" 'A Comprehensive Approach to the Study of the Housing Sector in Iraq; With Special Reference to Needs, Standards, Inputs, Density and Costs as Factors in the Analysis of Housing Problems in Baghdad' by M.B. Al-Adhami, B.Sc., M.A., Thesis submitted to the University of Nottingham for the degree of Doctor of Philosophy, November 1975".

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Housing Inputs

C H A P T E R 7

HOUSING FINANCE

House building requires materials, men and land. Since the men have to be paid, and since payment for materials must usually be made before the house is finished, some amount of working capital is necessary. Often production can be expedited through the use of various kinds of machinery. Consequently, money and machinery are included in the requirements of a house-building programme.

Apart from the money which is required as working capital so that the builder may pay his men before he is paid by his client, there is other money, at the disposal of the client, without which little building will proceed. House building is not housing, but it is the means by which the stock of housing may be expanded. Similarly, money at the disposal of the client is not a building input, but it is the means by which the client can exercise command over these inputs, provided that they exist.If any one of these is scarce in relation to demand then he will have to pay more for it.

Unfortunately the problem is complicated by the fact that money at the disposal of the client is not necessarily money owned by the client. Even if it were, the client would have to consider the opportunity-cost of devoting that money to building rather than to some other purpose.

It is for this reason that finance plays a large role in housing development, not simply as an important means of commanding resources, but also in the sense that using money for one purpose means that it cannot be used for another, and so, since some people often wish to use more money than they have, while others have money for which they have no particular current need, there is a market for money. The volume of money available for building depends on the forces at work in this market.

From the foregone, it seems that the finance of residential construction is an extensive and complex issue because this finance is compatitive with other investment sectors of the economy, particularly industry and services where the return value of these investments is much higher than that in housing generally. Therefore, financing of housing cannot be considered separately from the financing of other activities and buildings.

In this chapter, an attempt will be made to discuss the economic background to housing, its investment significance, and the public and private components of its production and finance. In addition, an attempt will be made to analyse the existing pattern of housing finance, their sources and problems, with particular emphasis on the cooperative system of housing development in Iraq and Baghdad, with a review of the British experience in housing associations and societies. Finally general and specific measures and recommendations were put forward taken into account the recent increases in the government revenues from the oil which is bound to effect the financing system of the country and housing in particular.

7.1.0 The Economic Background to Housing:

Housing may be regarded as an investment in addition to being a place for living. This is because a family which has a house of its own gives her a degree of security in a psychological and economic sense. Ownership of a house can be regarded as an extension of the attribute of privacy. In addition, ownership of a dwelling represents a symbol of wealth, since it is the most important actual wealth which most families ever manage to accumulate.

The value of financial investment in a house may increase due to a sudden rise in demand for property in the area, or it may fall as the neighbourhood becomes less desirable or as the community as a whole suffers an economic decline. Houses which are likely to rise in value and which are relatively secure from various types of expropriation are more desirable than other physically comparable houses. The investment quality of a house, then, is very complex, and each house has to be studied from this point of view.

Sheer physical shelter, a roof over one's head, is certainly an element of housing and it may require no more in terms of economic resources to build an attractive, secure, private dwelling than it costs to provide an exposed, insecure, uncomfortable eyesore. Sometimes the resource cost for the better house may even be less. From the general economist standpoint then, housing is just a lump of resources which might as well be called shelter. As far as others are concerned, particularly those who want to understand the economics of housing, the attributes of privacy, location,

environmental amenity, and investment are at least as important as the resource bulk of the housing commodity, the bricks, concrete, pipes and wires. Therefore, it is deceptive to attempt to reduce problems of housing economics to a single scale of input costs, because the real efficiency of the housing sector depends on a complex balancing of personal requirements, community institutions, in addition to considerations of resource costs.

Housing development and its feasibility has been for long subject to many arguments, especially by some development economists, who believe that housing is not a profitable investment compared with other economic activities such as industry.

Economic planners in developing countries usually favour restrictions upon the size of the housing sector. This tendency is based on the argument that, although housing is a desirable consumer good which ought to be available in the market in competition with other uses of resources, the public welfare of the country requires that housing demand be suppressed. Housing is very capital intensive, but it does not create conditions favouring economic growth as other forms of investment do, i.e. industry. Even if market institutions existed which tended to respond effectively to demands for housing and related facilities, capital should be withheld from the housing sector in order to foster economic development.

This is a multifaceted argument of substantial practical importance. With some oversimplification it is summed up in the concept of the "Capital Output Ratio" as a guide to the allocation of scarce savings

in a country such as Iraq, which hopes to increase its per capita economic output. [1]

The housing sector's output generally shows up as quite low in relation to the amount of capital invested in it. Its capital output ratio is, therefore, relatively high, and for that reason development plans in Iraq in the recent years accord a low priority in its allocations for the housing sector; see, (3.4.0) where the main emphasis was on defence and industrial investments.

It is difficult to argue with the contention that Iraq should not spend excessive capital on housing development. But the problem with the economists theories is that they assume that there is a sharp academic distinction between economic and social change, and between production and consumption standards.

To expand on this point of view, one may refer to Catherine Bauer, when she stated:

> "While postponing any general changes in the social environment until such time as adequate resources may be available for this purpose....Economic development invariably forces population redistribution, which in turn means radical changes in the basic pattern and structure of manmade environment. Economic and social change are integral parts of one process, the process of development....The remote industrial or power plant, where new housing is obviously necessary, is only a small if dramatic example of what is going on at a much larger scale in the cities". [2]

A signifcant view, from the economic standpoint, of housing investment may be obtained by relating it to the total investment in the country.

A study made by the United Nations reveals that the average

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1. see, Charles P. Kindleberger, "Economic Development", New York, McGraw-Hill, 1965, p. 87.

2. see, Catherine Bauer - Wurster, "The Case for Regional Planning and Urban Dispersal", pp. 40-41.

investment in countries with per capita incomes of less than £40, i.e. very poor countries, on housing, represented about 21 per cent of the gross fixed capital, which is in fact the same percentage as in the highest group of countries with per capita incomes greater than £360. But the gross fixed capital in the lowest group of countries averaged only 15 per cent of gross national product whereas it averaged 21 per cent in the highest group. In Iraq, it has been estimated that the total investment on housing, in 1969 by the private sector only, amounted to about 18.8 per cent of the gross fixed capital, while the gross fixed capital was about 18 per cent of the gross national product; see, Table (3.7).

A number of conclusions may be drawn from these facts of significance for balanced social and economic development. The first is that the patterns of investment in the developing countries as far as housing is concerned at least, are not conductive to long term economic as distinct from short term social development. This, in itself, however, is not necessarily an undesirable pattern depending on a number of considerations.

A significant portion of the investment in housing in Iraq and other developing countries may well consist of resource not normally useful or available for other types of investment, particularly large scale industrial investment. On the other hand, a significant proportion of investment in housing tends to be expensive luxury

construction which is not serving good social and economic purposes and consumes economic resources capable of being put to better use.

In Iraq, and most countries, the housing sector is a blend of private enterprise and government activity. The nature of the mix varies greatly from country to country, but the role of government is usually substantial even in those countries which generally allow the free market the greatest freedom in making economic decisions. Therefore, it can be said that the public and private components of the housing sector are generally so overlaped and interdependent that the housing sector have a dual decision making system.

The private component of the housing sector, that is the whole range of business activities associated with housing, is heavily dependent for efficient operation upon the existence of a set of laws, institutions, and public agencies. It cannot function effectively unless the community recognized and clarified the concept of real property ownership. A house builder will not build, a lender will not finance, and a family will not buy a house unless the legal system of the community assures each party that the rights thus acquired will be respected. The builder can then expect payment from the purchaser, the lender can expect some security of this investment, and the family can expect relatively undisturbed occupancy of the house.

The first necessity for the operation of a housing market is, therefore, a system which defines rights pertaining to property and establishes a set or procedures for the transfer of these rights. [3]

In a similar way the large financial aspects of housing development and purchase require the existence of financial institutions which advance funds and loans to households and firms. Financial institutions are thus middlemen in a commodity of such vast importance that the government either operate these financial institutions directly or regulate them extensively.

Housing requires special kinds of financial institutions because the product involved is so durable and heterogeneous. Housing finance involves very long term investment in a form of wealth which is not very liquid, which is not readily saleable. Housing is also so unstandardized that investors' interests in housing loans or equity are also relatively difficult to sell. There are many technical aspects of housing and the housing market which suggests that a certain degree of specialization in housing by some institutions will improve the efficiency of the sector.

The ability of the housing stock to provide good housing services to its occupants depends in part on the transportation system, the schools, other public facilities, and upon the manner in which nearby land uses are controlled. In most cases the private housing entrepreneur is not

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3. see, Frederick E. Case, "Real Estate", Allyn and Bacon, Boston 1962, Chapt. 12 and 13.

able to provide these elements of the housing product or to improve them. He is dependent upon the community's public agencies to assist him in making housing available to the market.

Given the best possible set of supporting institutions and well informed and motivated entrepreneurs, the private component of the housing sector ordinarily does not serve all the housing needs which the public, as a community, feel should be served. The low income families are an obvious case in point. The most effective and efficient private housing industry will not meet a housing need which is not backed up with purchasing power. Here, and in similar situations involving public concern about unmet housing needs, the public component of the housing sector acquires an additional function. It must change the nature of demand by means of subsidy or of supply by means of public investment, also involving subsidy, so that these nonmarket needs are satisfied.

Therefore, the public component of the housing sector has a twofold function; it should act to facilitate the efficient operation of the private sector of housing and it should subsidize the housing sector as a whole so as to overcome the problems of socially inadequate market demands for housing. This situation follows that the development of public policy with respect to housing requires a particular type of economic analysis. The establishment of legal and financial institutions will stimulate private housing activity, while public subsidies will change the direction of that activity as well as stimulating it further. In formulating a public programme

for housing, it is necessary to know not only the current limitations or faults of the private housing market equilibrium, but also the manner in which that equilibrium would be changed by particular proposals for government activity in connection with housing. The private portion of the sector will respond to changes in institutions or in purchasing power available for housing. The responses may or may not produce the overall changes in the supply and use of housing which is contemplated by the public programme. The manner in which a set of institutions is created may freeze a portion of the country's capital market into a structure which is not best suited to the country's long term needs. Housing activities may, at one time or another, be overstimulated or depressed by the very institutions and systems which were intended to make it perform efficiently. The form of a subsidy to needy families or to accomplish other social objectives may produce private housing market responses which aggravate those needs still further. Public policy does not simply amend what has taken place in the market. It acts as a catalytic agency to alter the very character of that market.

The dual nature of the housing sector results from qualities inherent in the housing commodity. The housing sector will not behave efficiently or satisfactorily without a variety of vital and substantial public activities. Housing market economic analysis requires an understanding of the interaction between private activities and public activities so that public activities will be able to accomplish their objective. The public objective in connection with housing is to secure for that sector as much of the country's resources as the well being of the whole community requires and to encourage the efficient use and appropriate distribution of these resources.

7.2.0 Sources of Housing Finance:

In Iraq there is a mixed pattern of housing finance, with heavy reliance upon direct government loans and credits, with very little savings generated by the people for the purpose of house building.

In most cases, the government funds are made available from direct budgetary appropriations and are loaned at low rates of interest with long repayment periods. The funds of the specialized institutions or mortgage banks are usually loaned for much shorter periods of time and cover much smaller percentages of the value of the construction or property. The capital of these specialized institutions in most cases is also derived from the government budgetary appropriations or allocations, and subject to government policy changes.

The problem of financing housing constructions in Iraq is compounded by the inadequacy in the allocation of resources on the one hand, and the increasing demand for private houses on the other. And the financing of low cost housing in particular has the added dimension of security requirements for the loan and the rate of interest. Those who borrow for low cost housing face the problem of providing the necessary security for the loan and at the same time are not capable of paying a high rate of interest.

In Iraq, the Real Estate Bank and the Cooperative Bank are the two primary vehicles for the financing of housing built by the private sector. The Real Estate Bank is an organization owned and operated directly by the Government. The loans given by the bank have changed

three times in the last decade, first it was 2000 ID to be paid within eight years, with a rate of interest of 7 per cent, then the loans were reduced to 1500 ID, this time to be paid within 12 years, at a rate of interest of 6 per cent. At the present the bank's loans is 1000 ID, to be paid within 20 years, at a 6 per cent rate of interest. The main reason for these changes were to allow more people to benefit from these loans, and also to reduce the burden on the middle and low income groups by reducing the rate of interest and stretching the period of repayment. Also these changes was directed to minimize the effect of black market on housing finance. During the period 1961 - 1969, the bank granted loans of about 60 million ID. More than 60 per cent of these loans went to people living in the city of Baghdad. [4]

Security is demanded by the Real Estate Bank in the form of the title deed "Tapu" of the land. These restrictions limit the use of the Bank in the housing field to those who have a title to land and to those who are able to provide the cost of the building mainly from their own resources.

The Cooperative Bank, established in 1956, lends money to the housing cooperative societies, and through them to their members, at 5.5 per cent repayable in five years, and payment to commence six months after the loan and to be made in 54 equal monthly instalments plus interest, diminishing as capital is paid off; and the interest is not deducted in advance. Because of the limitations of capital, the Cooperative Bank has had to limit its loans to 500 ID per member of the housing society.

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4. see, Report of the Real Estate Bank of Iraq, 1970.

As for the other sources of housing finance for the private sector, there is the Mortgage Bank, which is usually provides loans to government employees and industrial workers, gives loans up to 150 ID, to be repayed within 12 months. Also there are the Commercial Bank and the Directorate of Underaged Trust, which gives loans up to 500 ID each, to be repaid within five years, at a rate of interest amounted to 7 per cent.

From the foregone, although the individual who wants to build a house can obtain up to 2750 ID from the different sources, this sum is by no means enough to build a house at the present standards, and the rising costs of building materials and labour; see, (9.3.0), therefore, the need to create and develop appropriate structures for stimulating the use of the private institutional and personal funds becomes necessary.

In the developed countries, there are different approaches to the problem of directing more private institutional savings into investment in housing. One of these approaches is to create and nurture through appropriate incentives and guarantees a national system for savings, which can in large part be greatly stimulated if linked to the possibilities of acquiring housing. For instance, in West Germany, the individual is encouraged to save towards a house as soon as he starts to earn. The saving is encouraged by tax concessions, and when the house is built, there are special provisions which allow the owner to gain further benefits in the shape of depreciation allowances. [5]

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5. see, A.A. Nevitt, "Housing, Taxation and Subsidies", Nelson London, 1966.

Another basic approach is to endeavour to canalize the funds that are held by banks, insurance companies, pension funds, social security institutions, and other institutional holders of savings into further investment in moderate cost housing, in recognition of the fact that this is a safe and traditional field for capital that is not spectulative in character, but which seeks long term commitment. The canalization or encouragement of private investment funds into housing is very limited in Iraq, and there is a lack of any national mortgage system that guarantees mortgage loans made by private lenders or institutions. In Iraq, although studies have been conducted to show how savings and building societies can be successfully established on a sound basis by utilization of existing internal resources, unfortunately no-one of these studies have yet received much interest, support or backing. Furthermore the current incentives for savings remain small, in terms of interest paid for individual funds and in terms of efforts by banks and other institutions to encourage and facilitate such savings.

It is apparent that all of these possibilities, if accompanied by vigorous promotional efforts and adequate technical assistance and supervision, hold great promise in Iraq, which is on the verge of deriving expanded new income from the oil resources, an income which will inevitably filter down through the population as it is invested in one form or another.

7.3.0 The Cooperative System:

The cooperative movement in Iraq had its beginnings in 1944, with the objective of organizing the efforts of the working classes and the fixed income earners so as to improve their economic and social

conditions. As a result various forms of Cooperative Societies have been established to provide members with the services they need. The most important type of these Cooperatives are:

a. Consumers Cooperative Societies: these provide members with foodstuffs and clothing at reasonable prices.

b. Agricultural and Credit Cooperative Societies: these aim at providing members with loans at a low rate of interest which they can use for agricultural and livestock productive purposes.

c. Housing Cooperative Societies: These provide members with housing at cost prices or supply them with land to build their own housing. The former policy was mainly practiced pre-1958 revolution and shortly after. But by 1963, the second policy was in full swing where numerous tracts around the city of Baghdad were allocated to different housing cooperative societies, and by 1966 many of these lands were already beyond their half way of development. [6]

The following table demonstrates the marked increase of the housing cooperative societies in Iraq during the period 1959 - 1970:

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6. it has been estimated by Baghdad Municipality that nearly 40 per cent of the total residential areas of Baghdad are occupied by people who purchase their land through the housing cooperative societies.

Table (7.1)

Number and Type of Cooperative Societies in Iraq during the Period 1959-1962 and 1970:

Type of Coop. Societies	1959	1961	1962	1970
Consumer	2	18	12	-
Agriculture	12	20	34	-
Housing	11	55	39	408
Total	25	93	85	-
Percentage of Housing Cooperative Societies	44	59	45.8	-

Notes:

- Data for the years 1959 - 1962, are obtained from a study made by B.S. Hakim, "Co-operative Housing, Baghdad: An Evaluation and Recommendations", Nova Soctia Technical College, School of Architecture, Report Series, Halifax, Canada, May 1972, Also see, Ekistics, Vol. 33, No. 196, March 1972.

- Data on the number of Housing Cooperative Societies in 1970 obtained from the Ministry of Labour and Social Affairs, Annual Report, 1969-1970, Baghdad.

The figures of the above table demonstrate the dominant part the housing cooperative societies play in the cooperative movement as a whole. The city of Baghdad took the major share of the number of the housing cooperative societies, where it has been estimated that by 1970 some 190 societies were located in the city, this represents nearly 47 per cent of the total number of societies in the country; see, Appendix (7.1).

7.3.1 System of Operations:

At the present, housing development through the cooperative socieites follows the following pattern:

The government allocates and distributes parcels of land (which it owns or has confiscated) to different ministries and their affiliated societies, the cost of sq.m. is minimal, usually between 0.150 to 0.350 ID. The government also provides the technical services - free of charge - to the cooperatives for subdivision activities. Then the cooperative societies subdivides the land parcels with the aid of the Planning and Engineering Department of the Municipality of Baghdad - if the land is located within its boundaries - or by the Directorate General for Engineering and Services in the Ministry of Municipalities - if the land is located elsewhere - and contracts lotteries to allocate individuals to each plot within the parcel. In turn, the individuals pay the land cost plus the cost of processing, i.e. survey, ownership transactions etc. The individuals cannot sell the land to others; this regulation was intended to prevent land speculation by the members of the cooperative societies. But they can sell land and structure after a minimum number of years of residence, usually two years.

Renting of houses built on land purchased through the housing societies is discouraged within minimum specified period of residency, usually two years. Tenure is freehold, provided that plots are built two years after purchase. The government's owned or controlled agencies, such as

the Water and Electricity Boards provide the houses with water and electricity, while the Municipality coordinates the sewage system and prepares tenders for road paving. There is usually no time lag in the provision of water and electricity, but time lags exist in the provision of paved roads and sewers. The cooperative societies follow up the provision of these amenities, particularly when a collective of members require them at roughly the same time.

The individuals will pay for installation of water, electricity and sewage connections from their plots boundaries to their dwellings. At time of road paving, they pay a specific rate based on the length of the road frontage. They must also provide a spetic tank at appropriate approved locations within their plots boundaries up to the time when sewers are made available. This responsibility on behalf of the individuals is also applicable to the private housing development system.

As for the permission for building, the Municipality approves house designs prepared by the individuals or their consultants by checking them against a list of planning regulations. The Municipality is also responsible for providing community facilities structures, and personnel to staff them through appropriate agency of the responsible Ministry.

The cooperative societies maintain close relationships with the government staff in subdividing different tracts and ensuring that community facilities are either available nearby or new appropriate space be allocated within tract. The individuals will be responsible

for design and construction of their dwellings including boundary walls, [6] but there are some agreements reached on that subject between individuals where their plots are adjacent to each others, but that was strictly on individual basis. The individuals are also responsible for all finances deals directly with contractors of their choice.

From the foregone, it seems that although the main objective of the Housing Cooperative Societies is to assist the low income groups by reducing the gap between the cost of housing and their financial capabilities, which was mainly due to the rises in land values, inflation in construction costs, and the relative increase in the interest levels; these Housing Cooperative Societies have limited themselves to solving the problems of the provision of cheap land, without going far enough into the construction and the management fields. This is mainly due to the lack of adequate subsidy systems, which resulted in that these cooperatives have catered mainly to the middle income groups, who can afford to buy building materials from the market, while the low income groups have been handled mainly by the government.

The main question, therefore, is to determine how best can the Housing Cooperative Societies contribute to solve the housing problems for the low and limited income groups, who have no financial ability to obtain housing through the market mechanism, particularly in the light of the rapid urbanization which created great pressures on the housing stock.

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6. there is no system at the moment where sharing of cost could be arranged between neighbours.

Before trying to answer this question and put forward some recommendations, it is of interest first to review some of the experiences in the field of Housing Societies and non-profit-making Associations in other countries, namely the experiences in the U.K.

7.3.2 The British Experience

In the U.K., Charitable Housing Associations, which are housing associations and trusts registered as charities and operate under the 1957 Housing Act, started during the period 1866 - 1875 as "Public Utility Societies" providing housing, usually in the form of new tenement blocks, for the working classes. Present day charitable Associations are autonomous bodies varying widely in their constitutions and objectives but relying mainly on donations for their income.

In the inter-war period, during the rise of the local authorities and Building Societies in the housing field and while frequent changes of government caused emphasis to swing between public and private sector housing, a role was seen for the housing Association in combining private initiative and local authority loan facilities. Like the Charitable Associations, Housing Associations are autonomous and very varied in constitution and objectives though they must be registered and have their rules approved under the Industrial and Provident Societies Act.

Housing Societies in the U.K. were set up by and operated under the 1964 Housing Act and, although their definition is very similar to that given for Housing Associations, their method and field of

operation is much more clearly defined. They are non-profit-making Societies providing either housing to let at a rent which exactly covers the cost of its provision "Cost Rent Housing" or housing in which the occupier's payments are his share of a group mortgage taken out by the Society "Co-ownership Housing". These Societies are required to be registered under the Industrial and Provident Societies Act and to operate in accordance with the practice notes issued by the Housing Corporation, which is the controlling body also set up under the 1964 Housing Act. Control, both fiscal and procedural, is a great deal tighter over Housing Societies than it can be over any other type of Housing Association.

Another body in the housing movement in the U.K. is the National Federation Housing Societies which was founded in 1935. This Federation suggests model rules to new Associations of all types, provides and publishes information, technical advice, publicity and scrutinise and assess proposals for housing schemes.

The Housing Corporation was set up by the Housing Act 1964 to promote and finance schemes of new building by Housing Societies in well populated and expanding areas and to help Societies in every way possible. This Corporation is not permitted to finance schemes solely for the acquisition of existing property for improvement or conversion. It gives advice to and approves new Societies set up using its model rules, approves proposals for housing schemes through its regional offices, and gives both

general advice through publications and particular advice on Societies' individual legal, architectural and other problems. The Corporation has also to try to interest Building Societies in providing first mortgages on Housing Society schemes and then to administer government finance in the form of a second mortgage and payment of management expenses.

The Housing Societies Charitable Trust is the agency which operates through the National Federation of Housing Societies to distribute funds from national charities to Housing Associations to help with schemes that house the elderly, handicapped, disabled and homeless. It operates in two ways:

a. grants or interest free loans are made to Associations to expand their housing stock.

b. interest free loans are made to associations, from a permanent fund, for specific amenities such as central heating, lifts etc., which help the ambience of tenants.

At present, there are nearly 2000 Housing Associations and Societies in the U.K., of which approximately one third have charitable status.

According to Dr. R. McKie, the major problems facing the organization of the housing associations in the U.K. are the complete lack of any central organization of, or even information about, Housing Associations and the only group to have been provided with any financial incentive, the Housing Societies, are entirely separate

from the rest of the movement. Any Association wanting to benefit from this direct government money would have to form a separate Society, and that Society, by its constitution, would be unable to provide assistance in some of the most important fields, for example work for the poor and rehabilitation.

There is also a lack of general publicity about Housing Associations and their work. This is due in part to the previous problem of the wide range of types which tend to confuse those who might be able to help and also those who might receive assistance. Local authorities are in the strongest position to help and yet they are often the most confused since they have to deal with all the different types of Association.

As of the system of financing, the Charitable Associations are largely financed through donations in the form of response, legacies and endownment and long term low intrest loans made at their foundation. As such, the larger Associations tend to benefit most because of their wider coverage and publicity. All Charitable Associations are eligible for the local authority loans but limitations imposed by the local authority may prove deterrent: they may be required to allow the authority to nominate some or all of the tenants and they may have to build to certain space standards, e.g. Parker Morris, which do not suit the needs of their potential tenants.

If a Housing Association is registered under the Industrial and Provident Societies' Act, all members must hold at least one

share, usually £1 nominal value, though no person can hold more than £200 in shares and most Associations secure, eventually, many members. There is no limit to the number of shareholders that an Association may have. Any interest or dividend paid on members' money must not exceed the treasury bank rate. Associations may also be registered under the Companies Act, in which case the shareholders may have a higher individual holding.

In addition to acquisition of share capital, Associations may issue loan stock and thereby obtain borrowed capital on which a low fixed interest is paid. These sources will provide finance for general purposes and may finance schemes of building or improvement which are not carried out in connection with a local authority. Where an Association wants, or is forced by lack of other finance, to work with a local authority, the authority can provide money, either by making a grant, subscribing for shares or stock, guaranteeing the interest on the Associations' stock issue or making a loan. The making of a loan is the most common method of financing individual housing schemes and for this purpose the Housing Association is entitled to receive any subsidy which the authority would have received had they themselves been doing the building.

Government finance is provided for Housing Societies through the Housing Corporation. The Corporation is empowered to provide for the whole or part of the cost of a Housing Society's activities, but the present arrangement is that the Society is expected to submit to the Housing Corporation a completed

scheme for which a site has been found and valued. If the Housing Corporation approves the scheme it offers a second mortgage of about 50 per cent of the cost, while the Building Society provides the first mortgage for the remaining 50 per cent.

However, if the scheme should prove abortive at any stage, no money whatsoever is forthcoming even for the expenses of preparing the scheme or professional fees. This method of finance does not vary whether the scheme is for Cost Rent or Co-ownership housing.

All Associations and Societies except those registered as charities are taxed, but since the Finance Bill 1965 they have been able to get all tax refunded after providing the Inland Revenue with satisfactory proof that they have, throughout the financial year, acted only as a non-profit-making Housing Association. Members of a Coownership Housing Society are taxed as owner occupiers and are allowed relief on their share of the Society's mortgage interest repayments.

According to Dr. R. McKie, the major deficiency in the field of housing finance in the U.K. is related to that of organization, for instance, there is no central source of funds independent of the control of other bodies. In addition to this problem there are a number of specific difficulties:

a. Building Societies do not seem to be interested in financing Housing Association projects, either cost rent or co-owernship.

b. Loan finance which is related to the full cost of a rehabilitation project, which includes purchase and conversion for instance, is seldom available because the cost is usually more than the final valuation of the property.

c. Varying loan charges cannot be spread among schemes to allow the most equable distribution of the cost among the tenants.

d. There is no finance available for self build Associations during the construction period.

e. Co-ownership schemes have to choose between tax relief and the Option Mortgage and the method of relief chosen applies to all members regardless of incomes.

The Housing Act of 1974 has greatly strengthened the powers and resources of the Housing Corporation and clearly aims to involve it directly in major problem areas such as the renewal of the inner city. It is, however, too early to say how these intentions will work out in practice.

7.4.0 General Conclusions and Recommendations:

After the examination of the problems facing housing finance in Iraq, and the role of the housing cooperative movement plays in housing development; also after the review of similar experience in the United Kingdom, the following conclusions and recommendations

have arrived at in respect to the ways and means needed to achieve better financing policy for housing, particularly after the recent increases in the government revenues from the oil. Recommendations will also be put forward in respect to the future role of the cooperative movement in assisting and financing housing development, particularly for those people of low income and limited resources.

In view of the recent increases in the country's revenues from the oil production, it seems appropriate that financial policies for housing should be reappraised, to take into account the expected increase in the demand for housing as a result of the general increases in the standard of living.

In the field of private housing sector for instance, although the prime financial institution is the Real Estate Bank, which extend loans up to 37 per cent of the total money individual households can obtain for their house construction, its operational capital and the terms for its loans are far from satisfactory. For example, the amount of loan, which is now standing at 1000 ID, is not enough to complete at least half the construction, particularly with the present increases in building materials and labour costs; on the other hand the rate of interest charged to the borrowers and the period for repayments was set regardless of the income level of the borrowers and their needs. This situation resulted in that the majority of the borrowers were from the upper middle and high income groups, deriving capital from the bank at the

expense of the low income groups, who are in actual need for such loans. An increase in the working capital coupled with low rates of interest and long term payments linked with the borrower's income is an essential requirement for providing houses for the low income groups. Greater working capital could also open the way for granting of small loans to the people for rehabilitation purposes.

The following is an attempt to link the Real Estate Bank loans for housing with the income levels of the people seeking its loans. This is done by proposing different terms for each income groups, taking into account their estimated needs for capital, their ability to pay, the period for repayment and the rate of interest. The main objective of this proposal is to ensure that the low income groups will be the main beneficiaries of this facility, by providing them with the most favourable terms, i.e. low rate of interest, and long period of repayment.

Table (7.2)

Proposed Scheme for the Real Estate Bank Loans for Housing in Baghdad:

Income Groups	(1)	(2)	(3)	(4)	(5)	(6)
A	Up to 50	2000	30	1	77	6.400
B	51 - 100	2500	25	2	126	10.500
C	101- 200	3000	20	4	213	17.750
D	Over 200	4000	15	6	395	33.000

Notes:

(1) Monthly income, ID.

(2) Amount of loan, ID.

(3) Period of repayments, Years.

(4) Rate of interest, per cent/annum.

(5) Annual repayment including interest, ID.

(6) Monthly repayment including interest, ID.

It is recognized that the above proposed scheme will face many problems in regard to the assessment of incomes, and the ensurance that these loans will be used for housing construction only. To control all these problems, the following measures are recommended:

1. The applicant for a loan must provide a title deed for the land that he is proposing to build his house on, "Tappo";

2. The Bank must ensure that the applicant will use the loan for house construction, this may be done by dividing the loan into two instalments, the first instalment will be given at the time of approval of application, whilst the second instalment will be given after an inspection by the bank that the first sum was spent on construction. In the case of the first instalment not used for house construction the second should be withheld and the applicant should repay the money within, say, 5 years, at a high rate of interest equivalent to the general rate of interest established by the government.

3. In order to achieve a fair and wide distribution of the bank loans, it is recommended that the bank must ensure that the applicant for a loan did not receive loans from the bank before;

4. To secure repayments, if the applicant is a civil servant, then repayments should be deducted directly from his monthly allowances; on the other hand, if the applicant is self employed or working in a private company, then the bank should have the right of confiscating the house in the event of withholding payments, for say, six months in succession.

As far as the other sources of housing finance for the private sector are concerned, i.e. the Mortgage Bank, Commercial Bank, and the Cooperative Bank, all of which are nationalized institutions, it is recommended that the government should increase its allocations to those institutions so as to enable them to increase their loans to the borrowers, with easy terms, i.e. low rate of interest and long period of repayments. Furthermore it is recommended that the government should encourage individual saving, since savings help to provide funds to finance housing and related projects. Savings can be effected through banks, insurance companies and other saving institutions, such as social insurance and pension funds. In view of the strong desire manifested in the government's National Charter, the government should encourage savings for housing purposes in particular through cooperative societies, saving and loan associations and other non profit organizations, under the supervision of the government. Also it is recommended that local and municipal councils should assume responsibility for the major part of financing public services required for housing projects and that these councils should be assured of the necessary financial resources. This makes it important

that Municipalities develop their own total approaches to the housing problem, instead of depending exclusively upon the central government for solutions. This would include the establishment of housing departments or agencies and consideration of the following measures, among others: special taxes or other sources of revenue to build up revolving funds; the acquisition of land and providing it with public services so that it would be available for social housing purposes, including cooperatives; the use of municipal guarantees or credit to facilitate lending to groups in need of housing, and the use of tax exemptions under selective conditions, as an aid to lowering housing costs for a period of time. The central government must facilitate, where necessary, credits and loans to the local authorities and use concepts of matching grants, as well as subsidies, to stimulate greater local concern and action to deal with the housing problem.

As for the housing development through the Cooperative Societies, the following conclusions and recommendations are arrived at:

1. Stable and precise government policy is the basic requirement for the development of cooperative housing societies and the non profit housing movement. This allows for preparation of long term programmes, the planning of continuous financing systems and the structuring and management of housing.

2. The development of cooperative housing where capital is scarce depends primarily on the national government for financial resources.

3. The mobilization of private resources, particularly for cooperative housing societies, can make a significant constribution to housing production, if the government provides favourable conditions for such mobilization.

4. The role of the housing cooperative societies must not be confined only to the provision of land to their members, but also to assist the poor in the provision of shelter and security.

5. Well organized and integrated systems of the non profit making housing movement are considered the best way to overcome the housing problems, since such systems allow for the fruitful participation of the two basic forces necessary for success; the government and the public.

6. Financing through cooperative housing societies is one of the most important elements for low income group housing, and the single most important source to provide such financial assistance for these associations is internal savings generated with the assistance of the government.

7. National financial institutions providing funds to housing cooperative societies should take account of the fact that cooperative housing involved primarily the low income groups and that the terms on which money is made available should be as flexible as the financial institutions could arrange.

8. Since the greater part of housing funds comes from the national budget, it is essential that the government have clear and definite cooperative credit policies which should be in accordance with the payment ability of the cooperative members.

9. Regarding the inflationary possibilities of the housing development, housing investments if carried out by cooperative societies and other non profit making associations, speculation can be eliminated, and if a national land policy is adopted and also the flow of building materials is organized and controlled while savings are encouraged, then the possibility of inflation could be curbed.

10. Liaison arrangements and adequate machinery for consultation are necessary between the authorities responsible for cooperative societies, housing, land and public works, and the authority responsible for environmental questions. And the ultimate responsibility for housing cooperatives should be under a single body with the support from other government departments, particularly the Ministry of Housing and Public Works and the Ministry of Municipalities.

11. The government, as well as the cooperative societies themselves, should provide for a broad and well organized educational programme of cooperative principles and of managerial, auditing, and executive capabilites particularly among the low income groups.

In addition to the above general recommendations, the following are specific proposals related to the operational system of the Cooperative Societies in the event of a specific project:

1. Allocation and distribution of land parcels should remain, but must be within the general guide lines of the current master plans of the cities, particularly the recent master plan of Baghdad; see, Appendix (1.5).

2. In the case of adopting the policy of distribution land only, the government should assist the low income groups in reducing the cost of construction by constructing all the boundary and party walls according to plan. This should follow a timetable of the phasing and implementation of the housing project.

3. The government should also implement community facilities structures and provide necessary control and maintenance according to the timetable of implementation.

4. The Housing Cooperative Societies should take the initiative in establishing a mechanisms for competitive subdivision designs and allocation of individual members to plots according to the project phasing programme of subdivisions; also arrange with the municipality to develop areas of allocated land as public gardens and open spaces, this should include provisions for maintenance and control and should be within the guide lines of the structural plans of the cities.

5. The Housing Cooperatives should ensure that the phasing programme of the housing project is economical and feasible for implementation, and should follow up any delays which might be caused by the agencies responsible for a specific utility, such as the provision of water and electricity.

6. The Housing Cooperatives should also keep a list of contractors names and qualifications who have demonstrated their competence and honesty, also the cooperatives should keep up to date of the current tender prices for every item of construction and of different standards, and make these available to individual members upon request.

7. Finally, the individual members of the Housing Societies should:

   a. be free to decide which phase of the subdivision programme of the project suits him best, and the result of the collective decisions of the members should determine the final phasing of the programme.

   b. arrange the design of his dwelling according to the guidelines and regulations set up by the government and the cooperative society.

   c. commence construction according to the phasing programme of the project and pay penalty for delays beyond deadline.

   d. ensure that all his utility connections are made according to the instructions, and pay fine for faulty connections and deviations from these instructions.

C H A P T E R 8

THE LAND : PROBLEMS AND POLICIES

The literature on the cities of Iraq is concerned almost entirely with their history and geography. Information on contemporary social structure is scarse and little or no research has been done on urban land use policies and practices. This chapter is an attempt, therefore, to put together in a systematic form what information is available on such policies and practices. It is hoped that it does at least provide an overall view of the urban land development and a base from which further analysis can be made.

For early economists such as Thomas Malthus and David Recardo, the peculiar characteristics of land, as an economic resource, were the source of pessimistic prophecies about human society. Since land was both an indispensable input for the production of food, and virtually fixed in supply, growing population would cause the average output of food per capita to fall, keeping humanity close to the subsistance level. Since land of poorer and poorer fertility would be placed in cultivation as human demand for food increased, the owners of better land would receive an increasing share of society's total economic product compounding general poverty with the grossest form of economic inequality. [1]

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1. see, Paul A. Samuelson, "Economics", McGraw-Hill, New York, 1967, p. 710.

For one reason or another, at least for industrializing western countries, these fears proved to be exaggerated. In the midst of their emerging affluence, societies have found many things more serious and more interesting to worry about than a shortage of agricultural land. One of these modern specters is the shortage of urban land.

The surface aspects of the modern land problems are all too apparent. Housing, which occupies the largest part of urban land, is everywhere regarded as insufficient or inadequate to some degree. The creation of more or better housing requires land, but such land is hard to find and harder to acquire. Its price is high, and the continuing increase in its price, in many of the world's urban areas, makes its present owners anxious to keep it as long as possible. The gap between the demand for housing land and the supply of available urban land in much of the world seems hopelessly vast.

A closer look at the urban land problem, reveals that the amount of land within existing urban areas seems sufficient to accommodate greatly increased population with space and comfort.[2] Measures and estimates for various metropolitan areas bear out this more optimistic observation. Simple arithmetic makes it easy to believe those scholars who feel that the shortage of urban land if it does exist, is not due to the physical limitation of land.

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2. see, Hans Blumenfield, "The Modern Metropolis", Scientific American, 1965, pp. 70 - 71.

In the case of Baghdad for instance, about 13360 hectares are used for residential purposes; see, Appendix (1.5.A), this area accommodating around 2.5 millions inhabitants. This means that the theoretical density is about 18.7 persons / ha., about 3 families to the hectare. Such numerical exercise lead to wonder where the urban land shortage, which is offered as the reason for widespread housing inadequacies, can arise.

The factors which convert a physical abundance into practical dearth include transportation and land use inflexibility. To be useable for residental development, a parcel or urban land must conveniently adjoin an efficient intraurban network of public transportation or roads for the use of private cars. This requires heavy public and private expenditures, to the extent that the system is vehicle oriented.

Utilities must also be provided in order for land to be residentially useful. The technology of water, gas and electric power distribution and of sewage disposal, is perhaps simpler or less ambiguous than that of human transportation, but the aggregate cost of such facilities is substantial. These are capital costs, in large measures, and usually represent assets which the municipality must acquire. Their adequate provision rests upon the ability and willingness of the municipality, with the assistance from larger units of the government, to commit the community to a large burden of fixed charges. All of these matters are highly specialized subjects in themselves, but one must observe at least that limitations upon community action in this respect result in a limitation upon the supply of residential land and hence, in principle, in a limitation upon the possible supply of housing.

With the most adequate financial resources and the most advantageous technology for the provision of transportation, utility, and other services to residential areas, the city area can, in principle, reach out so far that the supply of useable land is exhausted, when a body of water block further expansion, for example; when the length of the typical intracity journey interferes with productive employment; or when the congestion of human and vehicle movement at transportation nodes becomes too difficult to manage. Then the question arises whether the growth of the city will, or should, cease. There does not seem to be historical or current example of a city whose further population increase has been blocked by the inadequacy of its supply of residential land.

Land use, inflexibility, which is the principal reason for a virtual shortage of residential land, refers to the fact that residential development or redevelopment, with or without changes in density, is sometimes hampered by business, legal and financial factors.

In the first place, it must be observed that much of the land suitable for housing is occupied already by residential structures. A city which aims to improve the housing supply available to its inhabitants does not necessarily require any more land. Indeed rebuilding of residential areas at higher densities means that ultimately less land in total will be used for housing.

Imperfect legal titles to land can hinder its sale or re-use. Undeveloped market practices may make the search for suitable land within the city both difficult and expensive. In many cases, heavy brokerage fees may reflect this condition and it is not uncommon to find that prospective buyers and sellers of properties distrust the established middlemen in the field to the extent of preferring a do-it-yourself effort.

8.1.0 The Land Tenure System:

Iraq has been for centuries part of the Ottoman Empire, and later legislations have left almost untouched the basic elements of the Ottoman system particularly those related to the land tenure system.

The basic land law in Iraq is the Ottoman Land Law of 1858, which synthesized land practices which had developed over the course of the Ottoman Empire. This Law divided all land into four main categories which are still used in Iraq. These are Mulk, Miri, Waqf and Musha.

1. Mulk is land which is owned by an individual and over which he has full ownership rights.

2. Miri is land which is owned by the State and which carries usufruct "Tassruf". This right of enjoying the property may be sold by the usufructuary, or it may be let, mortgaged, or even given away. It may also be transmitted to the usufructurary's heirs, although the land could not be divided among them. The State retained ultimate ownership and, if

there were no heirs, the property reverted to the State. Also the State had the right of supervision over all transactions pertaining to the transfer of usufruct and any such transfer had to be certified by the State.

3. Waqf is land which cannot be divided or alienated, but continues in perpetuity to the descendants of the original owner. The Waqf is a form of endowment unique to Islamic countries. The word itself means "stop", and the legal document drawn up for the Waqf contains the full expression "Mawquf Lilah", meaning stopped for God. Originally meant as a charitable endowment for the establishment of schools, mosques, libraries, hospitals and other institutions, or for the care of indigent families, whereby the interest was given to particular designees while the capital was given to God, the Waqf soon was turned into an institution for the preservation of property from extravagant heirs or from an acquisitive State. Many families in Iraq and Baghdad in particular, have in fact succeeded in protecting their properties by converting them into Waqf. In Iraq there is a separate ministry called "Ministry of Al-Awqaaf", which administers waqf properties. Only property which was under the full ownership of the endower could be converted into Waqf, and once thus converted, could not be repossessed.

4. Musha is land which is owned collectively. It originated from the tribal practice of dividing the arable land on which the tribe settled between its members. Since both extent and

quality were taken into consideration, members were given pieces of land in different zones of the village. Also, to maintain equality, the land was re-allocated at intervals. The practice still obtains although it is falling into disuse because of settlement of title which requires registration of title to a definite area. Cultivators thus became owners of permanent holdings. [3]

Two of these land institutions, namely "Waqf and "Miri" are of particular importance in understanding urban land problems and policies in Iraq.

The rulers of the Ottoman Empire tried to make most land either Waqf or Miri, while the immediate consequence of this policy was the retardation of land fragmentation and the curbing of the powers of the large landowners and tribal sheiks. The long term consequence of the increase of Waqf land was the immobilization of city land. Most Waqf land in Iraq lies in the cities. In Baghdad alone it is estimated that there are more than 10,000 dwelling units which are Waqf and some of the most valuable land within the Municipality of Baghdad is Waqf. Since this land cannot be alienated, it is an impediment to urban renewal which might require appropriation for purposes of street widening, establishing green spaces as parks, or instituting housing estates.

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3. see, "Agrarian Reform Law. No. 30 of 1958", Government of Iraq.

Geography and politics combined to give the policy of Miri extension some unexpected long term consequences. The Ottoman rulers did seize and thus extend their holdings of Miri land, but they also sold much of the agricultural land which they acquired to cooperative and complaisant subjects. Waste land which was Miri remained in the possession of the State. Although some agricultural land, which was Miri and was sold to individuals lay on the outskirts of cities, the bulk of the immediate hinterland was waste land, and thus remained Miri since it was virtually unwanted at that time. When, in the second quarter of the twentieth century, the cities expanded rapidly into the waste areas, the State found itself in possession of land which could be used for urban development.

8.2.0 Land Problems and Policies:

The purpose of Urban Land Policies is to ensure that sufficient land is available for the different urban activities such as residential, work, traffic, leisure etc., and available in such a way that harmonious urban development can take place. One of the main problems is to make sure that ownership rights and prices do not prevent the land from being used in the way, the amount and in the chronological order, required for development. The land must be equipped for its ultimate use with roads, water sewerage, etc. and the cost of equipment must be taken into account. This problem is complicated by the fact that established human activities and rights must be considered, as well as convensions and legal rights which may not seem to correspond to important needs but which will involve a difficult and lengthy procedure if they are to be changed.

The urban land problem has acquired hightened significance in recent years in Iraq and Baghdad in particular, partly because the amount of land necessary to meet demand or generally accepted needs has increased sharply. This is in part due to the population increases. Further, the concentration of the greater part of the population in urban centres, a process which in most developing countries has been particularly rapid, has considerably increased the demand for urban land; see, (1.2.0).

Other factors leading to the increased demand for urban land are the higher standards demanded in cities, including reduced densities on housing areas, bigger open spaces, more space for schools, health services, etc. Furthermore, considerable areas are needed for both traffic and for parking. Many problems of environmental pollution also create needs for extra space.

In Baghdad, the need for land for development up to the year 1990 was estimated by Polservice, to be 429700 ha. this corresponds to about 100 sq.m. per head of population increase, and 134.3 sq.m. per inhabitant; see, Appendix (1.5.8).

The equipment and qualities now demanded from urban land have made the provision of equipped building land much more expensive in Baghdad, and the orderly provision of the land is much more complicated matter. The land must now be relatively near to main roads, and have access to them through a network of secondary roads. The different roads must be coordinated over a wide area, and all of them, in view of the loads they will have to carry, be

of far higher quality than was needed only two to three decades ago. All these qualities demanded, however, are the result of economic standards and social goals put forward to cater for the expected increases in needs and demands. For instance according to the current master plan of Baghdad, it is no longer considered satisfactory for great parts of the population of Baghdad to live in slums or congested substandard districts, it is also considered essential that all inhabitants should have reasonable access to recreational facilities. These standards in itself are bound to create great additional needs for urban land, and the need to make land available for the planned activities almost independently of ownership and other rights. [4]

This situation calls for the planners to take into account during the process of plan preparation the cost of undeveloped land and the cost of equipping it with the essential services. It is pointless to plan a nice neighbourhood of one family houses to be built in the near future for instance, if the price of the land is so high that it will not be possible to finance the houses and then sell or let them. The price level of undeveloped land in Iraq is influenced to a considerable extent by planning. These prices tend to go up if it is planned in a foreseeable future to change the present use of land or land in the vicinity to one which can command a higher price. An example of that may be drawn from the Doxiadis Associates master plan of Baghdad, where the price

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4. see, Polservice, "Master Plan for Baghdad", Vol. 1, 1967, Baghdad.

of the agricultural land in the south of the city "Al-Chadria" rose up by almost ten times as a result of the planning decision to build a new campus for the University of Baghdad in the area.[5] Therefore it seems that the government and the public authorities have a strong influence on the land prices and land market as a whole through their town planning measures, taxation, the provision of public utilities, etc. As such, it is important that they exercise this influence in accordance with a plan, thus avoiding price and sales conditions which may have serious and injurious effects particularly in the field of housing for the low income groups.

In the developed countries, one of the main problems encountered in the land policies has been the high rising prices of land which are either sold voluntarily or compulsority. The immediate result of these increases, which were mainly occured in the cities have been that new dwellings have, in many cases, become too expensive for those in the middle income groups.

If these high prices are not balanced by public subsidies, "a method which might provide a deplorable incentive to further price increases", they may hamper house building, thus accentuating housing shortages and possibly stimulating further speculation; they may lead to higher densities than desirable in order to keep land cost per dwelling down; they may push house building out to unsuitable and less central places where land prices are lower.

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5. information obtained from the Municipality of Baghdad in 1972.

It is clear, therefore, that there is an urgent need in Iraq for the formulation and enforcement of clear urban land policies which are not merely consistent with nationally set objectives, but which in their details, will be suitable for local conditions. The alternative would be disorganized growth accompanied by mounting social costs which would inevitably defeat the purpose of development policies. The purpose of such urban land policies would be not to stifle urban growth, but rather to control it. It is not really the size of the city that matters, but rather the speed and manner in which it grows.

8.3.0 Land Values and Effects:

The economic development of a country is the product of both social and economic factors. Land as an economic factor plays an important role in the economic development of countries. Both land value and land use affect the process of economic development and are in turn affected by the stage of development of the country.

Economic development is generally accompanied by high degree of industrialization and urbanization. Higher levels of industrialization and urbanization affect the land values and land use patterns. Industrialization increases the demand for industrial and commercial land and thereby raises the prices of such land. Urbanization creates a pressure on existing urban land thereby raising the value of land.

Land values and land availability occupies an important place in housing studies. Any consideration of it must begin with an appreciation of the fact that land is the one marketable commodity

whose total supply is known and fixed. On the other hand, there is often a great deal of confusion in discussion of land values, because people fail to distinguish between the total area of land and that area which is being offered for sale, or can be readily acquired by compulsory purchase. Another source of confusion is a point which makes the economics of land rather different in some respects from the economics of other commodities. It is that every piece of land is characterized by a unique location. In this sense, no piece of land has a perfect substitute. While several pieces may be more or less as suitable as each other for some specific purpose, they may be widely different in their suitability for another purpose; and time can change the suitability.

Over the last decade, the pattern of land values in Baghdad show signigicant downward trends, the following table demonstrates the nature and causes of price changes in Baghdad;

Table (8.1)

Land Value in Baghdad in Different Areas, in ID per sq.m.

Year	Central area	Residential Area	Newly developed area
1960	46 - 75	4.6 - 10	1 - 2
1965	40 - 60	4.6 - 7.5	2 - 3
1969	less than 50	4 - 6	1 - 3

Source: U.N.E.S.O.B.

The relative decrease in the land values in 1965 shown in Table (8.1) was the result of the government nationalization measures, which created uncertainty in investment particularly in the commercial fields, also this decrease in the land values was the consequence of the mass distribution of land by the government to the housing cooperative societies to encourage middle and low income groups to build their own houses; see, (7.3.0).

Some experts think that to solve the problem of land supply for housing development, public ownership must be encouraged. Looking at this point more closely; if there is any commodity which is fixed in supply, while the demand for it rises, the price at which it changes hands will rise, unless some form of control or rationing is introduced. This is an important fact which in turns effecting land prices.

In any situation, there is a fixed amount of land, some of it may be devoted to buildings of various kinds, some to roads, and some used for recreation. There may also be some land which is used for agricultural purposes, while other land, usually of a kind which it is difficult to farm and on which nobody wishes to build - either because it is in the wrong location or because the terrain is difficult - may be left idle. If, as a result of population growth or rising standards, a public authority or a private organization wishes to increase the number of houses in the area, then it is almost certain to do so by trying to

devote to housing some land which was previously used for some other purpose. The only alternative is to build upwards, or in the garden of an existing house in the form of an annex. There is a limit to what can be done in either case.

When additional land is devoted to housing there is less available for other purposes. Usually it is agricultural or recreation which loses. Unfortunately population growth also affects the demand for goods and services that agricultural land provides. Over a long period, the growing competing demands for fixed total supply will certainly result in rising prices if a free market prevails.

The availability of state-owned land in Baghdad, and the government distribution of this to the public, have kept the price of land relatively low. For instance, the Municipality of Baghdad, in cooperation with the Ministry of Housing subdivided and distributed 65,000 plots of land to various Housing Cooperative Societies during the period 1964 - 1968.

The size of the plots was uniform: 200 m^2. for labourers and daily wage labourers, and 600 m^2. for government officials. The prices were usually less than one tenth of the market values and ranged from 0.150 ID per m^2. for the workers to 0.350 ID per m^2. for government officials.

Baghdad's problem is that of providing enough basic facilities such as sewer systems, drainage, electricity, piped water, storm drains and paved streets to catch up with spiralling demand in the already congested parts of the city, where, to compound difficulties, land appropriation is difficult and expensive.

