25.5	25.3		37.5	59.0	33.8	56.9	46.8

APPENDIX 1.

SAMPLE RELIABILITY.

$$n = \frac{N}{1 + Ne^2} \quad (1) \qquad \text{at 95\% confidence level} \qquad \text{---------- (A)}$$

where n = sample size

N = population size

e = error

This formula is derived from

$$\sigma = \sqrt{\frac{pq}{n}} \qquad \text{---------- (B)}$$

where σ = standard error

p = proportion of "successes"

q = "failures"

n = sample size

Formula (A) assumes a maximum standard error which occurs when $p = q = 0.5$ in (B) and substitues 2 normal deviates for 1.96 normal deviates at the 95 per cent confidence interval.

For entrant households, the sample survey comprised 516 families i.e. $n = 516$ and $N = 10320$ whence $e = 4.3$ per cent.

For the Bonteheuwel survey, $n = 277$, $N = 5220$ and $e = 5.9$ per cent.

(1) Taro Yamane : Statistics : An Introductory Analysis. Harper International Edition : New York 1969. p.581.

APPENDIX 2.

ESTIMATED DEMAND FOR DWELLING UNITS 1969 - 1974.

Coloured population 1967		328210
Growth rate per annum		3.2%
Estimated 1969 population		$328210 \times (1.032)^2$
	=	349552
No. of houses at 5.8 persons per household	=	60250

$$N_5 = 60250 \times (1.032^5 - 1) + \left\{60250 + \frac{60250 \times (1.032^5 - 1)}{2}\right\} \times \frac{5}{50}$$

$$= (60250 \times 0.169) + \left(60250 + \frac{60250 \times 0.169}{2}\right) \frac{1}{10}$$

$$= 10182 + (60250 + 5091) \frac{1}{10}$$

$$= 10182 + (65341) \times \frac{1}{10}$$

$$= 10182 + 6534$$

$$= 16716$$

Backlog = 12000

Total = 28716

Average annual demand = 5744

(Calculation of N_5 is based on formula in paragraph 6.0)

APPENDIX 4.

ADDITIONAL ANNUAL SUBSIDY FOR ONE ADDITIONAL ROOM.

Cost of 1 room of 100 sq.ft. @ R1.75 per sq.ft. = R175

Cost of 1 extra room for 6,000 units = R1,050,000

Allocation of housing categories. (see paragraph 4.1.5)

Sub-economic	:	46 per cent
3% income category	:	37 per cent
5% income category	:	10 per cent
6% income category	:	7 per cent
		100.0

Allocation of additional costs.

Sub-Economic	:	0.46 x 1,050,000	= R483,000
3% category	:	0.37 x 1,050,000	= R388,500
5% category	:	0.10 x 1,050,000	= R105,000

Additional Annual Subsidies based on 6% interest return.

(a) Sub-Economic : Loans repaid at ¾% over 40 years

Capital Recovery Factor (C.R.F.) @ 6% = 0.06646

@ ¾% = 0.03024

0.03622

Additional annual subsidy = 0.03622 x 483000

= R17,494

(b) Economic : Loans repaid over 30 years.