8.3.1 The Role of the Government in Controlling Land Values:

The policy of deliberately acquiring land and holding it in reserve to offset land speculation is a technique which, although used in many countries, is not known in Iraq. In Copenhagen, for instance, land speculation is controlled partly by the city's policy of offering its own land at low prices when it is considered desirable. In the Netherlands, almost every city with a population of over 2,000 has a reserve land policy which is credited with having facilitated the rational use of land, limiting land speculation and helping to hold down development costs.[6] In Iraq, the municipalities extended their boundaries in 1956, but failed to follow through by acquiring the newly incorporated land.

The range of measures which are open to the authorities to control land speculation is wide and may include:

- price control of land;
- taxation of profits from land sales;
- acquisition of development rights;
- withholding of permission to build;
- taxes on unused land;
- financial inducements to build.

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6. see, U.N. Publications, Sales No. E.73.IV,9, p.34.

If land is owned by the State or Municipality, then it may become the function of the authority concerned to allocate land between different uses - a task which would otherwise be done by the price mechanism. As sole supplier it would also be able to set the price at which it would lease any specified plot, but it could not guarantee either that there would be a leasee at that price, or that there would be only one. If it altered the price so that there was exactly one purchaser then the market mechanism would have asserted its ascendancy over bureacracy, and State ownership would mean nothing more than power to veto the use of land for an undesirable purpose, and the comforting thought that any profit being made out of the land would be going directly to the State. Neither of these aspects of State ownership would reduce the price of land to the house builder.

It is, however, possible for the State to own land and to lease it at less than its market price or value. This could be done in two ways. Possibly one type of land use would be more profitable than another, but the State might lease the land for less profitable purposes because of the greater social benefits that might arise. Another possibility is that although a number of people might want a piece of land for the same purpose, and be prepared to pay varying amounts for a lease, the State might decide to lease it to a specified person at less than another might pay for it, because his need for that particular piece of land seems to be greatest. The first method of altering the cost of land is two-edged, and already exists wherever the

public authority has power to control land use. It may cause prices to rise or to fall, it is a consequence of State control rather than State ownership. It could also be achieved by levying taxes on sale of land, with the tax varying according to the nature of the existing and new land use.

The other method, involving a discrimination between prospective lessees by some mechanism other than the price mechanism is more typically one of State ownership. But it is open to such abuse, and to such allegation of abuse, that many who advocate State ownership would shun this particular idea. On the other hand, it is perfectly possible for a Government to achieve a similar effect by devising a scale of discounts. According to his needs and his income a man bidding for some land would need to pay only (x) per cent of his bid. Consequently if a wealthy man bids 1000 ID then he may be beaten by a less wealthy man who bids 1200 ID but has to pay only 600 ID. A difficulty here is that in time those without discounts would tend to bid even higher than had been their custom. But not all land is wanted by the wealthy. Although it is true that this tendency would exist, it is also true that a device of this kind would enable the State to allocate land in a way that would be open to little abuse, but would favour those whose need is greatest.

Over and above this discussion of whether public ownership means lower prices, and of how land is to be allocated between competing claimants, stands the one undisputed aspect of public ownership.

Individuals cease to make profit out of land sales. Quite apart from any discussion of the ethics of profit, or of the ethics of nationalization, there is one point to be made about this. There are times when a person who can make profit out of a sale may withhold land from the market in the expectation or hope that he may make more profit if he sells it later. It is equally true that a public body may argue that by withholding land it will later be able to let it at a higher rent than now, and so add to its income. In some countries, and certainly in Britain, nationalized industries are still run more with an eye on profit and loss than with the larger aim of acting in the national interest. Public ownership without a careful appraisal of policy may do more harm than good.

8.3.2 Land Taxation

Land taxation is not only a source of revenue to governments but an important tool for controlling both the use and value of urban land. The efficiency of this tool varies from country to country depending on various economic, social and administrative factors.

In Iraq, and Baghdad in particular, the holders of long lease "Arasa", pay tax of 1 per cent of the value of the assessed land under Estate Tax Law No. 162, of 1959 and its amendment. The tax is collected annually by the Ministry of Finance in the year when it becomes due. The holders of such land are required to notify the government every year of the number of plots owned

and any changes in ownership. Exemptions from this tax include holders of land whose plots do not exceed 800 m^2., non profit institutions such as schools, religious and charitable organizations and public utilities.

The holders of real estate must pay a basic tax of 1 per cent on the annual revenue earned from their real estate. In addition, there is a progressive surtax starting with 2 per cent for revenues between 1000 - 2000 ID and reaching 12 per cent for the range of 10000 ID per year, the surtax is imposed at the rate of 15 per cent, while those with revenues less than 1000 ID do not have to report their incomes. The basic tax is collected in two instalments, on 1st of April and 1st of October, while the surtax is collected in the first half of the fiscal year following the fiscal year in which the tax becomes due.

A number of laws specifically forbid both private and public parties from entering into the real estate transaction before making sure that the taxes on the real estate have already been paid. The objective of such laws is to prevent the evasion of paying real estate taxes.

In order to encourage the construction of residential buildings on plots of land which are suitable for such purposes, and to discourage leaving such plots vacant, an annual tax of 1 per cent is levied on the assessed value of the land. This tax could be made more effective by making it progressive with the passage of time. The rate of this tax could be increased every year so that it would become more costly to keep land vacant for purposes of speculation.

8.3.3 The Cost of Equipping Land:

In principle, the cost of equipping land may either be considered as a public service which should be provided to the users free of charge, or the full cost may be charged to the users. The first principle or policy is widely adopted in the socialist countries where public housing is provided at very low rents. However, the provision of the equipment of land free of charge or at a very low price was also the practice of many municipalities in western European countries, but during recent years this practice has become less and less common. This is partly because, with rising standards, the equipment costs have gone up so much that municipalities can no longer afford to pay them from their income from general taxation.

It is also partly because the practice has been combined with a relatively free land market, where prices of undeveloped land have tended to increase in cases where equipping land free, namely to assist in providing inexpensive housing, has been thwarted, and the effect has been an unwarranted profit for the land owners. It seems logical, therefore, to draw the conclusion that the practice may be subject to considerable doubts; furthermore, if it is to be successful other strong measures to influence the price level are necessary, for example very large public holdings of adequate building land. In addition, the relevant authority must be in a strong financial position in relation to the development task in question.

The principle of charging the total costs directly to the users can easily lead to practical difficulties if the development is undertaken in small instalments, as some common elements, e.g. main roads, may have to be finished long before the land is ready to build on. In such cases this part of the costs will not at first be covered by the future users, but usually by the local authorities.

Some of the main roads and conduits may serve both the town itself and many outling districts in such a way that it is difficult to charge the people living along the road for the whole of its cost. Moreover, charging the full equipment costs to future users, may, in the case of plots which are expensive to develop, make them too expensive for the houses they are particularly suitable for. In such special cases subsidies to balance the extra costs of equipped land may be warranted. In other cases the costs of a new estate may become too expensive for the people it was intedned for; it may, for example prove difficult for families with several children to afford individual houses. In such cases a general reduction of the land cost charged to the users would not seem to be a suitable measure, as it would result in higher undeveloped land values, or in a waste of land in large plots. Subsidies per dwelling or adopted to the situation of each family would, in this case, seem to be more appropriate.

For practical reasons, in Iraq the total cost of equipping the land is not directly charged to the users when the costs are incurred. They are charged to a greater extent as annual payments.

Such charges are imposed as local rates representing a payment for services, water, electricity, roads. In the case of governing the cost of sewage network, the payment was calculated equivalent to the cost of using water supply, and paid quarterly. These taxes or rates which are imposed on the value of the land encouraged to a certain degree investors to avoid too large sites. Used in the right way, such tax may, therefore, have the effect of reducing wasteful use of land, and thus contributing to a reasonable balance between supply and demand for land which in itself may be a favourable result in preventing land speculation, so long as this tax does not cause undue hardships to some middle and low income groups.

8.4.0 Process of Land Control:

Absolute ownership of property by individuals is constitutionally guaranteed in Iraq. The consitutional guarantees derive from Islamic precept and practice which respect the right of private property, permit each individual the legitimate ownership of whatever moveable or real property he wishes and allow him to draw profit from it within certain bounds. These bounds are defined by the injunction to the wealthy to discharge certain obligations to the poor and to expend a certain amount on income from the owned property for general good. Thus, even the 1968 socialistic consitution declares that "private ownership is guaranteed. Private property may not be appropriated except in the public interest and for adequate compensation according to law."

Physical planning control, the relevant insitutions, procedures, and connected administrative actions of municipal authorities, have their formal and legal background in the following two basic documents:

- The Law of Municipal Administration.
- The regulation in respect to roads and buildings.

The law of municipal administration [7] is the basic legal regulation controlling all the problems connected with municipalities and their activity. Among others, it incorporates the procedure of organizing such units, appointment or election of authorities, also scope of activities, duties and rights, means and way to effect their tasks, and several other problems. Among all the above, within articles 43 - 47, are very generalized indications, referring to object and scope of plans for physical development within towns and cities, to characteristic elements in respect of the way of their execution, to degree of their obligation, also to the procedure of their approval, introduction of revision or changes. Among problems dealt with by articles 48 - 51, are also definitions referring to municipal administration, also supervision for investment and building activity. The problems of land economy are included in articles 52 - 55, 60 - 63 and 70. They deal with the disposition of land areas belonging to the state, with the gain of areas by the municipalities resulting from ownership subdivisions and from establishing street boundaries and with ways of disposing of these areas.

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7. see, Law No. 165 of 1964.

The regulation in respect of roads and buildings [8], together with several later revisions, changes and additions, controls several different problems. They incorporate:

- regulation in respect of physical planning, i.e. residential zones, their divisions into particular classes, conditions for development, also design of roads and streets in separate classes.

- regulations in respect of building by-laws and building supervision service which are solely referring to design and construction of buildings, roads and streets, to building licences, to duties of supervision service, to maintenance and repair of streets.

Because of the fact that the above regulation was not suited to present conditions and needs, has led the government to the conclusion that its basic revision was necessary. By the end of 1969 a specially appointed committee took the task of preparing a new regulations regarding roads and buildings, the new regulations derived its necessity to form the master plan of Baghdad, which was prepared by Polservice. It must be stressed here that the old regulations are only a section in the Municipal Administration Law, and are mixed up among other regulations referring to quite different problems of town administration. It is only because all of them are the responsibility of the same local authority, that they are combined into one Law.

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8. see, Law No. 44 of 1935.

The new regulations control part of the problems incorporated in the scope of the old one, which are the problems having town planning, architectural and building character. These include:

1. Proportion of land area for different types of development transportation, recreational and green spaces;

2. Size and minimum dimensions of plots;

3. Width of roads and condition for their routing;

4. Principles of development on plot, which includes, proportion of built up area, set backs, permissable designs on situation of plot, particular demands in respect of the building;

5. Principle of development for service uses;

6. Detail regulations prepared for zones needing special attention because of historical value deriving from ancient monument social and religious buildings, and the like;

7. Binding regulation in respect of designing and construction of building particularly in respect of public safety, hygiene, climatic and sanitary conditions.

8.4.1 <u>Appropriation Procedures</u>:

Under Law No. 54 of 1970, ministries, government and semi-government departments and services may appropriate any real estate in the public interest. The procedure is as follows:

1. The approval of the appropriation is given by the Minister of Justice; if the real estate is being appropriated by the Ministry of Justice the project has to be approved by the Cabinet Council;

2. After the promulgation of the Minister of Justice or of the Cabinet Council of the appropriation approval, the appropriator asks the registrar's office to stop any further transaction on this real estate;

3. After the proceeding measures, the Mayor promulgates an order to create a committee composed of the director of the registrar's office, two employees of the state - one of them an engineer and the other one an employee from the Ministry of Finance - and two experts, each one of them chosen by one side;

4. The judging committee is charged with estimating the real estate and establishment values based upon the market price on the date of the promulgation of the appropriation decree;

5. The price determined by the judging committee is paid to the proprietors according to the nature of their ownership and their share;

6. Both the appropriator and the real estate owner have the right of objection within 30 days;

7. Pursuant to a decree of the Mayor, the appropriating side has the right of immediate appropriation of the real estate already estimated;

8. The law permits the appropriating side to come to terms with the real estate owner on a price which would not exceed that set by the judging committee. Further, the

law permits the exchange of the needed land with government land equal in price and location. Also the owner may request the appropriation of the residual part of any property when such residual part cannot be sold at an economic price;

9. The law permits appropriation, without compensation, of one fourth of a property if it can be proved that the property appreciated in price as a direct consequence of improvements made by the State such as street widening, building of public squares or bridges. Such appropriation cannot be repeated however high the land may appreciate in price subsequently.

A more direct measure to secure the supply of land needed for projects is the compulsory purchase of land without recourse to appropriation procedures. In Iraq, such powers are, it must be emphasized, rarely used. Public agencies depend largely upon negotiated sales to acquire their land. One example of compulsory purchase of land is where a belt of land 200 metres wide and approximately 18 kms. long which lays 6 kms. east of the centre of the city of Baghdad was acquired to build a canal connecting the river Tigris north of the city to the Diyala river at the south, the value of the land was set at the very low price of 6 ID per 2500 m^2. The amount paid was based upon the argument that the land was agricultural land.

8.4.2 Land Subdivisions;

The existing legal classification of residential areas in Baghdad was originally based on Law No. 44, 1935, and its amendments.[9] This law classified the residential areas in the cities and towns in the country into six classes, as follows:

Table (8.2)

Classification of Urban Residential Areas in Iraq According to 1935 Law:

Residential Classes	Plots not Smaller than
Class 1	100 sq.m.
Class 2	200 sq.m.
Class 3	300 sq.m.
Class 4	600 sq.m.
Excellent	800 sq.m.
Special	2000 sq.m.

Source: Law No. 44, 1935, Baghdad.

The fundamental fault of the criteria applied in the mentioned classification, is the determination of the smallest allowed size plot only, leaving freedom in determining the largest sizes. Further drawback is in the fact that subdivisions undertaken by the government institutions are excluded from the direct control of the Municipality of Baghdad. In consequence, the number of plots, and the resulting number of inhabitants, within a given area, is of spontanious character. This situation have the following effects:

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9. see, Government of Iraq, Official Gazette, No. 1465, Oct. 1935.

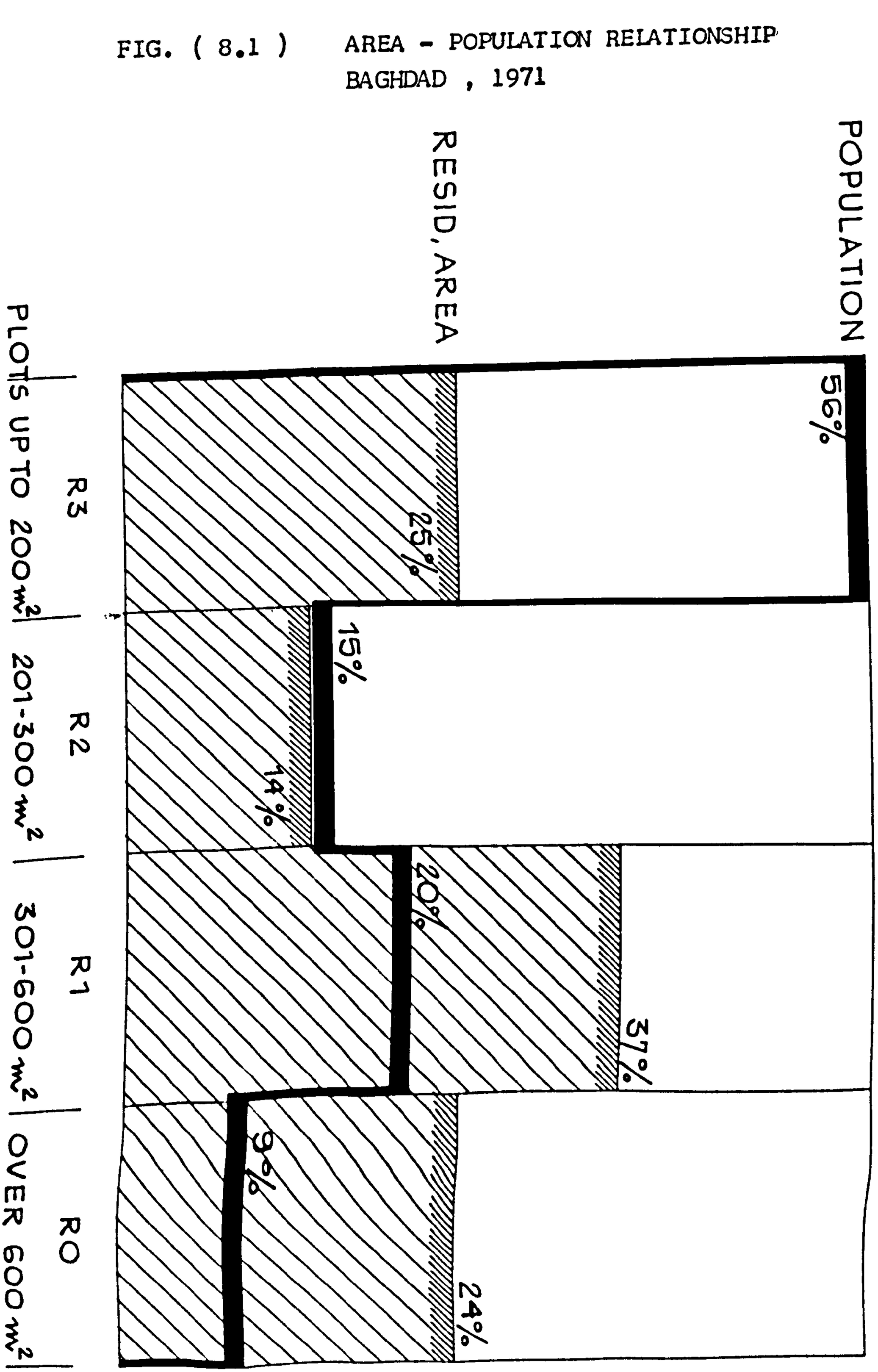
a. Does not allow for synchronization of housing projects, planned for a given area, in respect to transportation, infrastructure and various service facilities, and the number of inhabitants that will occupy that area.

b. It makes difficult the creation of the correct size of neighbourhood units or residential communities, thus effecting the balanced distribution of the service facilities and their use.

In addition the existing practice of undertaking subdivisions on isolated areas, scattered within the city of Baghdad, further aggrevates the unfavourable conditions mentioned above. In consequence they create an unnecessary increase of the housing costs, because of the need to provide transportation and infrastructure facilities, on a much larger area, that is actually necessary for the present size of the city. This is also responsible for the difficulties encountered by the inhabitants, in the form of long distances and difficult access to service facilities. For example, children have to go a long way to schools, and cross busy streets on the way.

The lack of adequate land subdivisions regulations in Baghdad was the cause of many problems, for instance, there are great differences in the gross densitities of the various residential areas, caused by the disproportion in the number of inhabitants living in areas of subdivisions covering almost the same proportion of the total residential areas of the city. This may be illustrated in Figs. (8.1 and 11.3) and Table (8.3),

FIG. (8.1) AREA - POPULATION RELATIONSHIP
BAGHDAD , 1971



where plots of the size of up to 200 sq.m. and over 600 sq.m. occupy about 24 per cent each of the total residential areas of the city, the first one are inhabited by almost 56 per cent of the total inhabitants of Baghdad, while the latter, over 600 sq.m. plots are inhabited by only 9.0 per cent.

Table (8.3)

The Relationships Between, Plot size, Average Number of Households per Plot, Household size, Total Residential Area, and the Total Number of Inhabitants:

Plot Size square m.	Average No. of Households/ plot.	Household size	Total Residential area (%)	Total No. of Inhabit (%)
Up to 200	1.18	8.9	24.7	56.0
201 - 300	1.19	7.9	14.3	15.0
301 - 600	1.10	7.5	37.3	20.0
Over 600	1.08	7.4	23.7	9.0
		Total	100.0	100.0

Source: Polservice, "Comprehensive Civic Survey for Baghdad", Baghdad, 1972.

Another disproportions caused by the lack of adequate land subdivision for residential use, is the fact that in some residential areas, particularly where plot sizes are very small, up to 200 sq.m. there is virtually no reserved land available for public facilities, which are in great need in these areas, while on the other hand, in other residential areas where plot sizes are larger, reserved land for public facilities exceeds development possibilities even in the distant future; see Figs. (5.5 , 5.6).

8.4.3 Building regulations:

In general, the subdivision controls which are usually administered by municipalities, require that in the original subdivision of the raw land, the arrangment of the streets, the dimensions and shapes of blocks and lots, the provision of open spaces and public buildings be adequately planned according to the subdivision regulations. It is obvious, that once the lots have been divided, the essential character of the neighbourhood is shaped for generations to come.

While controls exist over land within all municipal boundaries, there has been little or no control over the suburbs and already existing villages on the periphery of the urban centres, with the result that insanitary, sub-standard buildings on unplanned narrow streets arose. These built-up areas lack essential community facilities and create health, aesthetic, financial and administrative problems of great magnitude for the municipality under whose jurisdiction they ultimately fall. Until recently, there has been very little system in siting, planning and development of these outlying areas. More often than not, they are unbalances communities with little or no provision for shopping and service facilities and are usually unprotected by zoning or other controls.

Before the adoption of comprehensive zoning in some urban centres in a form of a master plan, a number of cities had enacted regulations governing the portion of lots which might be built upon. These regulations are generally contained in city buildings

regulations. The proportion of the lot which could be covered with buildings was controlled by elaborate regulations.

The subdivision regulations in Iraq governing the proportion of the plot which must be left free are not precise; the larger the plot area, the greater the open space. Thus the open space in the lowest standard housing areas which has a plot area of up to 100 sq.m. is not required and usually the owner builds to the maximum percentage of the plot area. As a result, the low income residential areas generally lack all amenities and gross density of population is as high as 500 persons per hectare; see, Figs. (11.3 , 1.4.G).

8.4.4 Zoning:

Zoning may be defined as the regulation of the use of land. Zoning if applied correctly, can play a major part in improving and maintaining the community environment. It can lead to substantial economies in the provision of public utility services, including transportation. In the Iraqi urban centres, the tendency has been for the commercial and industrial core to expand, gradually pushing out the residential suburbs, or in many cases submerging them in a wave of uncontrolled commercial development. Once attractive residential areas have been invaded by industry and disfigured by unsighly factories and cheap commercial establishments. Those wno could afford to do so withdrew to more pleasant surroundings, while their less fortunate neighbours were forced

to remain in the now blighted districts. Very little attention seems to have been given in the Iraqi town plans to zoning as an instrument of orderly development. Zoning ordinances existed but they were either drawn so loosely that innumerable loopholes existed, or they were, for one reason or another, not enforced.

The Road and Building Law No. 44 of 1935 and its amendments, is the only mechanism for the control of land and building. It is highly inadequate for the demands of modern communities or large urban centres like Baghdad which suffers from such typical metropolitan ailments as noise, random plots, lack of green areas and parks, inadequate parking areas, traffic congestion and mixed land use.

The extent of town planning in the municipalities, according to the mentioned Law, can be summarized as follows:

1. Planning and implementation of the road and street pattern within the municipal boundaries together with the allowable green areas.
2. Planning and carrying out of a broad classification of residential zones according to basic differentiation of plot sizes; see, Table (8. 2)
3. Planning and carrying out of very broad zoning that differentiates broadly main categories of the city or town functions.

8.5.0 Prospects:

From the foregone, it would appear that policies pursued in Iraq with respect to urban land are in fact a series of adaptations and adjustments made by different, and often discrete, authorities to problems which have arisen in consequence of the growth or urbanization.

Although in Iraq, and Baghdad, land suitable for development is not lacking, speculation, wasteful subdivisions and building practices and failure to enforce regulations have created in recent years a relative but no less critical scarcity of land at prices which make development of low cost or moderate cost housing and related facilities difficult. With the rapidly increasing pressure of urbanization, unless proper measures are taken, particularly in the big cities,availability of suitable land for housing may soon become the most serious obstacle to the achievement of the desired rate of house construction in Iraq and particularly in Baghdad.

In this connection, the following is suggested:

1. Perhaps one of the main consequences of the increasing pressures on land in the cities of Iraq, and particularly Baghdad, is speculation. In this context, it is the tax system practiced in the country that encourages speculators to take advantage of urbanization and the increasing pressure on land. At the present, vacant land in the cities, taxed at a rate of 1 per cent per annum;

see, (8.3.2), on its value as agricultural land, which is far below its current market value, can be held indefinitely by the owner, whose profit, when he finally sells, will far outweight the accumulated costs. In this respect, the government should reduce the intentives for land speculation through a system of land taxes designed to discourage speculation in land and to siphon off speculative profits when they do occur. One of the options open to the government is that vacant land suitable for development pays sharply increased taxes; similarly, increments in land values should be taxed more heavily than profits made, for instance, from investments in construction, industry, and other forms of productive economic activity.

2. Another source of difficulty is the lack of effective control over the use of land. In Iraq, as the cities grow without effective control, the result has been a disorderley pattern of mixed land uses, congestion, uneconomic use of public facilities and other familiar results of unplanned, uncontrolled development. In view of the present and expected rapid growth of population, particularly in the big cities; see, (1.1.0) which will create, in the next few decades, unprecented pressures on land, with consequent inflation of land values, thus making the provision of housing and related facilities prohibitively costly, the control of land use, including planning and the promulgation and enforcement of regulations, is therefore essential. Such regulations, particularly those relating to the density of land use, can serve to limit the potential value of the land and help discourage speculation.

*3. In addition to tax measures and land use controls, the other main problem to be considered is the provision of land needed to house and service the present and expected increases in population. In this context, it is recommended that the government should expand the supply of land through either the distribution of the "Miri" land, or through compulsory or other kind of public purchase, the price paid through the compulsory purchase should be assessed in accordance with the land use for the plot set forth in the city's master plan, not with the owner's speculative hopes. Once this land is in public ownership, then it may be rented or sold for housing purposes to either the cooperative societies or individual families at prices or rentals reflecting the level of income of the families to be served, or at appropriate prices for the use to be made of it. It is also recommended that the government should consider public purchase well in advance of need, in this case the land can be leased for continuation of its current use until needed, or it can be laid out for the temporary use of newly arriving migrants needing a place on which to build temporary shelter. The ultimate rental or sales price can be set to reflect the increment in value for the use intended, thus capturing for the inhabitants the profits that population growth and urban expansions would otherwise have created for the speculator.

C H A P T E R 9

THE BUILDING MATERIALS

House building materials are, in general, among the most abundant and most primative of economic resources. Stone, clay, timber, or other materials close at hand are used in the construction of dwellings, often with very little processing. Industrial products, such as glass, pipes, wires, and the processed materials, such as bricks, tiles, tend to be assimilated where they are available but are not indispensable.

It may be generalized then, that the traditional form of housing evolved in any particular country is that which employs materials long available in abundance for the use of the society, and that of several materials which might be used, one, or in combination, would be selected which best suited the environmental conditions. For instance, thick brick walls serve well in the hot arid climate of Baghdad, while this type of construction is unsuitable for areas where earthquakes are common. Therefore, the availability and suitability of building materials tend to effect and define the society's traditional concept of housing form and structures. This is very clear in the evelution and development of the traditional house in Baghdad; see, (11.2.2).

The need for building materials in housing is generally massive, since large and diversified quantities are required. Therefore it is convenient for the community if the supply of such materials is relatively elastic, otherwise fluctuations in the rate of construction caused by demographic, economic, and climatic factors would raise and lower costs from time to time, and thus encourage the substitution in materials or techniques, thus producing a mix of construction types within the community. Therefore, a material which in relatively elastic supply, as well as abundantly available and suited to the environment, seems the natural choice for housing development.

When housing construction incorporate substantial amounts of particular industrial products, such as cement or steel, then the expansion in such construction requires either new capital investment in those industries or an increase in the share of their output going to housing. It must be realized that housing has important competitors for sucn materials; the construction of office buildings, dams, or highways for instance may impose constraints upon the expansion of the housing sector in terms of the availability of building materials. Thus building materials problem becomes one of reallocation of the current outputs.

Transportation costs are very significant in limiting the range from which housing construction materials may be obtained. It might be said that a large part of tne cost of the raw materials in finished houses is a transportation cost, for the resources themselves tend to be easily extracted but bulky and heavy.

Unfortunately, there is no way to calculate this fact in regard to the housing construction in Iraq, but one may assume that to supply 3000 brick units to a construction site in Baghdad, transportation cost will amount to 20 per cent of the total price. Therefore, it is clear that transportation cost and technology is linked to the residential construction concepts and costs, so that any substantial change in the former may eventually cause a shift in the latter.

In this chapter, an analysis will be made on the problems of building materials in Iraq and Baghdad in regard to their production, the government policies, and the problems of prices fluctuations. A review also will be made on the main building materials used in house building, their problems and prospects. Finally, a set of proposals were put forward in relation to the measures needed to reduce the effects of speculation in such material as bricks, particularly on the low and middle income groups, recommendations also made on the problems of imported building materials, their specifications, and the problems of standardization of locally produced materials.

9.1.0 The Problems of Building Materials:

Although it can be said that the building materials and components industry in Iraq is in its early stage of modern development, nevertheless, it constitutes a basic component in the industrial sector of the economy; this is because of its contribution to capital formation and employment opportunities, also because of its indirect effect on many other industries. To illustrate that, for instance, the contribution to the gross domestic fixed capital

formation by the construction sector in general and housing in particular in 1969 were estimated around 67 per cent and 19 per cent respectively; also it has been estimated that the percentage of workers involved in the construction sector of the economy in Iraq was around 5 per cent of the total gainfully employed workers in 1969, this is except those workers who are engaged in agricultural activities; this percentage tends to increase in Baghdad, where it was estimated by Polservice, that the number of workers involved in construction and building activities were about 23000, this represents about 6.4 per cent of the total gainfully employed workers in the city, see, Appendices (10.1,10.2).[1]

Although, the government has shown in recent years increasing interest in the construction industry in general and the production of building materials in particular, where for instance in the 1965 - 1969 National Development Plan about 32 per cent of the total allocations were devoted to building, and in the current plan, 1970 - 1974, the government proposed the establishment of a number of factories producing different types of building materials, such as Class, Cement, Asbestos pipes and Concrete blocks, at an estimated total cost of about 15.65 millions ID.[2] the majority of the building materials resources are still not fully exploited. Of the mineral resources available to the construction industry, for instance, only lime, gypsom, and sand have been exploited to any great extent, and this is mainly because they are needed directly in the manufacture of cement and in the making of concrete.

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1. see, Central Statistical Organization, "Statistical Pocket Book, 1960 - 1970", 1972, Baghdad, Table 17.
2. see, Republic of Iraq, Planning Board and Ministry of Planning, "The National Development Plan, 1970-1974", April 1970, Baghdad p. 26 and 76.

Another indicator of the low level of exploitation and development of building materials resources and their production is the number of firms engaged in the production of such materials in Iraq and Baghdad in particular; for instance, according to the Iraqi Union of Manufacturing Industries, the number of manufacturing plants, producing building materials at the end of 1970 in Iraq was about 200 plants, 69 per cent of them are located in Baghdad, about 137 plants. About half of these plants are producing bricks, the majority are privately owned and have a very low level of production which under the best circumstances could not meet the increasing demand for their products; see, Appendix (9.1).

Considering the progress in other fields, however, the building materials industry contrasts unfavourably with the progress of other industries, where mass production, vertical organization, and scientific management, have in general, resulted in a better product at a much lower price. The process of production in the majority of the building materials industry is still rudimentary, revealing poor utilization of raw materials, labour , waste and general efficiency.

Although the general supply of the different building materials has always been below the increases in the level of demand, this is particularly significant after the substantial increases in the oil revenues, where massive capital has been allocated for construction projects,[3] there is a competition between the public and private sectors for such materials, which already in limited supply. This competition may take the form of a government using

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3. data obtained from official sources in Baghdad suggests that during the year 1974, some £1100 million were already spent on different projects.

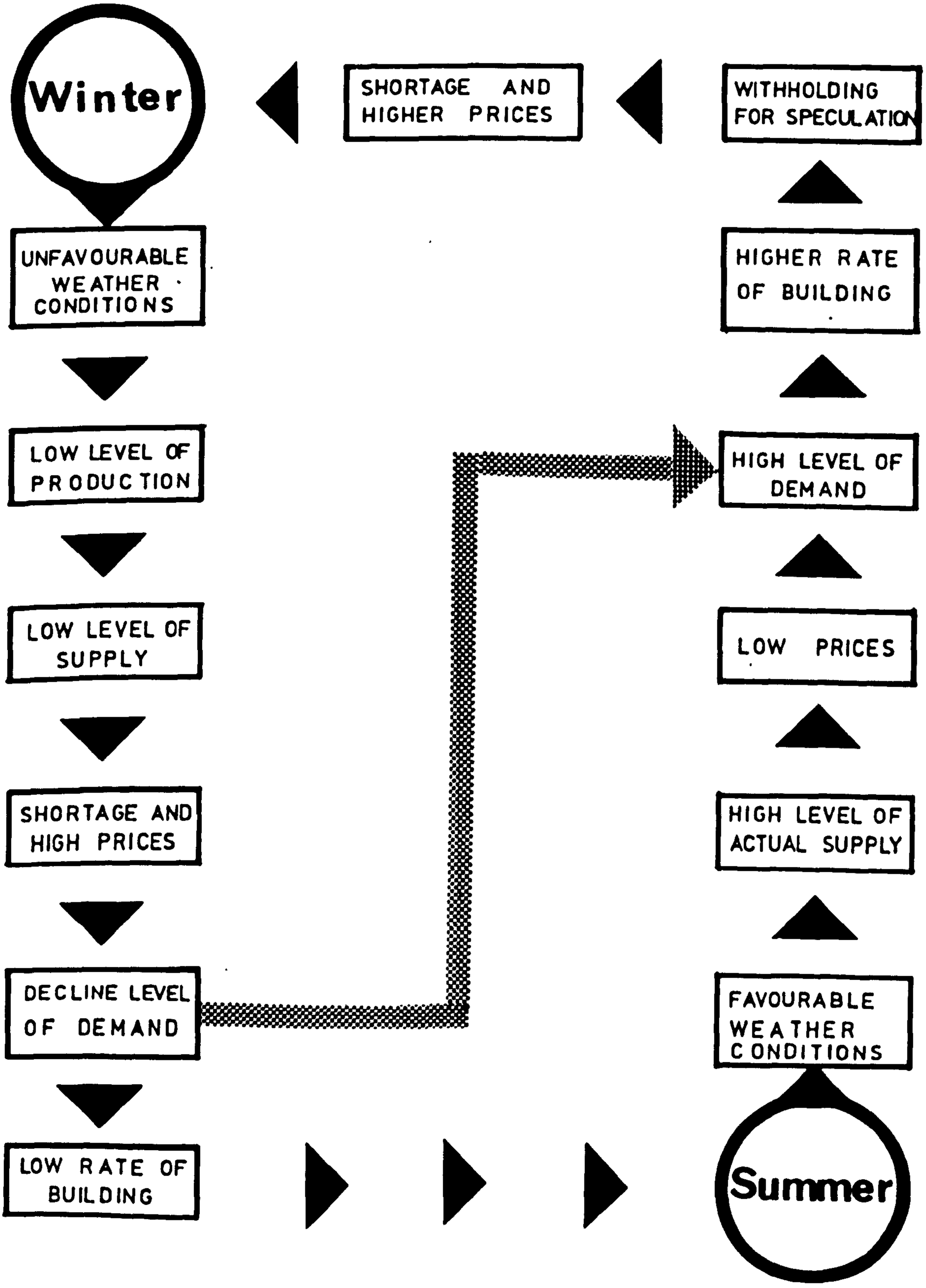
its power to buy almost 90 per cent of the products directly from the manufacturers, leaving the private sector struggling and chasing the remaining 10 per cent, and often paying higher prices.

*Perhaps one of the most serious problems facing the production and supply of building materials in Iraq is the seasonal fluctuations caused primarily by climatic conditions and the production process used. This situation is particularly significant in the case of brick production, where the majority of the factories are still relying on direct sun heat for drying the clay. Another problem facing the supply of building materials is speculation by the producers and importers. This speculation trend usually take advantage of the seasonal fluctuations in the production of some materials, particularly bricks, also by the lack of a clear and consistent government policy in regard to imported building materials.

Although the government excercised its power to control speculation of imported materials by the merchants, through the establishment of the State Organization for Importation, which governs the import of iron and steel, tubes, glass, timber, sanitary and plumbing appliances, etc. these measures failed to control speculation in the locally produced materials.

To illustrate the effects of seasonal fluctuation and speculation in the locally produced materials, one may refer to brick production in particular, where brick production in Iraq and Baghdad has far reaching effect on the rate and cost on construction, and house building in particular, This may be illustrated in Fig. (9.1), where:

FIG.(9.1) FLUCTUATION TREND IN BRICK PRODUCTION AND ITS EFFECTS ON BUILDING RATE



1. Since the majority of brick production depends largely on the weather conditions, which means that during winter months, production will drop dramatically due to the effects of rain and the lack of sun heat on the clay which was prepaired for drying;

2. As a result of this drop in production, the supply level of bricks will be below the market demand, and the manufacturers sometimes rely on the remaining stock, which was withheld from the previous season, summer months, for speculation purposes.

3. This will consequently result in higher prices charged by the manufacturers, where it was estimated that during January and February, bricks prices will increase by almost 50 per cent as compared with its summer prices;

4. This substantial increase in the prices accompanied by the low level of supply, thus reducing the rate of house construction, except for those people who are prepared to pay such high prices, causing the demand for bricks to drop. As for the others, they simply postpone their building until the summer.

5. When the summer comes, actual brick production will increase, and prices also drop below winter levels, but supply will still not satisfy demand because:

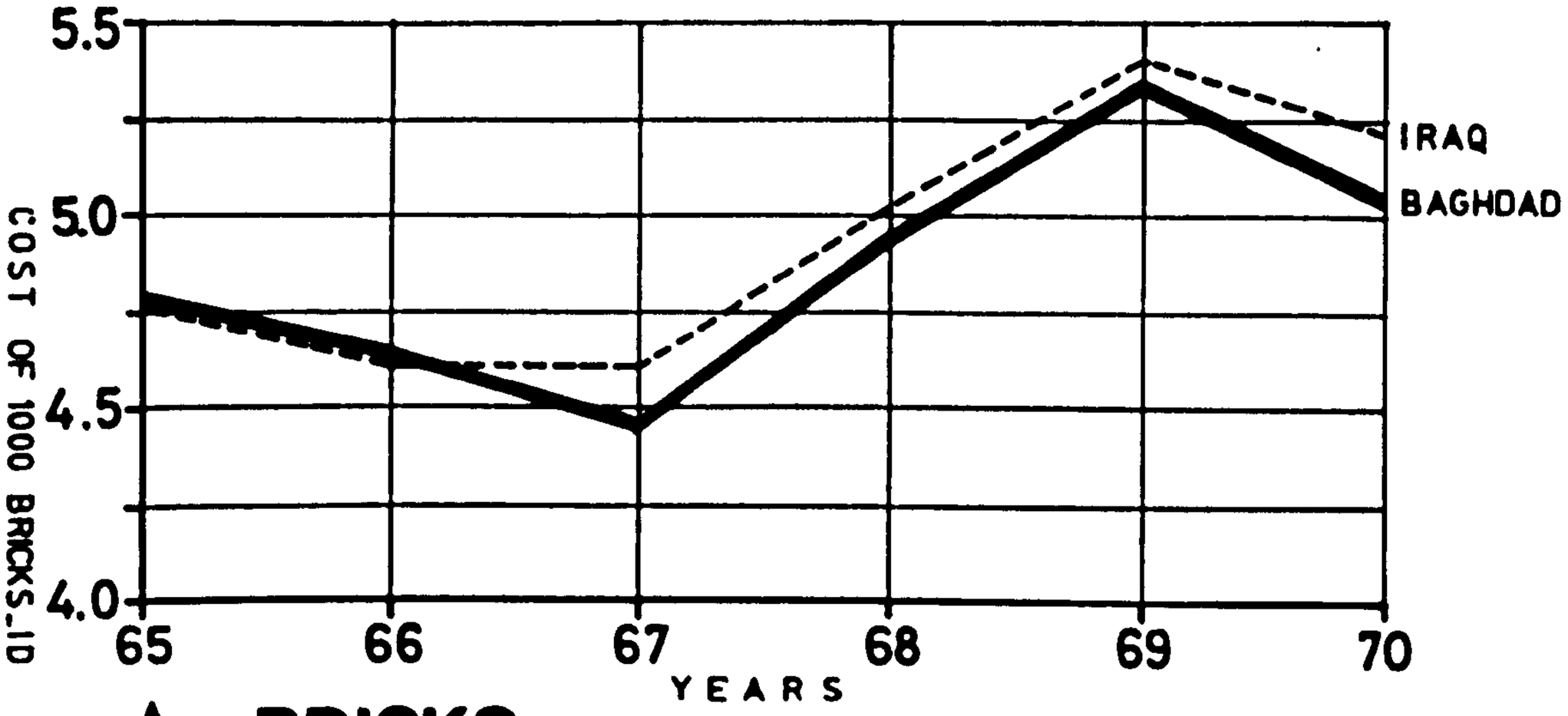
   a. As the majority of the people postponed their construction until the summer, they in fact generated an extra demand to this material, beyond the supply level, thus prices level will not fall as it should do.

b. Most of the manufacturers take advantage of this seasonal fluctuation and tend to speculate by withholding supplies so that they can sell it at higher prices in the winter.

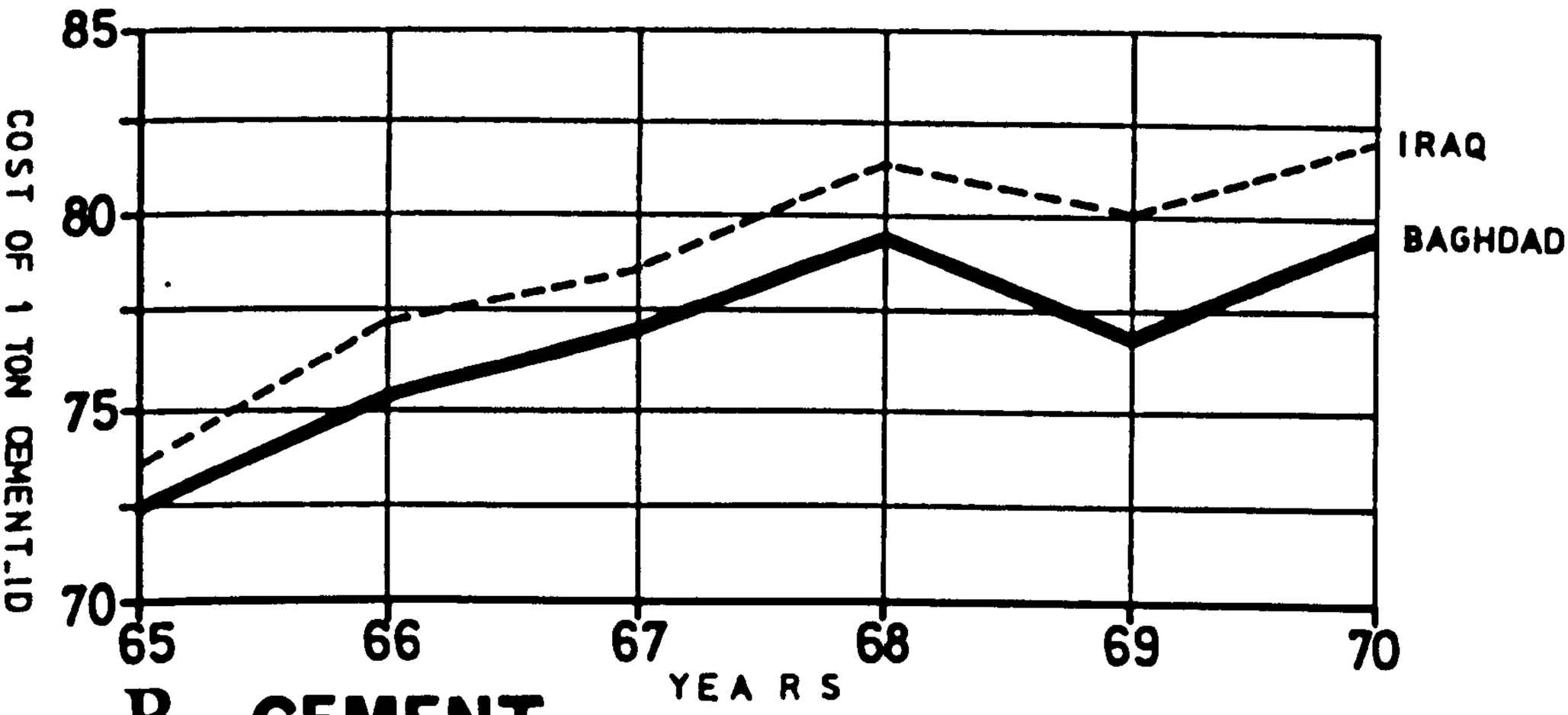
*The cost of building materials in Iraq and Baghdad during the second half of the 1960s shows unstable trends. For instance, in the case of the cost of bricks in Baghdad it ranged between about 4.5 ID to 5.3 ID per 1000 units by 1969. Also it is significant to notice that bricks cost in Baghdad is relatively less than that in Iraq as a whole, this may be attributed to the fact that most of the brick factories are located in Baghdad, thus reducing the cost of transportation. This trend applies also to cement, where the difference in cost is even greater. In both cases, bricks and cement, the costs seem to take an upward trend despite many attempts by the government to control prices. In the case of stone, the situation is opposite, whereby costs in Baghdad is much higher than that in Iraq as a whole, particularly in the northern parts where stone represents the principle building material, this is because of the high cost of transportation of the stone from the north of the country to Baghdad; see, Fig. (9.2).

It must be stated here that the significant increase in the cost of stones, coupled with a relative drop in the cost of bricks during the period 1966 - 1968, is attributed not to the substitution of bricks by stones in house construction, particularly in Baghdad, but by the fact that during that period, the use of stone as a decorative material in house construction in Baghdad has increased

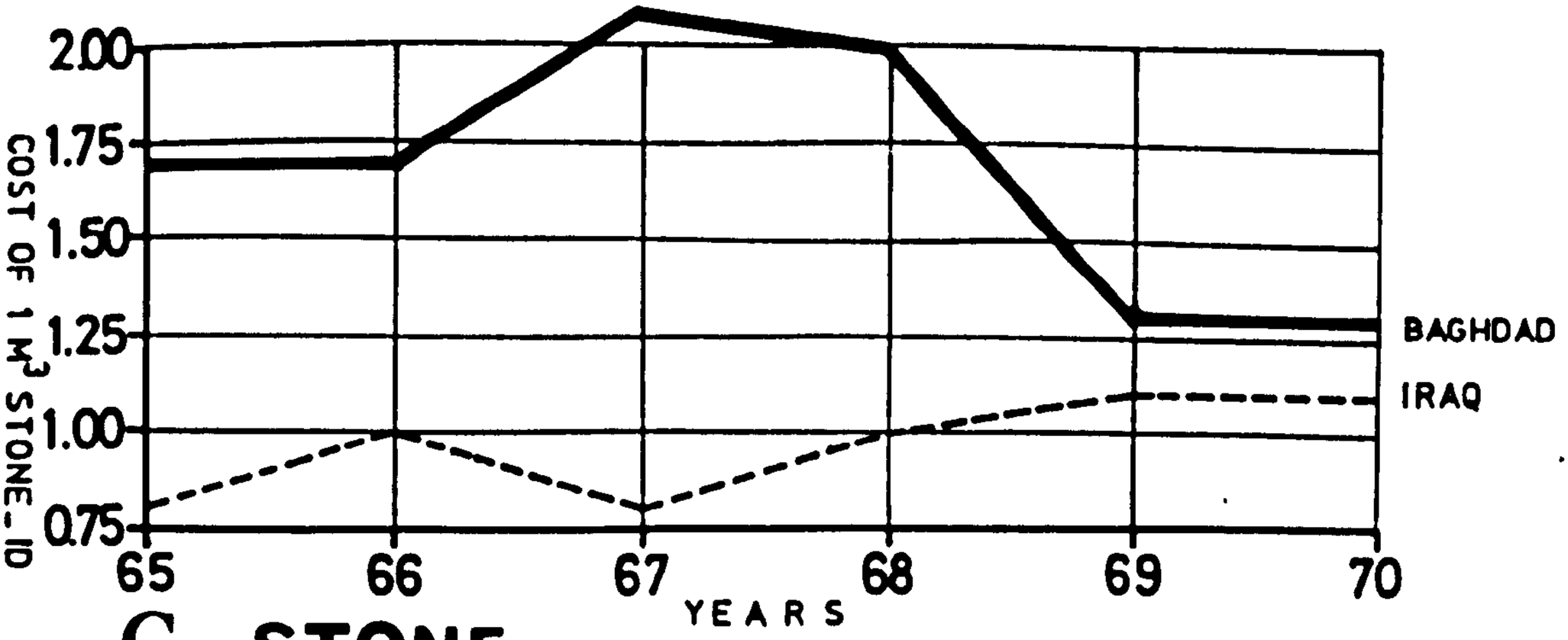
FIG.(9.2) COST TRENDS IN MAIN BUILDING MATERIALS IN BAGHDAD AND IRAQ-1965 constant prices



A. BRICKS



B. CEMENT



C. STONE

which in turn forced prices upwards, while at the same time there was a high rate of brick supply in the market which in turn forced the prices of bricks downwards. This fluctuation in the costs and prices of the main building materials is a demonstration of the lack of any government policy designed to stabalize the forces of supply and demand in the building material industry.

A review of the building industry in comparison with the present housing needs indicates great opportunities for the development and implentation of more efficient and rational construction materials and techniques particularly in the urban areas. This might concentrate on the increasing use of modular coordination, standardization and prefabricated elements as factors in increasing house production, while decreasing its costs. Also there is particular opportunity for further research and development of radically new materials which can be produced from the petro - chemical resources. [4]

9.2.0 The Main Building Materials

As it has been mentioned earlier, housing construction requires a large and diversified quantities of building materials. With the increases in living standards, and technological development, many building materials of different types and use have been produced and developed in recent years, particularly by the highly developed countries. Another reason for such development of building materials is the increasing complexity of designs and structural components,

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4. For furhter analysis on the feasibility of using prefabricated elements in the construction processes, see (10.3.0).

which demanded special types of materials and fittings. Despite all the advantages these new materials possess in regard to their structural and construction qualities, and the choice they represent to the people engaged in construction, i.e. architects, clients, and builders, their use in buildings in general and housing in particular have not been very successful. This is mainly because the majority of the designers and builders have not yet mastered the use of such materials, due to the fact that most of these materials are still in their experimental stage and require new techniques of construction which the ordinary labourer is not accustomed to. This situation has manifested itself in many construction faults and subsequently contributed to increases in costs.

In Iraq, these problems have further aggrevated by the almost complete lack of technical and traditional experiences to use such materials properly and maintain them. Another problem is that since most of these materials are imported, they are usually expensive, thus their use is mainly confined to the high income groups of the population who can afford them. Perhaps one of the main problems facing the use of new building materials in Iraq, is that the majority of them were originally designed to be used in temperate climates, thus using them in a hot dry climate such as that of Iraq, where the difference between day and night is around 20 - 25 C, is bound to present problems in respect to durability, and appearance, for instance, the use of painted cement on external surfaces proved that it does not keep its original colour for long and the rough-cast cement stucco which has been used often lately collects dust so quickly that soon its colours reduce to that of

the all prevailing dust. As far as the other new materials are concerned, which includes aluminium for window frames, asbestos and plastics, their use has been limited to the high income groups, since their expense is high and well beyond the middle and low income groups.

The following are some of the main materials used in house building in Iraq and Baghdad, their use and production:

9.2.1 Bricks:

Building with bricks in Iraq has a very long tradition, almost all the civilizations flourished in Mesopotamia, such as the Babylonians and Summerians, used bricks in their construction. Even it has been said by historians that the bricks used in the construction of Babylon was much better quality than the present products, this may be true, since they up to the present stood against the elements of the extreme climate which characterizes the area.

Yellow clay brick is Iraq's prime building material, as it has been for ages past, long and thin in the days of Babylon, now burned in standard shapes in kilns. They are small enough for the mason's assistant to toss up from the ground to the builder several stories up. Apart from walls construction, builders utilized bricks in a wide range of construction, particularly in the construction of roofs. In that respect for instance, a flat brick arch carried between steel joists, is still the quickest and relatively cheapest method of roofing a small span especially with the hollow bricks, which makes it infinitely cooler than concrete slab.Juss or gypsom is used as quick drying moter of the brickwork which is afterwards plastered.

Before the days when steel was in common use, masons lavished their decorative skill on vaulted brick ceilings, rich in arabesque design. At the present, the cost of a small ceiling of this type, assuming there are still few men left who do this work, is equivalent to the building of two bedrooms and a bath, and very few clients nowadays who prefer the first to the second. But some local architects are reluctant to let the feeling for this tradition die, and are trying to revive some of the simpler decorative uses of brickworks, herringbone patterns in some of the flat arched ceilings, geometrical patterns for the floors of couryards or in pierced brickwork screens; see, Figs. (9.3 & 9.4).

To illustrate the importance of bricks in house construction in Iraq and Baghdad one may refer to the housing census of 1956, which revealed that almost half the houses in Baghdad were constructed exclusively of bricks, while in Iraq as a whole this percentage dropped to about 15 per cent, the main reason is that the census included small towns and villages, which most of them are built by mud and reeds; see, Appendix (9.2). Also according to data provided by the Central Statistical Organization, almost 98 per cent of the permits issued for the private sector in 1971, were buildings with bricks as their principal material, in Iraq as a whole this per cent dropped to 83 per cent; see, Appendix (9.3).

Although, bricks production in Iraq shows an increasing trend, where for instance production during the period, 1960 - 1968, increased by almost 47 per cent, the quality of these bricks, apart from one or two factories, are poor in quality.

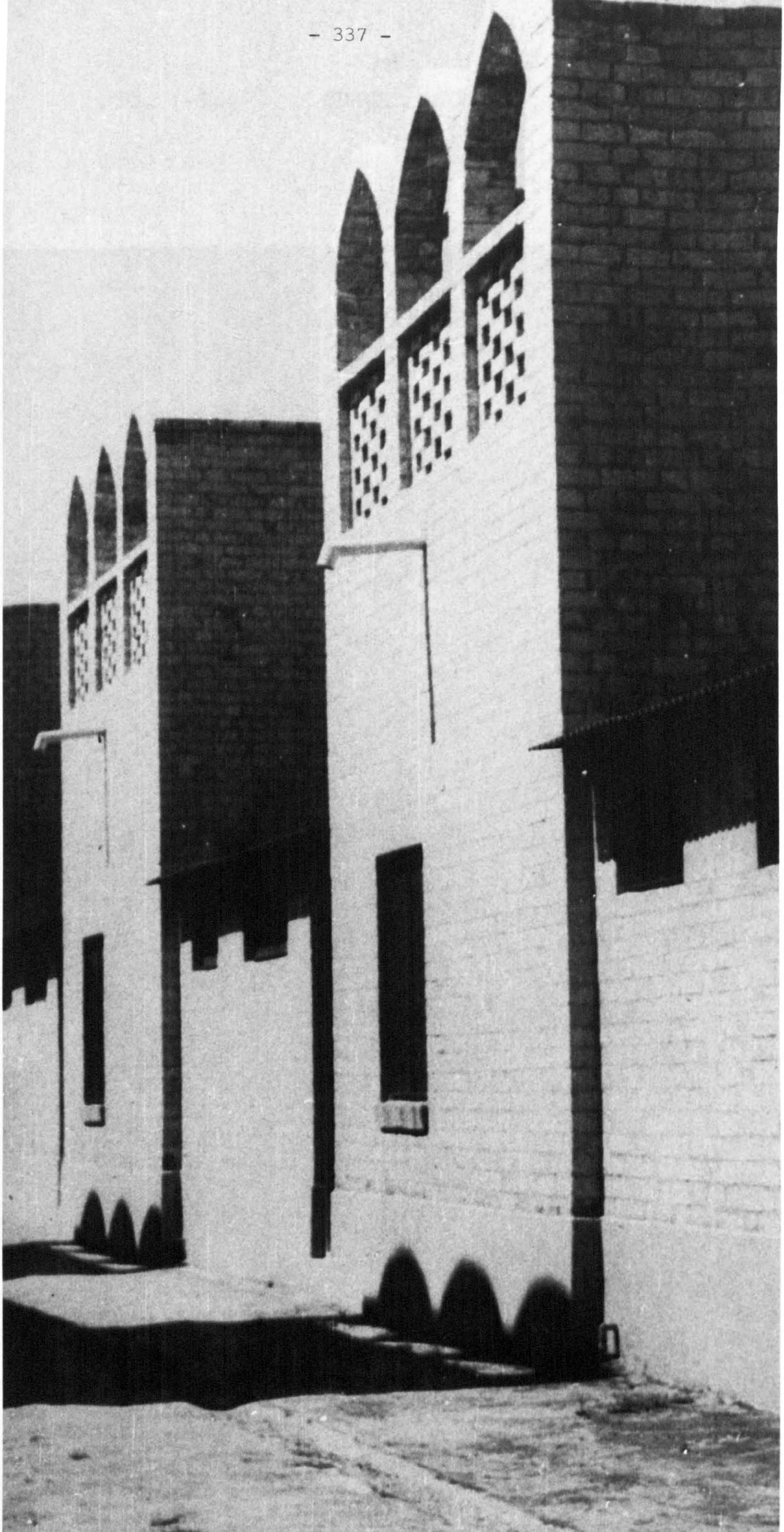
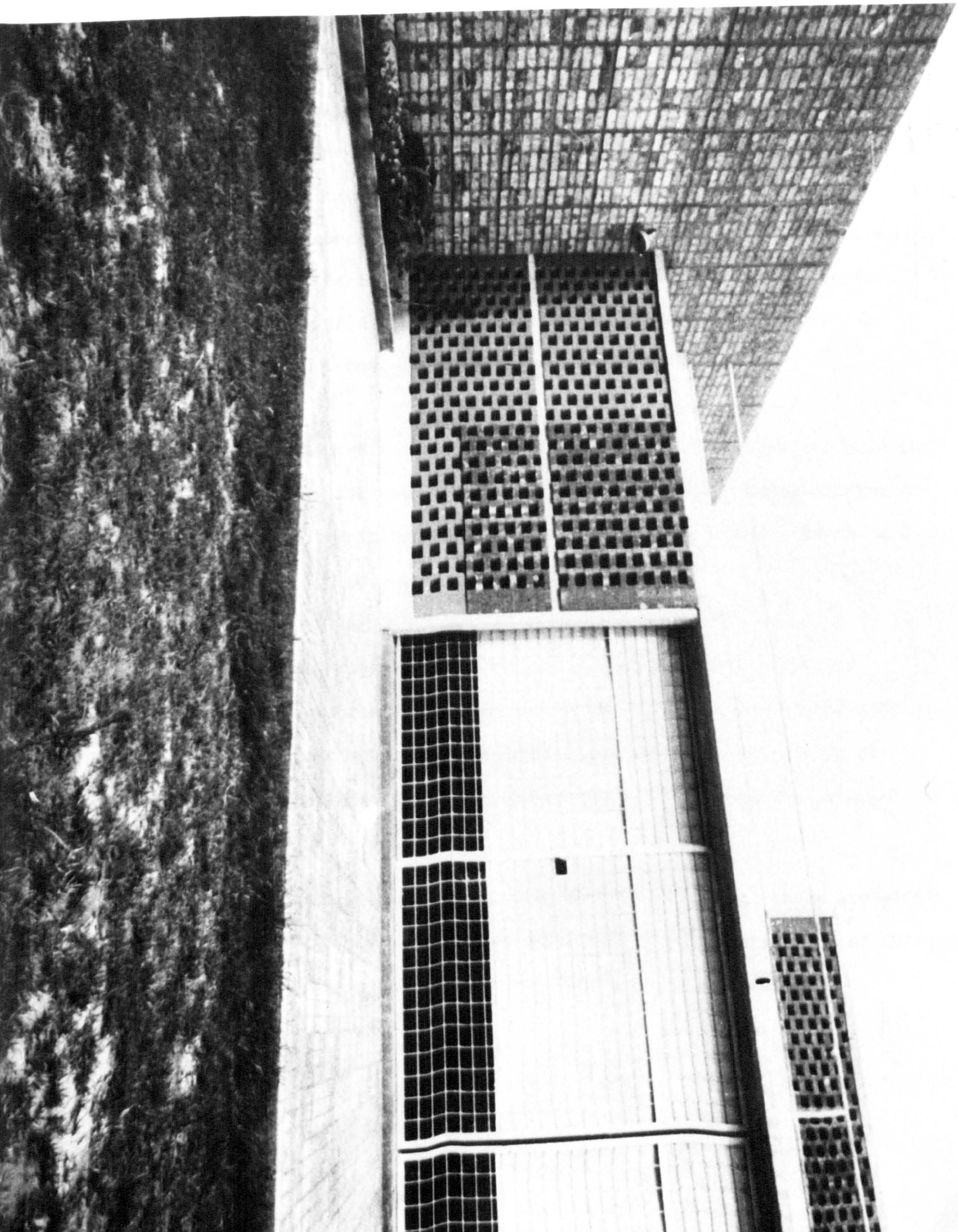


FIG. (9.3) BRICK HOUSES IN BAGHDAD

FIG. (9.4) BRICK SCREEN IN BAGHDAD



The poor quality of the modern bricks produced may be attributed to the non-scientific processes used. An investigation made by the National Centre for Construction Research in Baghdad revealed that only 10 per cent of the factories which produce bricks have carried out tests on the raw materials; the clay used was rarely washed before processing, and only 3 per cent of the factories were using de-airing in the mould formation. It was also revealed that brick burning was controlled by a supervising forman rather than by pyrometers or similar instruments. Brick factories are not subject to restrictive public supervision and control, therefore, qualitites of different specifications may be found in any purchasing order.

Bricks produced in Iraq and Baghdad vary in their quality, thus its suitability for use, according to their position during burning in the kiln, for instance, the ordinary building bricks - 24 cm. x 12 cm. x 7.5 cm. - are graded as follows:

a. "Mussakhrij", or the overburnt; this particular brick is greyish green in colour and rather misshapen due to the melting of the clay. They are mainly used for the construction of foundations and even as a decorative element in the external walls.

b. The yellow facing bricks, which are well burnt; these are widely used in the walls construction and in the construction of roofs and floors, when reinforced concrete is not used.

c. The white facing bricks, which are underburnt, they are mainly used secondary exposed work and internal partitions.

Bricks produced in Iraq vary considerably in their sizes, this is due to the minimal care taken during the moulding, burning, and transportation processes. This may be illustrated by the following figures provided by a survey on 110 different brick factories, which was conducted by the National Centre for Construction Research:

Width		Length		Depth	
10.5 cm.	50%	24.2 cm.	45%	7.0 cm.	14%
12.0 cm.	28%	23.5 cm.	12%	7.5 cm.	68%
10.0 cm.	22%	23.0 cm.	43%	6.5 cm.	18%

In Iraq, bricks manufactured in three methods:

1. The traditional method: this is one of the oldest method used in the manufacturing of bricks. In this method, bricks are made by adding small amounts of water to the soil to make it adaptable for moulding, then it will be cut by hand into brick shape, and dried naturally under the sun for a period of up to eight months, later it will be burned in primitive kilns, using dried reeds as fuel.

2. The semi mechanical method: in this method, soil excavation, mixing and cutting are mechanically done, but drying is done naturally under the sun; burning is done in special furnaces using mainly oil as fuel.

3. The fully mechanical method: in this method, mixing is done mechanically, in moulding high pressure is used in addition to de-airing; drying and burning are done mechanically and continuously by using special tunnels.

The quality of bricks depends largely on the type of soil used in the manufacturing process, and the percentage of soluble salts in it. High percentage of salt in the soil effects the strength of the bricks, and makes it less vulnerable to compression stresses. Also the mechanical specifications of the bricks depends on the manufacturing process used, for instance, bricks produced by the traditional method tend to be irregular in shape and dimensions; but this type of brick is usually with a small amount of soluble salt, because the soil used is usually shallow, and contains very little percentage of salt.

It is important to stress here that the different qualities of the bricks produced in Iraq by the methods mentioned above are all useful in the construction activities, since it is not always necessary to use high quality bricks in construction such as sub pavement in flooring and non bearing walls. Also the different methods used in the production provides wider range of bricks in regard to colour, texture and insulation qualities, which makes them very useful in decorative work. It is also important that by maintaining the old, and traditional method of manufacturing, it is feasible to produce relatively low cost bricks for the purpose of house construction to the low income groups and the rural dwellers.

9.2.2 Cement:

The introduction of cement in the building industry in Iraq and Baghdad has revolutionized building techniques, and introduced a new dimension to the possibilities of architectural design. Because of its unique properties as a strong structural element, in the form of reinforced concrete, and prefabrication; cement in all its forms has been gradually replacing burned bricks, stone, mud and timber and other indigenous building materials in the construction of roofs in the form of reinoforced concrete, in walls as mortar, and flooring in general.

Besides cement in its pure form, other products based on cement as their principle materials were also produced, such as asbestos-cement, concrete blocks, precast concrete beams, roofing blocks, kerbs, slabs, lintels, pipes, sills, sidewalks and staircases. In addition to these products, which are produced by organized mechanized factories, some are produced in small quantitites on a small scale by improvised plants as well as on the sites directly by the builders.

Local production of cement in Iraq started as early as 1949, after the establishment of the Iraqi Cement Company in Baghdad, with an initial output of about 0.4 mmillion tons of ordinary Portland cement. As a result of the increasing demand for such important material, another five companies were established by the private sector. By 1964, with the introduction of the nationalization programme, all these companies were nationalized and reorganized into three main companies, namely: the Iraqi Cement Company, Mosul Cement Company, and Serchinaar Cement Company.

During the 1960s, cement production in Iraq in general shows an increasing trend; see, Appendix (9.4), and by 1968, Iraq ranked as second to Eygpt in the size of production in the Arab World, this may be illustrated in the following table:

Table (9.1)

Cement Production in the Arab World in 1968:

Country	Size of Production in millions tons.
Eygpt	3.147
Iraq	1.320
Morrocco	1.011
Syria	0.917
Lebanon	0.906
Algeria	0.866
Tunisia	0.514
Jordan	0.381
Sudan	0.145

Source: Iraqi Union of Manufacturing Industries, "1970 Year Book" Baghdad.

During the same period cement export, mainly to the Gulf countries, has also increased; see, Appendix (9.4), but this was on the expense of local consumption and needs. It seems that the main motive for such exports is not economic, but political, since the value of such exports are minimal compared with the economic values

which can be obtained if these quantities were left for the local market.[5]

Perhaps one of the main effects of the export policy of cement is that local prices has risen sharply, particularly during 1967-1968, where the exports amounted to about 70 per cent of the quantity consumed; see, Fig. (9.2). As for cement consumption in the building industry, it shows during the same period an almost stable trend, which means that most of the increases in production are directed to the outside market.

As several large cement factories are now operating the use of concrete structure is increasing rapidly and the builders and architects are learning more about the techniques of its construction and design. However, one feels that a cellular concrete suitable for the severe climatic conditions of the country will have to be found before concrete rivals brick as the basic building material.

9.2.3 Concrete Products:

At the present there are eleven factories in Iraq producing different types of prefabricated concrete products, employing about 700 workers. Their production has increased dramatically during the 1960s, where it has been estimated that between 1960 and 1968, the production of different concrete products has risen by almost 235 per cent, this is mainly due to the increasing demand on certain products, namely, the cement bricks, and the concrete tiles; see, Appendix (9.5)

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5. It has been estimated that during the period 1960 - 1969, the value of cement exported was about 16.7 millions ID.

The following are the main types of the concrete products, which are locally produced:

a. Concrete pipes, used mainly in the sewerage networks.

b. Concrete tiles of different sizes and shapes, used mainly in the pavement of streets walksides,; roofs particularly in the office buildings; and as walkways in the private gardens.

c. Concrete blocks, hollow and solid; their uses are mainly confined to decorative purposes and in the construction of partitions and infilling panels in the concrete structures.

d. Prefabricated beams and columns.

e. Cement bricks; the use of this brick for load bearing walls are very limited, since they do not provide adequate thermal insulation as compared with the clay bricks; but coloured cement bricks are widely used for decorative purposes, as well as in fencing housing plots.

9.2.4 Stone:

Although building with stonefor residential purposes is not popular compared with bricks for instance; see, Appendix (9.2 & 9.3) nevertheless, it is the principle building material in the north of the country. Stone is usually found in deep continuous deposits or in layers in varying depths ranging from 15 to 50 cm. Only big contractors have for their own use permanent quarry installations using mechanical equipments, while local builders quarry the stone themselves by primitive methods.

Stone buildings are generally constructed in random rubble with "juss" or gypsum as mortar. Door and window openings are generally narrow because they are spanned by a single stone or a shallow arch, this is a dominating architectural feature especially in the northern settlements, which gives an overall unity of style. To give smooth and tidy finish, walls built with stone are usually plastered internally with "juss", and occasionally it is applied to external walls as well. In Baghdad and the southern parts of the country, stone walls are introduced recently for purely aesthetic reasons rather than as structural material; see, Fig. (9.5)

9.2.5 Mud and Clay:

"Pise" rammed earth is the usual form of mud construction in Iraq. The process of building with mud is as follows: first the ground adjoining the proposed house site is broken up and some straw is added to the earth, the mix then saturated with water and left for a few days to ferment, when the mix, which is called "Libbin" is matured, it is kneaded into a stiffer workable consistency. The "Libbin" is then transported by hand in bowls form, and placed into position on the walls, and rammed by hand into the required shape. The walls built with this material in courses of about 30 cm. to 50 cm. in thickness, and usually without foundations.

Another form of mud used widely in house construction, especially in the low income districts of Baghdad, is the "Adobe" or the sun dried clay bricks. This material is mainly used in the construction of fences and shades. The clay used for this purpose is chosen

FIG. (9.5) BUILDING WITH STONE IN BAGHDAD

carefully; the most popular variety is the sandless pink clay "Tin hurri" which contains few decaying vegetable products. The mix is prepared by the same process as for the "Pise" construction, and the bricks are then made in wooden moulds on levelled ground, without applying high pressure, thus these bricks have very low bearing capacity to be used in load bearing structures.

Although mud is relatively cheap building material as compared with bricks, and has good thermal insulation, its use in Baghdad and the other big cities as a main construction material has become minimal, and mainly confined to the construction of temporary shelters. But some twenty years ago, this material was dominating the housing areas of Baghdad, where it was estimated in 1956 that about 28 per cent of the houses was built by mud; see, Appendix (9.2).

In order to utilize mud and convert it into a successful building material especially for low cost housing development, it is important that some earth stablizing element must be introduced. The soil used for mud construction at the present is of alluvial origin and consists mainly of silt and clay with varying percentage of sand. This means that earth particles do not contain sufficient binding matter and the builder depends on the adhesive quality of the water content in the mix to hold particles together. And this water content must be maintained at an optimum level. If more water is absorbed, the earth begins to swell, and if it evaporates, the earth will crumble. As a result, rendering is applied to walls every year to help maintaining the optimum water content; this process is not always reliable.

9.2.6 "Juss" or Gypsum:

"Juss" a gypsum product is used extensively in Iraq and Baghdad as morter and for plastering. This material in its raw form may be found in the northern and middle parts of Iraq. The process used in its production is by burning the deposits for a period of up to six days in special kilns "Koras" which are usually built near the quarries. After dehydration, the chunks of gypsum then ground finely and the "juss" is ready for use.

Although "juss" is easily workable, it is not durable as cement, this is because hardened juss expands when moisture is absorbed, and as it dries it shrinks and cracks will appear. The failures in juss appears to be caused mainly by impurities in the raw material; laboratory tests carried out in the National Centre for Constructiɒn research in Baghdad shows that raw gypsum used is usually contaminated with silica and lime.

Iraqi builders and the Baghdadis in particular, mastered the work with "Juss" especially in interior works, this perhaps attributed to the early Islamic practice in using this material for plastering and decorative purposes. Many houses in Baghdad still have ornament panels made from "Juss", in the living and bedrooms, and particuarly above the doors.

There are no adequate and detailed data on the number of factories producing "Juss" or their size of production. But figures obtained from two different sources, indicates that by 1970, there were about

18 factories producing "Juss" registered in the Iraqi Union of Manufacturing Industries, in addition to about 150 small factories which are not registered. The total output of these factories was estimated in 1968 to be around 0.377 million tons annually ; see Appendix (9.5).[6]

9.2.7 Reeds:

Building with reeds is widely common in the southern parts of the country, particularly in the small towns and villages in the marsh areas. Until recently, almost 16 per cent of the dwellings accounted in the housing census in 1956 in Baghdad were built by reeds in the form of a "Sarifa" while in Iraq this percentage reaches up to 26 per cent; see, Appendix (9.2).

Reeds are usually found in large quantitites in the shallow marshes, and the people use it in large quantities in house building, because it is almost the only building material available, as well as its suitability and cheap cost. Reeds used in construction are in the form of mats of a size usually 3 m. x 3 m. and takes a man about two hours to produce. The main area for reed mats production is the central marshes near "Kubaish", where it has been estimated that about 1.25 million mats are produced per annum.[7]

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6. see, Ministry of Planning, "Study on the Problems of Housing in Iraq and its Solutions", June 1971.

7. see, the author's study, "Housing Policies for the Marshes of Southern Iraq for the Year 2001", M.A. Dissertation, Institute of Planning Studies, University of Nottingham, 1972, p. 14.

Basically, construction with reeds are of two forms; the "Sarifa" and "Mudhif". The "Sarifa" is normally used as a living and sleeping space, and in some cases the family use it as a kitchen and store. It is a relatively small rectangular structure, about 2 m. x 3 m. and about 3.5 m. high, with straight walls, and curved roof, in the marshes the roof is usually pitched. The "Sarifa" is entirely built from reeds, except in part of the roof where palm trunks are used as structural support. This shelter is usually divided by curtains into two compartments, one used by the family, and the other part by the visitors, when the family do not have another "Sarifa" or a guest house "Mudhif". Perhaps one of the main advantages of the "Sarifa" is that it can be fairly easily assembled and moved to another site, with no special tools needed. The family members themselves can move their "Sarifa" and re-erect it without calling in any outside assistance.

Since the problems of the "Sarifa" as a shelter are discussed in greater detail in another chapter; see (4.1.1), it is important to mention here that although building with reeds is impermanent type of construction, since reeds are highly inflammable and may be attacked by termites, and subject to rot when in contact with the soil, they can be manufactured with the help of synthetic binding agents and treated chemically for permanence. At the present, a factory in Baghdad is producing reed boards, which is used as temporary shelter components such as partitions, roof panels and parapets, but their use is not yet common, especially by the middle income groups in their housing development.

9.2.8 Lime:

Before the widespread of cement, builders used to mix "Nura" or lime with "Rumad" or ashes, to prepare morter for the construction of walls below the ground level, i.e. foundations and basements. Good quality raw materials for the manufacture of lime are abundant in Iraq, especially in the north, where there is a modern factory which produces lime for the manufacture of silicate bricks. Although Iraqi builders are not accustomed to work with lime, and use it only where "Juss" is altogether impractical, as in the plastering of bathrooms and toilets, lime may prove a good substitutes.

9.2.9 Asbestos:

Asbestos manufacturing in Iraq is relatively new, where the first and only factory was established in Baghdad in 1955. The main products of this factory are pipes of different sizes used mainly in water supply and sewerage projects, as well as corrugated and plain asbestos sheets used mainly for roofing purposes. One of the main advantages of the asbestos produces, especially pipes, is that they proved more capable in resisting the salty soil characteristic of Iraq than the cast iron pipes. As for the use of asbestos sheets in flooring, although they are more cheaper than concrete, for instance, they proved unreliable under all weather conditions, and no specific units for gutters, ridges, etc. have so far been produced to increase the efficiency of its use. Finally, it is worth mentioning here that maximum care must be taken in manufacturing Asbestos, since there is always the risk that the workers might be subject to Asbestosis disease which effects their lungs.

Other building materials, i.e. iron and steel as bars used in the reinforced concrete or as joists for the Jack Arch roofing structure; timber of different types and sizes used in doors and window frames and other fittings; glass for windows; they are almost entirely imported in increasing quantities. For instance, in 1968 the imports of steel used as reinforce for concrete and joists has been estimated at about 0.133 million tons, at a cost of 3.778 million ID.[8]

9.3.0 Conclusions and Recommendations:

From the foregoing, it appears that the major problems facing the production and development of building materials in Iraq are related mainly to:

a. Under exploitation of the raw materials necessary for the production of manufactured building materials.

b. Heavy reliance on the part of the building materials manufacturers on the climatic conditions for their production, which in turn causes seasonal fluctuations in the output of such materials.

c. Low level of investment by the government in the building materials industry and its development.

d. Inadequate control and management of the importation of building materials, causing wasteful expenditure of scarce foreign exchange, and unstable supply of essential foreign materials such as steel and wood.

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8. data provided by the Central Statistical Organization, Baghdad, 1972.

e. High concentration of the main building materials manufacturing firms in Baghdad and the areas surrounding it, which makes these materials more costly to other parts of the country because of the costs of transportation involved.

f. Speculation by the building materials manufacturers and suppliers, through their exploitation of the seasonal fluctuation in production and the inadequacy of the government control and management of building materials imports.

g. Increasing competition between the public sector and the private sector demands for the already short supply of building materials, causing sudden shortages and rising prices.

h. Fluctuated and increasing trends in the prices of essential building materials particularly Bricks and Cement, thus creating uncertainty in the market and hardship to the low and medium income groups in their house building.

i. Inadequate research facilities for the development and experimentation in local and traditional building materials to improve them so that it can cope with the modern needs of house construction.

j. The almost complete absence of any standardization and specification control system in the production and importation of building materials.

k. Misuse on behalf of the professionals, i.e. architects and engineers, of some of the building materials particularly those which are imported, in regard to their application, visual appearance, and functions.

After the review of the main problems confronting the production and use of the building materials, the following recommendations are put forward:

1. Ways must be found of utilizing available local materials in order to minimize imports of expensive building materials, which are in many cases non-essential. In Iraq, resources have been wasted by importing a wide variety of expensive and unfamiliar manufactured building materials which did not even prove satisfactory in terms of climatic and cultural conditions. Frequently, the possibilities of using existing local materials, either in their traditional form or as they may be improved with relatively small investment are overlooked particularly by the high income groups. In addition to the cost of importing such materials, a factor to be considered is that local labour may be quite skilled in the use of traditional local materials, but the majority of them are unable to handle sophisticated imported or manufactured components, let alone their maintenance.

2. Increasing investment in industries which can produce cheaper and better quality building materials, not only for housing, but also for other construction needed in the process of development. In Iraq, where the total construction needs require large quantities of building materials, particularly bricks, development plans should allocate sufficient resources to permit industrial plants manufacturing such materials to function properly. This investment, however, should be carefully coordinated with assured utilization of the products.

In this connection, a sustained and growing housing and community facilities programmes can provide an assured market for such materials and can help swell total demand not only for housing but for other construction activities, i.e. public buildings, bridges, factories, and other consumers of building products.

3. In order to reduce the heavy reliance on weather in the production of certain building materials, particularly bricks, it is recommended that major supplier firms of such materials should be equipped with necessary machinery for drying, also these firms should be provided with adequated sheltered space for storing their products, thus eliminating the effects of extreme weather conditions.

4. In order to curb speculation by the manufacturers of essential building materials, government intervention is necessary. This may be done as follows:

   a. The government may impose a statutory price control on such materials as bricks, tiles, Juss etc. taking into consideration, the cost of production, transport, and marginal profit, not more than say, 10 per cent.

   b. The government may carry out periodical inspection of stock held by the manufacturers.

   c. The government may inter the market of such materials as the supplier, with the objective of balancing the supply and demand of such materials. It must be stated here, that the prices of materials supplied by the government should not be too low to put private manufacturers out of business.

It is hoped that these measures will achieve the objectives of protecting the low and middle income groups from excessive prices caused by speculation and contribute to a more stable supply of essential building materials.

5. As for the problems of standardization and specifications of locally produced and imported materials, here it is recommended that a central government agency should be established with the responsibility of controlling the quality of the building materials produced locally from the point of view of their durability, safety, and applicability. As for the problem of standardization of these materials, although it is beneficial to have wide variety of sizes and types of building materials, it is important that these types and sizes should be controlled particularly in the case of bricks, so as to eliminate construction problems caused by irregularity in the sizes and shapes of one particular type of building material. As for the specifications of the imported building materials, here it is recommended that strict control should be imposed on these materials, taking into account the international reputation of the manufacturers, the conditions of these materials as it is arrived to the country, whether these materials are according to specifications stated by the manufacturers, and finally, whether these materials are suitable to be used in Iraq, in respect to climate, safety, and durability.

6. Since Iraq is one of the major producers of oil-ranked seventh in the world, it is logical and justifiable that the possibilities of producing building materials based on oil compounds should be fully exploites. If successful, this will not only cut short the expenditure on imported materials but also provide large quantities of materials at a low price, in addition to the creation of employment opportunities.

7. Finally, it is recommended that scientific research should be carried out on the existing building materials, particularly those locally produced, with the objective of increasing their efficiency, as well as exploring the possibilities of producing and developing new building materials based on local resources. Although at the present there is a national centre for building materials research, with the responsibility of carrying out tests on such materials as bricks, concrete and sand, its work so far is isolated from the manufacturing aspect of these materials, thus very little has been done to utilize the findings of such tests in practical sense.

C H A P T E R 10

LABOUR AND THE CONSTRUCTION INDUSTRY

A discussion of the building industry in Iraq must begin with the statement that Iraq has an ancient tradition of its own which has produced designs and constructions of a unique excellence, whether from the technological, functional, architectural or aesthetic point of view. This tradition can best be noted in the religious buildings, i.e. Zikurrats, mosques and schools, houses, and market places, "Suqs". This tradition is the synthesis of different technological civilizations and cultural influences dated back some 6000 years, in which the unifying elements are local climate, landscape and building materials. These unifying elements can best be illustrated by comparing the residential quarters of the city of Ur which was built some 5,500 years ago, with those of the old residential quarters of Baghdad which were largely built during the XVIIth Century, see, Figs. (10.1 and 10.2). The common features of those two examples are the brick work techniques used and the presence of features designed to provide protection against the climate, e.g. flat roofs, small windows and doors, inner courtyards to provide cross ventilation, and the narrow streets, etc. [1]

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1. for further examples of historical cities, planning and designs in ancient Iraq, i.e. Mesopotamia; see, Paul Lampl, "Cities and Planning in the Ancient Near East", Planning and Cities series, Studio Vista Ltd., London.

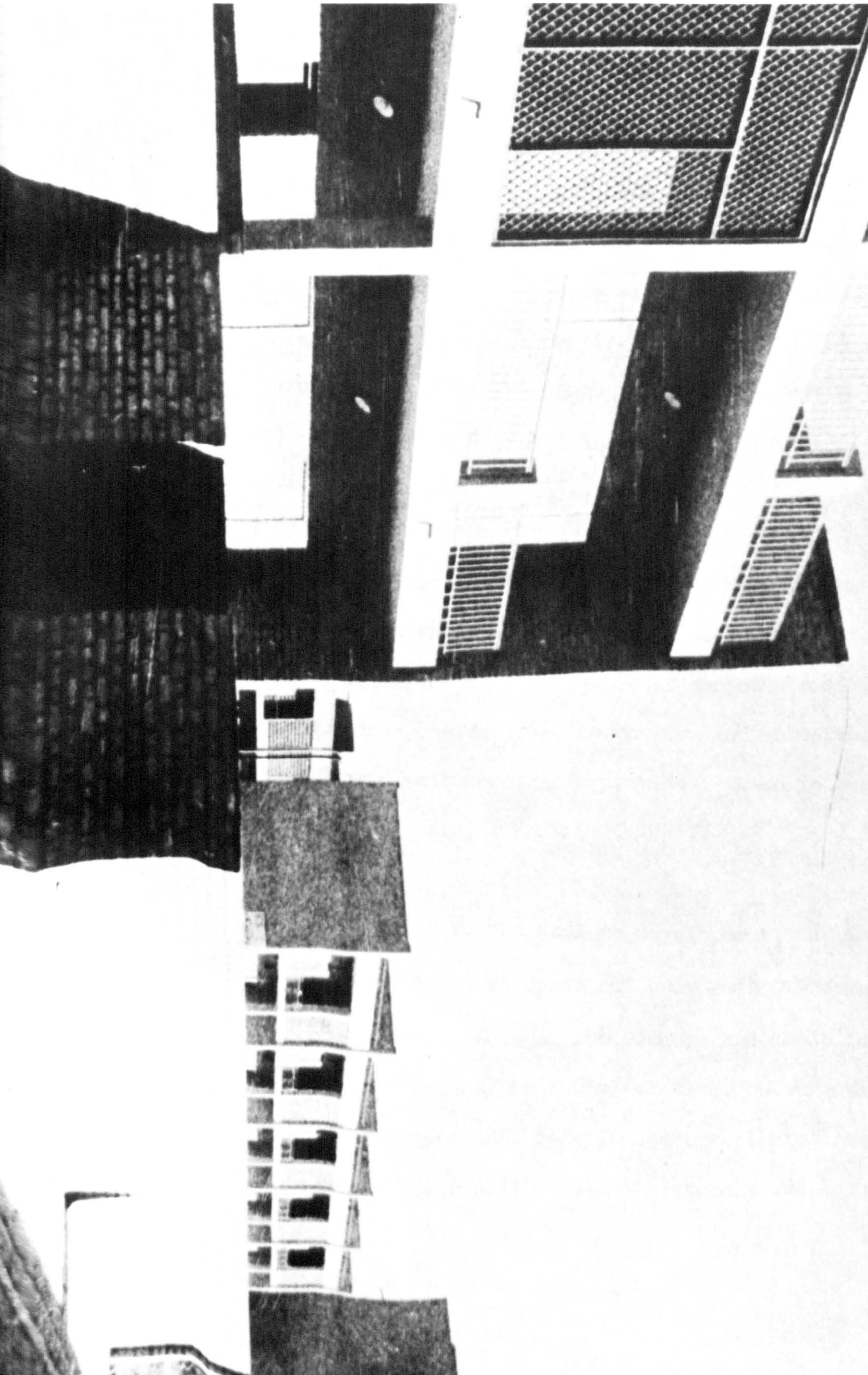
FIG. (10.1) RESIDENTIAL AREA IN Ur , DATED 5500 B.C.

FIG. (10.2) RESIDENTIAL AREA IN BAGHDAD , DATED XVII th. CENTURY

With the discovery of oil, and the establishment of the Republic in 1958, economic development became the fundamental aim of the government; this aim was largely manifested in the type of buildings the government erected which tended to display all the features associated with a high level of industrialization and development. As a result, the government often imitated the designs used in countries which have reached high level of development, even though they may be technically inappropriate, architecturally misplaced and economically unsound under local conditions. Often these presige construction projects feature a richness of ornamentation which exceeds not only the economic capacity but also the real needs.

Such prestige construction projects concentrate, most often, on buildings for the use of the state, i.e. the residence of the head of state, ministries, offices of the central administration, monuments, etc. Only very rarely does it include housing projects, unless these are for the privilaged groups, such as army officers in the case of the "Al-Dhubbat" housing area; see, Fig. (10.3). Much of the blame for this situation must attach to foreign consultants invited by the government, who, sometimes with the best of intentions, apply the patterns of construction and design used in their own countries without regard to local needs and possibilities, and make the mistake of transferring Western architectural innovations to Iraq, where they are not appropriate to the climate, custom, and values; see, (4.2.0). Similarly some of the blame must attach to local architects, who because of their foreign training, either copy the designs made by the

FIG. (10.3) ARMY OFFICERS HOUSING AREA IN BAGHDAD



foreign consultants, or utilize their foreign training to implement designs which are in many cases alien to local conditions. A specific example of this is the windows. Traditionally local builders used small windows and large wall spaces which act to insulate the interior against overheating in summer and over cooling in winter; see, (11.2.2). The windows, though small, let in the amount of light needed, and when they are large, they are usually unglassed, protected by grills, "Queem", and serve as a ventilation for the interior as well as for privacy purposes. This system of natural ventilation which maintains an even internal temperature inside the house, has been perfected through centuries of experiences and became a feature of most of houses, even those that are far from luxurious, see, Fig. (11.9).

Modern architecture in Baghdad and in many cities in Iraq, however, has replaced the traditional brick walls with large expenses of glass; see, Fig. (3.4). This represents an imported solution which causes overexposure to the sun and unbearable heat unless some form of air cooling is provided, which in turn involve higher costs; see, (11.2.2).

Construction is fundamental to development, and the construction industry has multiple links not only with other industries but also with the other sectors of the economy and constitutes a dynamic force in the economy as a whole. Also, construction plays a particularly important role in the creation of fixed assets. In Iraq, at least half of all investments and about 65 per cent

to 80 per cent of housing are accounted for by construction costs.[2] Thus the fulfillment of investment plans and consequently the growth of both productive and service sectors in the national economy are largely dependent on construction.

Construction can act as a tool for economic management. For instance, in times of economic stagnation the government may resort to construction as a convenient way of stimulating activity in other sectors of the economy and providing employment. On the other hand, in a situation where the economy is threatened with inflation, construction may be the first activity to be curbed, and in extreme cases a complete ban may be placed on the initiation of new projects; the reasons being that construction is one of the main contributors to the inflationary process, since a larger proportion of its production outlay is paid out in wages than in the case in other sectors.

Another characteristic feature of the building industry is the high durability of its product and its high unit cost. This is particularly evident with respect to housing. A dwelling represents an investment which is to last for generations. What new construction represents in the way of an economic burden may be seen in the unit cost index of the end product, e.g. per sq.m. of living space, expressed as the equivalent work time paid at the

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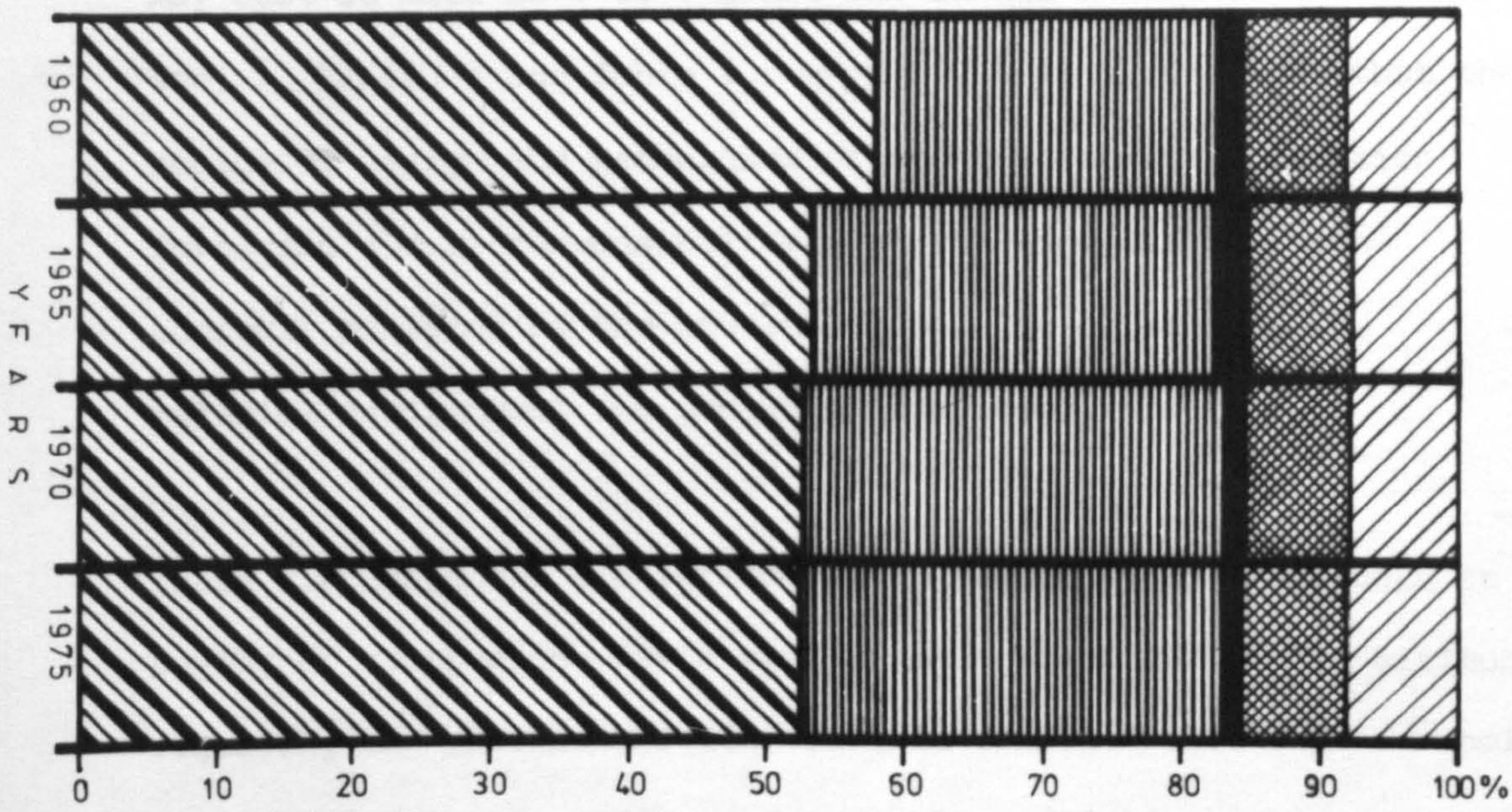
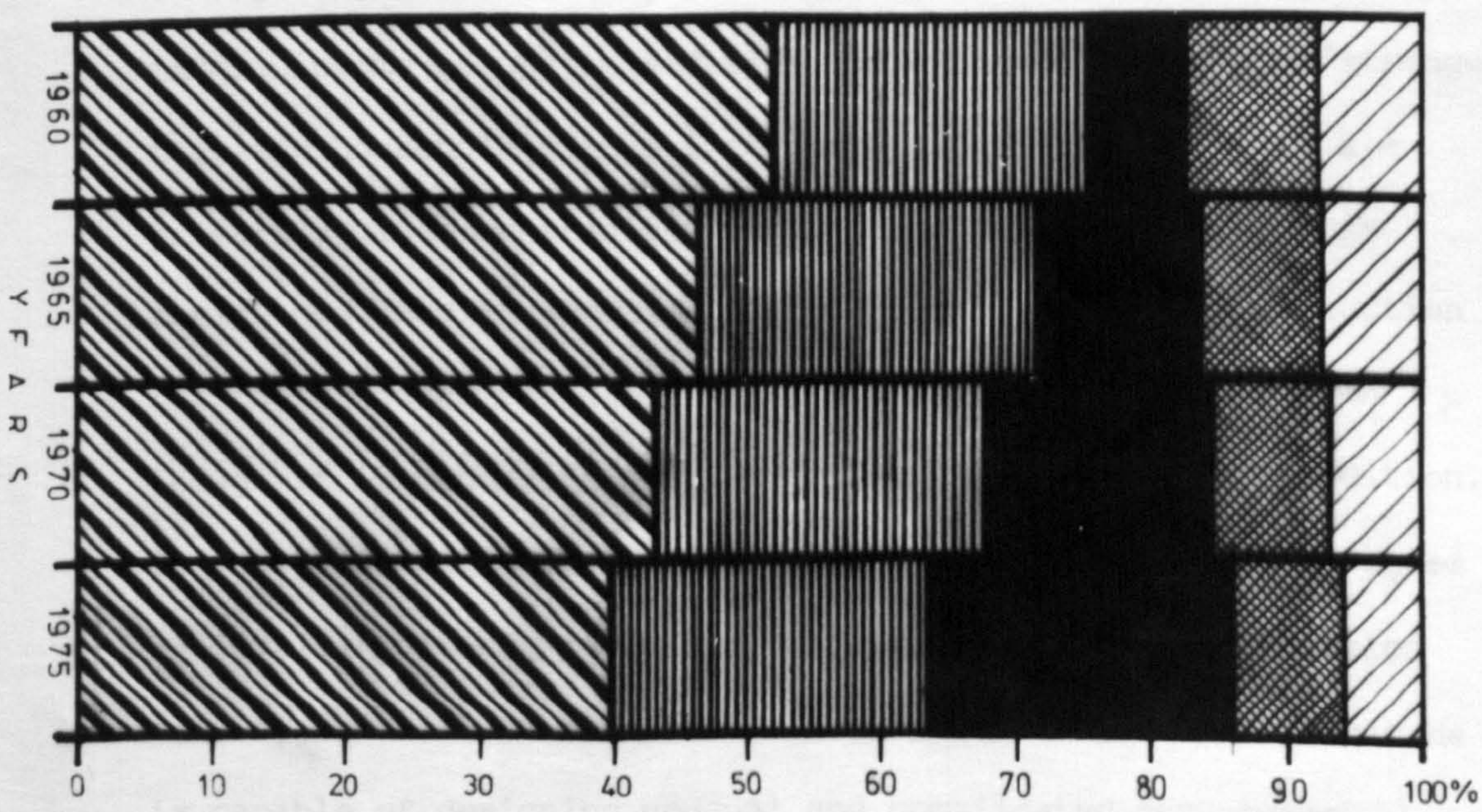
2. the first percentage related to housing developed without government subsidy on land, while the second percentage is related to housing developed with government subsidy on land ranging from 70 - 98 per cent of the total land cost in the free market; see, Fig. (10.4).

FIG.(10.4) COSTS RATIO OF LOW COST, 70 sq.m. FLOOR SPACE HOUSES BUILDING INPUT- BAGHDAD 1960 - 1975 (Based on U.N.E.S.O.B estimates)



A. COSTS RATIO WITH 70_98 % GOVERNMENT SUBSIDY ON LAND
(1960 Constant Prices)



B. COSTS RATIO WITHOUT GOVERNMENT SUBSIDY ON LAND
(1960 Constant Prices)

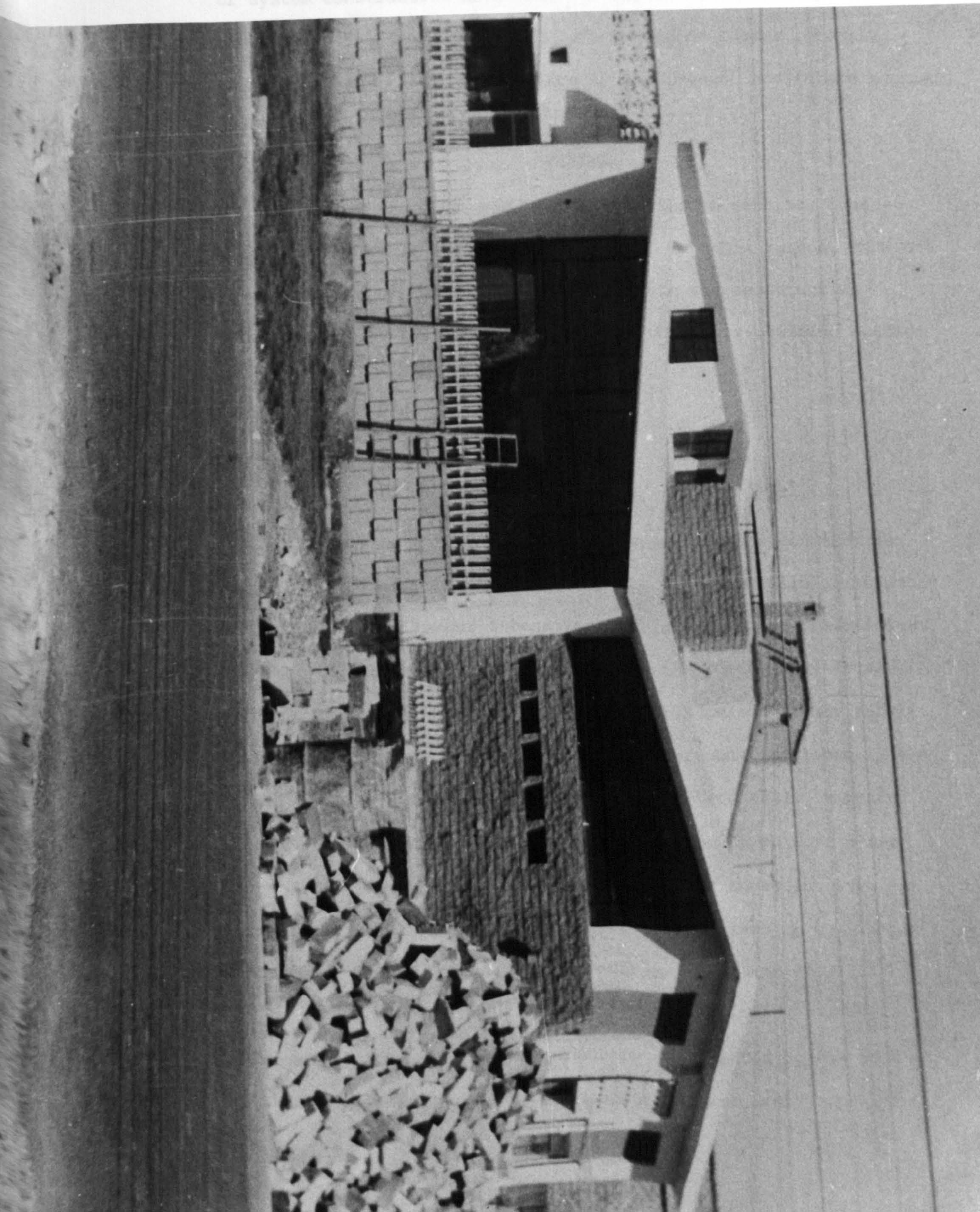
BUILDING MATERIALS
LAND
MANAGEMENT
LABOUR
LAND DEVELOPMENT

prevailing average rates. In Baghdad, for instance, a dwelling of a 150 sq.m. floor space and of low standard of construction may cost as much as 6 to 7 times the annual income of the household; see, (12.4.0) and Table (12.5), this illustrates that the choice of design and techniques of construction is a decision involving a dual responsibility; it profoundly affects the economic position of the household and also determines the material environment for generations to come.

These circumstances are reflected in the household's approach to buying or contracting for a house, which contrasts to its attitude regarding the purchase of less durable commodities. The household's attitude is usually made up of several conflicting motives, e.g. deep distrust of unknown structural designs and innovations, a desire for ostentation, a wish to provide for the future, etc. In Baghdad, for instance, particularly between the high and upper middle income groups, the desire for ostentation is often stronger than the household's innate conservative tendencies which are primarily based on tradition and religious principles. This desire has lead many households to select a type of construction for their houses because it is fashionable at the time, even though it is unconventional and without roots in local tradition. Fig. (10.5) illustrates one of these houses which was designed by local architect, mainly to satisfy his client's ostentation desire, and also to demonstrate to his fellow architects that he is capable of designing unusual and complicated structures.

In the following paragraphs an attempt will be made to study the main aspects of the building industry in Iraq and Baghdad in particular, which includes the employment situation in the building

FIG. (10.5) FASHIONABLE HOUSE IN BAGHDAD



industry, the seasonal fluctuations, the government policies, and the problems associated with the choice between industrialization or system construction which demands capital intensive operations and the traditional construction which demands labour intensive operations, and their applications to the present and future economic development of the country.

It is not easy from the published statistics to separate house-building from other building activities. For this reason, much of the discussion of this chapter will concern the construction industry as a whole, and where possible the house-building section of it alone.

10.1.0 Employment:

Before discussing the problems of employment in the construction industry, it is important first to state that the building industry in Iraq is a very labour intensive; the labour aspect predominates over the capital aspect far more than in the purely industrial sectors, such as the oil industry. For this reason it may safely be said that the building industry at the present is almost like a craft, where the human efforts and ingenuity are still override the capital aspect. In Iraq, this industry employes some 5 per cent of the gainfully employed workers, except those involved in agriculture, while in Baghdad this percentage rises up to 6.4 per cent, about 23000 workers, see Appendices (10.1 and 10.2).

Employment in the construction industry is affected by the problems facing the human resources in the country, these are:

1. A rapid growing population with the predominance of the young age group, i.e. up to 14 years; see Appendix (1.7). This has resulted in an increasing burden on the people who are in the working age and the gainfully employed.