C.R.F. @ 6% = 0.07265

C.R.F. @ 3% = 0.05102

0.02163

Additional annual subsidy on R388,500 = 0.02163 x 323750

= R8,403

C.R.F. @ 5% = 0.05828

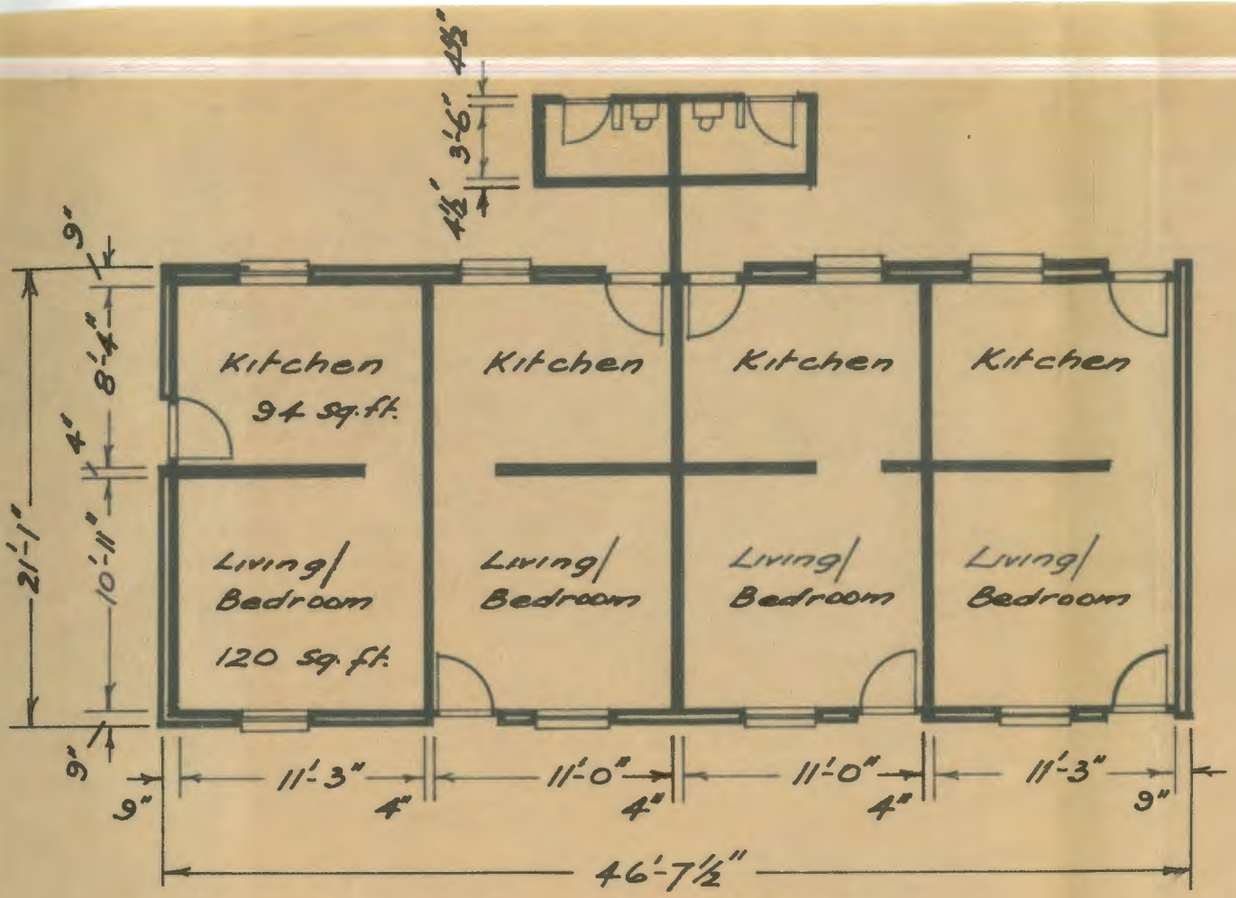
Additional subsidy on R105,000 = 0.01437 x 105000