2. A low percentage of the gainfully employed people to the total population of the country. This may be illustrated by referring to a study on the manpower requirements in Iraq by N. Strom, which indicated that the percentage of gainfully employed to the total population in 1969 was around 28.2 per cent, out of it about 55 per cent are engaged in non urban activities, i.e. agriculture.[3] As for the city of Baghdad, the distribution of the gainfully employed population reveals a different pattern, where in a survey made by Polservice on the labour force in the city of Baghdad, it was estimated that the percentage of gainfully employed to the total population of the city in 1971 was around 14.4 per cent, which is almost half of that in Iraq as a whole. The survey also revealed that the majority of those gainfully employed people were engaged in the administrative and commercial sectors, and this depends largely on their location within the city, and their socio economic groups; see, Figs. (3.13 , 3.14) and Appendix (10.2). It must be stated here, that this low percentage of gainfully employed people in Iraq in general

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3. see, N. Strom, "Manpower Assessment in Iraq" and "Study of Selected Industry in Iraq" and "Estimation of Manpower Supply in Iraq, 1970 - 1975", U.N.D.P. June - Nov. 1969, Baghdad; see, Appendix (10.1).

and Baghdad in particular, has a significant bearing in the formulation of construction policies regarding the choice between labour or capital intensive construction industry. This choice will be discussed in a later paragraph.

3. Shortage of persons with critical skills and qualifications; in the planning and construction fields, this shortage is particularly accute in respect to intermediate level personnel, such as foremen, draughtsmen, technicians, and surveyors; see, (2.2.3).

4. Inadequate organizations and institutions for mobilizing effectively human efforts. Although, trade unions in Iraq were established some twenty years ago, and was encouraged by the government, where it was stated in the Labour Law of 1970, that:

> "Freedom of trade union organization is guaranteed to enable unionist movement to carry out its responsibility in stressing the sacredness of work, protection of workers rights and development of their personality and talents." 4

they became, particularly after the 1958 revolution, battlegrounds for competing political groups, which handicapped them from the concentration on the real issues of development, i.e. increasing productivity, achieving better standards of living for their members,....etc.

5. Lack of adequate incentives and security for the workers particularly for those engaged in professional activities which are of a particular importance to the national

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4. see, Government of Iraq, Labour Law, No. 151, 1970.

development, such as research, and experimental projects. This is despite the issue in recent years of a number of laws to protect the manual workers and those who are not covered by government pension laws.[5]

It may be assumed that as development advances, the proportion of workers in the construction industry to the total gainfully employed workers will increase; this increase will not only be confined to the contracting industry itself, but also to the workers extracting raw materials, manufacturing building components, and those engaged in transport and distribution for the industry.

Although the government policy in regard to employment in general is directed towards the achievement of full employment in all sectors of the economy, this objective is highlighted in the Labour Law, No. 151, 1970, where it was stated that:

> "Work is regarded a natural right which should be made available to each able citizen on the basis of equal conditions and apportunities for all, without discrimination on grounds of race, sex, language, or religion, against a wage proportionate to the efforts exerted and production provided that best opportunities and soundest conditions for the operation of productive forces of the society be made available". 6

Also it was stated in the recent National Development Plan of 1970 - 1974, that by the end of the plan's period, employment of all kind should increase by almost 24.3 per cent, and the employment in the building industry by 43.3 per cent.[7]

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5. see, Government of Iraq, Laws Nos. 58, 68, 112, 180 of 1969.
6. see, Republic of Iraq, Ministry of Planning, "Progress Under Planning", 1972, Baghdad, p. 25.
7. see, Republic of Iraq, Planning Board and Ministry of Planning "The National Development Plan, 1970 - 1974", Baghdad, April 1970, Table 34.

this objective was never achieved, that was due to the fact that the projects envisaged by the plan - new projects or expansion of existing ones - could not absorb all the outputs of the educational systems, and as a result many persons capable of work were left without suitable employment opportunities. At the same time there was a shortage in some technical specializations, a fact which hindered the growth targets of some economic sectors, particularly the industrial sector. Such situation, where there is a surplus on one side and shortage on the other, was actually a reflection of the lack of the element of manpower planning, short and long term, at sectorial and occupational levels, despite the fact that this planning should go side by side with the general economic development planning.

Secondly, the hature of employment in the construction industry is, in Iraq,different from other types of employment. This is related to a number of factors, i.e. construction activity in general is of a seasonal character influenced by weather, and the construction labour force is largely casual, where large numbers of workers leaving and joining the industry from month to month, and regard their occupation in the construction industry as a temporary occupation. The smaller firms normally keep a permanent staff which is sent from site to site. But among large contractors, in general only a small supervisory staff is on permanent employment and most of the site labour is engaged on an ad hoc basis. At the other end of the scale, there is a considerable movement of firms in and out of the industry. A painter or a plumber may stop working for someone else and decide to work on his own. After a time he may decide to rejoin his old firm. The transition either way is an easy one.

The building industry draws most of its labour force from the rural migrants, who came to the cities, especially Baghdad for the prime objective of finding work. Most of them are unskilled labour with very little knowledge of the construction trade in the urban areas, with all its complicated techniques and labour relations. This is attributed to the fact that construction activities in the rural areas are dominated by the self-help system, based on family and tribal organizations. When those people come to the cities and have been absorbed in the construction industry as a very cheap labour[8] they start to face the problems of adjusting themselves to the new environment of the cities and the demand for better qualities in the construction process. This in many cases has a bad implication on the quality as well as on the productivity rate of the process itself. Appendices (10.4 and 10.5) illustrate very clearly the dominance of the unskilled labour in the construction sector, almost 70 per cent of the total persons involved in the construction sector in Baghdad.

This situation calls for the rapid development of vocational training programmes especially for the young workers. Although specialized training insitutions have been established in the last twenty years or so, as a means of supplying certain categories of personnel needed in the immediate future which normally cannot be obtained through the normal educational system. These insitutions faced with many difficulties:

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8. it has been estimated that the average earning of the unskilled labourer in the construction industry amounted to 4 ID per week, in Baghdad; see, Appendix (10.3).

1. Owing to the shortage of instructors and lecturers, the training institutions suffered from discontinuity and unstability in the lectures. Heavy reliances is placed on part-time lecturers and overburdened government officials, who cannot devote enough time to the preparation of lectures or to work seriously with the trainees.

2. In spite of the variety of incentives provided to the trainees, there are still difficulties in recruiting adequate numbers. This is mainly because there is still bias in the society against manual work and industrial occupations, also those whom training is offered often see little advantage in it, as compared with the gains they anticipate to obtain in other forms of employment, mainly as government civil servants.

3. The geographic distributions of the training institutions reveal that most of them are located in the city of Baghdad and the major provincial cities, where they are close to instructors, and can receive better administrative support. The significance of this phenomenon is that the trainees are often reluctant to leave Baghdad after the completion of their training course; when these institutions are located in the provincial cities, the difficulty is to attract good instructors, since most of them are located in Baghdad.

4. The training programmes tend to be more theoretical and superficial. This form of training creates a problem of status for those workers trained in this fashion vis a vis their colleagues which have received more regular training.

10.2.0 Seasonal Fluctuations; an Endemic Problem:

In Iraq, construction in general and house building in particular has always been subject to seasonal fluctuations. These are mainly due to:

a. The production process of some local building materials particularly bricks, where their supply in the market is affected by the weather conditions, i.e. high supply in the summer season followed by low supply in the winter; see, (9.2.1).

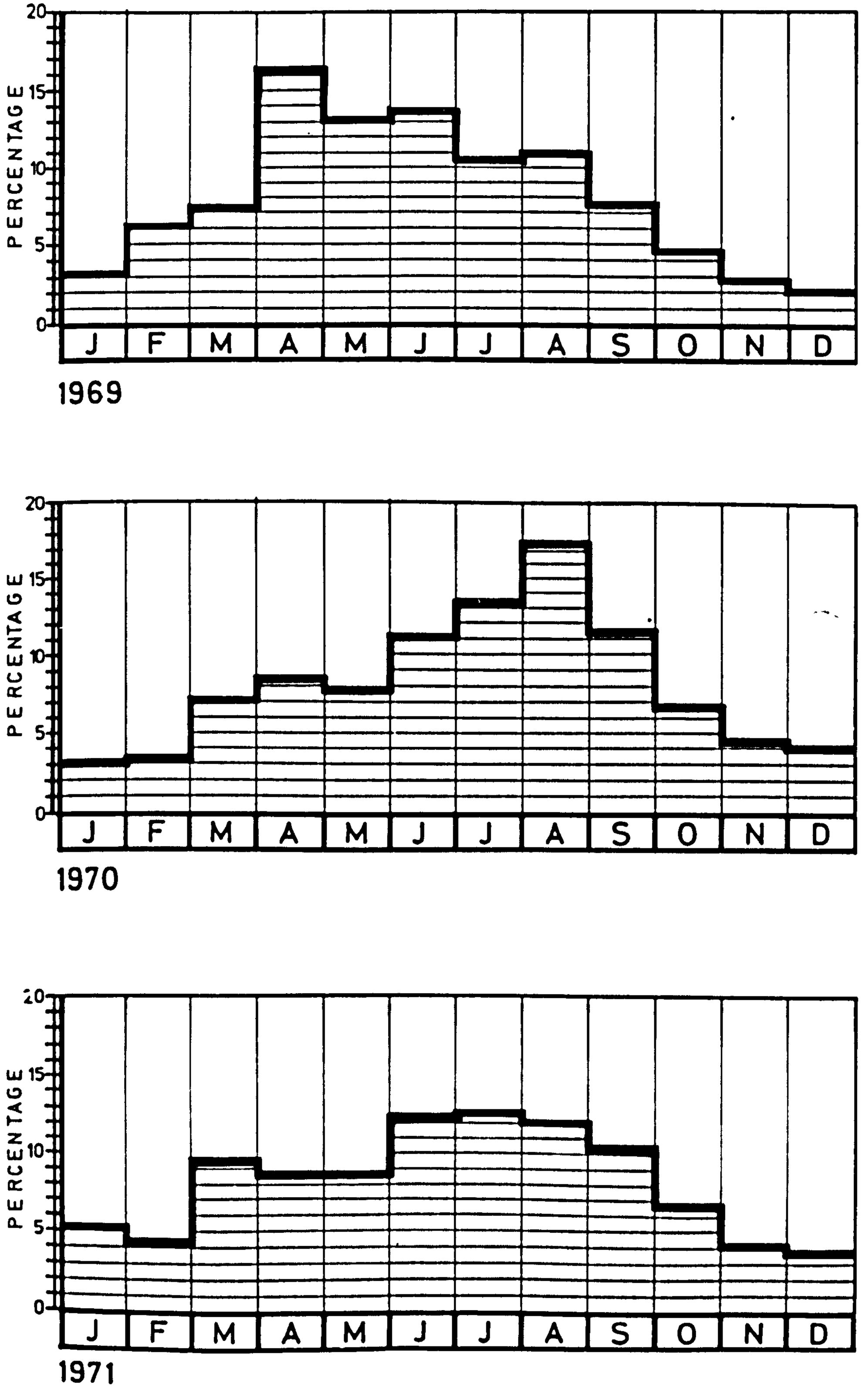
b. The type of construction, which is mainly traditional, demands dry weather conditions particularly in regard to roof construction when "Juss" or gypsom is used as the prime material for morter.

c. Most of the people take advantage of the summer holidays and the longer daylight period to start constructing their homes or maintaining them.

Fig. (10.6) demonstrates clearly the fluctuated trend in house construction in Baghdad, 1969 - 1971, and shows that during the months, October - February, which are the winter months in Baghdad, the rate of construction drops considerably than that in the summer months, i.e. March - September.

Apart from the effect of this fluctuation on the rate of house construction, the main effect is on the labourers. The non official figures on unemployment in the construction industry indicate an upward trend during the winter months, and it is the unskilled or semi-skilled workers who are usually the main sufferers of the lack

FIG.(10.6) RATES OF HOUSING CONSTRUCTION IN BAGHDAD 1969-1971 PER MONTHS.



of continuity of production. It must be stated here that these figures give very limited pictures, since some of the building labourers who are not employed during the winter months can still be employed in other sectors, i.e. services and commerce.

While all the parties concerned in the construction industry suffer from the effects of this fluctuation and the susceptibility of the industry to climatic conditions, the government seems not yet to realize the importance and implications of this situation on the building production and the housing sector in particular.[9]

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9. In Iraq, the government involvement in the construction industry takes the following forms:

   1. The provision of finance for construction, lending capital for housing or other purposes;

   2. Acting as a client, whereby it provides funds for, and commissions work from, the construction industry, this is mainly done through the Ministry of Housing and Public Works.

   3. The government also in many cases involve in the actual design of buildings for its own programmes. In the Ministry of Housing and Public Works as well as in the Municipalities, particularly Baghdad Municipality, there are departments which employ architects, engineers, and surveyors, who prepare plans and specifications.

   4. Perhaps the most direct involvement by the government in the building industry was after 1968, where the government took direct responsibility in the production of its buildings, this was achieved through the formation of the National Centre for Engineering and Architecture Consultancies, which was established in 1973 with the task of preparing designs and specifications for projects otherwise given to local consultants; also the establishment of the General Company for Engineering Contracts, mainly to compete with private constractors for government work.

In the developed countries, particularly the Scandinavian countries, measures have been taken to give greater continuity to the building industry. The authorities in these countries have been instructed to defer their construction projects as far as possible to the winter months. In this way and by using a flexible system of starting permits, winter unemployment can be eliminated to a considerable extent. Other methods used to reduce the impact of this situation is by granting subsidies to those contractors who are prepared to take measures to promote the continuation of work under less favourable weather conditions.

In Iraq, although there is no legislation protecting the workers against the disturbance of construction by weather, some work contracts guarantee the workers an income in excess of unemployment benefits in the event of bad weather conditions, these benefits varied according to the nature of employment as well as the nature of contract.

In addition to fluctuations in the building industry due to the reasons mentioned earlier, there are a number of other factors which hamper the optimum exploitation of the existing capacity of the building industry. One of these factors is the loss of working days due to illness and accidents. The main reasons for that are:

a. The majority of the workers in the building industry, particularly the unskilled, are of low income groups, consisting of people who migrated from the rural areas; those people by their social and cultural background are not accustomed to go to hospital or clinics in the event of illness or minor accidents.

b. Lack of safety regulations in the construction process which demands the lifting and assembling of heavy and bulky materials, and also the lack of closer check of the equipment used in the construction.

This situation calls for the introduction of strict safety regulations to protect not only the workers but also the public in the vicinity of the construction work, together with restrictive check on their observance. In addition to that, effective measures must be taken to protect the workers through compensation and retraining programmes in the event of accidents. At the present, this protection is only confined to construction projects commissioned by the government, this protection should be extended to cover also construction work carried out by the private sector, since this sector employes the majority of the workers; see Appendix (10.5).

10.3.0 Possible Trends in Construction:

It is difficult to classify construction in a comprehensive and uniform way because technical and organizational factors are difficult to separate.

In general, construction can be classified as :

a. Traditional;

b. Non-traditional, or as industrialized or system building.

Traditional building is simply the form of building normal for the time and place, it embraces all those methods of construction in which materials and componenets are purchased from the market and

assembled on the site into building and works designed to the requirements of individual clients or expected clients. Its form depends on the materials and labour available, on technical knowledge, on the economy in which construction takes place, and on the resources of the client or owner.

Non-traditional, or system building is one that is difficult to define since the definition can encompass at one extreme the prefabrication of components, to the prefabrication of a total dwelling. G. Leon defines industrialized building in the following way: [9]

> "....the development of mechanized methods of factory production and site erection for the manufacture, assembly and rapid construction of standardized building and component parts in order to achieve greater productivity, minimise site labour requirements and reduce total construction costs."

He further states that prefabricated components:

> "....can reduce material costs by standardising high outputs, minimise site labour costs by finishing and assembly in the factory of components which incorporate services and fittings, replace manual labour by machinery, and substitute semiskilled or unskilled factory workers for skilled craftsment on site."

In the U.K., for instance, most of the systems were produced from within the building industry and were consequently based on preconceived ideas concerning structures and materials. Systems were thus produced utilising steel or timber frames, or alternatively structural wall panels. [10]

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9. see, G. Leon, "The Economics and Management of System Construction", 1971, p. xiii.

10. see, E. Maidment, "System Housing , Industrial Building Systems and Components", July, 1966, p.6

In 1965, there were some 127 housing systems in the U.K. listed in The Comprehensive Industrialized Building Systems Annual; by 1967, this figure had increased to 175 systems. The Housing and Construction Statistics published tables containing data on 79 of these systems, and which indicate that industrialized construction methods are between 8 and 14 per cent cheaper than traditional methods. Contained with these Tables, however, are rationalized traditional building methods incorporating only prefabricated components. As an example, the Wimpey system, which falls within this category, accounted for 21 per cent of the industrialized dwellings under construction at the end of 1971. [11]

The shortcomings of the industrial building programme in the U.K. can be attributed to three main factors. Firstly, it was found that building system were most suitable for high rise dwellings utilising repetitive components. Secondly, there were too many systems to guarantee a steady production flow for the manufacturers. Thirdly, and perhaps more important, is that the production of standard house types with standard exterior finishes led to a social reaction against what is called "the compartmentalisation of human beings". [12]

In addition to these broad classification of construction types, construction is related to three sets of factors:

1. Technical, which includes materials, structural design, techniques of construction.

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11. see, H.M.S.O., "Housing and Construction Statistics", 1972, Vol. 2., Table XXXIX.

12. see, J. Riley, "All round flexibility of system building", "Building Technology and Management", April, 1971.

2. Functional, which includes climate, purpose of building.

3. Non-material, which includes aesthetic considerations, custom, tradition.

Some of the non technical factors have an objective character, e.g. climate, while others are more variable. Change from traditional concepts of building may in some cases be justifiable, but it may also destroy positive features and hence be undesirable. This is particularly the case when aesthetic patterns are modified since local traditional designs are the ones most in harmony with the environment.

The situation is different in relation to changes in construction techniques. A distinction should be made here; between materials and their utilization, structural design, and methods of construction. The introduction of new building materials is obviously desirable where local materials are of inferior quality or when the new material is more efficient for a given purpose. The same is also true of structural changes. The situation is different, however, with respect to the methods of construction. In comparison to other branches of production, the range of choice here is exceptionally wide, ranging from primitive manual labour at one extreme to a high degree of mechanization and even automation at the other.

In Iraq, the main reasons for the backwardness of house building are to be found in the organization of the industry, which in turn, is largely controlled by the nature of the product.

Construction is a complex industry, using bulky materials and producing an immobile and varied product. The immobility of the house, and high transport costs of building materials and the individual character of much private housing limit the scope for factory production and make housing markets local rather than national. The complexity and lack of continuity of house-building hinders to a large extent the smooth organization of operations necessary to obtain the benefits of large scale output and encourages the use of labour, which is versatile, rather than machines which can only be used for a specific task. The restrictions on the use of machines and factory methods allows the traditional crafts to survive in building. The combination of all these factors - the low level of mechanization, the conditions suitable for craft working and the local nature of the markets - produce an environment which is very favourable to the small contracting firms. In these conditions innovations are unlikely to occur frequently or spread quickly. Some construction techniques which could lower the total cost if the whole building process were reorganized round the new technique, may by upsetting the continuity of operations, only add to costs if introduced piecemeal into the traditional process. In these circumstances, even the largest contractors will be wary of abandoning traditional methods that have been tested over many years in favour of experiments with new techniques, especially when the failure rate is likely to be high and the cost of failure heavy.

Innovations in building are largely a response to changes in the economy and in technical knowledge. The use of materials found on the site declines when transport is sufficiently well organized to enable processed materials to be produced in bulk and brought from distant places. As the price of labour rises so does the use of highly processed materials, management skills and machinery. For instance, hand decorated materials such as carved wood and decorative plasterworks give way to decoration by the use of colour and texture.

Generally speaking, technical progress in the building industry in Iraq should be welcomed, because it promotes economic growth while at the same time provides the workers with the opportunity of improved working conditions. But whether industrialized building is more or less efficient and economical than traditional building is a question of special importance, particularly in the light of recent increases in the country's income from oil.

The existing building industries in Iraq, for instance,cannot be expected to cope with the increasing demand for house construction by the private sector as well as the demand for buildings and construction projects by the public sector, which is currently competing with the private sector in the consumption of the building materials, labour etc. This is because the building industries out-put is limited due to their dependence on traditional materials and time consuming methods of construction. These conventional techniques tend to become more and more costly as the country develops industrially and the cost of labour moving

steadily upwards as a reflection of the rising national income due mainly to the revenues from oil production as well as industrial development. It is, therefore, imperative that Iraq should encourage the development of new systems of construction production that will be capable of producing buildings in mass volume and at progressively lower costs.

In Iraq there was recently an argument within the government departments concerned with construction and housing development, that the use of consortia and large building programmes, with proper planning, can lead to buildings being produced quite as efficiently, or even more efficiently, by industrialized methods. It was also argued that traditional building may have at the present an edge on industrialized building, because the latter is still in its experimental stage in Iraq, and when this system has settled down and the people involved in it have adequate experience in its use, then it will become more efficient. The problem in evaluating whether economy and efficiency can be achieved in construction in Iraq and Baghdad in particular by the use of factory prefabrication and other non traditional forms lies in the proportion of the costs of dwellings in which economies can be achieved, as well as in the preservation of high employment level.

At the present, the cost relations in the building industry in Iraq are less favourable to the full prefabrication and industrialized construction. This is mainly because the aggregate size of the labour force involved in the house building and construction in

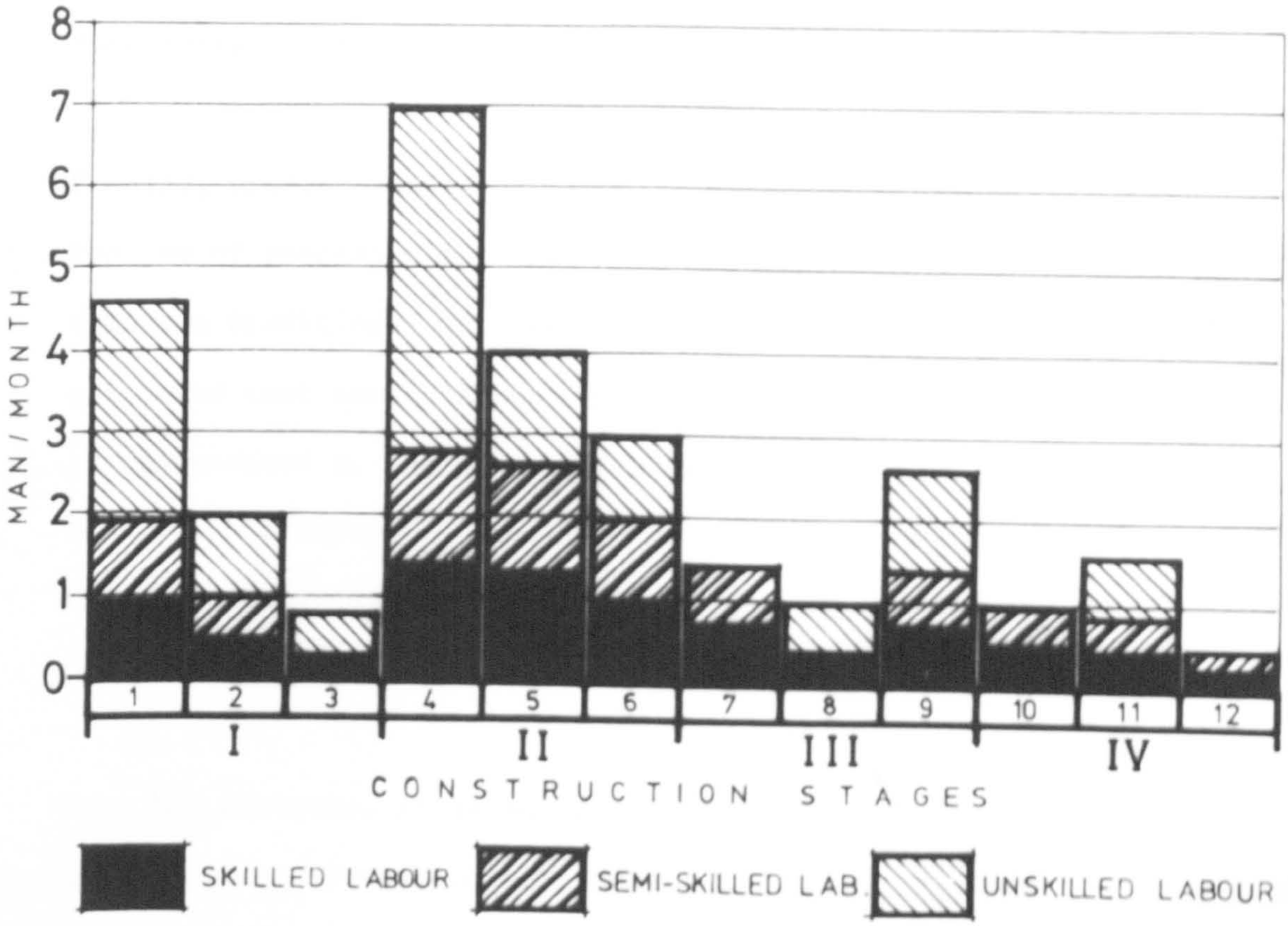
general is still substantial. It has been estimated that to build a house in Baghdad, for instance, with conventional structure, using traditional construction methods, at an estimated cost of 3500 ID, the average input of labour is about 30 man/month; [13] see, Fig. (10.7). This implies that if full industrialization in the building industry is adopted, then large amounts of those workers, the majority of them migrants from the rural areas and of very low income standard, will be out of work, a situation which carries grave social and economic consequences. This is in spite of the argument that in the use of industrialized components in the construction industry, the majority of the workers will move from the construction area as builders to the processing plant as industrial workers.

Secondly, the differential advantage in the wage rates of skilled as against the unskilled workers is still high in Iraq and Baghdad, where it has been estimated that the differential between unskilled and skilled labour wages, working in the private and public construction sector in Baghdad in 1970 was about 60 per cent; see, Appendix (10.3), thus, there is an economic advantage, at the present at least, in the use wherever possible a labour intensive construction techniques which replace skilled work by semi and unskilled work, this is particularly significant in the construction of houses for the low income people. This point in the argument will continue to be viable till a point is reached, where due to the expected increases in the incomes of the people as a result of the recent increases in the country's income from oil, the labour wages will rise to a level where it becomes more economical to relay on mass production of industrialized construction components.

13. Data obtained by the author from interviews with different contractors and consultants in Baghdad in 1972, notably the firm of Hisham A. Munir and Associates, Baghdad, Iraq.

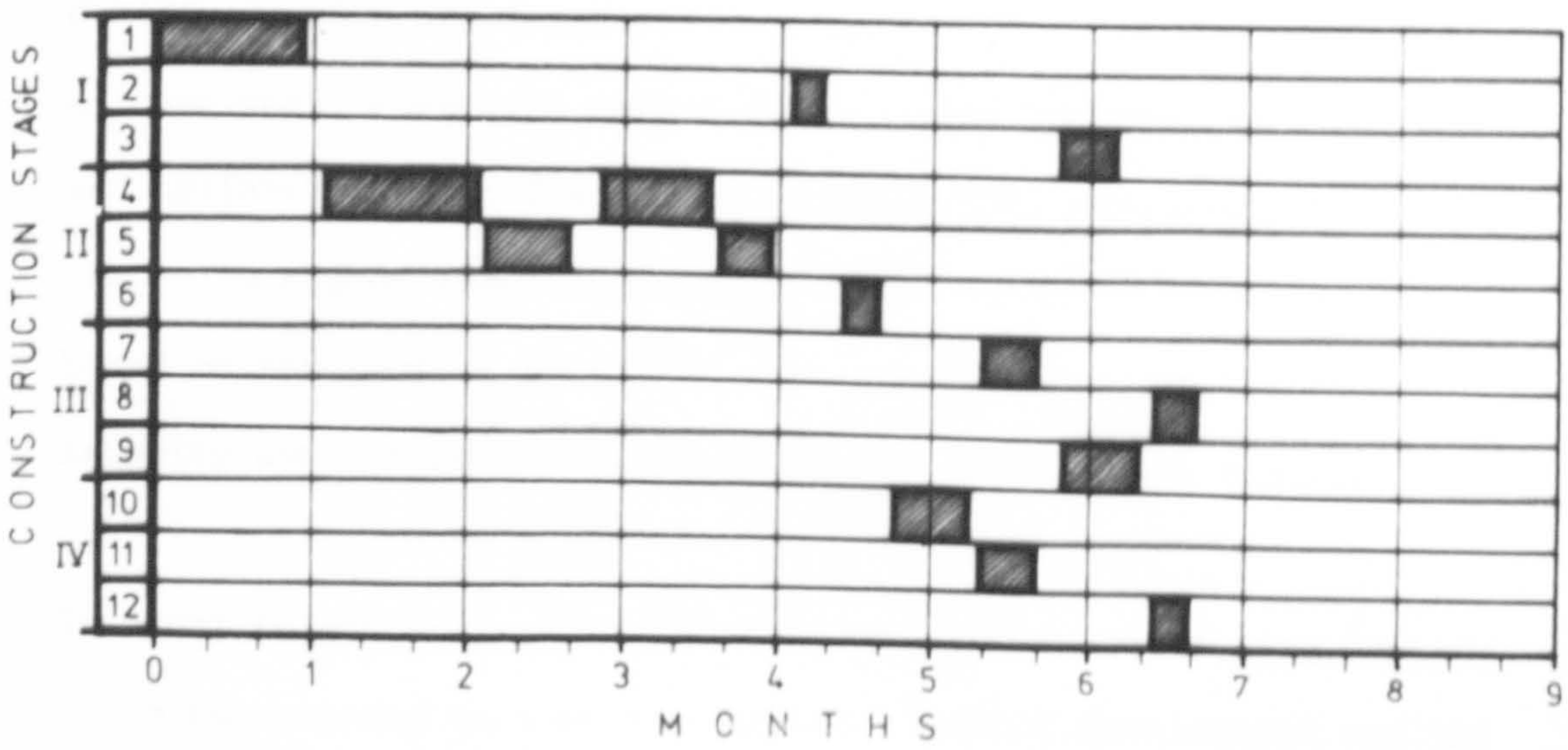
FIG.(10.7) LABOUR INPUT AND HOUSE CONSTRUCTION PROCESS

SEE ALSO FIGURE(12.6) & TABLE(12.5)



A. LABOUR INPUT IN HOUSE CONSTRUCTION

MAN / MONTH



B. HOUSE CONSTRUCTION PROCESS CHART

SEE ALSO FIGURE(12.6) AND TABLE(12.5)

Also, at the present, labour costs of site workers are generally a little less than those of factory workers, therefore, there is little economic advantages in transferring work away from the construction site.

Finally, prefabrication and industrialized building will require the use of precision materials, which may cost even more than the existing traditional materials. At the present, it has been estimated that about 52 per cent of the construction cost in Iraq is represented by the cost of building materials, and well over half of this expenditure represents fittings, equipment and finishing materials which frequently are not affected by the form of construction.

From the foregone, it seems that there are two conflicting arguments on the future of the construction systems to be adopted. The first argument based on the fact that in order to achieve the required level of construction output to cope with the pressures of urbanization and development, new construction systems have to be developed which are capable of production at a higher rate and at a lower cost, this will demand higher level of industrialization and prefabrication. The second argument does not favour the change to higher level of industrialization and prefabrication, based on the present system of employment in the construction industry and the costs relations in the construction industry.

In order to achieve a compromise between these conflicting demands, it is recommended that at the present stage of development and the degree of industrialization, stress may be laid on the improvement

of traditional building methods so as to utilize effectively the presence of labour. This may be achieved by better planning techniques and site organization, increased mechanization, better use of traditional materials and development of the production of new materials. Furthermore, traditional methods and progressive measures to improve the supply of materials and equipment should be planned so as to facilitate the transition to more industrial methods whenever these appear to be justified by general economic conditions. As the economic and technical conditions improved, and when the volume of construction has substantially expanded, the government may consider the use of more industrial building methods.

The achievement of such methods will require the coordination of operations in the various stages of building work, the application of standardization, typification which in the case of large scale factory production of building components and assemblies will reduce the multiplicity of types and dimensions of prefabricated elements, and the solution of a number of problems arising in the production, transport and erection of building materials and assemblies. In addition, these methods will require more advanced specialization of building operations and early preparation of the site of construction.

Finally, the designers need to obtain a better general understanding of the problems of construction, and be able to design in relation to the construction problems posed by the design, as well as in relation to the long-term performance and the use of the building. Contractors also need to improve their costing techniques and their planning of contracts and subsequent site management.

10.4.0 Practical Measures for Increasing Efficiency and Reducing Costs:

As it has been mentioned earlier, the main reasons for the backwardness of house building in Iraq are due to the bad organization in the construction industry, low level of mechanization, system of construction, and the nature of the product itself. In this paragraph, an attempt will be made to examine the possibilities of increasing the efficiency of the construction industry as a whole, thus increasing its capability to meet the increasing demand and reducing the costs of houses, particularly for the low income families. In this context, it must be emphasized that construction costs are only part of the total cost of a house. The cost of the land and site preparation, the cost of providing utility services, the profits for the contractor, and legal fees must all be added on the building cost to give the total capital cost.

For a house costing about 1100 ID, built in Baghdad in 1970, the non-construction costs which includes land, land development, and management might account for perhaps 20 per cent of the final price - this percentage is based on the assumption that land is heavily subsidized by the government - if this land is purchased through the free market, then this percentage might reach 35 per cent; see, Fig. (10.4), and Appendix (10.6).

Construction and non-construction costs are largely determined by different factors and the two costs ought to be considered separately in assessing the possibilities of reducing the total capital cost of

housing. Unfortunately, there seems small prospect of non-building costs being lowered substantially. The main items are the profits of contractors, legal fees, and the cost of land and site preparation. Building is a very risky activity. Given the risks involved, it might be expected that profits in building would tend to be higher than in other, more secure, industries; although this may not always be the case, since some of the contractors are operating on very low margins, particularly the small contractors, for competition purposes. The chances of being able to prune average profit margins any further without a complete reorganization of the industry seems remote.

Since the non-construction items in house building are dealt with in earlier chapters, the study in this paragraph will concentrate on the construction items. As such, the suggestions that may be put forward to increase the efficiency of construction items and reduce its costs can be grouped under three heads: greater simplification, prefabrication and the use of new materials; more mechanization on the site; and better planning, site supervision and incentives.

In attempting to explain the slow growth of housing output in Iraq, much has been made of the low level of mechanization, the small-scale production, and the lack of standardization. In other industries, costs are cut by standardizing the product and so making possible large scale factory production in which labour is substantially replaced by machinery. It is tempting to assume that the house building industry should also follow this course, but in fact it seems that the scope for a greater application of factory processes to house building is limited.

It appears that there are two approaches to making house production more of a factory industry. The first method is to standardize and simplify the variety of sizes and types of components and fittings used in house building, so that fewer varieties can be produced in great numbers at lower cost. Simplification is mainly aimed at reducing material costs in building. The other approach, prefabrication, aims at reducing labour costs by putting together parts of the house in the factory so that less of the assemby work has to be done at the site.

The scope of simplification in house building, judging from the experience in developed countries, is considerable. In these countries it was found that for most components the varieties produced could be drastically reduced without any stereotyping of design and with a considerable saving in cost. [14]

Simplification by itself does not entail any change in building methods, but it is a natural extension to pass from simplifying the number of components and fittings used in houses to simplifying the designs of the houses themselves.

One way of doing this is "modular co-ordination". Here the building is designed in terms of multiples of a standard length or module. Designs using this principle would reduce the waste of materials and labour involved in cutting components to the dimensions required

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14. see, United Nations, "Proceedings of the Ad Hoc Meeting on Standardization and Modular Co-ordination in Building", 1959 pp. 23-36.

and the variety of sizes of components used would be reduced even further. According to the Organization for European Economic Co-operation, a saving in cost of 25 per cent could be achieved if designs of houses and components were based on the principles of modular co-ordination. [15]

If prefabrication techniques were used more widely, houses could certainly be built faster, but it is doubtful whether in Iraq they could be built more cheaply. The costs of the finishes and fittings in a traditional house building are as high as the cost of the structural components; see, Table (12.5) and Fig. (12.6), so that if prefabrication is to be most effective in simplifying assembly work on the site, the finishes and the fittings, i.e. Stages III and IV, must be incorporated in prefabricated structural units. These units are likely to be large and heavy. But the cost of transporting the prefabricated units from the factory to the site increases rapidly with the size of the units. Once on the site, the weighty units can only be handled by cranes and other expensive equipment and the use of these large machines raises further problems. If the prefabricated units are smaller and less complete, then much of the intricate and time-consuming work of fitting the components together remains. The insertion of the factory made components into basically traditional houses can interrupt the flow of work and may well increase the number and complexity of the operations required to complete the job. Thus prefabrication can result in greatly increased overheads and possibly in inflated labour costs. Even when the cost of labour in house assembly is cut, the gain may be more than offset by the increased costs of materials.

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15. see, O.E.E.C., "Modular Co-ordination in Building", 1956

In general, the materials used to construct the traditional house in Iraq and Baghdad in particular; see, (9.2.0), such as bricks, plaster and tiles, are not suitable for the production of prefabricated units. These materials are not easily worked, or they are too heavy, too coarse or too brittle. And the materials that may replace them, like steel, wood, concrete and plastic, may add more to the material costs than prefabrication saves in labour costs.

Since prefabricated systems in Iraq are not yet established so that comparative costs analysis may be made; it is of interest to refer to a study done by the Building Research Station, now known as the Building Research Establishment - BRE - in the late 1950s of the cost of building different types of houses, where it was found that, in the most completely prefabricated house tested, the cost of materials alone was greater than the total cost of materials, labour and plant in the traditional house. [16] The conclusion of this study was that: 'It would appear that, in general, economy and house-building can best be sought in the evolution of traditional processes rather than in the introduction of radically different principles of construction'.

House building involves the movement of great quantities of materials. In addition to this, there is a large amount of earth to be moved during the preparation of the site and foundations, and the total weight of materials moved may be as much as 400 - 500 tons. In house building in Iraq much of the carrying of these materials is

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16. see, B.R.S., "A Study of Alternative Methods of Construction", National Building Studies, Special Report, No. 30, H.M.S.O., 1959, p.55.

done manually. Bricks and morter are carried in hods and bowls on men's shoulders. The mechanical aids used by the small contractors are often of the simplest type, like the standard one-wheeled barrow. The scope for increased mechanization in house building in Iraq would appear to be considerable, and indeed, manual handling of certain materials is gradually being replaced by machinery, such as the concrete mixer and vibrator.

The advantage of mechanization over manual handling will be greater the larger the project and the higher the structure. Labouring costs increase considerably with the height of the building but little with the base area of the project. In the U.K. for instance, if it takes 0.93 man/hours to carry manually a certain load up to the first floor of a building, then the same load carried under identical conditions up to the fourth floor may take 1.6 man/hours.[17]

The cost of mechanical handling, on the other hand, increases little with the height of the building, except when the operations are beyond the reach of equipment on the ground, but for a given number of dwellings, costs increase rapidly as the site area of the project increases. This is because big machines are expensive to move about. It is costly and time-consuming to erect and dismantle static lifting equipment, and the mobile machines may not be able to traverse uneven ground - though mounting equipment on caterpillar tracks partially meets this difficult.

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17. see, O.E.E.C., "Mechanization of Certain Building Operations on Site". 1959, p. 19.

The other major drawback of greater mechanization is that machines are less versatile than the labour they replace. Machines will be uneconomic unless they can be fairly fully employed, but any particular machine may only be useful for a small proportion of the work on the house. A group of men levelling the ground for foundations can be called away to move bricks or unload a waiting lorry. A mechanical excavator that might be able to do the specific job of digging foundations much more efficiently is less adaptable. For contractors working on small projects there may not be enough work to justify the use of any but the simplest machanical aids. Even on large housing projects, where the quantity of suitable work available may be sufficient for the machine's capacity, the lack of continuity in operations, due to lack of capital or building materials, may keep the machine idle for long periods. If more expensive equipment is to be used to its best advantage then the layout of the site, as well as the phasing of operations, will have to be carefully planned so that the machines are as fully occupied as possible and their movement kept to a minimum. Even some of the simplest of the new aids are likely to require some additional planning and reorganization of work. For instance, if portable electrical equipment is to be used, then electricity must be brought to the place of working early in the construction process.

Despite all these drawbacks, it seems that there is a wide scope for increased mechanization particularly with the small contractors, a number of simple, fairly adaptable machines that can be economical on medium and small projects without prohibitively complex planning

may be employed by these contractors. Obvious examples are some of the new hand tools, used particularly in finishings, like portable electric saws, sanders, drills and explosive rivet guns, etc.

House building is a complex process involving the inter-relationship of many interests, occupations and trades. The building owner engages the architect or engineer, both deal with the main contractor and the main contractor negotiates with a host of sub-contractors and materials suppliers, or in other type of contract, the owner does these negotiations. The work of the painter, for instance, cannot begin until the internal carpentry and plastering have been completed; the plasterer waits on the tiler, the tiler on the bricklayer and the bricklayer on the excavator; see, Fig. (10.7). The workers in all these trades use many different materials, which have to be brought to the site in the right quantity and at the appropriate time.

Unfortunately the spread of pre-planning in house building is hindered by the fact that in Iraq it is not customary for the architect or engineer and the main contractor to work closely together. This situation is quite different in the related civil engineering industry, where there is to certain extent closer and earlier co-operation between the designer and the contractor.

The common practice in the planning of house building in Iraq follows the following pattern: The architect or engineer, and in some cases the owner himself with the help of friends who have previous experiences in house building, draws up the design, the

cost of which are either estimated by a quantity surveyor or by the architect. It is often not until then that the main contractor is engaged. The contract between the owner and the main contractor may take one of the following forms:

a. The contractor will be responsible for the provision of labour and building materials. This type of contract is usually priced according to:

   i. sq.m. of the building area; or

   ii. Construction items, i.e., (x) cu.m. of brick work, or sq.m. of windows.

b. The contractor will be responsible for the provision of labour only, while the owner will supply the building materials. This type of contract is usually priced according to the cost of labour for each construction item.

The main contractor will usually arrange for some of the trades like roofing and plastering to be done by specialist firms under a sub-contract. In some cases the owner will arrange for a sub-contract, after agreement with the main contractor, and the architect who will specify that a particular specialist should be engaged to do a particular piece of work. In the case of large projects, where the owner is usually the government or its agencies, the overall supervision will be carried out by a resident engineer, who sometimes represents the owner and the architect at the same time. The supervision of the main contractor's work will be done by his agent, assisted usually by a general foreman and possibly by an engineer. Small contractors sometimes act as their own agents.

The design of the building may have been drawn up without full knowledge of the costs of alternative designs or methods of construction and the main contractor may suggest changes in the design. Changes, even at this comparatively early stage, can cause expensive delays. The owner may become impatient of the delays and work may begin on the site before the detailed working plans are complete. The result is extended work on the site and further increases in costs.

If, however, in order to avoid subsequent changes in design the main contractor is brought in early in the design process, then it may not be possible for the contract to be put out to competitive tender, since the detailed specifications will not be available to be costed. There does not seem to be any simple remedy to this problem. But whenever the main contractor is brought in, the site work should not begin until the final plans have been drawn up, the sub-contracts placed and the materials ready. Once the plans have been settled, it should be made clear in the contract that the cost of changing them can be heavy. The designs should as far as possible, be drawn up so as to make construction easy and cheap and the use of components of standard type and size should be encouraged. It is important both to the industry and the particular architects and contractors concerned that detailed information should be collected on the timing and cost of various methods of construction, and that this knowledge should be made more freely available to the industry. Architects and other designers will then be in a better position to choose the method of construction which most cheaply, as well as most aesthetically, fulfils the owner's requirements. Having chosen the

broad method of construction, a detailed knowledge of timing and costs will then enable the designers and contractors to programme actual operations more effectively. The main desiderata of the programme being to adjust the size of the labour so that all the labour teams and the machines are fully occupied on repetitive work cycles and to reduce the double-handling of materials to a minimum.[18]

Another method which can be employed to increase productivity and reduce costs in house building is incentive payments to the labourers, particularly on large housing projects where close supervision of all the work may not be possible. There is, however, the problem of ensuring that the quality of the work does not deteriorate.

There are broadly two types of incentive schemes in common use in the developed countries, which may be adopted in Iraq:

a. Plus rates:

These are predetermined payments made in addition to the standard wage rate. They are not specifically tied to output and are often made in order to retain labourers in times of labour scarcity.

b. Output rates:

These are directly related to the production level. There are many types of output rate, from pure piece-work at one end of the scale, to profit-sharing for employees at the other. The two most common output rate systems which are used in the U.K.,

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18. see, L. Needleman, "The Economics of Housing", Stabless Press, London, 1965, p. 116.

are the "target bonus" and "site bonus" schemes. In the first, a target is set for a particular operation and any saving on the target is shared in an agreed proportion with the labourers concerned, in addition to the basic wage rates. In the second, a standard time or cost is set up for the completion of the whole site work and any saving is shared among all the operatives. Site bonuses are much easier to operate but the incentive is less direct than the target bonus schemes. [19]

In house building in Iraq, formal incentive schemes are uncommon, particularly in contracting firms employing less than twenty labourers, this is mainly because in such firms there is a close personal supervision; nevertheless, rewards are usually given by the contractors and owners to the labourers at the end of a major construction operation such as at the end of the construction of the foundations and the roof. These rewards may be regarded as symbolic since the mentioned construction operations represent major construction stages.

10.5.0 Conclusion:

From the foregoing it appears that despite the many problems facing the construction industry in Iraq in general and house building in particular, which affect the rate of output and contribute to cost increases, there are still many areas in which improvements can be made. These improvements may take the following forms:

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19. see, L. Needleman, op. cit., p.117.

Because the building industry and the production of building materials are basic factors in the economic development of the country, state loans and other financial measures should be made available to encourage sound growth of this sector. In certain cases, the use of construction subsidies in housing may be found helpful, but to avoid increasing costs, such subsidies should not be given without adequate controls and should be limited to a specific period of time. The objective is to permit this sector to achieve a larger output at lower costs through a rationalized building technology. Efforts should be taken to promote standardization and modular coordination in building materials and components, to review building codes that are outdated and hamper the serving of social needs, and to improve contracting methods and the programming of housing and related demand.

In order to carry out housing construction at the rate estimated earlier in this study; see, (5.1.0) the government should establish long-term and comprehensive programmes providing scope for a series of interdependent measures to improve the supply of housing materials and equipment. The purpose of these measures should be to ensure an adequate supply of resources, especially key building materials such as bricks and cement, machinery and equipment, and the training of skilled workers, technicians and other specialists. The development of supplies of materials and equipment for housing should be regarded as an integral part of the supply programme for the building industry as a whole. Attention should also be paid to such matters as the number of skilled workers of various kinds required by the building industry as a whole, within the general framework of the economic development, the question of their training and accommodation, and

the establishment of sufficiently large organizations in the building industry.

The government can make credit available for small contractors. At the present, the credit system is geared to benefit the big contractors who can give securities and guarantees, and to exclude the emergent builder who really needs help.

The government can introduce training opportunities more closely reflecting needs. At the present, contractors, because of high labour turnover, are not interested in paying for training for their employees. Particularly important here is the provision of management courses for small and medium scale contractors. Too often in Iraq and particularly in Baghdad, the majority of contractors and manufacturers are uneducated, and some of them have less training than their skilled employees. Their greatest lack is a knowledge of the techniques of office and site management and job planning. A special kind of adult education is needed, and the best incentive to those contractors to attend such courses will be the knowledge that they will be rewarded by the government with contracts.

Finally, in order to reduce the fluctuating trend in the construction industry particularly in housing, with its effects on employment and productivity, the government has a major role to play; first, it can time the loans given to house builders or contractors so as construction can be evenly distributed during the year; secondly

it can regulate the issuing of housing and building permits; and thirdly, it can introduce restrict regulations in regard to the supply of building materials, which are locally produced, this may take the form of price control in the off season period, i.e. winter months; and finally, granting incentives to contractors who prepare to take measures to promote the continuation of work under bad weather conditions.

PART IV

Synthesis : Density ; Costs

C H A P T E R 11

HOUSING DENSITIES : CONCEPT, EFFECTS, AND CONTROL

The importance of examining housing density can hardly be overstressed. At the most general level density has been, for some, the most fundamental variable in explaining human social behaviour of all types. This interpretation is classically set out by J.J. Rousseau in "The Social Contract" [1] where he considers the hypothesis that increasing densities led to the emergence of most of the features of modern society, such as the family and the state.

Rousseau went further by saying that

> "No fixed relation can be stated between the extent of territory and the population that are adequate one to the other, both because of the differences in the quality of land, in its fertility, in the nature of its products, and in the influence of climate, and because of the different tempers of those who inhabit it". 2

From the earliest beginnings of urban planning, particularly in the U.K., there has similarly been a great concern with the social and environmental impact of human densities, though unlike Rousseau, most planners have tended to view the consequences of increasing

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1. see, G. Hawthorn, "Some Social Consequences of Growing Numbers", The Optimum Population for Britain, ed. L.R. Taylor, Academic Press, 1970, p. 59.

2. see, J.J. Rousseau, "The Social Contract and Discourses", Translated with introduction by G.D.H. Cole, J.M. Dent and Sons Ltd., 1963, pp. 39-40.

densities, or at least, of high densities, far less favourably.[3]

Despite the acknowledged significance of density, generally, in the evolution of planning and in specific planning reports, it has been very poorly examined as a topic in both sociological and planning literature. Probably the major reason is that behind an apparent simplicity, it is a concept of great complexity. Studies which fail to recognize this must inevitably be unsatisfactory, but having recognized it, some planners have turned away from attempting to handle the complexity or have even tried to play down the multifaceted nature of the concept.

In its complexity, density is very similar to many other issues with which planning is increasingly concerning itself and if planners are to live up to claims which are made that their specialist skills equip them to handle such issues, then sooner or later, a fresh approach must be made to the concept of density which fully embraces its complexity. If this is done the complexity becomes a powerful asset, since through assessing the significance of density, we are, by implication, taking into consideration a wide range of factors which overlap with it, affect it and are affected by it.

There is a common tendency among planners to search for solutions to housing problems only in terms of the middle grounds in density and indices. Even the tower blocks do not represent the extreme density level found in the old, traditional housing areas of Baghdad. This has probably stemmed from a belief that here lay the area of maximum freedom of operation and that to stray into solutions involving either

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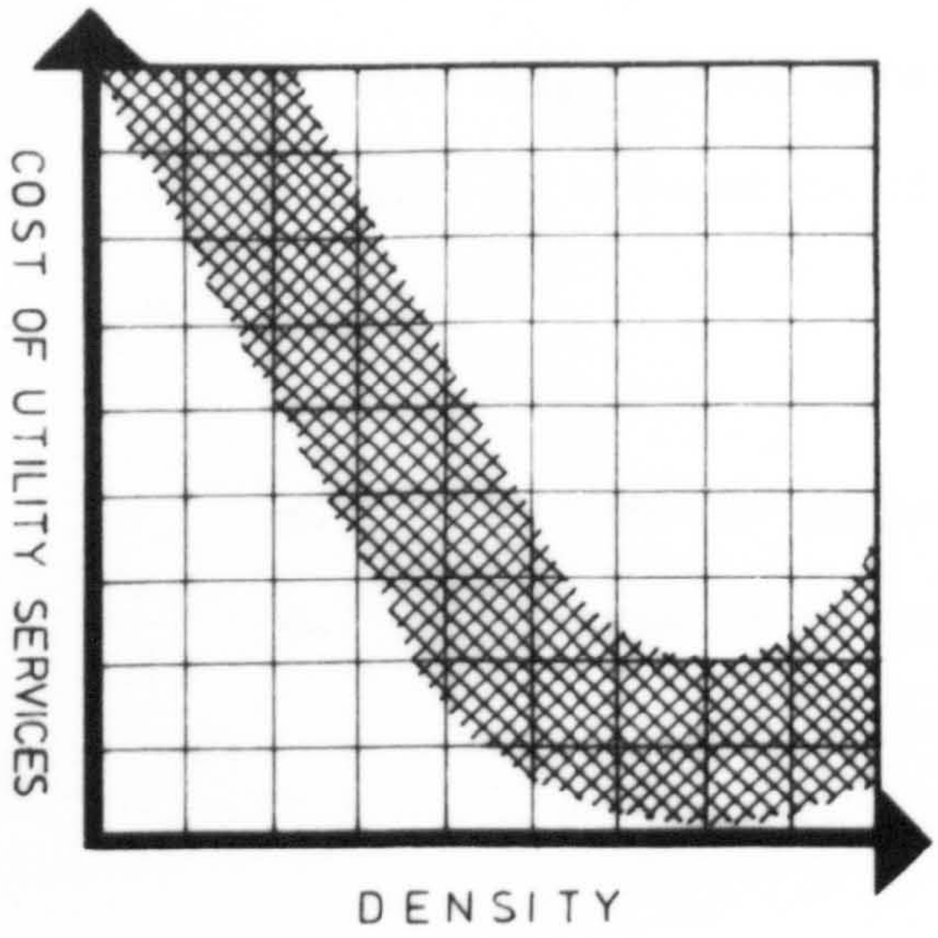
3. see, P. Hall, "Urban and Regional Planning", Penguin Books, 1974.

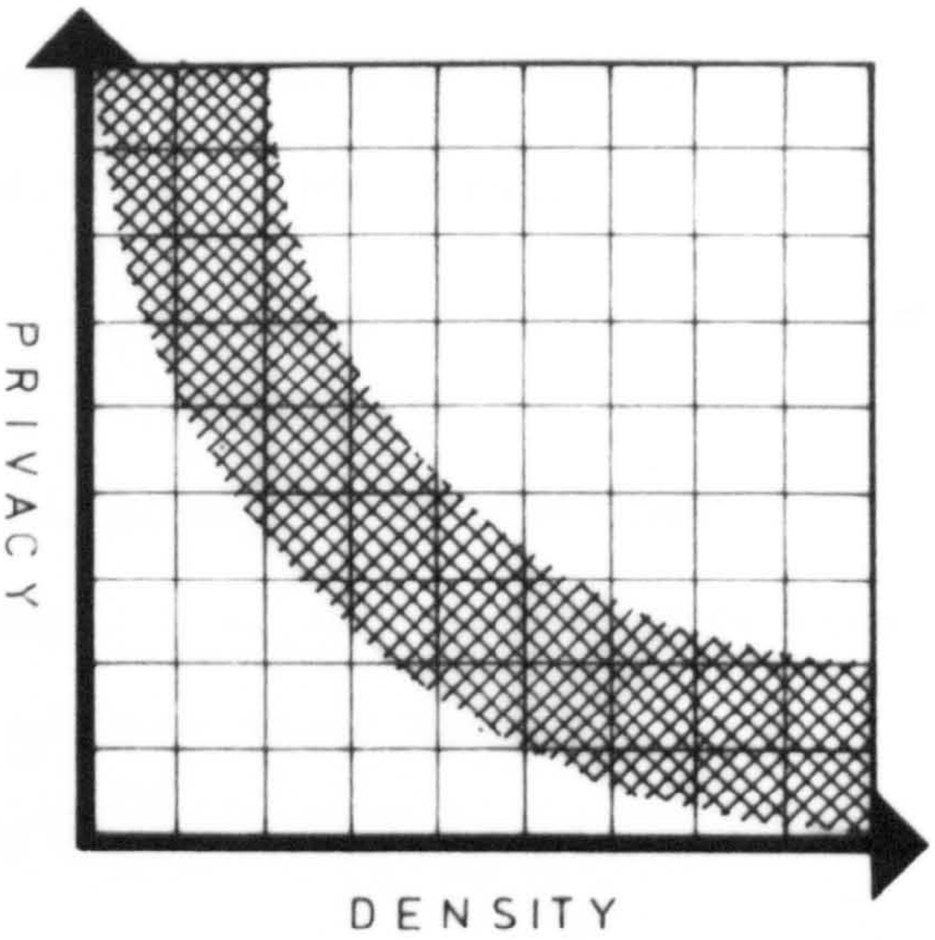
high or low densities would involve the acceptance of severe limitations of action. Of course, the maximum freedom of action also means the maximum means of manipulation and, therefore, of power, another reason why planners would be reluctant to envisage solutions to problems which involved constraints on their range of options.

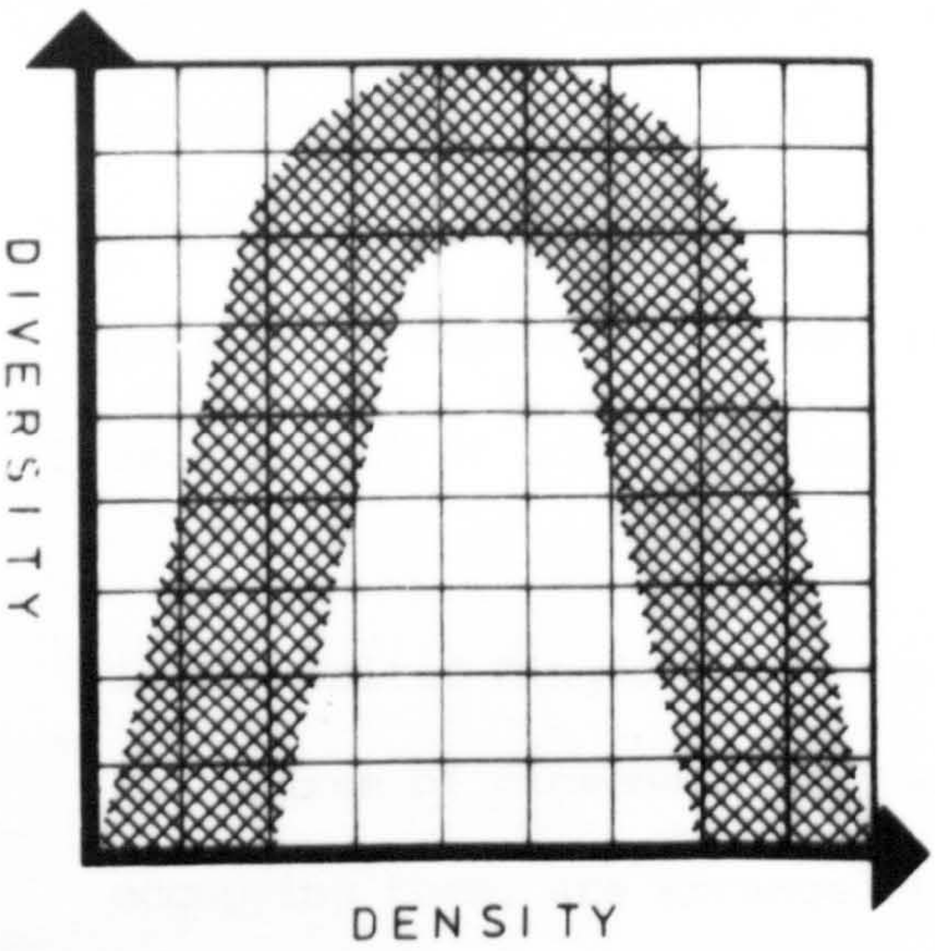
In the following paragraphs an attempt will be made to, first, discuss the concept of housing density and the different indicies used in assessing density standards; second, examine the implications and effects of housing density on specific aspects of housing such as public services, climate, living and open spaces, individuality, location, privacy and land. The main reasons for examining the implications of housing density on such aspects are, first, these aspects have been ignored despite their importance by the different planning consultants who engaged in the preparation of master plans for the main cities in Iraq particularly Baghdad, and second, to demonstrate the multifaceted significance of housing density, since these aspects are affected by housing density decisions in different ways, some of them demand higher densities to be effective, and others demand lower densities; see Fig. (11.1). The study will be extended to examine the aspects of density control, its effectivness in controlling living standards, and shortcomings in acting as a tool to control urban development.

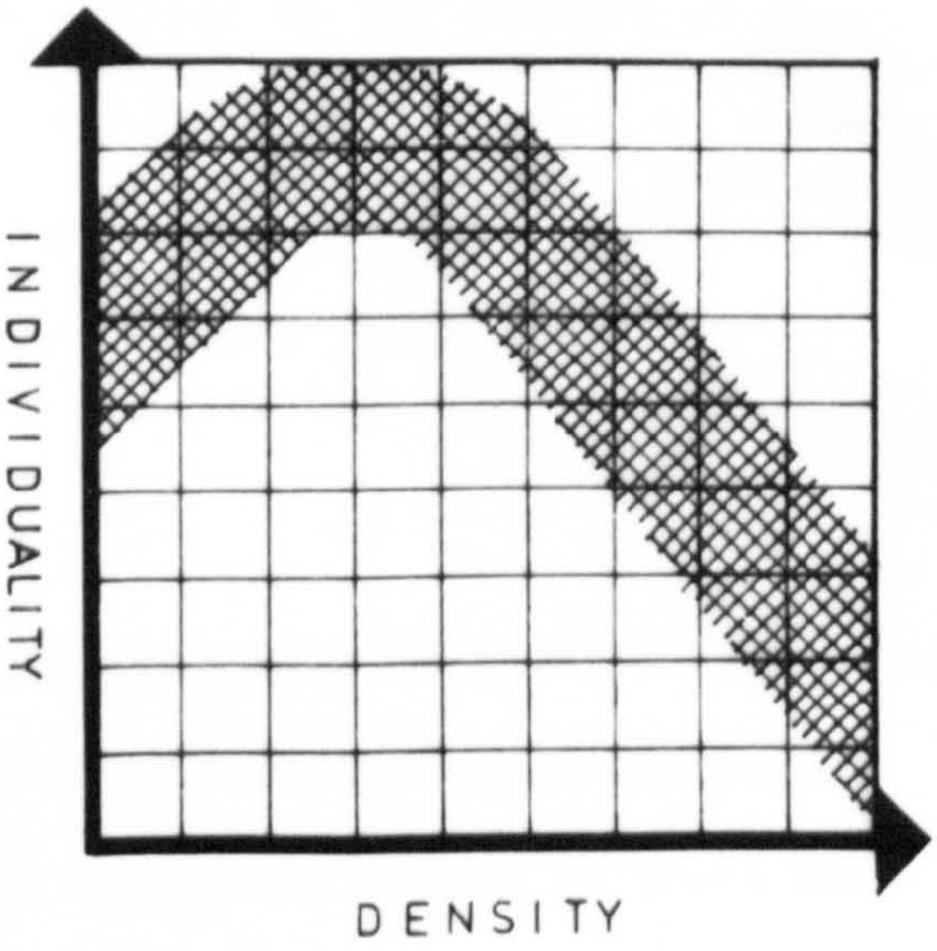
It must be stated here that the objective of studying housing density is not to arrive at a magic level of housing density at which housing should be developed in Iraq or Baghdad so much as to try to understand and draw the attention to the importance of housing density in the planning process, as well as its importance in shaping the living environment.

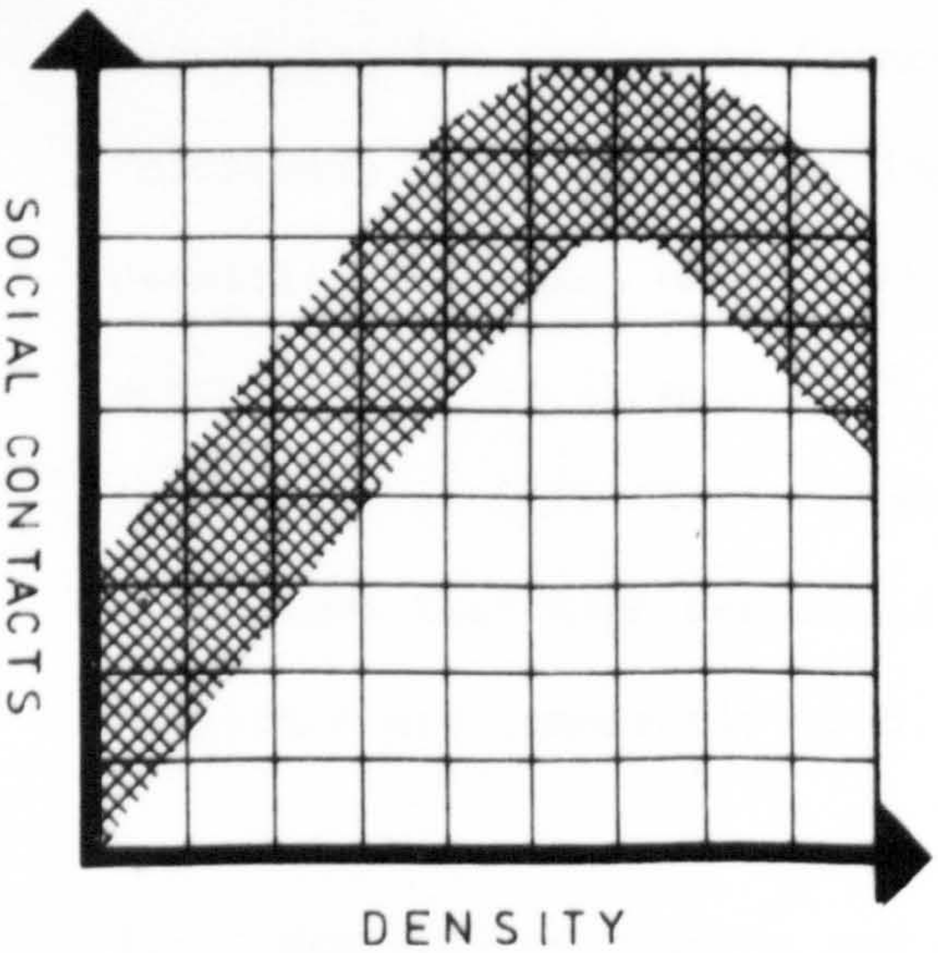
FIG.(11.1) THEORETICAL RELATIONSHIPS BETWEEN HOUSING DENSITY AND SOME HOUSING VARIABLES

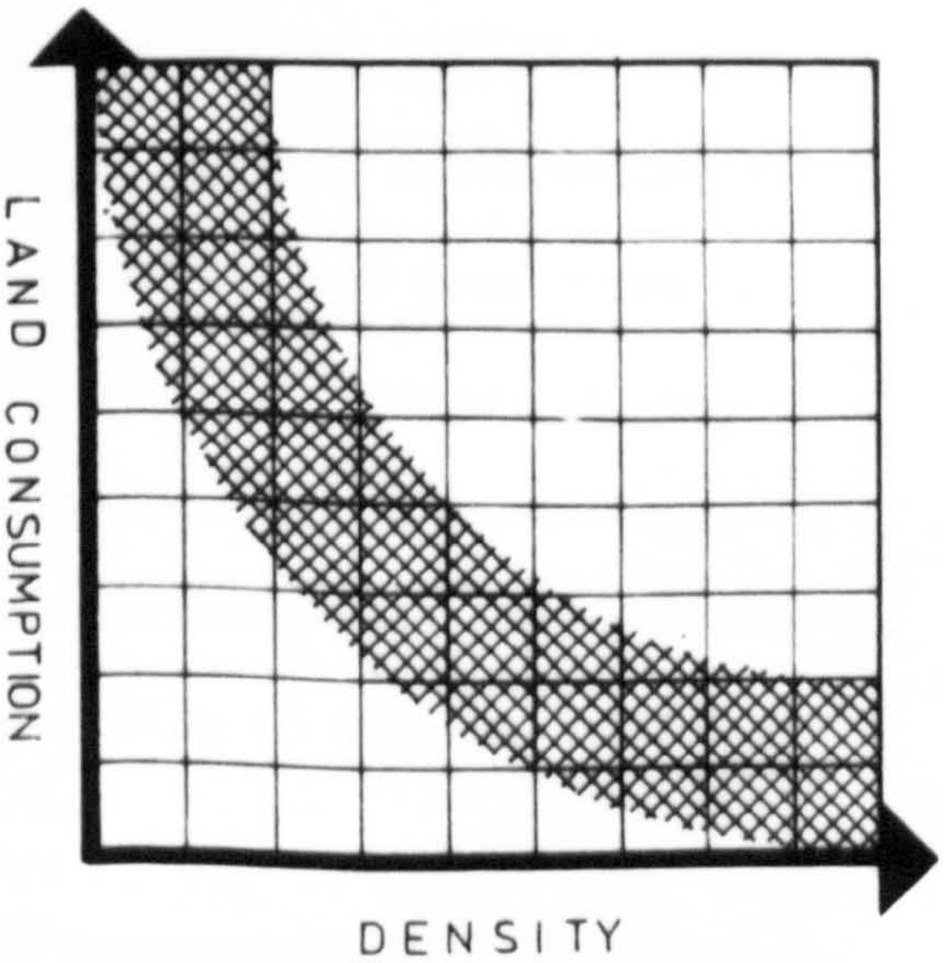












11.1.0 The Concept of Housing Density:

Broadly speaking, housing density may be defined as a measure of the intensity of occupation of land. It can be usefully expressed in two ways:

a. In terms of people, i.e. so many people per hectare.

b. In terms of accommodation, i.e. so many houses or rooms per hectare, or as a ratio of floor space to the area of land in the housing area.

The relationship between the two is defined by the measure of the intensity of occupation of the accommodation by people, i.e. so many people per house or room, so many square meters of floor space per person, or whatever unit may be selected as a basis for the measurement of accommodation.

In the United Kingdom, housing density has been defined as signifying the degree of closeness with which dwellings, and hence the people occupying them, are arranged in the residential areas of towns and villages. [4] It would be more apt, however, to describe it as signifying the degree of "concentration" rather than the degree of "closeness", for the latter implies progressive overcrowding as densities increase, whereas the opposite can and does occur in actual fact. It is essential at the outset to recognize the importance of this distinction, for there is a mistaken tendency to believe that high densities are inherently evil and that low densities are inherently good. According to Mrs. M. Smith:

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4. Ministry of Housing and Local Government, "The Density of Residential Areas", 1952, H.M.S.O.

"From the point of view of the tenant, density is not important. One may go as far as to say it is meaningless. True, he knows if he lives in a house or flat, if he feels his environment is cramped and overcrowded, if he is living in suburban sprawl or the centre of a city, but what he likes and dislikes about living in any of these conditions has little to do with density; it has to do with architectural design and layout, with social amenities, housing management, transport and proximity to work, the size and structure of his family, the rent and such intangible factors as whether he likes his neighbours and how much or how little he misses relatives and friends from his former environment". 5

In other words, housing densities, whether high or low, cannot be considered in isolation but must be related to planning, social and design considerations.

In any particular locality, there are almost certainly exist conditions of environment and circumstance that do not occur elsewhere and that make it impossible to generalize and to associate social evil or advantage with the degree of density without entering some qualification. Bad living conditions may derive from lack of light, air and sunshine; from overcrowding in terms of physical closeness; or from lack of space for cooking and personal hygiene. But they do not necessarily follow from people living at high density in terms of people or houses per unit area. Unhealthy conditions of overcrowding and environment may exist at comparatively low densities because of the particular nature of the development, the quality, size, and ground coverage of the building and the manner in which it is occupied; whereas in another area, where higher densities are reached, living conditions may be comparatively satisfactory. Therefore, it is most dangerous to think that if to establish a density of, say 150 people to the hectare, we can be sure of

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5. see, Mrs. Muriel Smith, T.P.I. Journal, January, 1961.

healthfuly conditions. Because for example in Baghdad people living at a 500 to the hectare in semi slum conditions, on the other hand at a density of 2500 people to the hectare in a modern liner, people live in the most excellent conditions, the same is true for the big, modern hotel. So density, is just one element, it cannot by itself bring good standards of health. [6]

While density indicies do give a measure of the intensity at which people live on land, they cannot provide by themselves any comparative basis for the assessment of living standards. They establish, however, a distinct relationship between people and the amount of land they need to attain certain standards of living in the context of a particular and unique set of local circumstances.

Perhaps the main purposes for the use of density indicies in planning is first to provide measures of the rate of land use that can be used to estimate total land needs for all purposes of the society, or conversely, to control the intensity of occupation of housing areas in order to avoid the over-burdening of existing community facilities and services. Secondly, it also provides a measure for the broader need to reconcile the rate of land use for housing and other urban residential purposes with the total demands on land use affecting the general economy and well-being of the city or the country as a whole. e.g., some compromises may require to be made between the needs of urban dwellers and the demands of agriculture, defence and other important users of land.

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6. see, Doxiadis, C.A. United Nations Seminar on Housing and Community Improvement, New Delhi, "Report of Discussion on Standards of Housing Accommodation", 1954, United Nations Housing, Building and Planning Bulletin, No. 9, p. 64.

The costs of dwellings, and of the roads and services that support them, depend to a large extent on the density of development. While the concept of density is not difficult to understand, there are so many measures of density and so many variations in their meaning that considerable confusion exists in all discussions of residential densities.

Briefly, density is usually specified as net, gross or town density. Net residential density relates to the net housing area and includes the land occupied by the housing sites, by the estate roads and by any incidental open space in the housing area. The gross residential density relates to the land in the net housing area, together with the land used for local shopping, primary schools, other local institutes and local open space. In Baghdad, the average gross residential density was estimated by Polservice in 1971, at about 163 inhabitants per hectare; see, Fig. (11.2). Town density relates to all the land within the urban boundaries of the town.

Net residential density is normally expressed in one of four ways; dwellings, habitable room, bedspaces, or persons per hectare. Each method has its own advantages and disadvantages. Dwellings per hectare is a useful measure for assessing the requirement for roads and services, but it takes no account of capacity, i.e. number of people in the area. Habitable rooms per hectare[7] cannot easily be related to roads and services, but this measure gives a better

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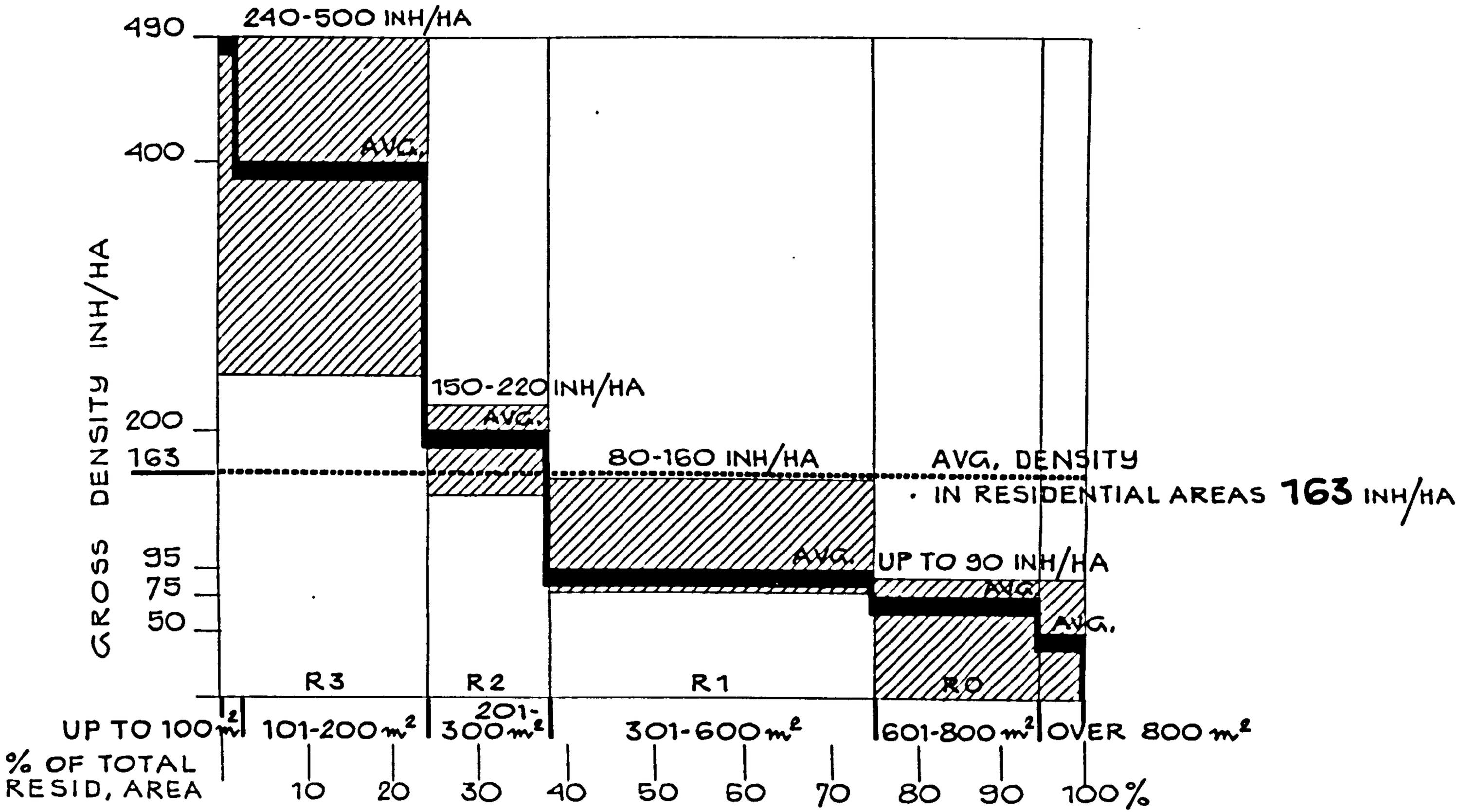
7. It is unusual to count kitchens in the number of habitable rooms when considering new housing, but a kitchen is counted for census purposes if main meals are taken there. Bathrooms, W.Cs. halls and landings are not usually counted as habitable rooms.

FIG.(11.2) RESIDENTIAL DENSITIES



measure of capacity than dwellings per hectare. Bed spaces per hectare provides the best measure of capacity. Persons per hectare reffects not only capacity, but also the way the dwellings are occupied, and is useful for measuring the need for other services, for example schools and shopping.

Recently, an attempt was made to correlate plots sizes with the gross residential densities in Baghdad; this attempt was made by Polservice, as part of the Master Plan for the city. Accordingly the subdivided areas were classified into five main categories, as follows:[8]

Table (11.1)

The Correlation Between Plots Sizes and the Gross Residential Densities in Baghdad:

Plot Sizes, sq.m.	Gross Residential Density inh/ha.
over 600	up to 90
301 - 600	80 - 160
201 - 300	150 - 220
up to 200	240 - 500
Old, Traditional Areas	300 - 700

Notes:

For the spatial distribution of these densities on the city level, see, Fig. (11.3).

Source: Polservice, "Comprehensive Civic Survey for Baghdad", 1972

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8. see, Polservice, "Civic Survey for Baghdad", Baghdad, 1972.

FIG. (11.3)

RESIDENTIAL CATEGORIES BAGHDAD

Source : POLSERVICE

Ro PLOTS OVER 600 M²
/GROSS DENSITY UP TO 90 INH/HA/

R1 PLOTS 301-600 M²
/GROSS DENSITY 80-160 INH/HA/

R2 PLOTS 201-300 M²
/GROSS DENSITY 150-220 INH/HA/

R3 PLOTS UP TO 200 M²
/GROSS DENSITY 240-500 INH/HA/

Rh OLD QUARTERS
/GROSS DENSITY 300-700 INH/HA/

In the actual situation, there are cases where the gross density in residential areas exceeds the limits set in the mentioned categories; according to Polservice, these areas are dispersed and do not form separate neighbourhood units, therefore, there is no point for determining separate categories for them. For example, areas of subdivisions of plots up to 100 sq.m. where the gross densities exceed 700 inh./ha. covers only 1.1 per cent of the total subdivided plots; see, Fig. (11.3).

The main purpose for this classification of densities by Polservice was to assess how much land is required for housing purposes, and how many people are likely to occupy that land, and what will be their social and economic structure. But this classification of residential densities felt short because it did not relate to the type of accommodation people are living in such densities, also it gives no relationships between densities and the state of community facilities and services, since those are prime contributers to the standard of living under any densities. This inaccuracy in the classification of densities may result, if care is not taken, either in the over burdening of the existing services, which may require an expensive remidial measure at later dates to restore proper balance, or in failure to exploit the maximum potential from these services.

The question, therefore, arises as to what is the most efficient index to be used in order to assess housing densities. For that matter, the house is not recommended because it fails to convey an accurate idea of the amount of accommodation in an area, unless additional information with regard to the separate sizes of dwellings is also given. The habitable room and bedspace

which are widely used in the U.K. and regarded as units which are most useful for town planning purposes and they are also widely used as means of describing the size of a dwelling, particularly by planning authorities for the measurement of accommodation densities in surveys and development plans maps prepared under the different Town and Country Planning Acts. But these measures are not suitable, however, for the general use in Iraq. This is because the relationship between room sizes and function, family structure, and social and economic standards in Iraq cannot be so clearly recognized and defined as in the U.K. For that matter, floor space, can give precise measure of the amount of living accommodation.

Floor space for this purpose should be the total floor area on all floors of the house, including outside buildings. It should be measured inside the external or party walls and include the thickness of internal partitions, all rooms, covering balconies and verandas, service and circulating space, excluding all external and common stairs, lift shafts, landings, corridors etc. This definition conforms as closely as possible to those in current use elsewhere, e.g. "net dwelling area" in the United Kingdom. [9] and "gross area" in the housing studies of the United Nations Economic Commission for Europe. [10] The only difference is that those definitions do not include covered balconies, roofs and verandas, which cannot be ignored, however, as a factor in accommodation standards in Iraq and Baghdad.

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9. Ministry of Housing and Local Government, "The Density of Residential Areas", London, H.M.S.O. 1952.

10. United Nations, Economic Commission for Europe, Housing Sub-Committee, "A Comparative Study of the Utilisation of Space in Current Types of Dwellings in 14 European Countries: 1948 - 1949", Geneva, United Nations, 1951

If the floor space index is going to be adopted in Iraq as a measurement of accommodation, it also represents a problem, in that it fails to give a complete picture of the actual living conditions. This is because in Iraq, outdoor living is both practicable and desirable due to climatic necessaties. The garden or compound, even the roof, provides more than mere recreational and occasional use for clothes drying and storage, it is a valuable extension of indoor living space with a vital role to play in determining living conditions. The building itself provides the essential shelter from rain, relief from the heat of the sun, and privacy when it is needed, but it remains only one part of the total potential living area. Its occupants sleep, cook and even take baths out of doors during the summer and warmer climates.

It is clear, therefore, that in order to give a true expression of living conditions in Baghdad, in so far as space standards are concerned, it is necessary to relate floor space to total living space. The latter can be defined as the total space available on all floors indoors and outdoors within the curtilage of a housing plot or group of housing plots.

Floor space rate, which is the area of floor space per person may also be used to define the relationship between people and the amount of floor space they occupy, and the parallel relationship between people and total living space can be defined by the total living space rate, i.e. area of total living space per person.

Although this concept of total living space provides an index of living conditions in terms of the total amount of space available,

it does not give a readily comparable measure of living conditions in terms of useful space without additional information on the distribution of total living space between different floor levels.

As soon as outdoor space is separated from indoor space, as in the case of dwellings on the upper floors of high buildings, it no longer serves the same useful living function, except perhaps for recreation, storage, etc. As dwellings become more remote from outdoor living space, there is a greater need for more floor space if living conditions are not to deteriorate. So far, floor space has been suggested as the most convenient unit of measurement of housing accommodation. The use of the floor space rate as the means of measuring the relationship between the number of people in a housing area and the total amount of floor space in the area, and of the total living space rate as the means of measuring the relationship between the number of people in a housing area and the total amount of living space in the area has been described.

The importance of the relationship between floor space rate and total living space in completing the total picture of space standards within the housing area hasalso been stressed. Given these factors, it is possible to state how much accommodation a given number of people will require in terms of floor space and total living space. The danger of adopting arbitrary standards has also been emphasized, and planners should study the existing floor space rates within the local area before deciding new standards for that area.

Finally, in order to relate the amount of accommodation to total land requirements within the housing area it is necessary to consider first, the various ways in which accommodation can be arranged within the house and house plot and, second, the way the houses and house plots themselves are arranged in relation to each other and to other housing area land uses such as access and open space.

11.2.0 . The Effects of Housing Densities:

So far an attempt was made to analyse the basic concepts of housing densities and the different measures used in determining these densities. In this paragraph, an attempt will be made to examine the effects of housing densities on the basic issues involved in housing, and the environment, as well as its effects on the socio-economic structure of the community.

11.2.1 Public Utilities:

Apart from physical limitations on the amount of available land, technical limitations in building techniques and designed skills, and social attitudes towards living, and other environmental questions, perhaps the state and type of public utilities and the way it was intended to serve the community, has a profound importance on the range of densities that will satisfy the basic criteria of evaluating the standard of living of the community, through its effects on health, physical appearance of the housing area, and indeed its total cost.

An important element is the cost of providing the utilities required to sustain adequate standards of health, safety, economy and convenience for the community as a whole. This includes the provision of water, sewage disposal systems, drainage, lighting, power, roads and footpaths, public transport, etc. Generally, as densities decrease, the cost of providing such utilities rises; see, Fig. (11.1). This is because it becomes necessary to provide greater lengths of roads and footpaths, a more widespread reticulation system for sewage disposal and water, gas and electricity distribution, and more public lighting; a public refuse collection vehicles and public transport vehicles have to undertake longer journeys to fulfil their functions. Not only must the cost of providing new utilities be considered, but also the need to exploit the economic potentialities of existing utilities to the full by more intensive development of existing areas.

These factors are of particular importance in considering the economics of development in areas intended for lower income groups. However, they become of less direct importance in dealing with density problems in areas intended for higher income groups, who may be prepared to pay the cost of low density living.

Broadly, therefore, it can be safely argued that as densities decrease, the cost of providing public utilities increases, this is mainly because of the sheer physical factor that in low densities the area to be served will be larger, thus the cost of such services per dwelling will be higher; see, (12.5.0. The same also can be said in the other direction, whereby as densities increase, the cost of providing these utilities decreases. The main fault of this

argument is that it considers the cost of public utilities only from the point of capital investment in their network without any regard to the extra cost that might occur as a result of their effect on health and environment through the way they are provided. This point in the cost relationship between the provision of public utilities and housing densities leads to the conclusion that the rate of increases and decreases in the cost of the provision of such utilities is not always proportionate to the increases and decreases in the housing area densities, see, (12.5.0).

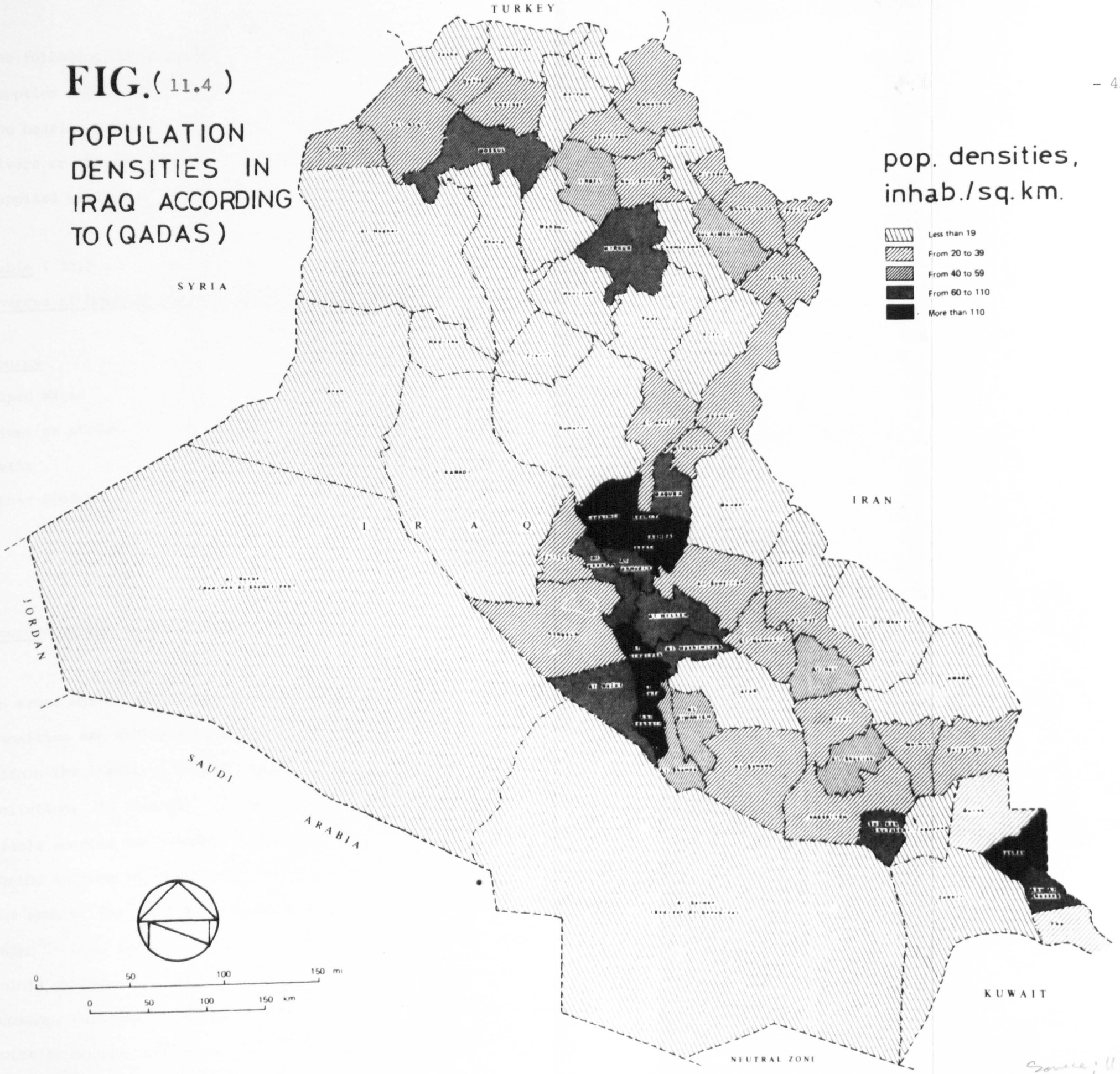
The following are analyses of the effects of such public utilities as water supply, sanitation and waste disposal on housing densities in Baghdad;

11.2.1.A Water Supply:

The need to provide a pure, plentiful, cheap and convenient supply of water is one of the most important factors influencing housing densities. Since the early periods of Iraqi society, water supply played a dominant part in influencing the density at which people lived. The pattern varies with differing physical conditions. Arab nomadic tribes, wandering the desert, settle temporarily in close communities centred on the spring or well of the oasis. More stable village communities in the fertile valleys of Mesopotamia cluster at the rivers' edge of Tigris and Euphrates or near a deep village well or spring, their dwellings sited within convenient carrying distance from the source; see, Fig. (11 .4).

FIG.(11.4)

POPULATION DENSITIES IN IRAQ ACCORDING TO(QADAS)



Source: UN.

The following table illustrates the distribution of domestic water supplies sources in Iraq and Baghdad; it reveals that almost half the housing stock in Iraq rely on water supply directly from the rivers or streams, while in Baghdad the majority of the houses are supplied with piped water.

Table (11.2)

Sources of Domestic Water Supplies in Iraq and Baghdad: percentage:

Source	Iraq	Baghdad
Piped Water	20.9	54.8
River or stream	50.2	13.1
Wells	8.1	0.4
Other Sources	20.8	32.0
Total	100.0	100.0

Source: Iraqi Housing Census, 1956, Tables 7 & 19.

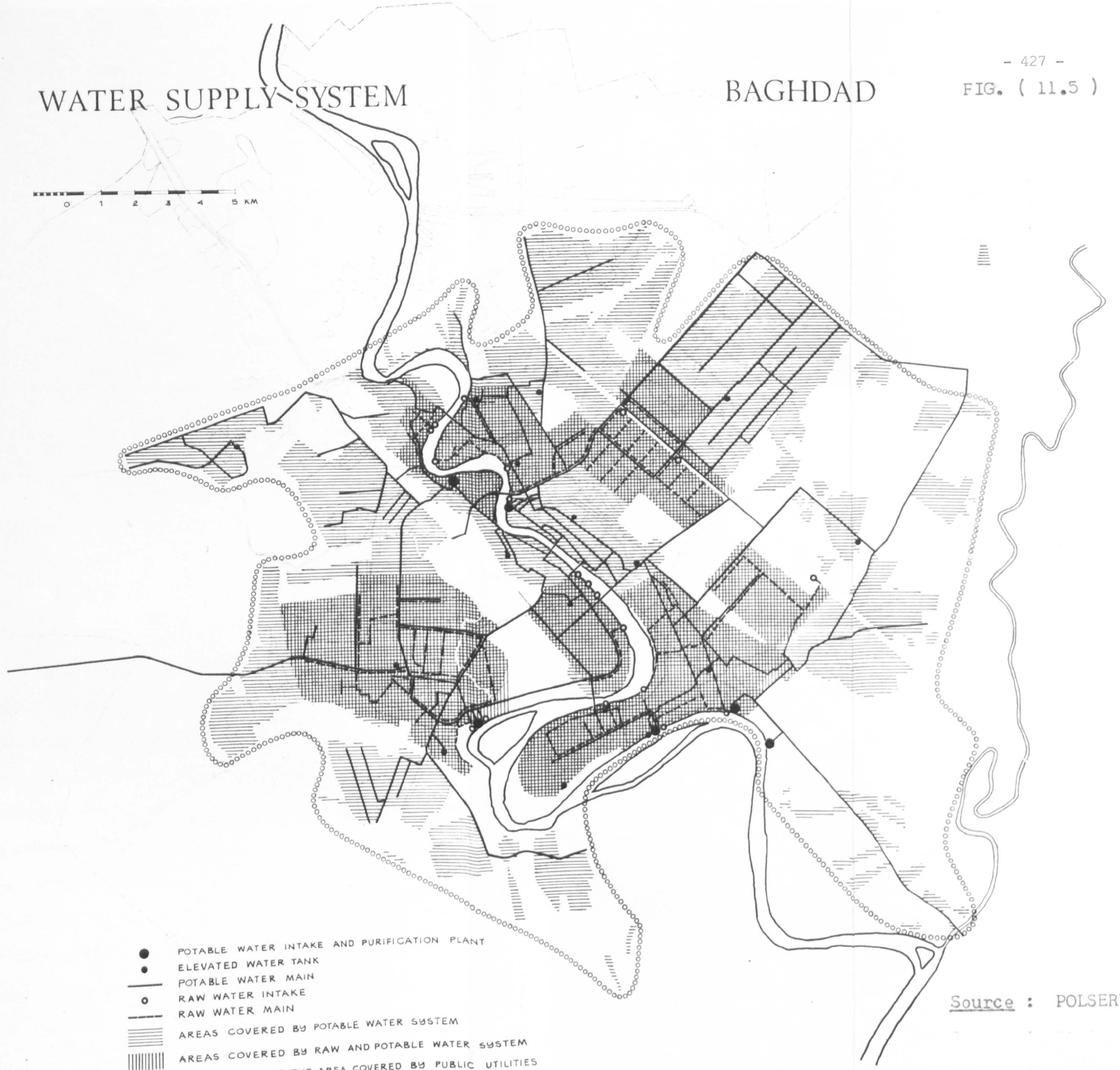
In areas where the people depend on individual water sources, housing densities are highly influenced by the need to keep water consumption within the limits of natural supply and to protect the supply against pollution. In contrast, if the people depend for their water on a single source, the problem of its distribution may become the main factor influencing the density at which the people live. But once the area of the settlement extends beyond convenient carrying distance, water in this situation has to be piped to either public water points or individual houses. In general, the more scattered the housing, the more costly this utility will be. Another important point to be considered in this context is that the more convenient

the supply of water, the higher consumption is likely to be, this is even if this supply is checked by relating it directly to cost through metering. Water consumption also involves the problem of waste water disposal, therefore, the decision of adopting high housing densities in order to reduce the cost of water reticulation, may result in overloading the absorptive capacity of the ground, thus creating highly insanitary conditions. In the case of the old traditional areas of Baghdad, where densities may reach up to 700 inh./ha., this situation is further aggrevated by the high water table in the area. Therefore, in such conditions the installation of a waste water drainage system is of utmost importance, and its cost may exceed the economies in water reticulation gained from the high density of the area.

In Baghdad, the problem of water supply involves more complex technical and economic factors. Two particular aspects, the source of water and its distribution, affected the decision to build the original city near the Tigris river, as well as the density and direction of later developments. For instance, before the development of the piped water supply system in the city in 1930, the built up areas of Baghdad were concentrated along the Tigris banks in high densities; see, Figs. (11.5 , 1.4.D), and not until the development of water intakes and purification plants, and the extension of the water supply network to cover areas far away from the river banks, such as "Al-Mansur" and "Karada" districts, that development of residential use were possible in these areas; see, Fig. (11.5). Fig. (1.4.D), which illustrates the historical evolution and development of the city of Baghdad; see, Appendix (1.4), demonstrates very clearly this trend, and showed that the majority of the development occurred after 1930 was away from the river banks.

WATER SUPPLY SYSTEM BAGHDAD

FIG. (11.5)



Source : POLSERVICE

Water consumption in Baghdad varies in the different parts of the city, depending on the number and kind of sanitary installations in the house, customs of use, standard of living, and indeed the density of development. For instance, according to the Water Board, the consumption of water per head per day in the low income, high density areas of Baghdad tend to be higher than that in the high income, low density areas. This phenomenon may be attributed to the fact that in the former, because of the type of sanitary installations in the houses, the way the people cook their food and wash, and the absence of modern household appliances, such as washing machines, the amount of water needed to execute such activities is much higher than in the latter, where the houses are equipped with almost all the modern devices that ultimately consume less water. Another factor to be considered in this context is that of occupation, for instance, in the low income high density areas, because the majority of the people who live there are manual workers, such as construction, industrial, workers, they wash more frequently, than the people in the high income, low density areas, where the majority of the people are engaged in white collar jobs, which requires less physical involvement,thus less need for frequent washing and consequently less water consumption. As for the irrigation water supply system, which is mainly used for irrigating open green areas and private house gardens, its consumption also related to the housing densities; for instance, in the low density areas, where most of the houses have large private gardens, the consumption of such water is much higher than in the high density areas, where the houses have small gardens. It must be stated here that in this

situation, housing densities are the effecting factor on the distribution of such water, rather than the opposite as it is the case in the potable water supply system. This is because the irrigation water system was designed initially to serve low density housing districts with large private gardens; see, Figs. (11.5 , 11.3).

11.2.1.B Sanitation and Waste Disposal: see, Fig. (11.6).

The method of sanitation used has a significant effect on housing densities. For instance, in the case of individual sewage digestion systems such as water privies, septic tanks and bored-hole latrines, which are still commonly used in the high densities and relatively old areas of Baghdad, they all discharge an inoffensive but bacterially charged effluent to percolate the adjacent sub soil. Thus they require sufficient space to reduce the risk of polluting water sources of overloading the absorptive capacity of the ground, and also to avoid their becoming a nuisance particularly if they are not well kept.

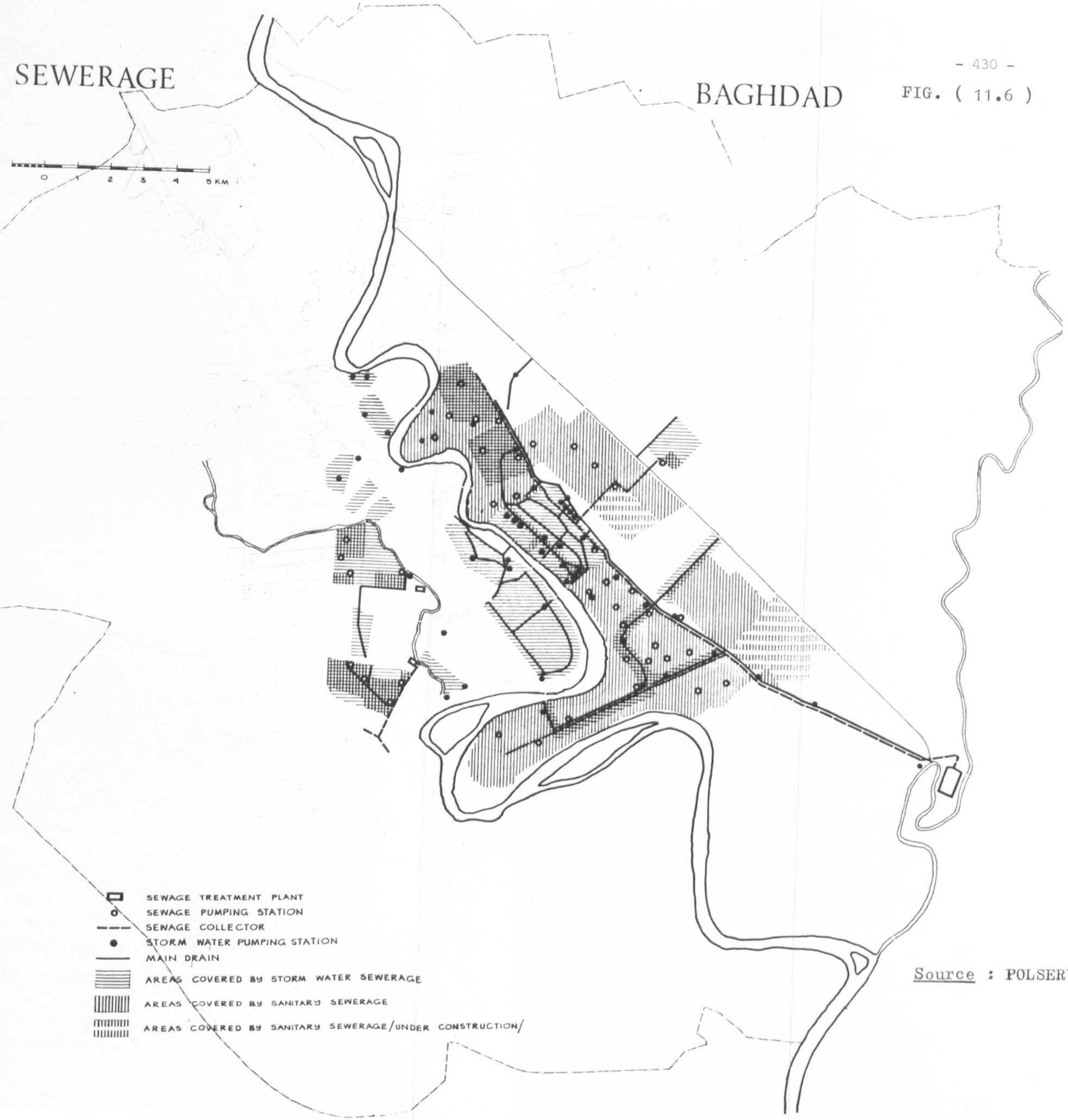
On the other hand, if community disposal methods are employed, low densities are no longer an advantage, and problems of convenience and economy then assume relative importance.

Central sewerage system, although may involve high initial costs, is preferable in every other respect. This system is particularly advantageous in high density housing development, especially if associated with economical layouts, thus lower initial and operating costs can be achieved.

SEWERAGE

BAGHDAD

FIG. (11.6)



Source : POLSERVICE

Perhaps one of the most important factors that effect housing densities in the field of public utilities is the system of refuse disposal. For instance, at a very low densities, such as those of semi urban character, it may be possible to dispose safely, without much health hazard, most of the domestic refuse on the plot. But when densities rise, public collection becomes necessary, and can operate at low cost, except at a very high density development, such as multi-family housing developments, where the problems of disposal need daily collection, thus increasing operating costs.

In conclusion, it appeared that public utilities has a profound impact on housing densities; although it is extremely difficult to distinguish which of them has a determining effect on the other; one fact appeared to be certain, that in low densities, the provision of public utilities is much more costly than in higher densities, up to a level, when very high densities, due to physical constrants and the amount of people to be served, requires more complicated system of public utilities, thus raising the cost of provision and operation; see, (12.5.0). Therefore, it is of great importance, that in determining housing densities, particularly as part of a master plan for a city, the cost of providing and operating public utilities must be considered and evaluated against criteria such as health, the quality of the environment, and time savings.

11.2.2 Climate:

The effect of climatic factors on health and physical comfort vary considerably with differences in geographical location and living customs. In a hot dry climate of Baghdad for instance, one must recognize the importance of the need for protection from the hot,

dust-laden winds, and for more compactness in development in order that buildings can provide not only mutual protection from the heat of the sun and from glare and burning winds, but also shaded communications between buildings. This requirement will have the most marked influence on density. It may be simpler to achieve desirable standards of sunshine, light and air circulation by the use of proper design methods at even the highest densities than it is to protect buildings from heat, glare and desert winds at low densities.