= R1,509

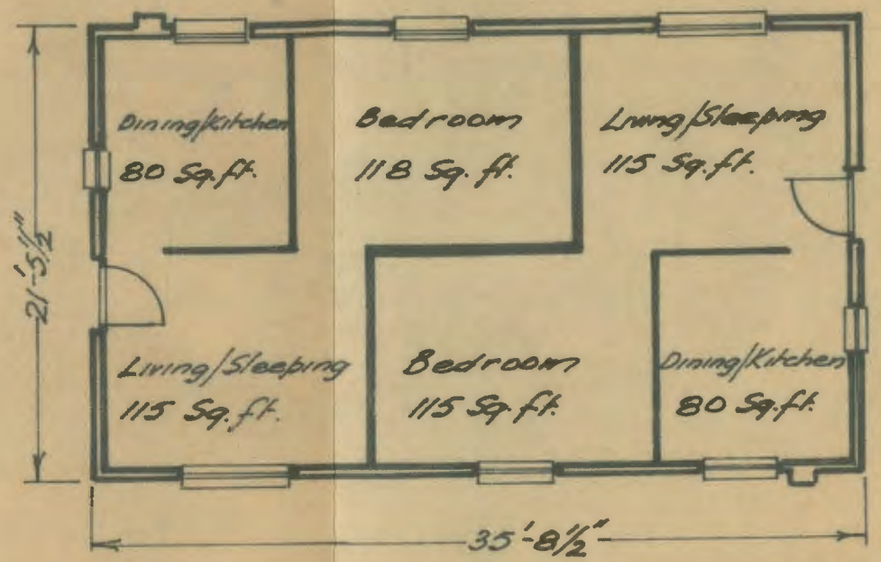
Total Additional Annual Subsidy :

Sub-Economic	R17,494
Economic (3%)	8,403
Economic (5%)	1,509
	R27,406

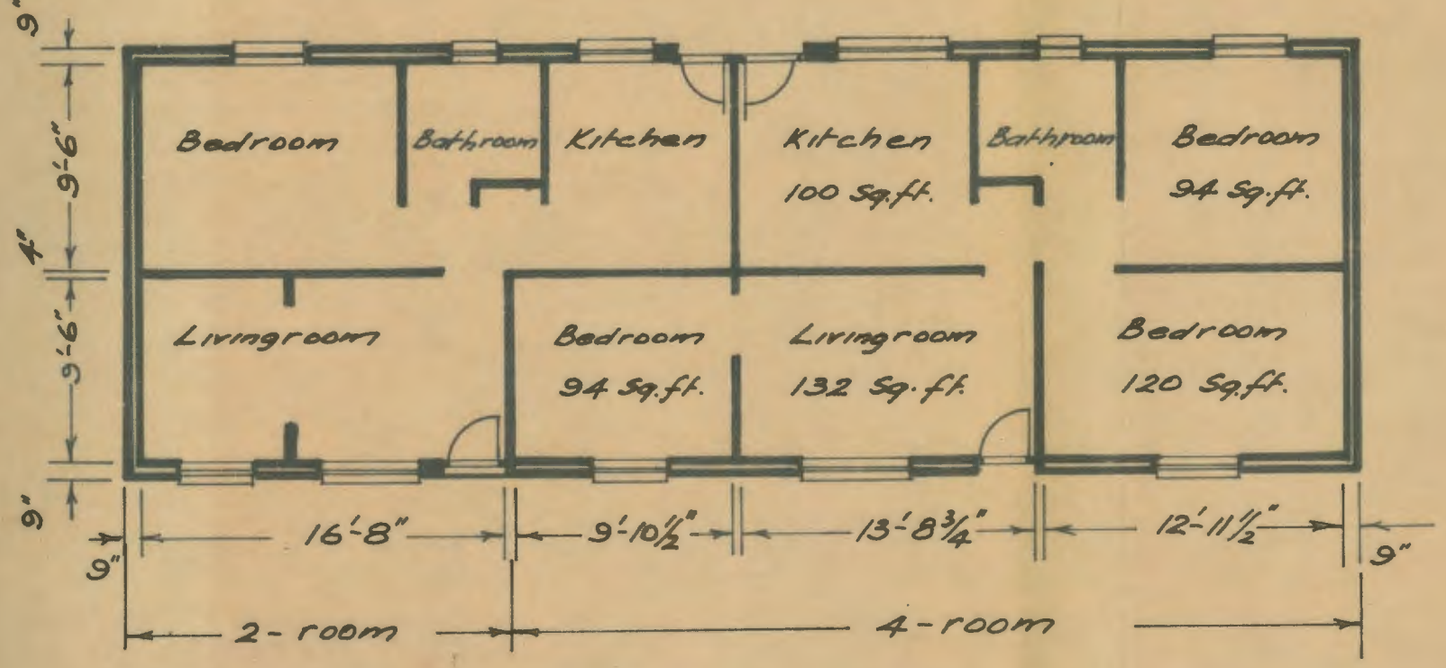
SAY R27,500.