Climate factors affect the capacity for mental and physical work. It also affects the capacity for enjoyment, rest and sleep. An unsuitable climate can produce feelings of lassidute and depression, affecting not only individuals but the whole community. Climatic fatigue has been suggested as one of the main causes for the slow progress of technological and economic development among some of the countries of the tropics and extreme north. This does not mean that human beings can live happy and active lives only in an ideal and unchangeable climate. On the contrary, changes appear to have a stimulating effect. Healthy adults can stand considerable climatic stress, provided it lasts only for a short time. Work under conditions of extreme heat or extreme cold is easier when the worker has the prospect of returning to the haven of a house with a good indoor climate where rest and recovery are possible.

Housing design in a hot and dry climate of Baghdad presents problems where sun is a far more serious factor to deal with. A hot bright sun overheats practically everything, the roof, walls, exposed

terraces and surrounding grounds. These surfaces either reflect light, and therefore heat, into the building or they transmit heat directly through the roof and walls into the interior. So the problem reduces itself to ways and means by which the house could be protected from the impact of solar heat.

Arab design in general has always been primarily inward-turning, characterized by almost windowless walls directly on the street and rooms opening on to an inner court. As social conditions grow less conservative and more secure, this fortress-like exterior aspect is giving way to a less severe separation between public and private life. In domestic architecture of the past, the courtyard assumed great importance, being used as a private garden-room for family life, a place for the housewife to wash and cook, a natural air conditioner which trapped the winter sun and warmed the surrounding walls, and in summer through the use of trees and vines kept up a circulation of cooling moist air.

The range of courtyard designs in Baghdad particularly is very wide, from deep cool wells of light penetrating through several storeys to courts perhaps partially roofed opening toward a river view on one side, or interlocking courts of varied sizes and shapes. The widespread use of the court, in a way seems to reflect a desire to enclose not simply the interior spaces necessary for living, but to frame a part of the sky, to pave a few meters of the desert, and to invest these fragments of nature with man's mark as a symbol of shelter. Whatever its emotional origins may be, the courtyard,

with its infinite possibilities for variation, still provides a satisfactory answer to modern design situations, particularly in housing.

The Baghdad climate which is characterised by a long hot dry season and a shorter cool season; see, Fig. (11.7), requires in general that houses should be developed at higher densities than that in temperate climates and be constructed with thick walls to protect the interiors from the extreme heat outside. Other requirements including shading from the sun and protection against dust storms. In the cool season, thermal storage in thick brick walls and the penetration of the sun through the south facing windows can be used to improve indoor conditions. Closely packed courtyard housing and narrow shaded streets are assets throughout the year. In the traditional houses, wind scoops are used to direct air through thick-walled ducts and over an earthware water jug into ground floor and basement rooms; see, Fig. (11.8). The air which is thus introduced is cooled by evaporation and humidified. Traditional houses in Baghdad have different rooms for different seasons. In the hot season the roof is used as a sleeping space at night and the shaded courtyard and thick walled rooms on the ground floor are used during the day. In the cooler season the first floor, where the sun can penetrate, becomes the main living space.

One of the solutions to the problem of direct sun in summer is the use of sun-breakers or louvres. Although these elements are used substantially in contemporary house building in Baghdad, the

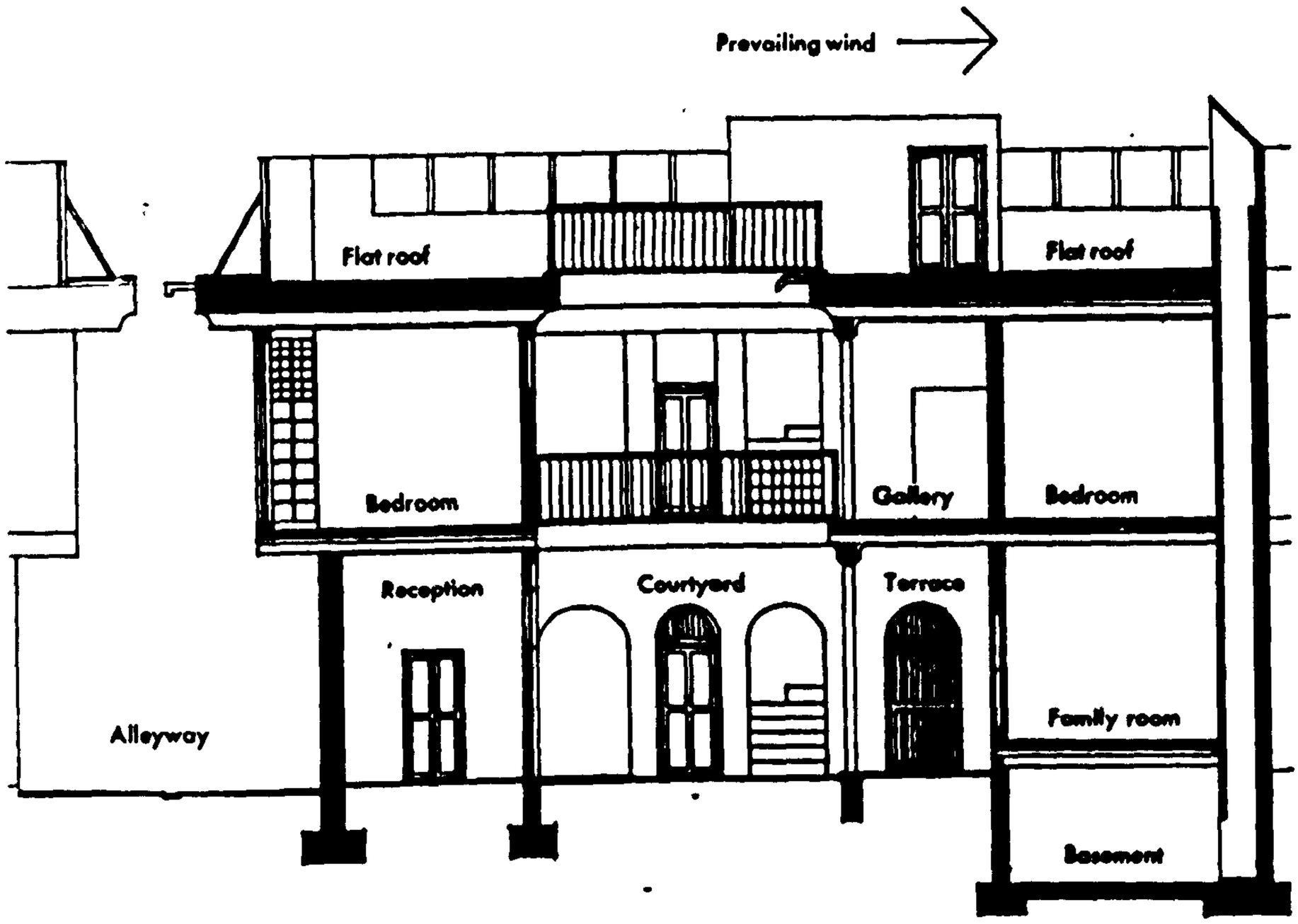
FIG. (11.7) CLIMATIC DATA , BAGHDAD

Temperature (^{o} C)	*J*	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*
Monthly mean max.	16	18.5	22	29	36	41	43.5	43.5	40	34	24.5	17.5
Monthly mean min.	4	5.5	9	14.5	20	23.5	25	24.5	21	16	10.5	5
Monthly mean range	12	13	13	14	16	17.5	18.5	18	19	18	14	12.5
Temperature (^{o} C)												
Monthly mean max.	16	18.5	22	29	36	41	43.5	43.5	40	43	24.5	17.5
Day comfort: Max.	29	29	29	31	31	34	34	34	34	31	29	29
Min.	23	23	23	25	25	26	26	26	26	25	23	23
Monthly mean min.	4	5.5	9	14.5	20	23.5	25	24.5	21	16	10.5	5
Night comfort: Max.	23	23	23	24	24	24	25	25	25	24	23	23
Min.	17	17	17	17	17	17	17	17	17	17	17	17
Humidity (percentage): Monthly mean max.	87	78	74	68	46	34	32	32	38	50	67	89
Monthly mean min.	50	41	35	27	18	13	12	13	15	21	39	51
Average	68.5	59.5	54.5	47.5	32	23.5	22	23.5	26.5	35.5	53	70
Humidity group	3	3	3	2	2	1	1	1	1	2	3	3
Rainfall (mm)	24	25	28	15	7	0	0	0	0	3	22	26
Wind: Prevailing	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
Secondary	SE	SE	N	N	N	N	N&W	N	N	N	N	SE

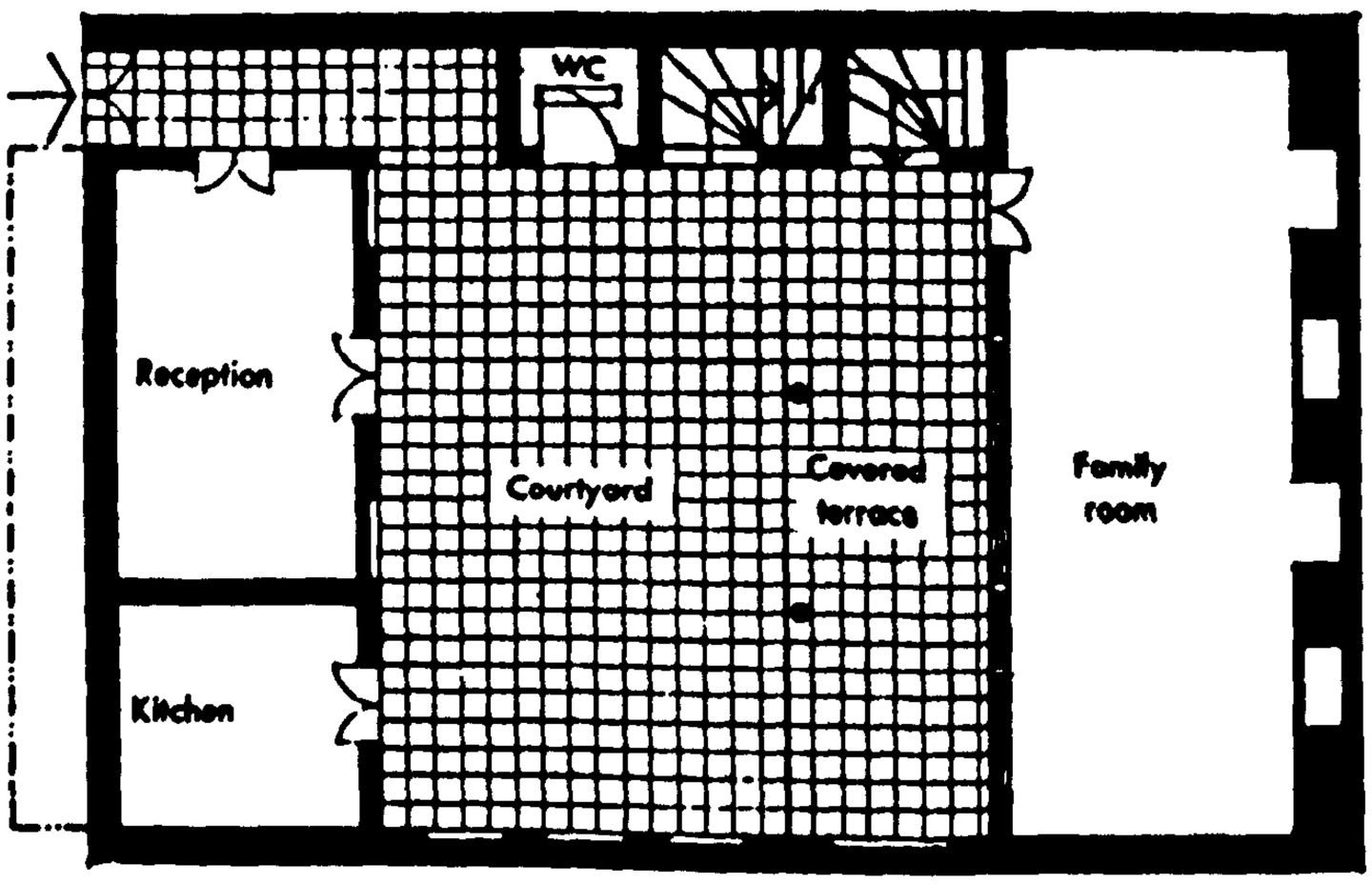
Highest	AMT
43.5	23.5
4	39.5
Lowest	AMR

150 Total

FIG. (11.8) TYPICAL OLD TRADITIONAL HOUSE , BAGHDAD



A. *Cross-section*



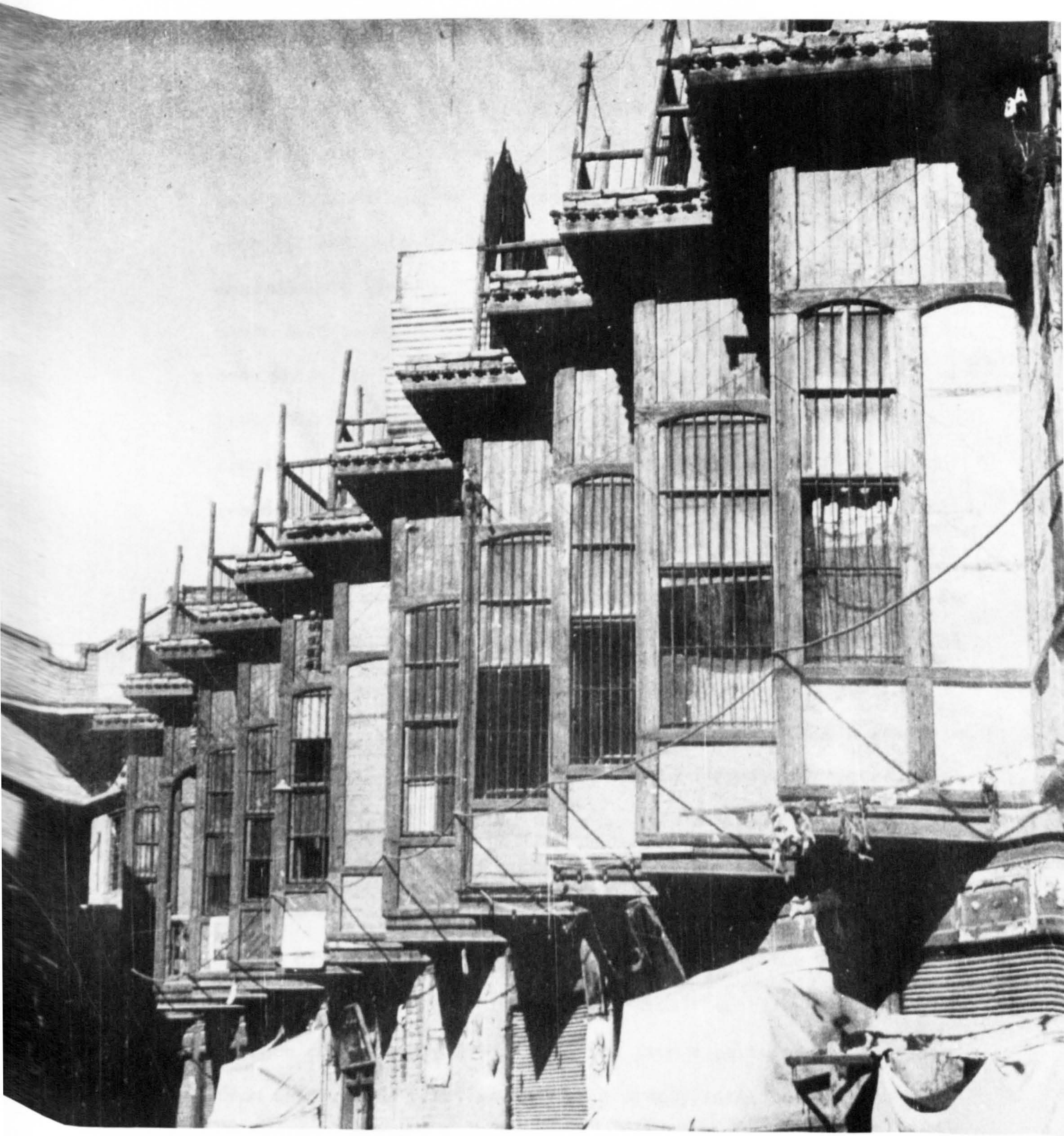
[Measured drawings by Subhi al-Azzawi

B. *Ground-floor plan*

majority of them are used to provide facade patterns only. In a hot dry climate of Baghdad, where day temperature during the summer exceeds 45°C., see, Fig. (11.7), the use of sun breakers has several limitations, particularly those made up of heavy materials, such as precast concrete louvers which tend to store up heat during the day, and after sunset they steadily warm the cooler night air on its way into the building. In conditions where buildings rely chiefly on night cooling, the answer seems to be either in using sun breakers that are made up of light thin materials, such as wood, aluminium or asbestos cement, or preferably employ smaller windows which could be kept shut during the afternoon and only opened at night. Once direct sunlight is excluded, the ground and surrounding buildings become the main sources of light and radiant heat. To reduce glare and heat, the view of the ground and, if need be, surrounding buildings and the lower parts of the sky may be cut off by screens or by placing window sills above eye level. In Baghdad, especially in the old traditional houses, perforated wood screens, "Qeem" have long been employed to provide thermal as well as visual comfort; see, Fig. (11.9). In modern houses, these have been substituted by hollow prefabricated concrete blocks screens.

In the case of roof shading, owing to its orientation and comparatively large area, the roof can be one of the main sources of heat gain in a house. The first objective, therefore, should be to reduce the proportion of radiation absorbed by the outer surface of the roof. In this respect, the colour of roof finish is of some importance. Generally, thick flat roofs with considerable heat storage capacity are the ideal solution.

FIG. (11. 9) WINDOWS IN OLD TRADITIONAL HOUSES , BAGHDAD



Traditionally in Baghdad and in many other areas in Iraq, the practice of building walls in heavy weight material such as brick is very common, since these thick walls of high heat storage capacity provide excellent protection from the heat of the day. Such construction takes a considerable time to warm up, it also cools down slowly. A house with 48 cm. external mansory walls and well insulated roof may possess a time lag of about 12 hours. In winter, when the outside temperature is in the 20°Cs, this is a considerable advantage. But in summer when the temperature may never fall below 35°C, it remains too warm for comfort. To get over this, the people sleep at night on the roof, sometimes protected by light canopy sleeping case or a verandah. But this trend has many problems especially in regard to privacy in a high residential density areas, as well as the problems of a sudden rain, especially in the late summer months, or dust storms which frequently occurs. The suggestion that bedrooms and other spaces reserved for night use only may be built up in light structures may prove to be suitable solution. If so this idea could lead to exciting architectural solutions where both heavy and lightweight, frame construction could be incorporated within a single structure.

Before the widespread of mechanical cooling in Baghdad, the usual practice in cooling was to cover all openings, and especially those in the direction of the prevailing wind, usually the west-north direction, with large thick mats of "Akool" or lilypad roots; this is made continuously soaked in water from a perforated tub or pipe from which water trickles down at a steady rate, so that the hot

dry outside air is made cool and moist before it reaches the interior. This principle has been applied to the current widely used coolers where an electric fan not only accelerates the flow of air, but its motor also used for recirculating the water that has been collected at the bottom of the soaked felt.

Although the capital and running cost of these coolers are within the reach of the lower-middle income groups of Baghdad, and their components, i.e. the motor and the pump, as well as the fan can easily be assembled and maintained, where it has been estimated that an average size of these coolers costs about 50 ID, and their running cost in summer is about 2 ID per month; they represent an architectural problem, since up till now most of the designs prepared by architects failed to provide suitable and acceptable solutions to its location, especially when these coolers are located in the front of the building. It seems that one of the main factors to be considered in this respect is to place them in a well hidden and shaded place thus protecting them from direct sun heat, as well as preventing them from dominating the architectural appearance of the building.

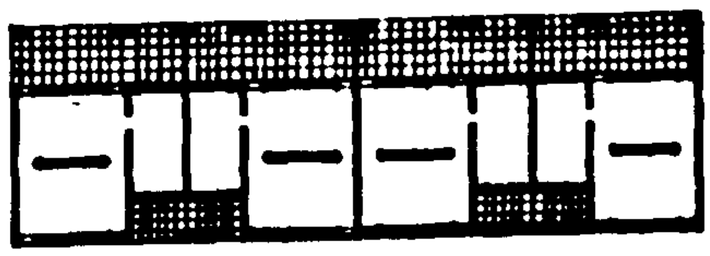
Although contemporary technology and engineering can provide artificial solutions to the problems of extreme climatic conditions, these cannot be regarded as a substitute for architectural and structural design solutions, which not only minimize the reliance on electro-mechanical appliances, thus reducing running costs, but also utilize local resources more efficiently.

Architects and urban designers have developed basic structures applicable to different climatic conditions and densities. Fig. (11.10) illustrates some of these structures which are applicable to hot dry climates such as that of Baghdad and Iraq in general. These illustrate the advantages of potential structural types in regard to densities and climatic protection. It must be stated here that some of the basic designs of these structures are not a pure invention by the architects and urban designers, since the majority of them were evolved in the Middle East region long before any architect or urban designer was qualified to practice. The following are brief descriptions of each of these structures:

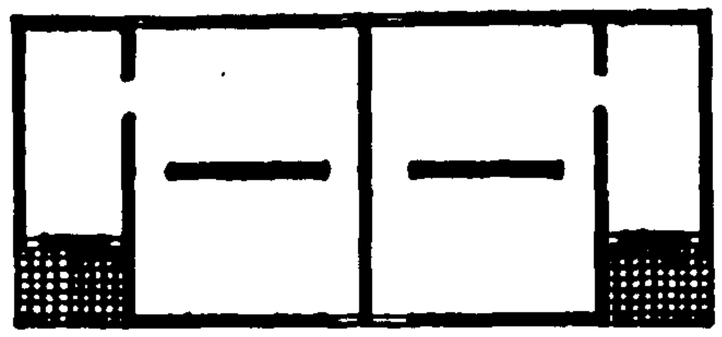
A. The single storeyed terrace; this structure comprises of row or group of four, six or more units joined together in row or informal groups facing north and south and protecting each other from solar radiation. This structure is most frequently used with pedestrian access. The roofs are designed for outdoor sleeping at night, this structure can be used in a fairly high densities, and suitable for suburban development.

B. The semi-detached or duplex house: this structure is compact with two room deep plans joined so that they have a long party wall in common. The East and West walls are protected by garages or other ancillary structures or shaded by high boundary walls. This structure is workable in low density housing layouts, and suitable for suburban locations.

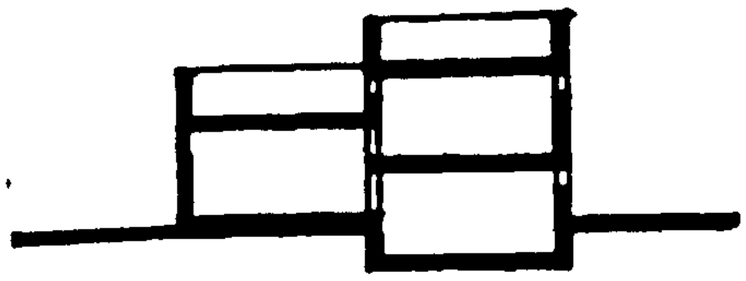
FIG. (11.10) BASIC STRUCTURES FOR HOT DRY CLIMATES



A. Single Storeyed Terrace

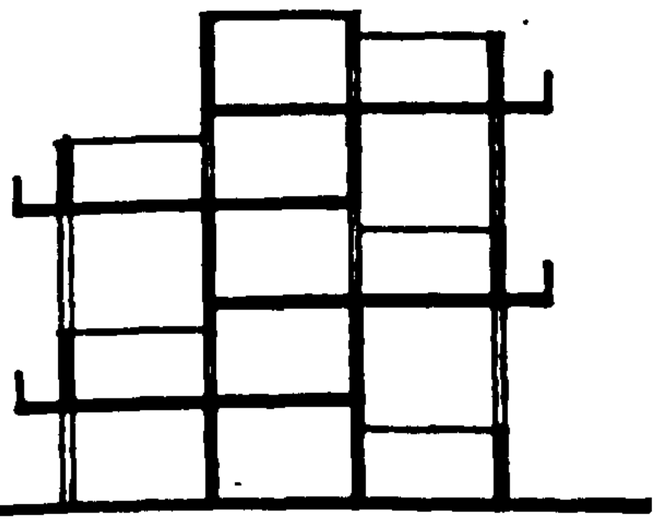


B. Semi-detached or Duplex House

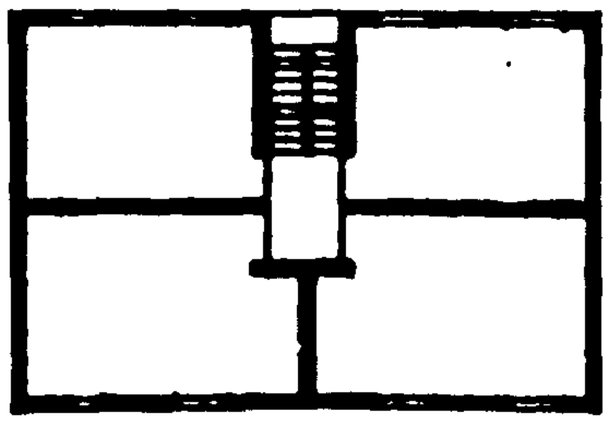


C. Split Level Terraces

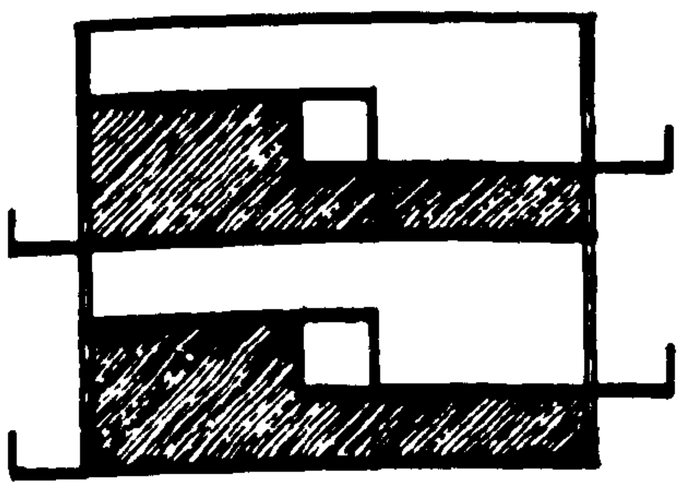
D. Two Storeyed Terrace



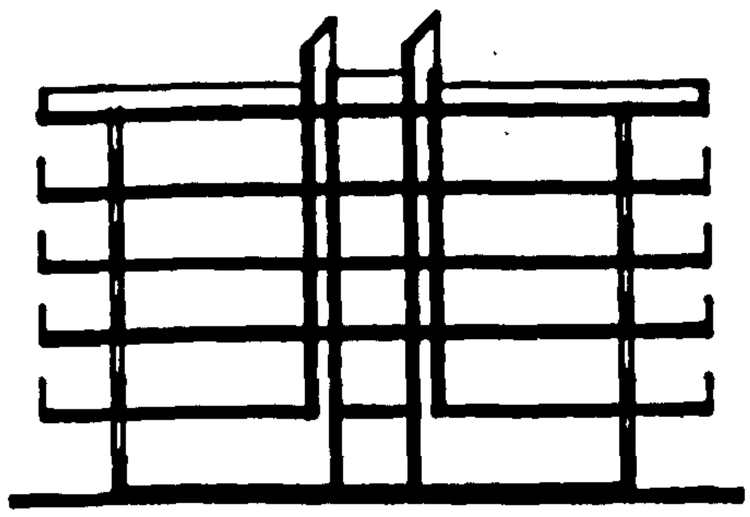
E. Casablanca " Atbat "



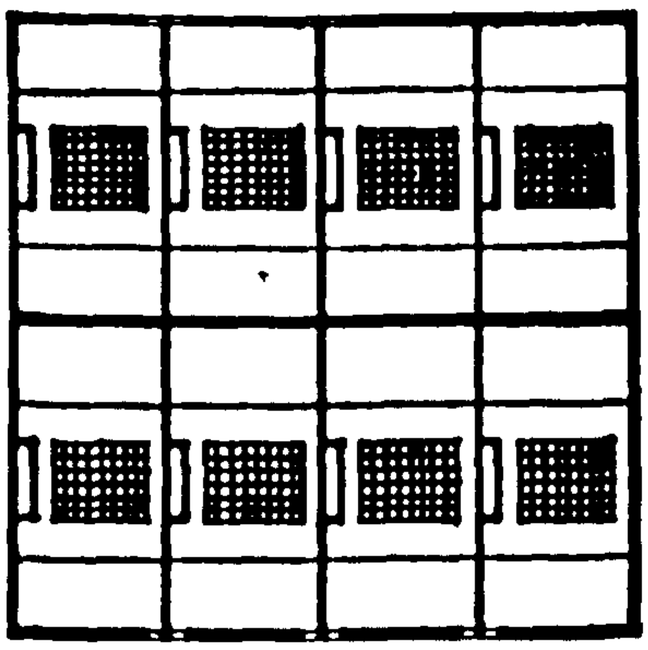
F. Staircase Access Flats



G. Marseilles Flat Blocks



H. Internal Corridor Access



I. Cout Yard Houses

C. The split level terraces: this structure is similar to type B in character and application. The main feature of this structure is that some of the rooms are semi underground, this gives an advantage in areas where thermal storage is needed for a large part of the year.

D. The two storeyed terrace: this structure is also comprises of row or group of units, this structure allows for fairly high densities, but presents problems of overlooking and privacy. Roof terraces for sleeping extend accommodation at night. The existance of a high party walls prevent overlooking by neighbours. This structure can be provided with pedestrian access, shaded pavements and footwalks, and garages at junctions of pedestrian and vehicular access routs.

E. The Casablanca or "Atbat": this structure is based on a staircase or balcony access flats, it is usually of four or five storeys high with large balconies as couryard substitutes and open air sleeping places. The balconies are arranged on alternate floors so as to be open to the sun in winter and the night sky in summer.

F. The staircase access flats: this structure contains three or four compact flats around an enclosed staircase. Where outdoor sleeping is desirable, this type of structure is usually restricted to two storeys so that the occupants of the ground floor can sleep in the yard, and those on the first floor on the roof terrace.

G. The Marseilles flat blocks: each flat in this structure has a two storey high living room and single storey bedrooms. Each unit can have good air movement. Passages in this structure are restricted to every third floor, with balconies for shading and out door sleeping on alternate floors.

H. Internal corridor access: this structure is based on flats arranged on both sides of internal passage with shaft or duct ventilation for each flat to induce rapid air change at night. Large and massive slab blocks and high densities are feasible in this type of structure, provided outside walls are protected by balconies for open air sleeping. Saving in staircases and elevators make up for the cost of balconies.

I. The courtyard houses: in this structure, the rooms are arranged around internal yards which serve as communication and outdoor living and sleeping spaces. Courtyard sizes are related to the height of surrounding buildings, small enough to be shaded by day and open to the sky at night. One storeyed buildings surrounding very small couryards are suitable for low income housing; while two and three storeyed buildings with larger courtyards are suitable for large and wealthy extended families.

There are two basic plan systems and structures that should be avoided as much as possible in Baghdad, particularly for the low income groups, because they lead to excessive exposure to solar heat and radiation, and need mechanical and electrical means to cool them, these are the detached houses and the high cluster or point blocks.

11.2.3 Living and Open Spaces:

The space consumed by dwellings vary considerably, depending on the occupants' socio-economic status and preferences. In Baghdad, this ranges from that taken by extremely small, low-cost dwellings with sizes reduced to a level which only satisfy minimum requirements, if not at all, to thattaken by the comparatively large and spacious dwellings of the wealthy. The latter tend to be associated with lower densities than the former. For instance, in "Al-Thawra" housing areas, where the average living space within the dwellings does not exceed 70 sq.m. the gross residential density reaches 500 inhabitants per hectare; while on the other hand in "Al-Mansur" housing area where the average living space within the dwellings may reach 400 sq.m., the gross residential density only reaches 90 inhabitants per hectare; see, Fig. (11.3).

The rate at which dwellings occupied by people, or in other words, the density within the dwellings, is fundamentally the key to the whole problem of densities in housing areas. For instance, in "Al-Mansur" housing areas, where the average family income per month may reach up to 200 ID or more, the average number of rooms in one dwelling was estimated at about 6.7 with a rate of occupancy of only 1.2 persons per room, yet the gross residential density reaches only 90 inhabitants per hectare; while in other housing areas, where the average family income per month may reach only 50 ID, the number of rooms in one dwelling amounts to an average of 3.1 and the occupancy rate reaches 2.6 persons per room, yet the gross residential density goes up to 500 inhabitants per

hectare or even more. These figures conclude that housing densities are more affected by the rate of occupancy of the dwellings, rather than by the number of rooms provided in the dwellings, and the index inhabitants per room is the function of the size of the dwelling, the size of the household, as well as the socio-economic groups; see, Table (11.3).

Table (11.3)

The Relationships between the Socio-Economic Groups, the Number of Rooms in One Dwelling, and the Number of Persons per Room in Baghdad:

	Socio - economic Groups				City Average
	A	B	C	D	
Number of Rooms Per Dwelling	3.1	4.5	5.6	6.7	4.0
Number of Persons per Room	2.6	1.9	1.4	1.2	2.1

Source: Polservice, "The Comprehensive Civic Survey for Baghdad", 1972.

As for the space provided for private gardens, this is generally limited by the space available and by what the community and the individual household can afford. The following Table demonstrates the variations in the net green areas of house gardens in Baghdad:

Table (11.4)

The Relationships between the Sizes of the Housing Plots and the Green Areas Provided within each House:

Plots Sizes sq.m.	Green Areas sq.m.	Index per One Person
200 - 300	100	10.6 sq.m.
300 - 500	200	23.1 "
600 - 800	350	43.8 "
Over 800	500	62.9 "

Source: Polservice, "The Comprehensive Civic Survey for Baghdad", 1972.

The above table reveals that while the green spaces in the plots, 300 - 500 sq.m. and 600 - 800 sq.m. amounted to about 50 per cent of the total plots area, the index of sq.m. in green area per one person in the latter is almost double that in the former. At the same time, the household size of the socio-economic, which dominates the 600 - 800 sq.m. plots, i.e. group (C) is only 9 per cent less than that of the household size in the 300 - 500 sq.m. plots, which are dominantly occupied by the socio-economic group (B); see, Fig. (1.4.G).

Regardless of the differences in the sizes of the open spaces, and the index per one person, open spaces in dwellings must provide for certain functional domestic needs, i.e. space for laundery and clothes drying, which mostly needed by the low income groups with large families; for the storage of dust-bins and other domestic equipments

play areas for the children; provision for outdoor leisure and living, which vitally important in a climate as hot and dry as that of Baghdad, especially where low standards are employed. It is obvious that the extent and the way these requirements should be met vary considerably with differences in personal preference, socio-economic status, the physical conditions of ground, and the pressure of other vital factors affecting density.

Useable open space for active and passive recreation, for gardens and landscaped grounds, for cooking and eating, and for many other outdoor activities is needed in any housing area. No fixed amount of open space can be prescribed for all housing areas, since adequacy of this or any space is related to the particular needs of the housing occupants. For example, recreation space needs are different for families with children, than for families without children. In housing for families with aged members, spaces for passive recreation and not active play areas are needed.

The economic status of the occupants must be considered in the planning of site open space, for instance, the lower income groups must be provided with greater amounts of recreational spaces immediately accessible to their dwellings since they frequently cannot afford distant ones. While the most useable and preferred open space is at ground level, supplementary space can be provided in the form of balconies and roof areas.

Perhaps the most dramatic effect of increases in density is the resultant allocation of open space for parking purposes. As open space gets swallowed up by increases in density, either space standards will have to be cut or remaining open spaces will have to be multi-purpose and accommodate a combination of activities.

The relationship between plots coverage and open space is direct. An increase in plots coverage, unless density remains very low, almost always causes a significant decline in housing quality with respect to useable open space. Nevertheless the loss of space due to higher plot coverage, just as in the case of higher density, can be compensated for by providing balconies and roof work and recreation areas, and at the ground level, by designing whatever space there is for a variety of uses.

Building type and size directly influences open spaces. Private, easily accessible open space at the ground level can be planned for occupants of single-family detached and row houses, but such space is virtually out of the question for occupants of high-rise buildings. The space at the base of tall residential buildings is generally communal, not private, its accessibility is determined by the height of the building and the distance from the various individual dwelling units to the ground. For these reasons, row houses may be regarded more liveable than a two storey building with separate dwellings on each floor, even though the amount of ground space per person might be the same for both buildings.

Finally, space around and between houses must be planned for both functional and aesthetic reasons. If houses are spaced too closely together, or the site is too crowded, the open space will be insufficient to accommodate all the activities of the occupants. If houses are too far apart, the appearance of the area may suffer even though the amount of open space is abundant. The site design will lack unity and focus. The appearance of the housing area can be judged in part by the treatment of open areas and how these in turn relate to building spacing and masses. Perhaps the most aesthetically satisfying and most liveable is an area with a variety of spaces, differing in size and location.

11.2.4 Privacy:

The importance of privacy in the life of the family and the individual privacy from one another, from neighbours, from passing vehicles and pedestrians, vary with different people. Generally speaking, the common desire is for complete privacy within the home. Religious, social and cultural traditions may emphasize different aspects of privacy; climate also has its influence.

The organization of the Iraqi family, and indeed the Moslem family, required that the house should provide maximum privacy and protect its dweller from the eyes of the outsider. These requirements led to the development of a double circulation system in the traditional house layout. Under this system, male friends and family guests were to be received in the front part of the house, leaving the other part as a private family sanctuary. To achieve the double circulation,

several solutions were adopted in the house design. In some houses with a single court, the private part of the house was generally raised a few steps above the rest of the house. Some other houses were planned with two courts, one for men and the other for women. Two storey-houses were also built, where the public part was on the ground floor, and the prvate part on the upper floor. The court of this house form was entered from the outside by a passage with one or two turnings to prevent the passerby in the street from seeing in. This oriented the house away from the street, receiving its light from the inner court. The windows and roofs were constructed in such a way as to prevent anyone intruding unseen into the intimacy of his neighbour's life. Whenever windows were opened from the outside walls, trellises or "Shanasheel" were projected on them; see, Fig. (11.9). These served to satisfy the curiosity of those who were indoors and could not be penetrated by the indiscretion of those who were outside.

Visual and auditory privacy are essential for all housing. In the single family housing privacy exists by virtue of the separation of units. Privacy in all forms, visual and auditory, indoor and outdoor, is more difficult to achieve in multi-family housing developments where units are close together.

Of all aspects of housing, privacy seems to be the one most directly related to housing density. Privacy and density are in direct contrast; as density increases, privacy declines. The more people on a given land and the closer together they live, the less privacy there is for each family.

Increases in plot coverage also tend to restrict privacy because an increased plot coverage implies a greater number of people living in close proximity. The disadvantages of high plot coverage can be minimized somewhat by the use of sound insulating materials and visual screening devices, particularly at plot boundaries. However a high plot coverage need not necessarily cause a corresponding decline in privacy. The row houses at Western Baghdad Housing Project by Doxiadis Associates; see, Figs. (12.1; 12.2) are excellent examples of high coverage plot housing, amounted to about 80 per cent where privacy is largely preserved by screening of private space at the plot boundaries.

In discussing the relationship between building spacing and privacy it is difficult to separate internal spaces from external site layout. While privacy generally increases with spacing, it is not the distance between buildings so much as the use of adjoining areas that contributes to privacy. The privacy of a dwelling unit is determined by indoor considerations, particularly the room layout in the same and facing buildings. In the case or multi-family housing development, flats in low buildings and those near the ground floor of high buildings are affected by an additional consideration, namely the use of outdoor areas immediately adjacent to the buildings.

In a high density housing development indoor privacy is essential and one ought to be completely private within one's house or flat. Distrubance from street noise and from neighbours will encroach upon one's privacy. While a good layout will minimize the impact of

external noise, only better internal planning and sound insulation can overcome the noise from neighbours. Complete outdoor privacy does not exist except in detached houses set in spacious gardens with a mature landscape. As soon as houses are joined together to form semi detached or terrace houses one's private garden is overlooked from one's neighbour's bedrooms; if, on the other hand, these houses are faced by another row of houses backing on to their gardens, this will result in overlooking from there as well.

In conclusion, it appears that lower housing densities give greater privacy; in particular, they allow more room for planting screen hedges and trees, and allow quieter and more private areas to be sited away from plot boundaries. But as the population pressure grows as a result of rapid urbanization, it becomes more and more difficult particularly in Baghdad to provide each household with a shield of open space.

11.2.5 Individuality:

The possibility for self expression in external design should be available to occupants of all housing. Although mass building techniques have reduced the opportunities for individual design expression in recent housing developments in Baghdad, i.e. the low cost housing development in "Al-Thawra" district, such opportunities are even more limited for occupants of multi-family housing developments.

In low rise housing developments, external individuality may be achieved through the use of different building materials, landscaping, and other design details; while high rise housing

development presents a more difficult challenge to the designer trying to provide opportunities for individuality. To solve this problem some recent proposals in housing in Baghdad break building facades through setbacks and projectioned in such a manner that separate dwellings can be recognized from tne exterior, others rely on large balconies to give occupants freedom to express design preferences and to lend variety to the face of the structures. Some European studies, however, have proposed the development of an adaptable housing unit, one that would reflect the individuality of tenants and could be adapted to changes in growth and needs of families. Such a proposal are more applicable to low-rise housing because of the complex structural problems involved in altering high rise buildings.

A quality aspect that is closely related to individuality is the diversity of house forms, which can be achieved by mixing different forms of houses on one site. This is particularly important for large housing development, where the repetition of identical houses may result in dreary monotony.

In theory, there is no necessary connection between housing density and the form of dwellings in the medium density ranges. For example, twenty dwellings to the hectare could be built in twenty detached houses or in a single block of flats. In Baghdad because it is the trend to build one and two storey houses, densities tend to influence building forms and indeed vice versa. This relationship implies that there is little to be achieved in terms of variety of building forms at low and very high

densities. On the other hand, there is a connection between housing form and size as it effects diversity and individuality. For instance, a row of identical two storey attached dwellings appears less repititious than a row of, say, identical ten storey blocks of flats. This impression owing primarily to the element of size, also on the element of continuity. Nevertheless, if a housing development necessitate the construction of identical dwellings, some degree of individuality and diversity can be created through architectural and landscaping techniques.

In addition to aesthetic considerations, there are practical arguments for varying house forms since people have different housing needs. Differences of age, income, occupation, and family composition, for instance, should be reflected in the form of housing units that constructed on a site. A housing project with a variety of dwelling forms, not just a variety of interior spaces, might be able to accommodate and encourage a mixing of population, which encourage social integration and development.

11.2.6 Location:

Density seems to have little influence on location. Rather the influence is exerted in the opposite direction; location influences density. In this context, the main factors determing the location of housing, thus influencing their densities are the income levels of the people and the accessibility to work, community facilities and recreation. The effect of incomes may be viewed from the fact that housing is a necessity for every household, and with a given income, the household can vary the proportion of income it spends

on housing within certain limits, whilst it can also vary the type and amount of housing purchases. Where demand exceeds supply, any increase in housing prices brings a decrease in consumption of housing per household, and is likely to lead to increased housing densities as a result of the increasing number of households in existing housing. As income rises, it is likely that the housenold spends proportionately more of its increased income on purcnasing larger and or better quality housing. Thus there is an increasing propensity to consume housing, for the greater is household income the greater, absolutely and relatively, its expenditure on housing. Therefore the demand for housing is income elastic.

Income, preferences, and choice of residence are positively related to this point since the greater is household income, the wider is its range of choice of housing type and location and the greater the likelihood that its preferences are more fully met. Similarly, the higher a household's income the stronger is its preference for more residential space and for newer housing. Net residential density, therefore, declines consistently with increasing income as high-income households buy more space per household. People in Baghdad with high income and high quality preferences are usually not satisfied with the best of the housing stock in the city, therefore one can always observe a strong tendency for those people to inhabit new houses.

Ability to pay for the better, newer, most desirable facilities and locations is a major determinant of the distribution of population within the city. Moreover, where residence is to compete for the most accessible sites it has to use land intensively, i.e. at higher

density, if land is to be competed away from alternative uses. As such a high price must be paid for accessible sites because of competition from productive uses whose profit levels depend on accessibility. Therefore, given the level of income, households can buy less residential accommodation in the position of greatest accessibility than elsewhere. Similarly, more accommodation or space can be bought as distance from that position increases, because land prices decrease as the supply of land increases. The choice facing the household is that it can buy more accommodation with increased distance from the centre but at the expense of increased journey costs. All this depends on the relative rates at which land prices decrease and commuting costs increase with increasing distance from the position of greatest accessibility.

Given that the preference in the high income groups for privacy and space is stronger, then those groups will use their superior purchasing power to buy low density housing. If in addition to large space, high income groups prefer new houses, densities will be lowest in areas of new housing. Since the urban growth of Baghdad shows an axial pattern, along the Tigris river, old, high density houses are usually near the centre and along the river, thus the high income groups can only find the low density and new housing they require at the periphery of the city. Perhaps the main two factors affecting the choice of the high income groups to seek locations in the periphery of Baghdad are, first, because of their strong preference for space and privacy, which is almost lacking in the central areas; second, because greater savings in land costs are possible as land prices are lower away from the central areas, and because that single family detached houses can

be provided more cheaply. On the other end of the scale, low income groups have a restricted range of housing choice, thus they have to take the least acceptable housing available, i.e. the oldest, most cramped, most obsolete and deteriorated segment of the housing stock. The older the housing the more cheaply it can be converted to occupation by lower income groups, thus the old, traditional houses of Baghdad, became a respository for those living almost around subsistence level; see, (3.2.2). Therefore, it can be stated that in a free market situation the mean quality of the housing stock improves with distance from the central areas. The value of the houses also increases with distance from the centre, whereas land values drop; hence house prices or rents per dwelling are inversely related to land values and accessibility. This trend is partly true in Baghdad, this is because of the enactment of rent control and the provision of highly subsidized land to the cooperative societies which increased the choice of location for the middle and low income groups, this is manifested in the mass distribution of subsidized land for the low income groups in "Al-Thawra" and "Al-Hurriya" districts, which are located on the periphery of the city and where the houses built are of low quality, and where the gross residential density reaches some 500 inhabi/ha., see, Fig. (11.3).

The other important factor influencing the location of housing and their densities is the accessibility to work, community facilities and recreation. At the local level for instance, the distribution jobs may influence the distribution of residential population more than any other single factor. Given the place of work of the head

of the household, a household has to weigh access to work against various possible combinations of commuting costs, accommodation prices, and its other needs for social contacts and amenities. The same applies where a person in a given job wishes to change his place of residence. In general, it can be said that where access to work is the only factor to consider, the price or rent of houses will decrease with increasing distance from the work place. Similarly, it can also be said that transportation costs will tend to increase as densities decreases. Therefore, where persons wish to live close to their place of work, those employed in the central areas must pay higher prices for their accommodation than persons employed in other parts of the city. Alternatively, people working in the central areas make longer journeys to work, incurring higher commuting costs, than those working elsewhere in the city. For instance, in Baghdad, the low income people of "Al-Thawra" district, east of Baghdad, pay almost 3 to 5 ID per month for transportation costs in their daily journeys to and from work in the central areas of the city.[11] This sum of money spent on transportation amount to 10 - 15 per cent of their monthly income; see, (3.3.0). As a result and to avoid such burden, many workers of this district are forced to tire themselves with long daily trudges to and from their place of work, and some of them used bicycles. In other cases, employers provide transport facilities for their workers, such as the case in the Oil Refinery at "Al-Dora" south of Baghdad.

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11. based on the assumption that the cost of transportation from this district to the central areas of Baghdad amounts to 30 - 50 Fills per person each way. 1 ID = 1000 Fills.

Proximity to community facilities is closely related to the location aspect of housing. If a housing project is small, the selection of a site should be made in relation to the availability of existing community service facilities. If the site is large, many of these facilities should be built on the site, especially facilities for education and recreation, such as nursery and elementary schools, and play grounds. The selection of facilities to be built on the project site is closely related to the specific needs of the residents and their socio-economic status.

Some facilities should be located in the centre of the housing area so that they are convenient to the majority of residents and can become points for community life. Schools and community buildings are obvious examples. Other services are best located on the periphery of the area to avoid excessive traffic in the midst of the housing and perhaps also to serve adjoining residential developments. Shops, cinemas, warehouses, are examples of such facilities that might be appropriate on the fringe of a housing area.

The location of a housing area is critical also to safety in relation to both on and off site activities. Planners are usually unable to control off-site development, but they can plan a site which provides for separation of pedestrian and vehicular circulation, minimizes conflicts caused by incompatible adjoining uses and has buffers against heavy traffic on bordering major streets. Usually interior planning and non design factors play a more important role in physical considerations than does site planning. However,

the planners can contribute to healthful living by planning for adequate sanitary facilities on the site and by spacing buildings so that light and air are adequate for all dwellings.

The relationship between site size, safety and health is not a very direct one. However, if a site is in a district of a city containing industries or major traffic arteries for instance, its size can be significant. Housing on a large site may be less exposed to the nuisances and dangers of such a location than housing on a small site. The greater the space, the more opportunities for planning internal buffers and arrangements of buildings providing maximum protection. On small site some protection can be achieved by, for instance, facing the buildings inward and letting them act as walls to block out any safety hazards.

11.2.7 Integration:

In analysing the influence of density on the integration of new housing into its surroundings, the cirtical factor is the density of development of these surroundings. If a new housing development is too dramatic a departure from the density of the neighbouring older areas, for instance, integration will be extremely difficult. For example, a new 10 storey multi-family dwellings cannot very successfully merge into an area of two storey houses. This is not to suggest that the status quo be preserved, what is suggested is that planners should take into account how the new and the old fit together. When an entire residential pattern needs to be altered, new and radically different housing can set the pace and scale for the density of development. In this case the problem of

integration is secondary, since older areas themselves will be rebuilt over time to match or harmonize with tne new development. On the other hand, when there is no anticipated pattern change and the new housing cannot be built at the prevailing density of the area, the likely way of achieving an integration is perhaps through details of architectural and site construction. The task of integration new housing whose density of development is significantly different from the surrounding older housing may alleviated somewhat if the new site is large. A large site has space enough to accommodate housing with a range of densities and to permit a gradual transition from existing densities at the periphery to a much different one at the core of the development.

Well designed and maintained site details add significantly to the quality of the housing area. Details such as pavement, plant materials, playground equipment, benches, and building facing may form the basis for judging the environmental value of the housing area. At a high density housing development, the details must be of substantial construction, thus more costly, to withstand the heavy use they are subjected to. In order to preserve the initial quality of construction, proper maintenance is therefore necessary. Therefore, details that require constant attention and repairs are generally poor choices for high density development.

Views from and to a housing area are aspects of design quality which have benefits to the residents of the area and those of the entire city, when the location of a housing area permits, views should be planned of distant points in the city and surrounding countryside. However, not all views need to be distant ones. Some can be enclosed

views with a feeling of intimacy and privacy. These may not be obstracted views, but of enclosed spaces, particularly of ground floor outdoor spaces around individual buildings. The appearance of a housing area from a close up and from a distance is of major significance to all tne inhabitants, and contribute to the overall appearance of the city. Therefore, it is important to consider individual areas as they appear from all angles when planning the layout of the buildings. In this respect, variety of forms is an important consideration in planning for views. A scene of identical houses, all evenly spaced, such as that of "Al-Thawra" district of Baghdad, enhances neither the livability of the area nor the immediate surroundings. The best designs result when architecture and site plans are developed together, and the building forms and the spaces around them integrated into a harmonious composition.

The density of development in itself neither creates nor destroys views. If a view from some dwelling units in a housing area is lost through a decrease in building spacing or an increase in density and plot coverage, poor site planning, not the high density, is the real cause. Building form and site location, however, do have some bearing on views, at least on potential ones.

11.2.8. Land:

Perhaps the most important factor affecting housing densities is the availability or shortage of land suitable for housing use. The actual shortage of land itself circumscribe the range of potential densities in relation to a given population, which is often reflected in land costs. Where the most convenient and suitable housing land

is expensive, for instance, the land cost factor may have one or two contrasting effects: either to demand higher densities, or to force housing development further out to less convenient but cheaper land.

Usually, the greater the density at which housing is developed, the less land is required per dwelling. The saving in land costs is, however, less than proportionate to the saving in land, since the price of housing sites and density is related. An examination of the prices of housing areas in Baghdad indicates that the relationship between prices of housing plots and gross residential density is significant. For instance, the free market prices of sq.m. of housing plots in "Al-Mansur" housing area, where the gross density is estimated at about 90 inhabitants per hectare, increase by about 700 per cent than those in other areas where the gross densities reached up to 500 inhabitants per hectare.

Another determinant of the price of residential land is the distance from the centre of the city. Estimates made by the U.N. on the prices of residential land per sq.m. has indicated that the price of land falls substantially as the distance from the centre of Baghdad increases, so that for example, the price of sq.m. of land in the newly developed residential areas is on average almost 40 per cent less than that in the existing residential areas, where their distances from the centre of Baghdad are not more than 4 kms.; see, Table (8.1).

In the U.K. similar trend can be found, particularly in the city of Birmingham, where according to estimates made in 1964 by the National Institute of Economic and Social Research, the prices of

land per dwelling fall by about half when densities increase from 5 to 40 dwellings per acrea. [12] Also in the same city, the price of land 15 miles from the centre of the city is only half what it would be in the centre. [13]

The physical shortage of suitable land for housing purposes in relation to needs result in a more intensive use of land. This shortage may be tne result of natural features, such as the case of the river Tigris in Baghdad, where development have been forced to follow its natural shape, and in many cases formed a barrier to urban expansion of the city; see, Appendix (1.4). Another factor may be the land tenure system, where in Baghdad, for instance, lands regarded as "Waqf" represent problems for development, particularly in central locations, since this land cannot be divided or alienated; see, (8.1.0). Therefore, it seems that the less land available to housing development relative to housing demands, the higher densities are likely to be adopted.

Housing densities can be affected considerably by the amount of land allocated for access to housing areas. This includes land for roads, car parking, footpaths, reserves and easements to provide for traffic generally, public services, drainage, sanitation, and power and water distribution. It is not uncommon in Baghdad for 30 - 40 percent of the housing area to be used for access purposes; see, Figs. (12.7 to 12.11). Careful design of housing layout, and the adoptation of standards for road and reserve widths and lengths related closely to the demands of the residential function of a housing area, will not only result in savings in costs but will

12. see, Dr. P.A. Stone "Urban Development in Britain: Standards, Costs, and Resources 1964-2004", Cambridge University Press, Vol. 1, p. 153.
13. ibid

enable either increased densities without sacrifices in living space standards or increased living space standards without change in density: see, (11.2.3).

11.3.0 Density Control:

Density control is one of the measures available to planners to reduce the number of over-crowded and congested areas to achieve better environment for living and satisfy the basic needs of the people. If this measure is used discriminantly it may reveal some limitations.

This paragraph deals in a general way with these limitations and suggests some of the factors which the Municipality of Baghdad should take into account when controlling development in housing areas against the background of the need for more intensive use of urban land due to the rapid population increase.

The main purpose of density control is to implement the land use and population policies which are the key factors in town planning. Those policies must be based on up to date population projections, adequate knowledge of household types and size, and as accurate an estimate as possible of the amount of land likely to be available to meet future housing needs. The amount of land required to meet those needs depends primarily on the density policy to be adopted both for new development and for redevelopment.

The need to keep total housing area population within broadly pre determined limits is a crucial element in planning policy, because the structure of land uses and community services may be severely disrupted if the population of the area substantially exceeds that postulated in the plan. It is, however, one of the most difficult factors to forecast with any precision or to control with any certainty except to a certain extent in large self-contained areas of new housing development. The density policy for a particular housing area is, therefore, need to be reviewed from time to time, particularly in areas of existing housing development where the rate of redevelopment is accelerating, in order to ensure that the planned population is not greatly exceeded. Alternatively, it may be right to revise the population target assumed by the plan and to provide for some expansion of housing area facilities to meet the increased population.

Once the land use and the population policies have been established within the framework of a broad density policy, it is important that the planners should be aware of the limitations of density control when considering detailed applications for planning permission. Density control is not something to be applied as a kind of byelaw control as it is in the case of land subdivision, or design parameters regarding building's height, coverage etc. If precise density figures are applied too rigidly in controlling housing development the result might be to produce uniformity and create unnecessary obstacles to the more intensive use of urban land.

Housing density cannot be a very accurate control. It is conditioned by so many variables. To speak in terms of persons per hectare taking an average household size as the basis, ignores the fact that the actual population of any group of houses is bound to vary from time to time as families are born, grow up and leave home. Similarly, to speak in terms of habitable rooms takes no account of the fact that one house may have a through living room and another of the same floor space may have two living rooms, which would make a difference of about 20% in the accommodation density of otherwise identical three bedroom houses. Although some allowances can be made for these variations, they introduce significant elements of uncertainty into housing density control.

Moreover, housing density control is often expected, or believed, to serve many purposes which in fact it can only accomplish within very wide limits if at all. For example, overcrowding within dwellings cannot be prevented by density control since it cannot limit household size or determine living habits, although it can influence the number of people who can live in an area by controlling the number of rooms or dwellings. Similarly housing density control cannot ensure adequate standards of light, air, privacy etc. for individual houses. These depend primarily on the design and layout of the houses and the housing area.

Density control cannot, therefore, ensure many of the qualities which planners and planning authorities may wish to secure in new housing development and redevelopment. Since it is possible to have a good housing environment at 50 persons per hectare and at 350

person to the hectare, and poor environmnent at any density. Therefore in development control, what is important is not to apply some pre determined density control measures, but to consider proposals in relation to the particular area, its surroundings, the type and number of people to be housed, the layout and the housing forms.

11.4.0 Conclusion:

In this chapter an attempt was made to define the basic concepts of housing densities, and the indicies most applicable to the situation of Baghdad and Iraq. Then, the various aspects that may influence or be influenced by housing density have been discussed; some demand spacious surroundings to each dwelling for private outdoor activities, or in the interests of privacy and health, thus tending towards low densities. Other factors demand concentration in the interest of convenience, climate, access and economy in the use of land and services, thus tending towards high densities. The main question is then to strike a balance between these conflicting demands.

Past planning experience in Iraq, particularly in the field of housing development, suggests that economic factors have exercised the most influence on determining housing densities. Social, climatic, and technical factors have been measured in the last analysis in terms of what is economically practicable and feasible. The dominance of economic criteria has resulted in housing areas being developed without basic regard to the way people are living, climatic limitations, availability of resources, and the capacity of the

construction industry. Another point emerged from examining previous housing development in Iraq, particularly in Baghdad; see, (4.1.0), especially those designed and proposed by foreign consultants, is that housing densities were set not to reflect local condition and needs, but rather arbitrary, reflecting largely the cultural backgrounds and previous experiences of those consultants and governed mainly by the number of people to be accommodated and the availability of land.

The problem of selecting housing densities that satisfy the optimum requirements of the people, present and future, is very complex. This is mainly due to the nature of housing in one hand, the conflicting needs and demands of different socio-economic groups, on the other. This is best illustrated by J. Tyrwhitt, when she stated that:

> "We must concede that the poorest people require the greatest space. The richest people can live and do live at the highest densities in most wealth cities of the world, because they have internal sanitation, electric light, electric cooker, refrigeration, washing machines, constant hot water, air conditioning, and central heating. Each of these saves space for them, because these appliances save areas which would otherwise be used for operations". 14

The antithesis is also true. The rich can and do live at the lowest densities, because they can afford to possess and maintain large grounds, pay for extensive road frontages and runs of services, and use cars to carry themselves and their households speedily and comfortably to places of business and pleasure.

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14. see, Tyrwhitt, J., United Nations Seminar on Housing and Community Improvement, New Delhi, "Report of Discussion on Standards of Housing Accommodation", 1954, United Nations Housing, Building and Planning Bulletin, No. 9, p. 63

Somewhere between these extremes, each in its own way representing at opposite ends of the density range, a form of comfortable and healthful living, lies a whole range of intermediate densities from which can be selected the one that satisfies the optimum requirements appropriate to the particular circumstances.

In Baghdad, the selection of housing densities that satisfy the optimum requirements of the people is further complicated by the fact that almost half of the people are rural migrants; see (1.2.0), and their living habits are often adaptation of traditional patterns of life to the new urban environment, and reflect sharply economic circumstances not far removed yet from the subsistance livelihood gained from the soil in rural areas. These contrasts can be observed for instance, in the eastern housing areas of the city. Under these conditions, social practices and habits often tend to conflict with modern concepts of health and moral standards. This may, to some extent, be due to the general backwardness or to traditional beliefs and customs. But undoubtedly the most important factor remains the personal preference, the motives which lead people to like or dislike a particular way of living are often extremely personal, and may take sentimental, superstitious and religious motives, which may involve people wittingly or unwittingly in some sacrifices to themselves in amenity, convenience or economy.

As far as the expected trend in future housing densities in Baghdad, one may assume that it is unlikely at least in the foreseen future that housing density in the city in relation to the forms of dwellings

will rise dramatically; in fact it is more likely that the density will fall as space standards rise as a response to the expected general rise in the standards of living brought up by the substantial increases in oil revenues. Moreover, more space about buildings is likely to be needed for garaging and other facilities. Additional space about buildings would also simplify the provision of further facilities, particularly in the high density residential areas of the city, which may be required in the future to reduce the risk of housing areas becoming obsolete, as have the more densly housing areas of old Baghdad.

Nevertheless, if moderate increases in housing densities is going to be generally encouraged on the ground of useful savings in the cost of development and land and providing more dwellings of the type and price for which there is a greatest demand. A point must be reached, however, when any further increases in density is bound to involve higher first costs because of the more complex design and building techniques necessary to achieve high densities. The extent of the economic burden imposed will largely depend on local prices and wages and on the availability of the skills, equipment and materials necessary to tackle the new and relatively advanced building techniques which may be involved. All these extra costs might eventually outweigh any savings that may be made in the cost of land, for instance. Although the effect of increasing density on land and building costs is a very complex subject and needs.. detailed analysis, certain broad conclusions can be simply stated, these are:

1. The cost of land per hectare will tend to increase as the permitted density is increased, although the cost of land per dwelling will tend to decrease.

2. Building costs per dwelling tend to decrease as the density is increased from a level which allows only large detached and semi-detached houses to one which permits compact two-storey housing, including terraces.

3. Utility services costs roads, footpaths, water and sewerage networks also tend to decrease with more compact development; see, (12.5.0).

Although it is more likely that any increases in housing densities in the near future will be achieved by building greater proportions of blocks of flats, than by increasing the densities of each type of housing, where it was proposed by Polservice, that about 20 per cent of the population of Baghdad should be housed in flats by 1990, it seems that there are still certain problems associated with high rise living, which are not yet appreciated by the planning authorities in Baghdad. The following are some of these problems:

1. High rise blocks of flats are usually more expensive to build than buildings of conventional height. Figures obtained from the British experience may help in this respect, where it has been found that to build a block of flats of ten storeys in London, it will cost about 35 per cent more than one to two storeys dwelling.[15]

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15. see, P. Stone, "Urban Development in Britain: Standards, Costs and Resources, 1964 - 2004", Vol. 1, Cambridge University Press, p. 121.

2. Building high presents a series of technical problems, such as cooling and waste disposal, these can only be solved by spending yet more money.

3. Another problem which is not related to cost, and that is the siting of high residential building, which involves more complex problems than is often appreciated, even by the local professionals, i.e. arcnitects. High buildings, which may appear to be the best answer locally, may have disastrous effects over a wider area and may destroy the scale particularly if it is sited in small communities. Therefore, high buildings should be used with much greater discrimination than have been done or proposed in recent years, where the majority of the blocks of flats built in Baghdad were unsuccessful because their designers tried to solve high density problems with low density mentality; the same goes for the designing of high buildings in general.

4. Perhaps the outstanding problem facing the building of high rise dwellings in Baghdad, and in Iraq for that matter, is the question of solving the problems of climate and privacy. This problem manifested itself in the provision of sleeping roofs at night, particularly for the low and middle income groups. In this context, it has been found appropriate to refer to a proposal made by the author in 1972, as part of his professional practice as an architect in Baghdad. This proposal consisted of the design of four multi storey residential blocks to house low - middle income families, i.e. small retailers, in Baghdad.

The main features of the design was that in order to provide adequate outdoor sleeping roof for those families, and at the same time provide the necessary privacy, a double volume balcony, large enough to accommodate three sleeping spaces, and screened by hollow bricks, to provide enough visual privacy and allow at the same time air circulation, was provided to each flat. These balconies were arranged on alternate storey basis so as to achieve maximum auditory privacy from the above and below flats; see, Figs. (11.11; 11.12; 11.13 and 11.14).

Finally as far as housing density control is concerned, although it has been found that such control cannot prevent overcrowding within dwellings, since it has no power to limit household size or determine living habits. Nevertheless it seems possible that by imposing certain measures on housing designs can satisfy some of the objectives of density control.

At the present in Iraq, housing density control is exercised through the control of plot coverage, i.e. the percentage of ground coverage. This is done by the division of the residential areas of the cities into categories according to plot sizes, and imposing maximum allowable plot coverage, for instance, in areas of between 600 - 900 sq.m. plots, ground coverage should not exceed 45 per cent of the total area of the plot. This measure of controlling housing densities fail short because it did not control the overall size of the house to be built, i.e. the total floor space. Thus leaving people free to build at any size they feel satisfactory to their needs without regard to the effects of this freedom on the floor space rate and

FIG. (11.11) DIAGRAM SHOWING THE ROOFING CONCEPT FOR BLOCK OF FLATS , AUTHOR'S PROPOSAL

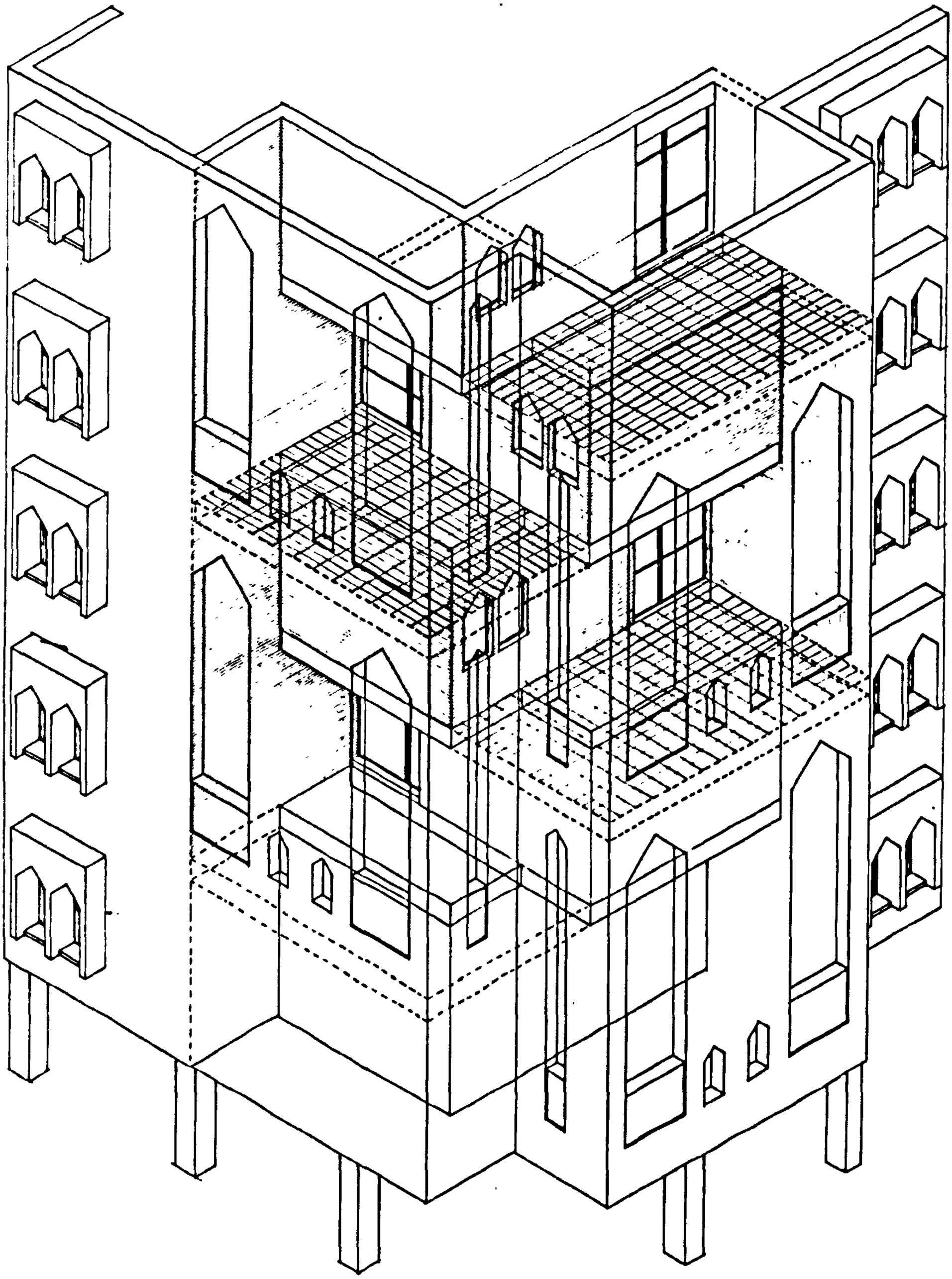


FIG. (11.12) TYPICAL FLOOR PLANS FOR BLOCK OF FLATS , AUTHOR'S PROPOSAL

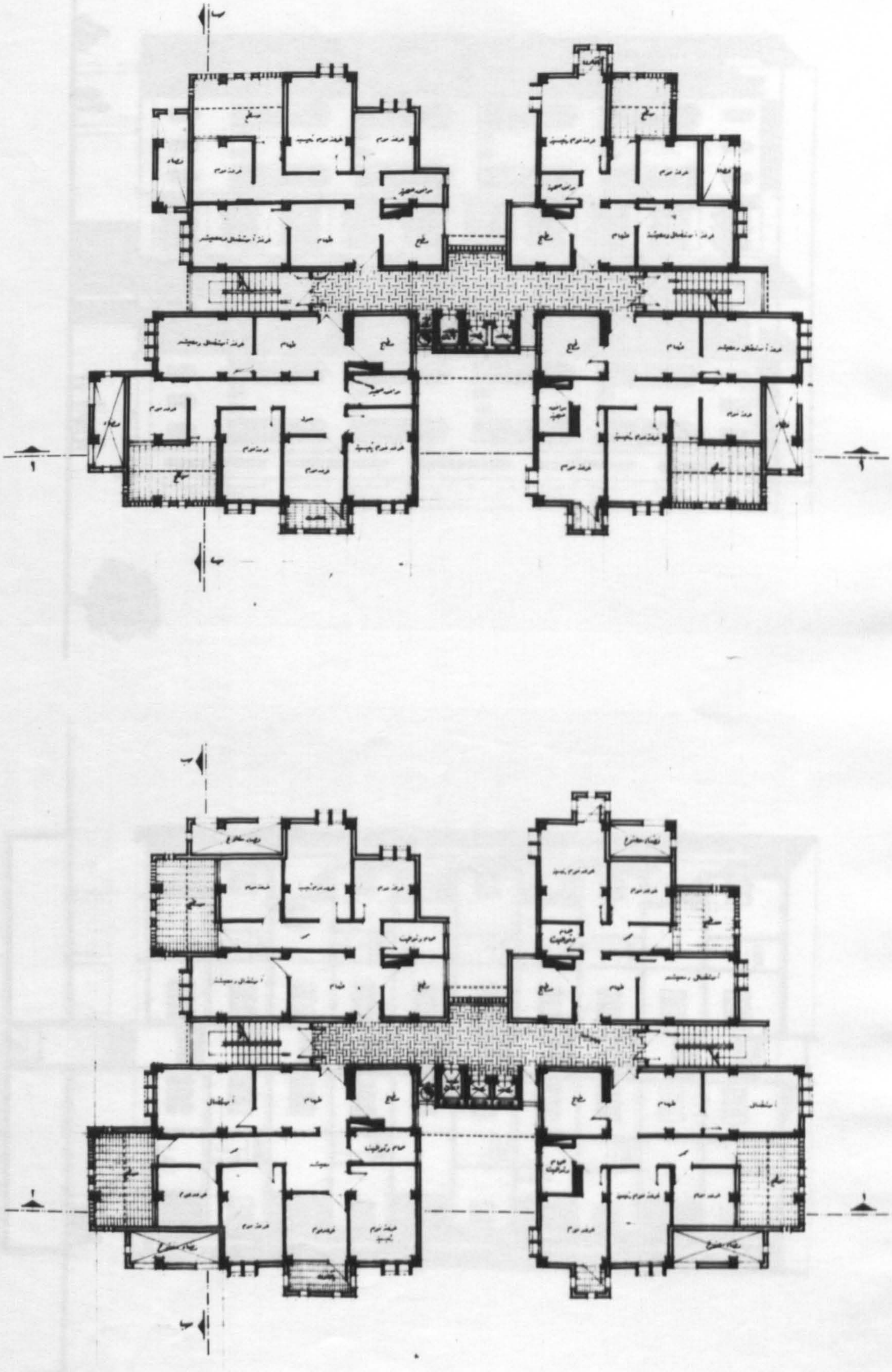
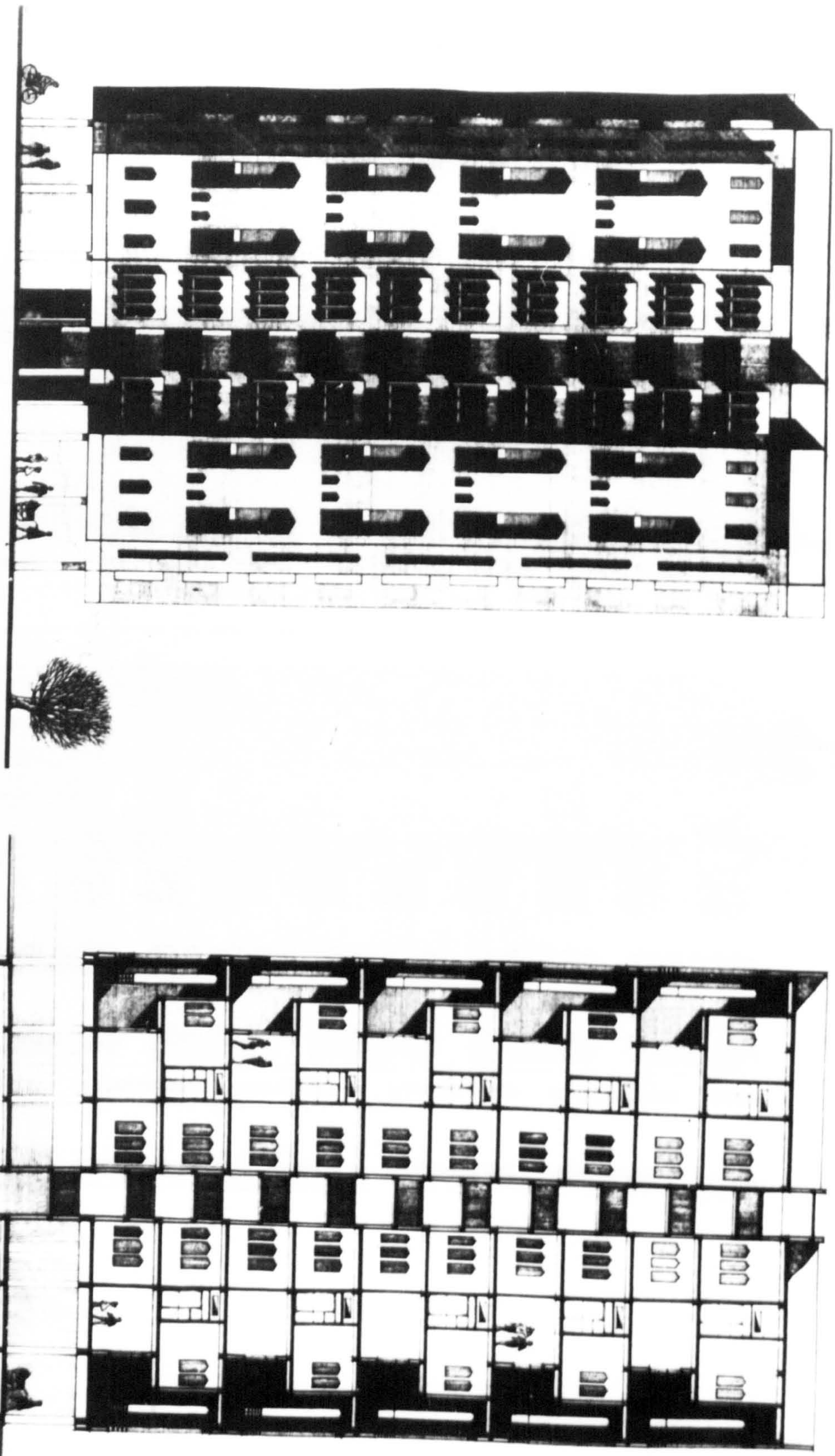


FIG. (11.13) ELEVATION AND SECTION OF BLOCK OF FLATS , AUTHOR'S PROPOSAL



A. ELEVATION

B. SECTION

FIG. (11.14) FRONT ELEVATION FOR BLOCK OF FLATS , AUTHOR'S PROPOSAL

the housing area ratio, and consequently on the overall standard of the area. [16]

The following is an attempt to control some of the aspects of housing densities which is found within the capability of the Municipality of Baghdad to reinforce, through the power it possesses in granting building permissions. These aspects are: see, Table (11.5).

1. Minimum setback of the houses from the front boundary of the plot:

The main objective of this control is to ensure better and safe access to the house, as well as provide the opportunity for tree planting in front of the houses, thus achieving better environmental conditions in the area in regard to climate, appearance, and privacy. This measure is particularly necessary in the case of relatively high density development, where the access roads are usually narrow, accompanied by lack of adequate open spaces. It must be emphasised here that excessive setbacks in houses, particularly in the case of small plots will restrict the full utilization of the plot, since these plots are usually occupied by low income people with large households, thus their need for space is much vital, particularly from the health point of view.

2. Settling a Maximum ratio of building area to plot size:

The main objective of this control is also to ensure better environmental conditions, particularly in regard to light, air movement between the houses, and better opportunities for tree

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16: in this connection Housing area Ratio may be defined as the total floor space within the housing area divided by the housing area; see, P.H.M. Stevens," Densities in Housing Areas", Tropical Building Studies, No. one, H.M.S.O., p. 18

planting. Another objective is to reduce the probabilities of maximizing the area of building on tne expense of quality, particularly in the large plots, which in turn be used for speculation purposes.

3. Maximum ratio of total floor area to plot sizes, which is the percentage of the total floor space to the area of the plot. The control of this aspect of house building is very important, since it is with the plot coverage, are the main contributers to the housing area ratio. The main objectives of controlling this aspect are first to ensure maximum privacy, since without it people will take advantage by building higher houses thus increasing the chances of overlooking their neighbours; and secondly, to ensure better physical appearance of the housing area.

4. Limitation on subdivisions of plots. The objective of this control is to ensure that small plots will not be subdivided into smaller segments to make way for the building of another house or an annexe, thus increasing the housing area ratio beyond the levels acceptable from the health, physical appearance, and privacy points of view. However, further subdivisions of plots may be allowed in the case of large plots, as long as the larger segment should not be less than 600 sq.m. The main reason for this condition is to prevent speculations, since it is likely that without this control people owning these plots, usually of high income groups,

will take advantage and subdivide their plots into smaller segments and either sell them or build small houses for rent, without regard to the implications of their action on the existing public service , environment and privacy.

The following table demonstrates the above suggested controls in relation to the sizes of plots:

Table (11.5)

Proposed Measures to Control the Building of One-Family Houses in Baghdad:

Plot Size sq.m.	Minimum Setback	Maximum Plot Coverage %	Floor Area Ratio %	Further Plot Subdivision
Up to 200	2.0 m.	70	140	Not allowed
201 - 300	2.5 m.	60	120	"
301 - 600	4.0 m.	50	100	"
Over 600	5.0 m.	30	70	Conditioned

It must be stated here that these controls are not to be regarded as a yard stick, since they depend on the location of the plots in relation to the city, traffic, community facilities, and indeed the densities prescribed in the recent master plan of the city; see, Appendix (1.5)

C H A P T E R 12

COST ANALYSIS AND RELATIONSHIPS

In this chapter, an attempt will be made to analyse the relationships between the main factors affecting the costs of the dwellings and the housing areas in Baghdad, using the available data, which are primarily published by the Central Statistical Organization in Baghdad, as well as information and calculations made and obtained by the author during the period, September 1972 - June 1973, from the different sources concerned with building in general and housing in particular in Baghdad. It must be stressed here that all the prices and costs involved in this study were adjusted to 1972 prices.

The main objective of this exercise is to arrive at a better understanding of the costs involved in housing and house construction and the relationships between the various aspects which affect such costs so that means and measures may be devised to reduce the costs in areas of house building where possible, thus helping the people, particularly those in the lower income groups, in their strive to acquire an economically and socially acceptable shelter within their present and expected financial capabilities.

In general, the factors that affect the cost of housing may be divided into two groups: Direct factors, which include the size, standard, and form of the housing, as well as its location in

respect to other urban activities; for instance, the form of housing affects the costs of developing the housing area, and through density it affects the amount of land required and hence its cost; see,(11.2.8). Dwelling size, standard and form jointly affect the cost of maintaining the dwellings and of providing the housing area services. The indirect factors affecting housing costs are mainly related to the national economic situation, which may be reflected in the rate of interest, which influences housing finance and consequently annual costs, also it is related to the government policies in regard to taxation, subsidies, and land provision.

Since the indirect factors have been discussed in more detail in previous chapters, this chapter will concentrate on the direct factors affecting housing costs. These factors can be divided into five categories and discussed separately; although they should not be considered as having an independent direct influence on housing costs. It is inevitable that there would be a cause and affect relationship between several of these factors, and where possible, this will be illustrated.

12.1.0 House Form and Cost:

As it has been stated earlier, the form of the dwellings is one of the main factors affecting the cost of the dwelling itself as well as the costs of the housing development and the land required for such development and hence its costs.

Housing form as it affect costs, means the relationship between dwelling types, storey heights and amenity standards. Although these factors generally have a predictable affect on cost for different house types, the actual design of the dwelling can also have a considerable affect, for example, the ratio of external walls to floor space or the number of external windows. [1]

In the U.K. experience for instance, it has been found that the cheapest form of housing is the terraced, because this form of development allows the sharing of the side structural walls as well as some the roof components; while the semi-detached dwellings are about 5 per cent more expensive, and the detached dwellings are about 10 per cent more. As for the block of flats, their costs in relation to the houses depends largely on their urban location, also on the number of storeys of the blocks. For example, it has been found that the cost differentials between 1 to 2 storey house and 6 storey block of flats is about 22 per cent, and this differential rises up to 44 per cent in the case of 15 storeys; On the other hand, the cost differentials in other provinces outside London of similar storeys are 39 per cent and 70 per cent respectively.[2]

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1. see, I.H. Seeley, "Building Economics", 1972, p. 18

2. see, Dr. P.A. Stone, "Urban Development in Britain; Standards Costs and Resources, 1964 - 2004", Cambridge University Press, Vol. 1, p. 121.

In the case of Baghdad, due to the absence of research data, and the fact that high rise living in Baghdad is still in its infancy stage of development, as well as the existing blocks of flats, were not built according to strict design and planning regulations in regard to building materials, space standards, fire precautions, etc.; see, (3.2.3) it is very difficult to assess with confidence the costs differentials between houses of different forms and the blocks of flats. Nevertheless, one may draw a tentative conclusion by referring to the Central Statistical Organization publications on construction and buildings, which suggests similar trends to that in the U.K. particularly as far as high rise living is concerned; for instance, it has been calculated that the average cost of medium construction standard, four rooms flat, within an average of 4 storeys block built in Baghdad during the period 1969 - 1971 was estimated to be about 37 per cent more than the average cost of 1 to 2 storey houses built during the same period; see, Appendices (3.5,3.10). Perhaps, the main reasons for this high cost differentials between low rise and high rise dwellings, are the very nature of the construction which implies the use of reinforced concrete for columns and beams, floors, as well as the use of piles for foundations in the high rise structures. These structural necessities for the high rise dwellings means that the structural components of the flats in the lower floors of the block will cost more than those of similar floor space in the upper floors, since they are supporting structurally the whole building, thus on average the cost for such flats is bound to be

higher than the low rise dwellings, where their structural components are supporting only the dwelling itself. Another important reason for the high cost differential is the use in the high rise dwellings of concrete staircases as a safety precaution in the case of fire and other hazards, this is in addition to the use of lifts and other electro-mechanical equipments for water supply and cooling if they are centrally designed. All these devices and structural necessities in the high rise dwellings leads to the conclusion that high rise living in terms of construction is always costs more than low rise living, but this conclusion does not mean that high rise living is always more expensive than low rise, since there are many other factors and variables involved which must be considered and costed, i.e. land saving, number of households to be housed, municipal services costs, and last but not least accessibility in relation to other urban activities.

12.2.0 House Size and Costs:

As it was stated one of the main factors affecting the cost of the dwellings is their size. This may be expressed by the floor space, since it gives an adequate measure of the amount of living accommodation and corresponds to the prevailing utilization of space, family structure, and the social and economic standards in Baghdad.

In order to examine the relationships between the floor space of houses and costs in Baghdad, it is of interest first to refer to the British experience in this field, which suggests that the

price of square unit of dwellings fall as their floor space increases. This may be illustrated by referring to a study made by Dr. P.A. Stone, which suggests that the cost per sq.ft. of a dwelling of 1175 sq.ft. of floor space is about 60 per cent per sq.ft. of a dwelling of 350 sq.ft. floor space, which is about 30 per cent of the first dwelling.[3]

In such a situation, since the price of dwellings rises apparently less than proportionately to increases in floor space, therefore one may conclude that it is not very costly to increase the amount of floor space per dwelling. As such, the provision of generous floor space is probably one of the cheapest ways of reducing the risks of early obsolescence, thus reducing maintanance costs. And the cost of housing large households in this case will be much less per head than the cost of housing small ones. Another consequence of the floor space - cost relationships is perhaps the difficulty arises in the provision of small dwellings at rents sufficiently low to attrace households declining in size away from larger dwellings so as to release them for larger households who are in more need for accommodation.

In the case of Baghdad, similar trends in the relationship between floor space of houses and costs may be found. This conclusion was based on the examination of five houses of different sizes and of similar construction standard - low cost construction - and occupied by one uniformed socio-economic groups i.e. group (A).[4]

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3. see, Dr. P.A. Stone, op.cit, p. 148.

4. these houses were selected from Western Baghdad Housing Development, Sector 10, which were designed by Doxiadis Associates; see, (4.1.0).

Table (12.1)

Basic Data of Five Low Cost Houses in Baghdad: see, Figs. (12.1 and 12.2).

House Types	1	2	3	4	5
A	120	160	5	14	39
B	112	122	4	14	24
C	100	80	2	12	16
D	45	52	2	6	9
E	80	87	2	12	15

Notes:

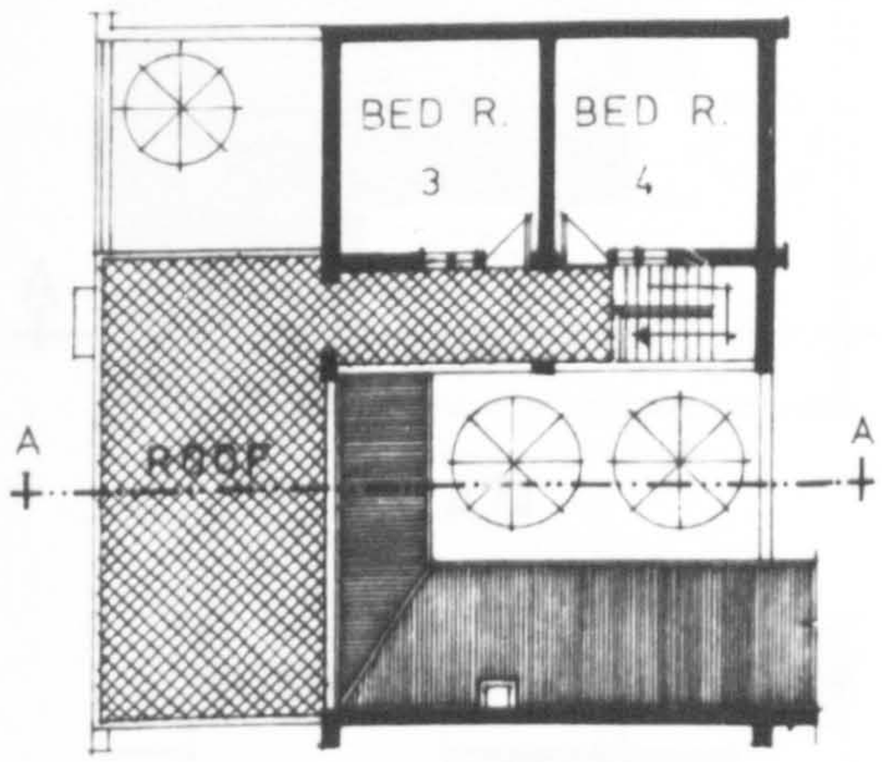
1 Plot Area, sq.m.
2 Floor Space, sq.m. including 50 per cent of the roof area.
3 Habitable Rooms, excluding: Kitchen, Bath, Store and Toilet.
4 Services Area, sq.m. including: Kitchen, Bath, Store and Toilet.
5 Circulation Area, sq.m.

The analysis of the above data illustrate that while the floor space of house (A), which is 160 sq.m. drops to 122 sq.m. as in house (B), the cost per sq.m. increased from 12.5 to 13.0 ID/sq.m. More dramatic increases in the unit cost may also be noted when the floor space drops to 52 sq.m. as in house (D); see, Table (12.2). The main reasons for such a trend is that the provision of standard amenities such as a bathroom, toilet, washbasin or kitchen sink, and the associated services, tends to represent a constant in the houses cost, regardless of the sizes of the houses; see, Table (12.1) Another factor contributes to such a disproportionate relationship between house sizes and costs, which is independant from the size of the houses, is the spatial distribution of the floor space,

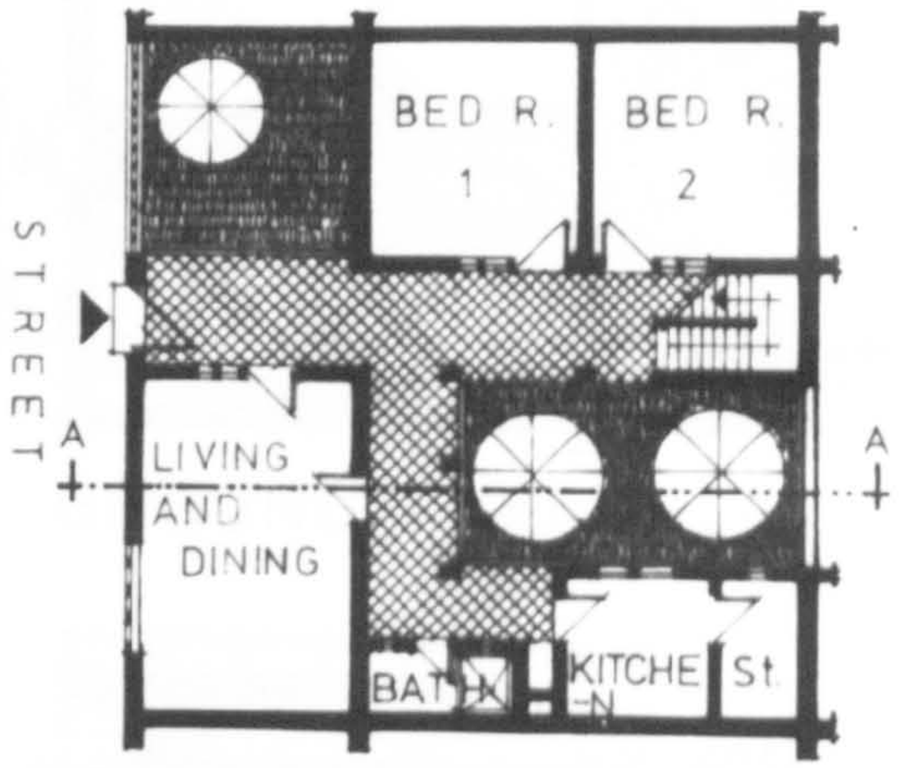
FIG.(12.1) HOUSE TYPES

WESTERN BAGHDAD HOUSING DEVELOPMENT

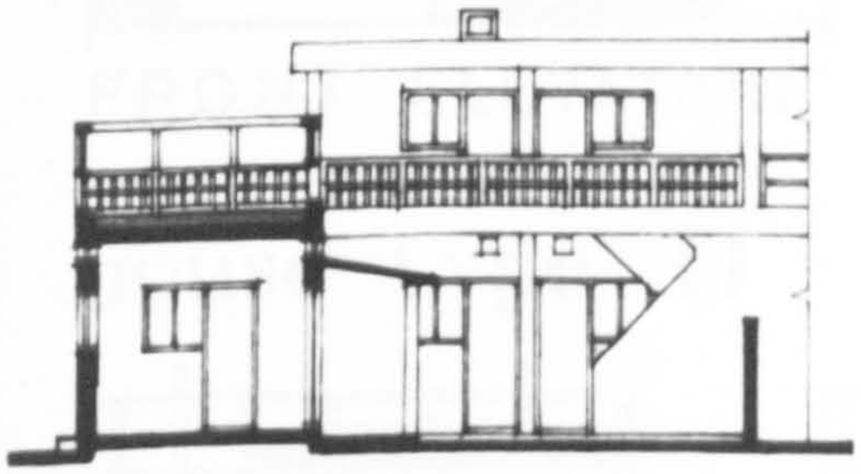
house type A



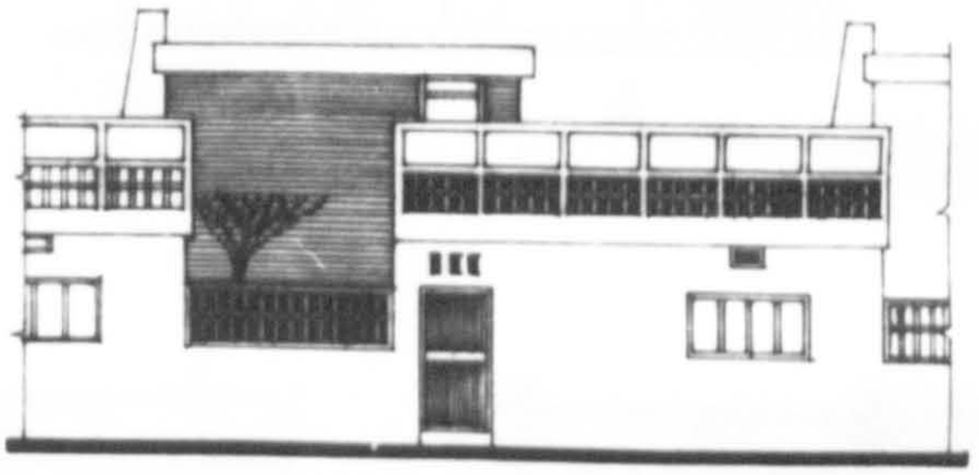
FIRST FLOOR PLAN



GROUND FLOOR PLAN

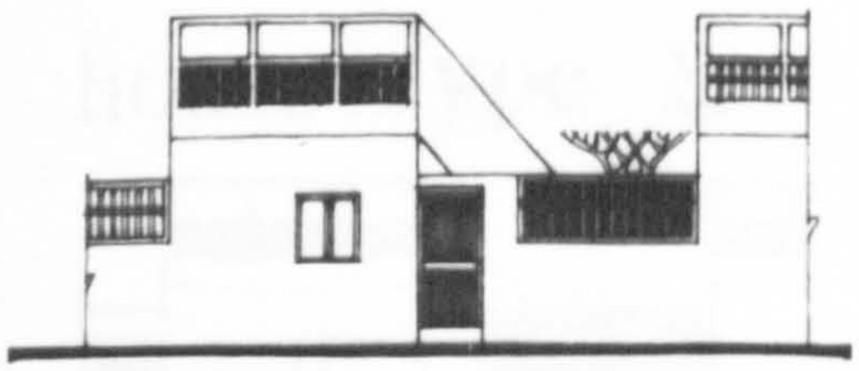


SECTION A-A

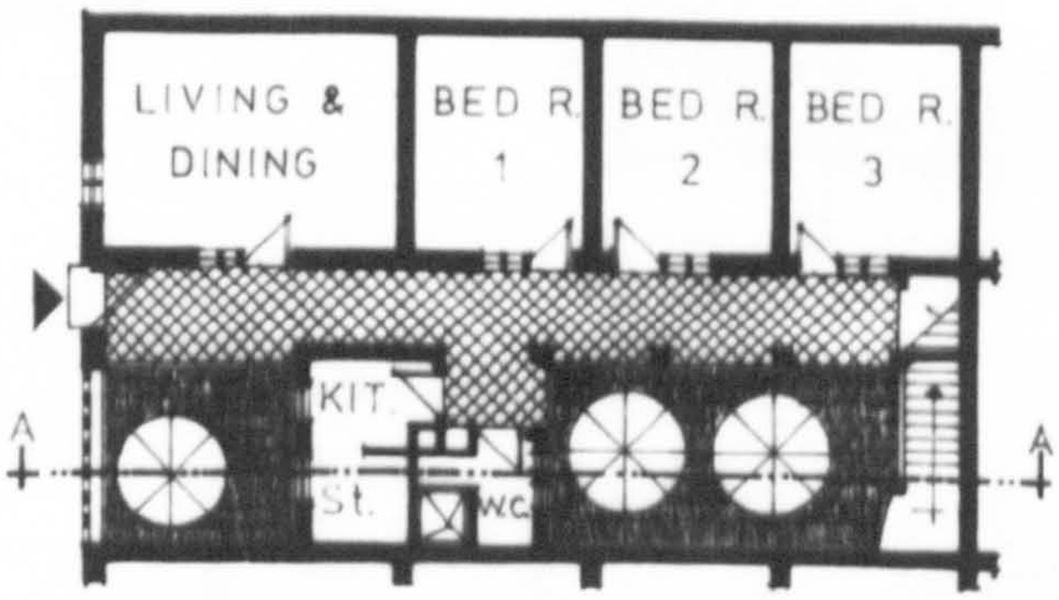


FRONT ELEVATION

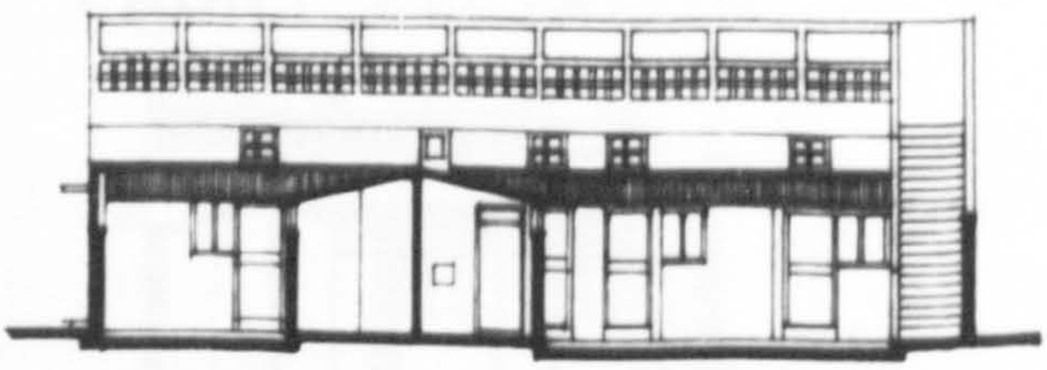
house type B



FRONT ELEVATION



GROUND FLOOR PLAN



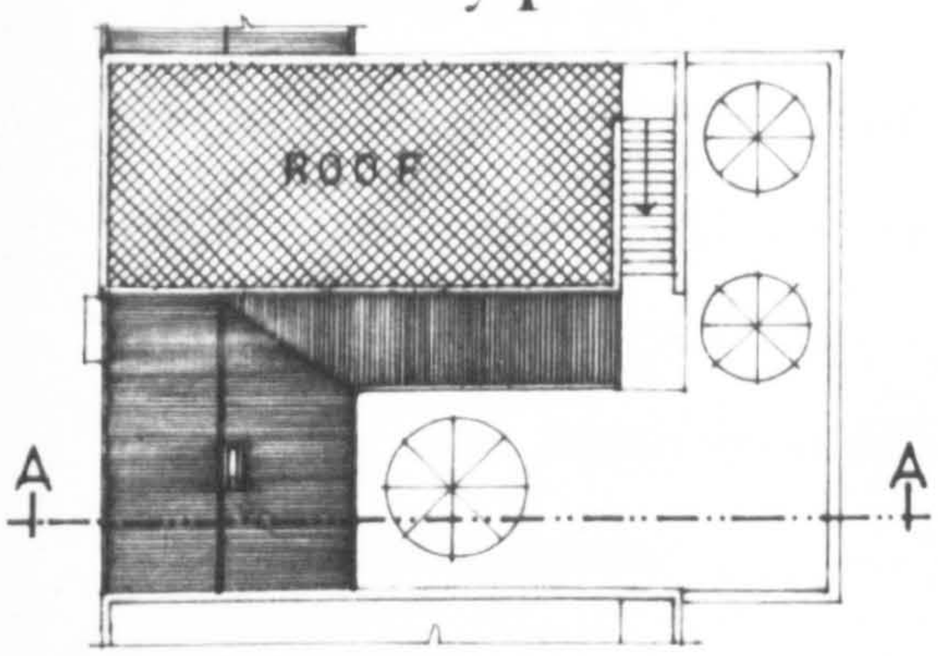
SECTION A_A

SCALE 1/200

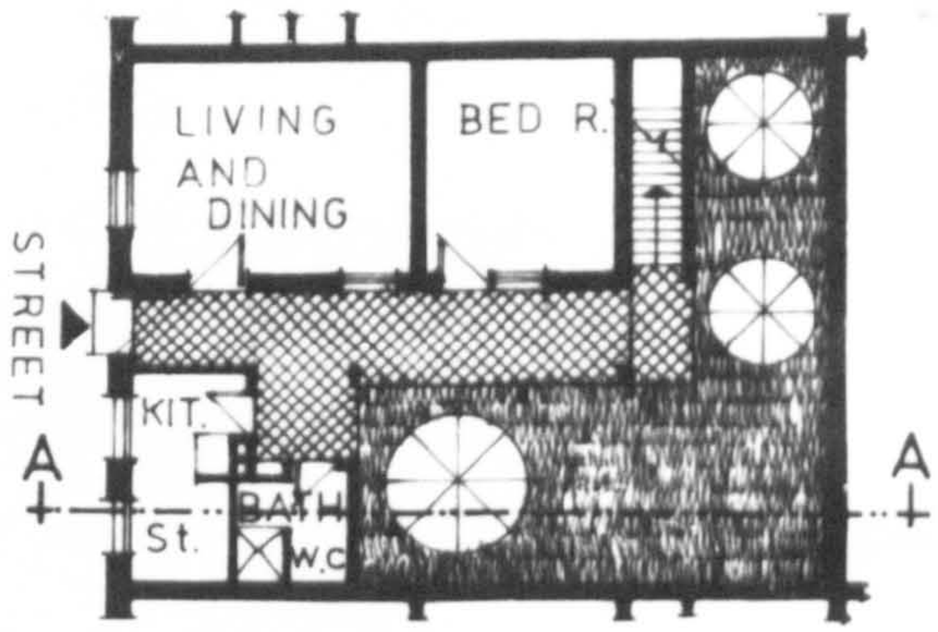
0 1 3 5 9m.