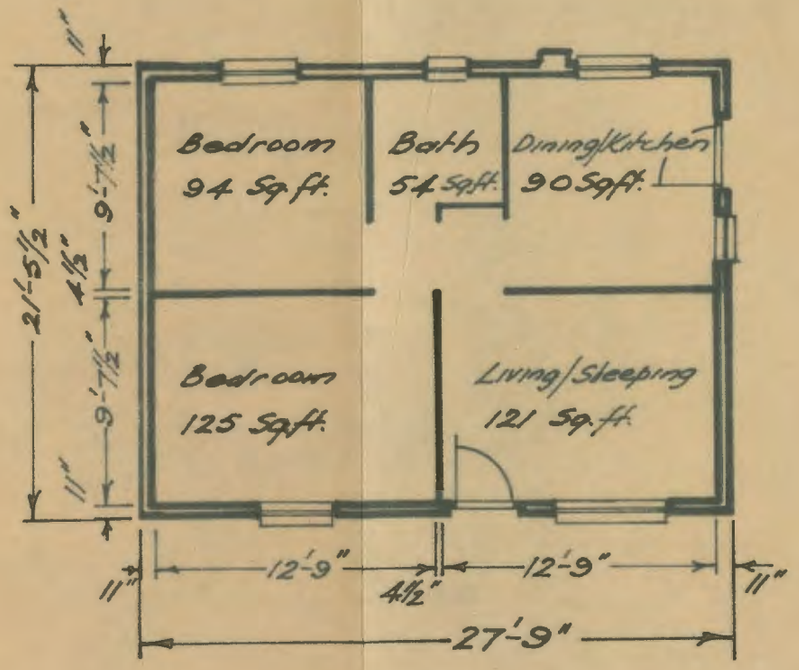
1-ROOM UNITS



2-ROOM UNITS



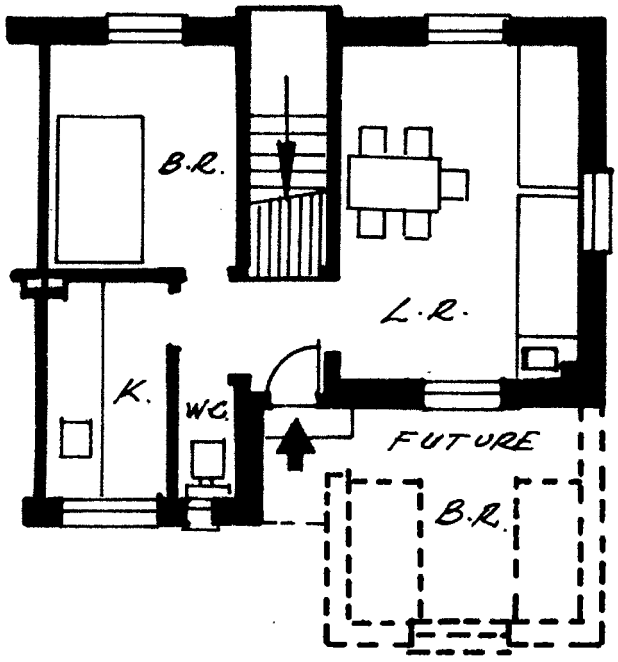
2 and 4-ROOM UNITS.



3-ROOM UNIT

Scale: ⅛" = 1 ft.

APPENDIX 5: DWELLING TYPES.



PLAN OF GREEK
NUCLEA DWELLING

Source: D.M. Calderwood and Paul H. Connel
Bulletin No. B. N.B.R.I 1952 p14.

APPENDIX 6

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