FIG.(12.2) HOUSE TYPES
WESTERN BAGHDAD HOUSING DEVELOPMENT

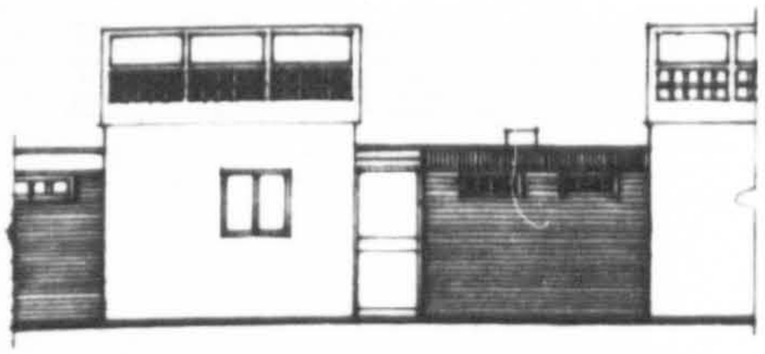
house type C



ROOF PLAN



GROUND FLOOR PLAN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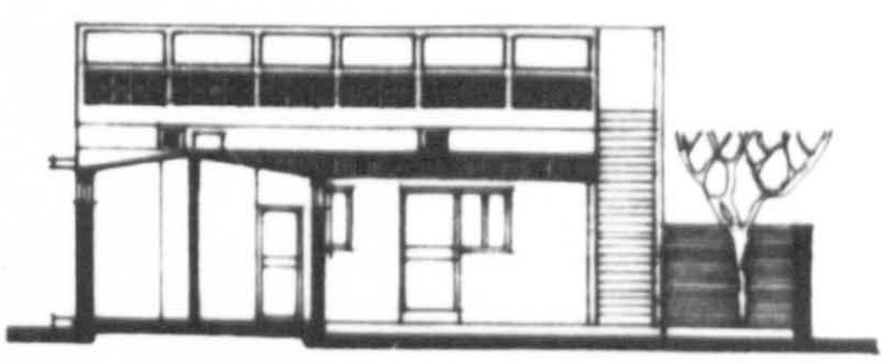
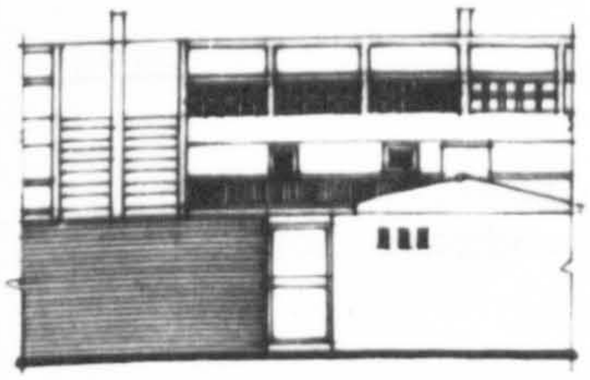
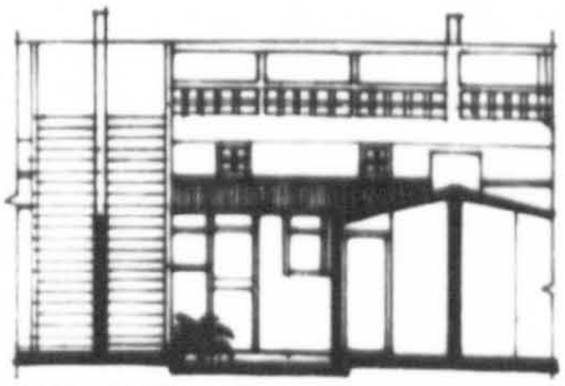
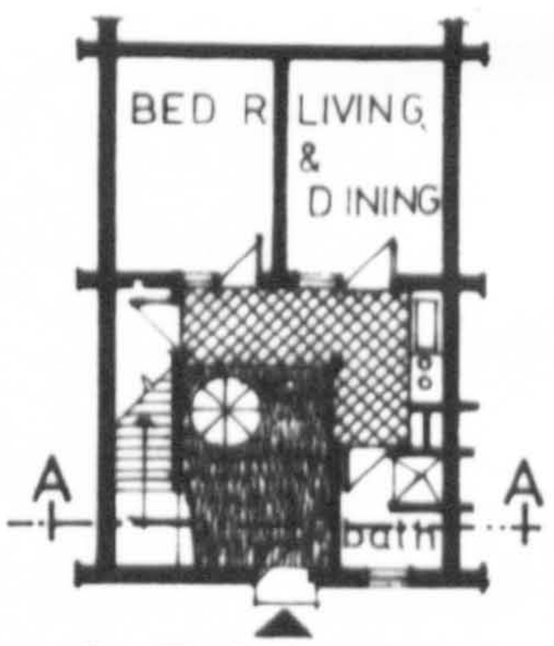

SECTION A_A

house type D

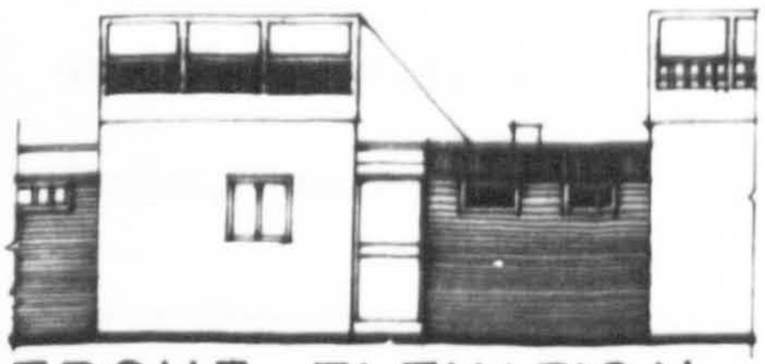

FRONT ELEVATION

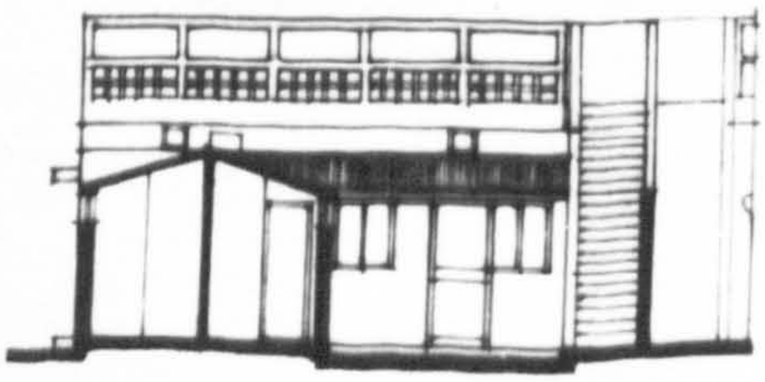

SECTION A_A

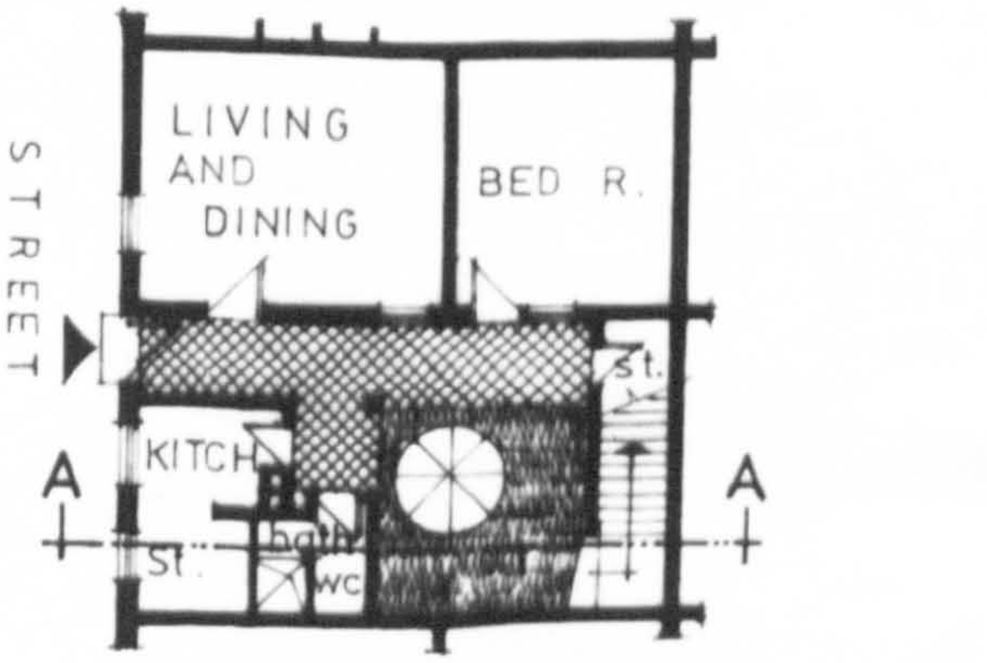


G. FLOOR PLAN

house type E


FRONT ELEVATION


SECTION A_A



GROUND FLOOR PLAN

SCALE 1/200

0 1 2 4 6 10m.

according to floors. For instance, if large percentage of the floor space was built in the first floor, this will tend to reduce the unit cost as compared with the same amount of floor space if lower percentage was built on the first floor; this is primarily because building in the first floor will require less cost per unit since it requires no foundations, and can be built with thinner walls.[5]

Table (12.2)

The Relationship Between Floor Space, sq.m. and Unit Costs, ID/sq.m. of Five Houses in Baghdad, 1972 prices:

	House Types				
	A	B	C	D	E
Floor space, sq.m. =	160	122	80	52	87
Unit Cost, ID/sq.m. =	12.5	13.0	14.7	15.4	14.0

Note:

The calculation of the Unit Cost was based on the prices of major construction operations; see, Appendix (12.1).

12.3.0 Maintenance Cost:

In general, maintenance costs of dwellings are affected by the dwelling's age, design, form, size and use, and also by external factors such as climate, and sometimes location.

5. it has been estimated that the cost of foundations on average represents about 18 per cent of the total construction cost; see, Table (12.5) and Fig. (12.6).

The level of expenditure on housing maintenance depends also on the economic life of the building; for instance, if a dwelling is approaching the end of its design life, then money spent on maintenance would represent a poor investment to the owner, and the continuation of such expenditure will be worth while only if it is lower than the annual cost for a new dwelling; see, (5.3.0).

Housing maintenance may be divided into two types:

a. Regular or constant, which includes internal and external re-decoration, and the replacement of parts of equipment which are subject to heavy use, and not durable in nature. This type of maintenance may be needed every two or three years.

b. Replacement and Repairs, this includes the repair of items which are more durable, also the replacement of equipments or the introduction of equipments made necessary as the standard of living rises.

In Baghdad, regular maintenance costs such as external decoration are largely related to the type and area of the exposed surfaces of walls and roofs, and effected by the climatic factors and the nature of building materials used. For instance, the use of plastering and paints on exposed walls and wooden frames for windows and doors require higher cost for maintenance than the use of face bricks and steel frames.

The main reasons are the effects of the dramatic differences in temperatures between day and night, as well as between summer and winter; see, Fig. (11.7), also by the frequent occurance of dust storms which affect the original colours and textures of the exposed building materials. As such, the cost of external maintenance are affected by the size of the room, and consequently by the total surface area of the dwelling. Similar affects of the climate may also be observed in the maintenance of gardens, where due to the dry and dusty climatic conditions, the costs involved in maintaining such gardens are relatively high, and depend largely on the size of the gardens and the type of plantations. For instance, the cost to maintain grass in good condition in Baghdad is much higher than that in the U.K. since it needs constant watering, while dates palms do not require substantial costs to maintain. As for internal maintenance, the main items involved which need frequent attention are: wall paintings, toilet and kitchen appliances, and floor tiles. Others such as wiring and plumbing, and wood work also need maintenance, but not so frequent as the previous items.

The main factors which contribute to the cost of regular internal maintenance are the extensive use of spaces as a result of overcrowding and the presence of large proportion of children in the household particularly in the low income groups; see, (3.3.1), also it is related to the way in which the spaces and equipments are utilized.

Although the cost of maintenance are affected by the size of the dwellings, i.e. floor space, the increases in such costs are not always proportionate to the increases in the floor space. This is mainly because items such as the number of doors and windows, kitchenand toilet appliances which account for a large proportion of the maintenance costs do not necessarily increase in number with an increase in the floor space.

This may be illustrated in Table (12.3), where an attempt was made to calculate the maintenance costs needed for three low cost construction standard houses, fifteen years old, and in medium condition, of different floor space, i.e. 70, 150 and 220 sq.m., this calculation shows that while the costs of maintaining these houses increased by 50 and 85 per cent, the floor space has increased by 144 and 214 per cent respectively.[6]

Table (12.3)

Composition of Costs of Arrears of Maintenance and Repairs for Three Low Cost houses, Fifteen Years Old, Medium Condition, in Baghdad, ID, 1972 prices:

Item	Floor space sq.m.		
A. Regular Mainteance, every 3 years	70	150	220
a. Internal:			
Plastering and Painting	20	30	45
Washers for taps, etc.	1	1	1
Others	2	3	3
b. External:			
Painting, etc.	10	15	20
Garden	2	3	4
Others	2	2	3
Sub - Total	37	54	76

5. these houses were selected by the author from the western Baghdad housing development on the basis of equal physical conditions; and the costs of maintenance were based on the 1972 construction prices, arrived at with the assistance of local contractors.

B. Replacement and Repairs, every 10 years

a. Internal:

Floors	15	20	30
Sanitary fittings	5	7	10
Electrical installations	3	5	5
Cooling installations	5	5	7
Kitchen fittings	7	10	10
Others	3	3	5

b. External:

Roof	10	15	20
Brick work	7	10	10
Concrete work	7	10	15
Windows	3	5	5
Pavements	5	7	7
Facing	7	10	12
Others	3	5	5
Sub-total	80	122	141
Grand Total	117 ID	176 ID	217 ID

Source: Based on the author's assessment with the help of local contractors working with the firm of Hisham A. Munir and Associates, Baghdad, Iraq.

The form of the dwelling also affects maintenance costs, for instance, dwellings in flatted blocks usually cost more to maintain than ordinary low rise houses. This is mainly because of the communal spaces in the blocks of flats, such as halls, corridors and playing grounds, also because of the maintenance of expensive services, especially lifts. In addition, maintenance requires far more organization and equipment on tall blocks.[6]

6. Although, there are no figures on the maintenance cost in relation to the form of housing in Baghdad, it is of interest to refer to the situation in the U.K. where it has been found that flats in blocks of between 2 - 4 storeys usually cost about 13 per cent more to maintain than houses or bungalows and flats in tall blocks cost up to 39 per cent more; see, P.A. Stone, op.cit., p. 154.

Maintenance costs are also affected by the age of the dwellings. This is particularly significant in Baghdad and in Iraq in general where dwellings deteriorate at a faster rate than it should be, particularly in comparison with other developed countries, such as the U.K., where it has been estimated that the annual maintenance cost increases only slightly with increases in the life of the dwelling.[7] The main reasons for such rapid deterioration in the physical conditions of dwellings in Baghdad with the consequent increases in the maintenance costs are:

a. The relatively low standard of the main building materials such as bricks, particularly those produced in recent years;

b. Extreme climatic conditions, which tend to effect the durability of building materials;

c. Failure by the majority of households to carry out regular maintenance, particularly in the rented dwellings; and

d. Excessive use of the spaces due to overcrowding.

Little data is available on the national expenditure on maintenance works for housing, this is primarily because these works were carried out by the private sector. Nevertheless, data provided by the Central Statistical Organization, based on the applications for permits by individual households for repairs and renewals

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7. According to Dr. P.A. Stone, the annual maintenance cost for a dwelling with a life of ten years would be about £23, this cost would be only about £25 for a dwelling with a life of thirty years; see, P.A. Stone, op.cit. p. 154.

shows that the average annual expenditure per dwelling in Baghdad is about 2.5 times more than in Iraq as a whole. This trend reflects mainly the relatively high standard of living and incomes in the city as compared with the rest of the country, and also the higher unit price differences. Table (12.4) illustrates the average annual expenditure on housing repairs and renewals per dwelling in Baghdad and Iraq by the private sector during the period 1968 - 1971, and shows the relatively low level of expenditure as compared even with the amount of expenditure needed to maintain a low cost houses of medium construction; see, Table (12.3).

Table (12.4)

Average Annual Expenditure on Housing Repairs and Renewals per Dwelling in Iraq and Baghdad, by the Private Sector, 1968 - 1971; see also Appendix (12.2)

	1968	1969	1970	1971
Iraq:				
Repairs	0.320	0.350	0.400	0.370
Renewals	-	2.210	2.780	2.800
Baghdad:				
Repairs	0.670	0.660	1.000	1.040
Renewals	-	5.380	7.180	7.200

Source: Data compiled by the Author from the Central Statistical Organization Publications, 1969 - 1971, Baghdad.

This low level of expenditure on housing maintenance by the private sector, particularly by the low income groups calls for government intervention with the objective of maintaining the housing stock at all times in good physical condition so as to satisfy the basic safety and health requirements. This does not mean that maintenance expenditure will cover the provision of additional equipments to the housing or providing renewals merely because fashion has changed, since these are problems of changing standards which are related to the increases in incomes and standards of living generally. However, where renewal is necessary because the component or equipment has ceased to function properly, then replacement should be according to the contemporary style and standard.

The government, in its attempt to raise the quality of the existing accommodation and contribute to increase the level of housing maintenance, has the choice of trying to force the owners, literally, to keep their house in order, or alternatively, it can bypass the owners completely by acquiring the dilapidated properties and renovating or replacing them itself.

The basic difficulty in carrying out the first policy is that the measures intended to improve the condition of the rented dwellings may lead at the same time to higher rents. As, in general, families only live in sub-standard dwellings because they cannot afford those of a higher standard, the provision of better but

more expensive accommodation is hardly a satisfactory solution to the problem. If owners spend more on repairs and maintenance and on the installation of amenities, they will want to recoup the increased cost in increased rents. [8]

If the government attempts to protect the tenant by insisting on the repairs and the provision of amenities but forbids any rent increases, then the owners are likely to resist this diminution of their income by delaying repairs and maintenance as long as possible or by skimping the work on the improvements in order to save costs. And if the owner's return on his property drops too low, he may prefer to abandon it altogether. This situation requires the provision for periodic review of rent controls so that maintenance renders economic for owners.

Another way of dealing with the problems of housing maintenance is by granting loans or subsidies to the owners to carry out maintenance work; this may be done either on a lumpsum basis, or proportionate to individual needs. In either way strict inspection and control must be made to ensure that the money was spent on carrying out essential maintenance work, not on something else.

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8. Although the government introduced a legislation in the form of a Rent Law, No. 67, 1973, to deal with this particular problem, where it was stated that the annual rents of houses must not exceed at any circumstances 7 per cent of the assessed value of the house, and that investments made by the owners for maintenance and repairs must not be less than 10 per cent of the total rents for the period between the date of construction of the house, this legislation of rent control proved inadequate due to lack of enforcement and rapid increases in housing demand; see, (3.3.3).

12.4.0 Construction Standards and Costs:

Increasing the floor space in relation to the number of persons in the household is only one way of increasing housing standards. They can also be raised by providing additional and better equipment and fittings, better finishes, and by improving access, circulation and external space, including, for instance, garaging, stores, boundary screens and landscaping.

Improving standards not only increases costs of construction, but frequently increases running costs. Additional floor space used to obtain greater spaciousness in the same number of rooms usually has little effect on maintenance or other running costs, but these costs rise when the extra space is provided in the form of additional rooms. Additional fittings usually add to the maintenance costs for their renewals, repairs and cleaning. Additional services also add to the maintenance costs in this way, and add to the consumption and cost of fuel.

Finishes which are self-cleaning, or at least permanently decorated, will have lower maintenance than those needing frequent decoration, but their physical life may not be very long, or early replacement may be necessary as a result of a change in tastes and fashions.

The following is an attempt to analyse the distribution of construction costs of three representative houses of low, medium, and high standards in Baghdad so as to assess the

relationships between housing standards and construction costs, and identify the areas of construction where costs are usually higher than others and where economies and other techniques may be applied, such as direct government subsidy, new building materials, or industrialized construction process.

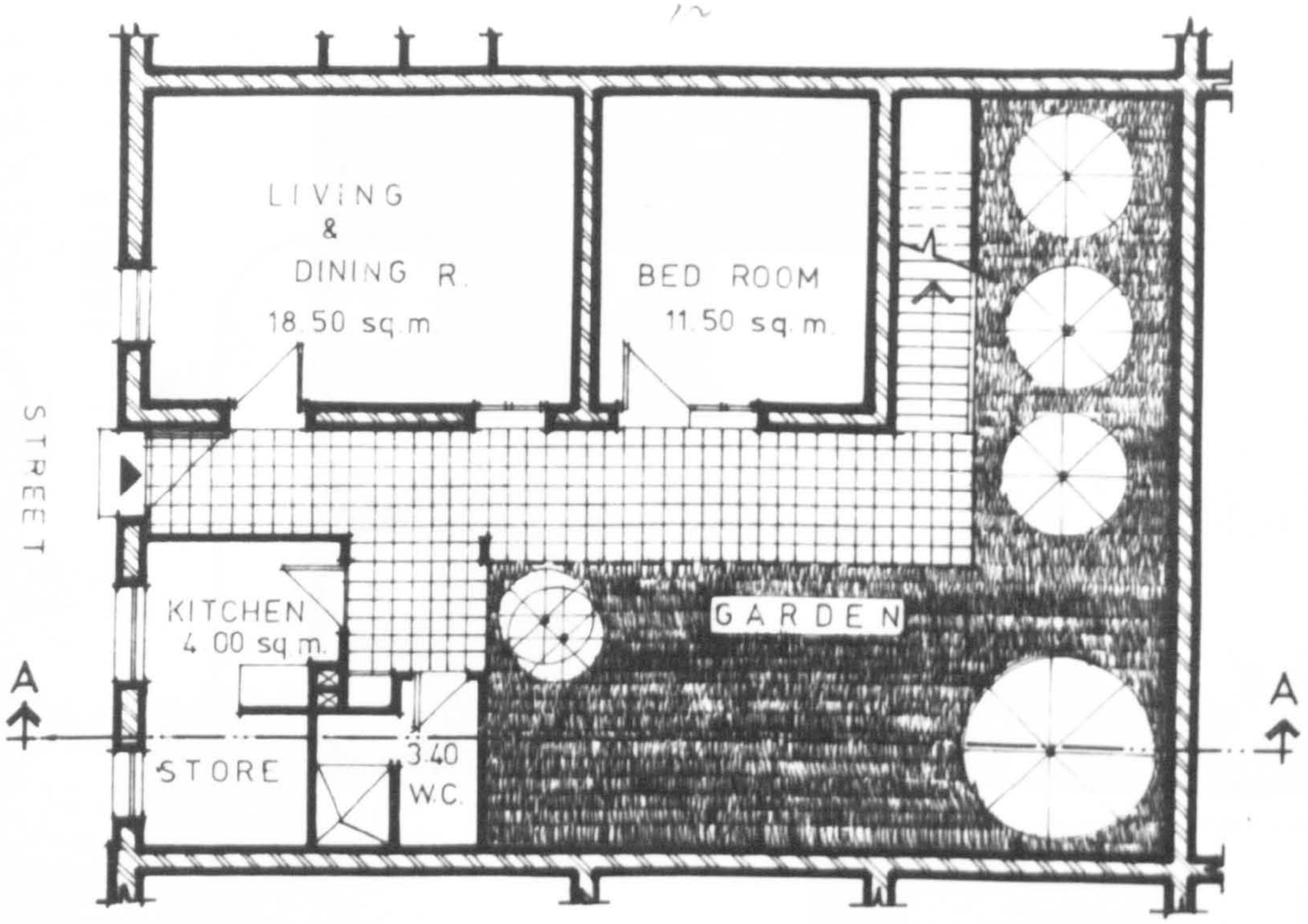
The houses used in this analysis are shown in Figs. (12.3, 12.4 and 12.5), two of them, i.e. the high and medium construction standards, were designed by the Author in 1969 during his professional practice as an architect; while the low construction standard house is part of the western Baghdad housing development, designed by C. Doxiadis Associates in 1958. The main factor determined the choice of those houses is that they are representatives in terms of space standards, building materials, finishings, and construction techniques.

Appendix (12.3) illustrates the basic characteristics of these houses which includes particulars on the structural system, finishing and utilities.

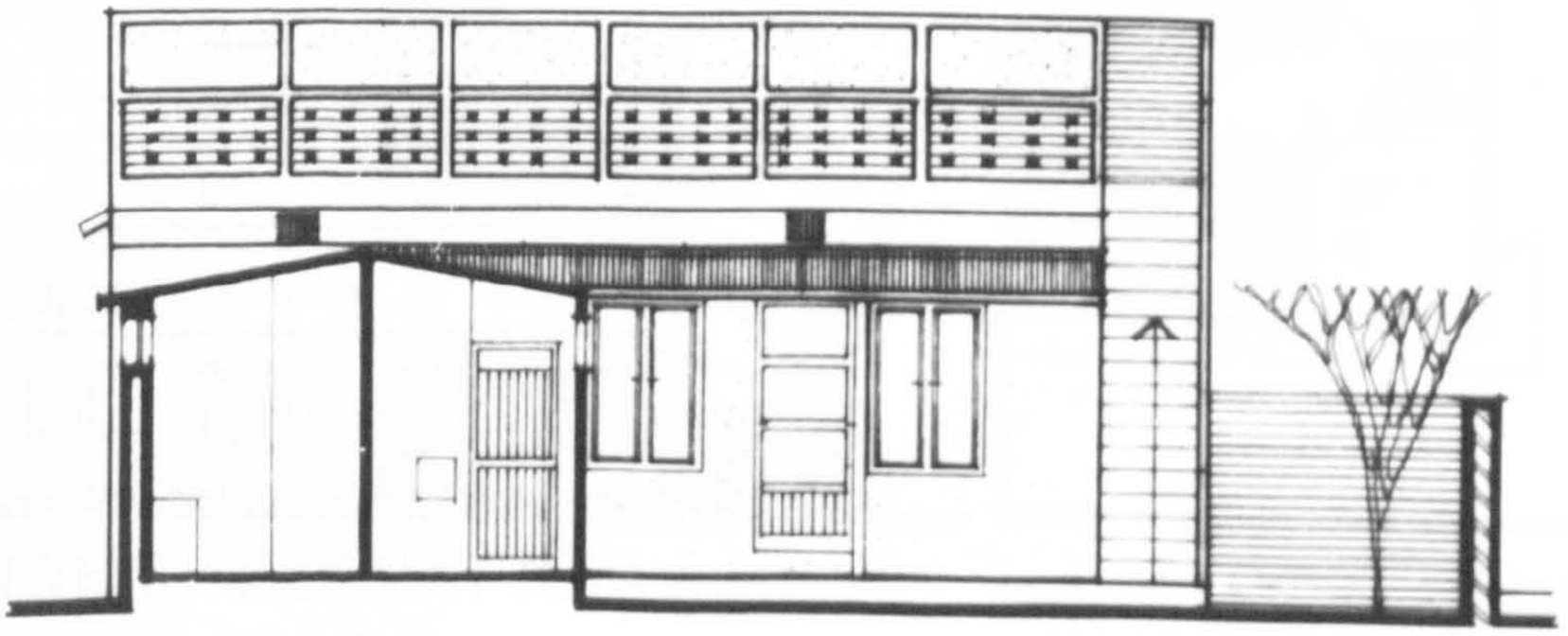
In order to assess the cost distribution, the entire construction process was divided into four main stages, corresponding to the nature of construction and use. These stages in turn are divided into items containing the specific construction operations as follows:

FIG. (12.3) TYPICAL LOW COST HOUSE

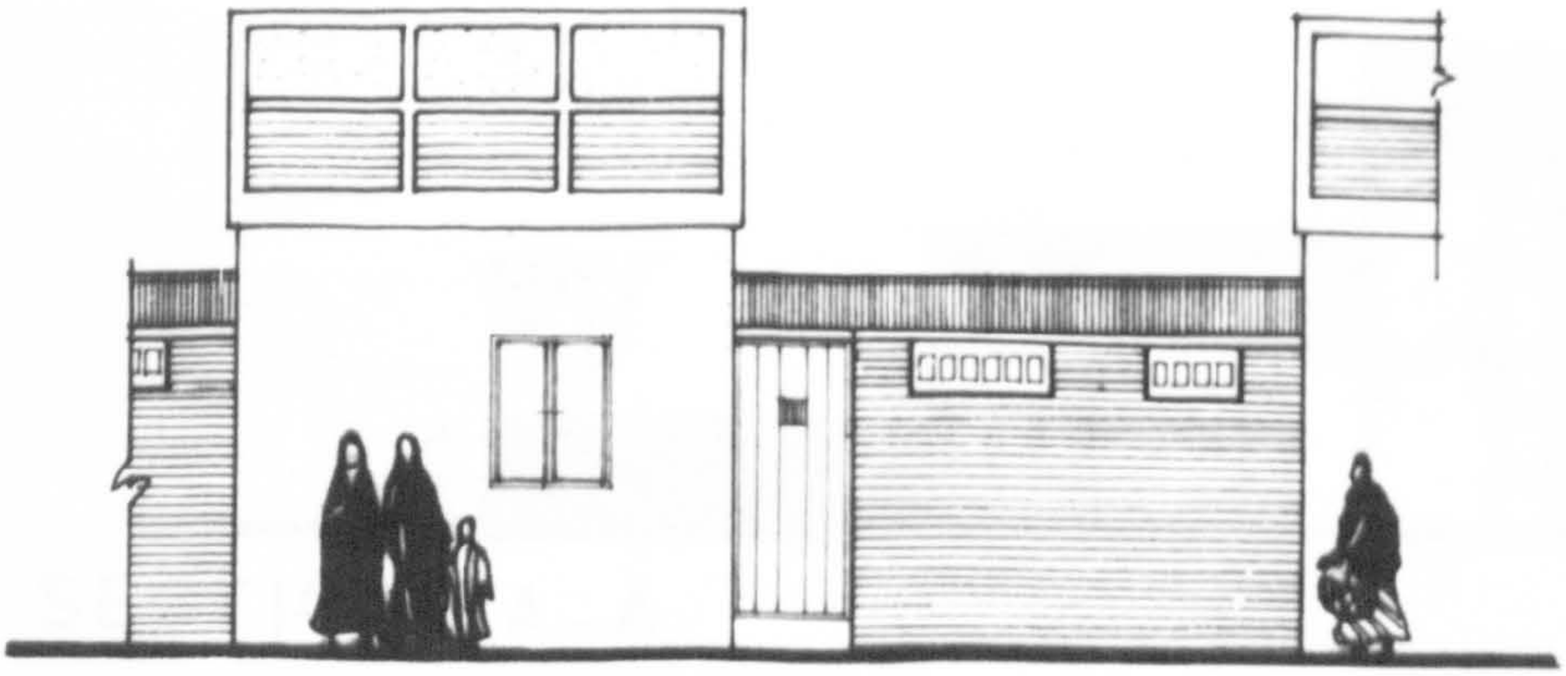
WEST BAGHDAD HOUSING PROJECT



GROUND FLOOR PLAN



SECTION A_A



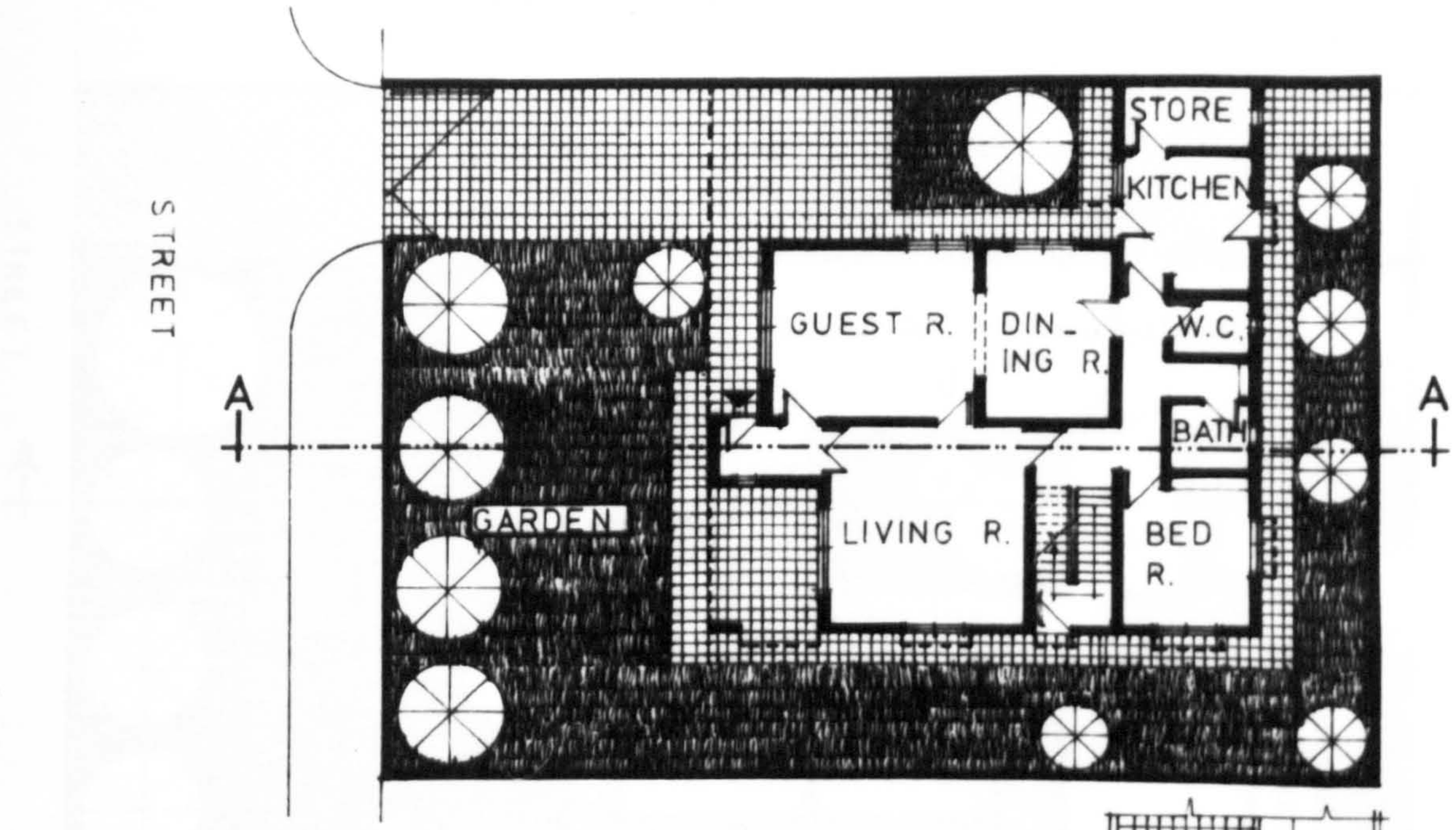
FRONT ELEVATION

SCALE 1/100

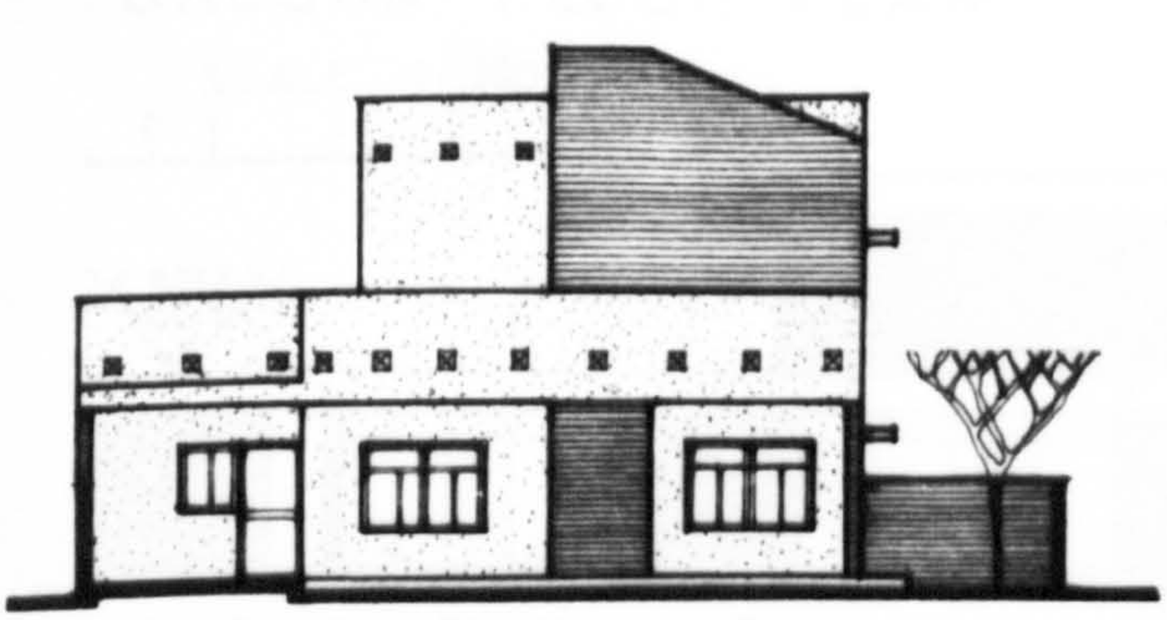
0 1 2 3 4m

FIG.(12.4) TYPICAL MEDIUM COST HOUSE

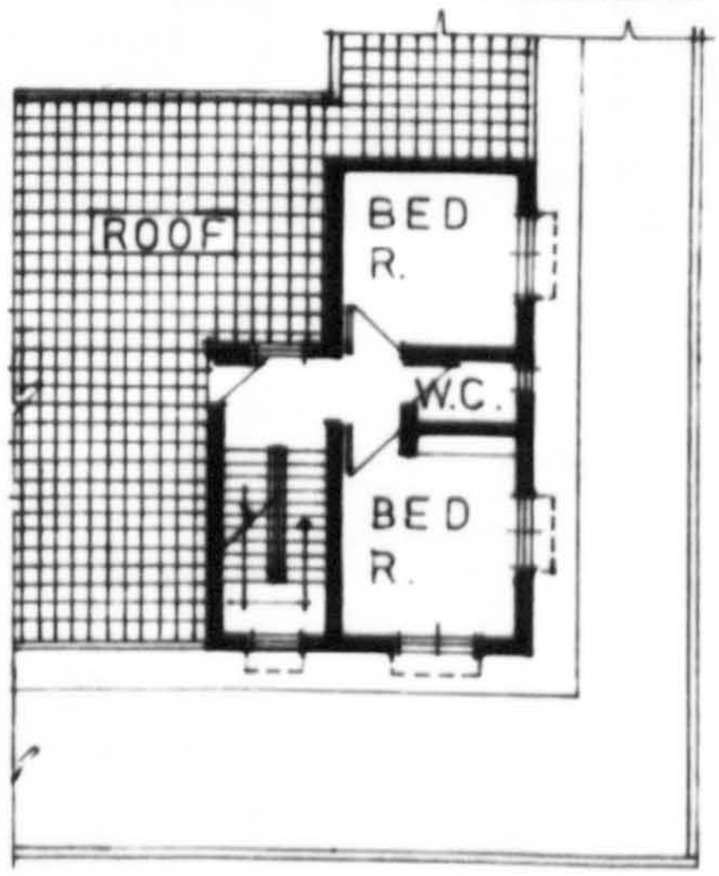
BAGHDAD_ AUTHOR'S DESIGN _1969.
CLIENT: Mr. A. AL_AJRAM.



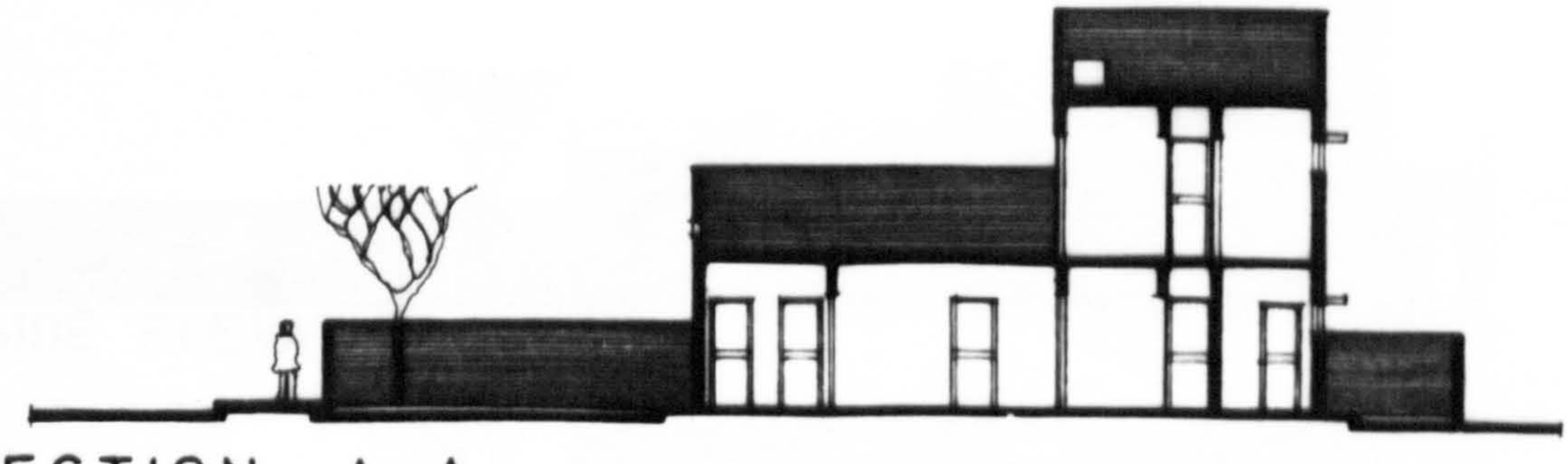
GROUND FLOOR PLAN



FRONT ELEVATION



1st. FLOOR PLAN

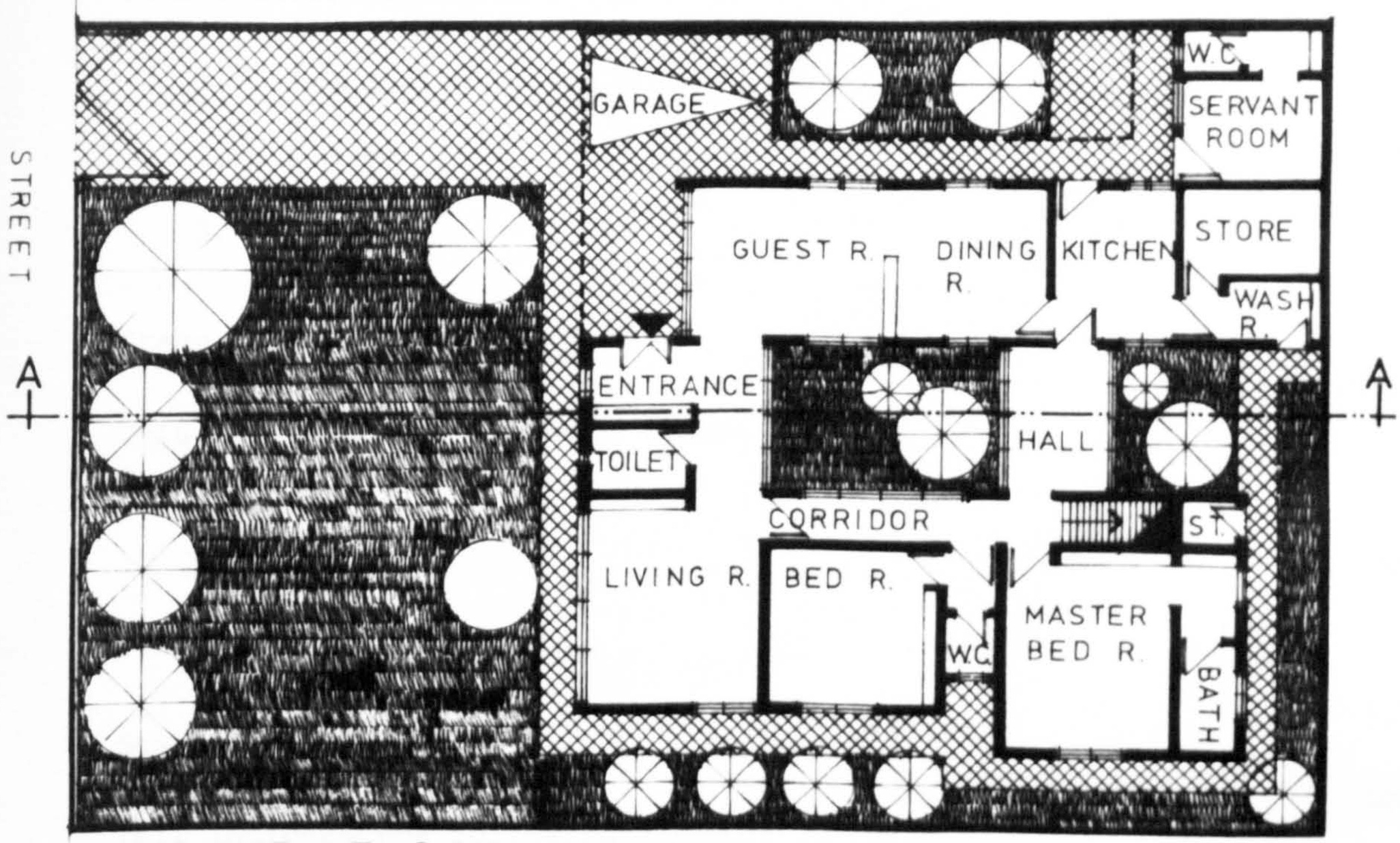


SECTION A_A

SCALE 1/200
0 1 2 4 8m.

FIG.(12.5) TYPICAL HIGH COST HOUSE _ BAGHDAD

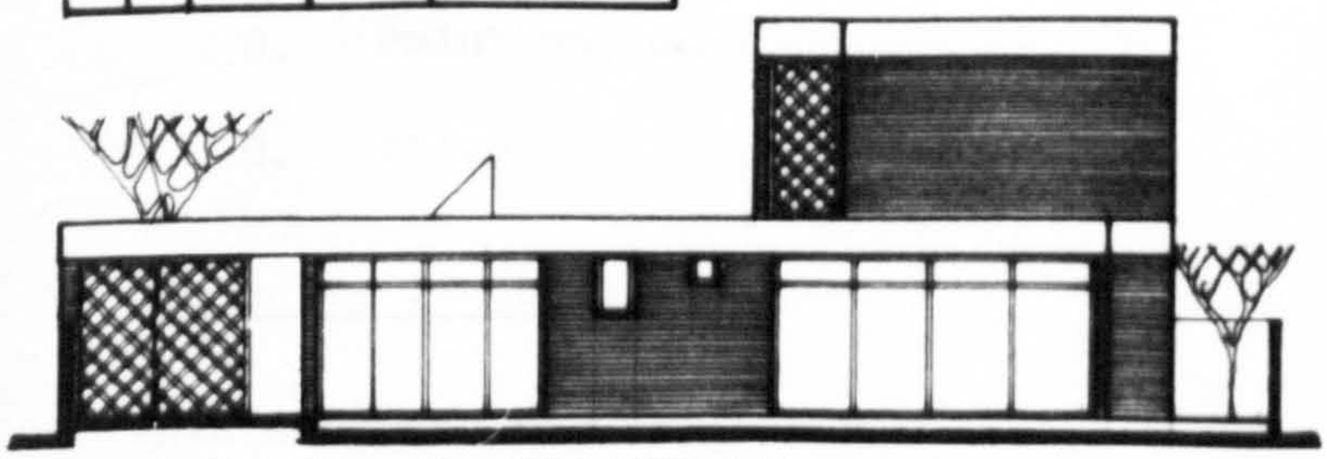
AUTHOR'S DESIGN _ 1969 . CLIENT: Mr. N. AL-DAHHAN



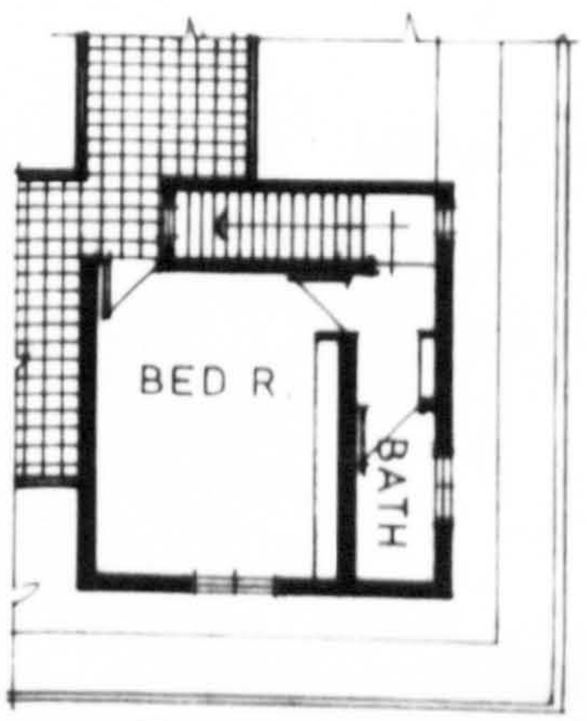
GROUND FLOOR PLAN

SCALE 1/200

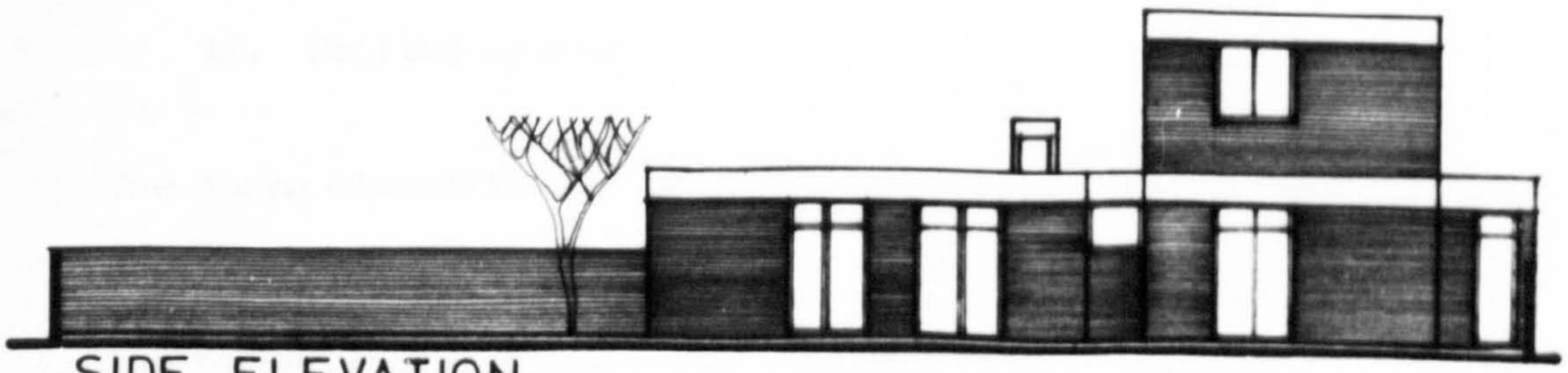
0 1 3 5 9m.



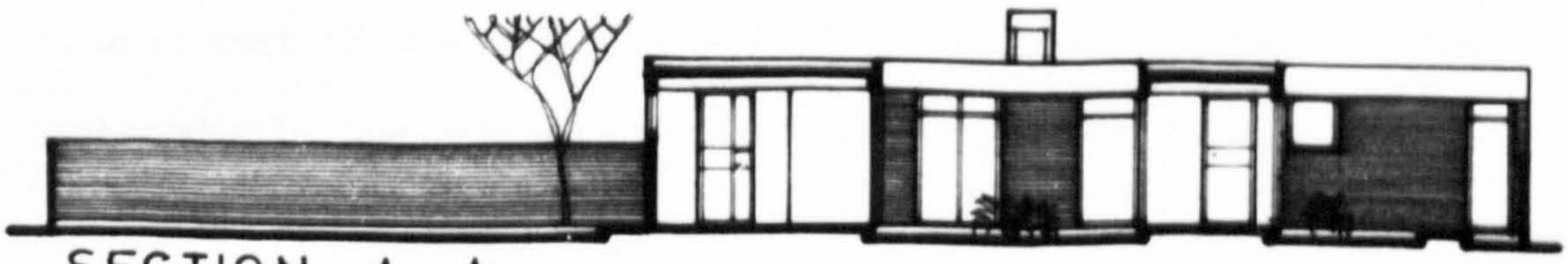
FRONT ELEVATION



1st. FLOOR PLAN



SIDE ELEVATION



SECTION A_A

Stage I : Infrastructure

This includes the following items:

1. Foundation of walls
2. Floors
3. Garden

Stage II : Superstructure

This includes the following items:

4. Walls
5. Roofs
6. Windows and Doors

Stage III : Finishing

This includes the following items:

7. Plastering, outside and inside
8. Painting, outside and inside
9. Tiles

Stage IV : Utilities

This includes the following items:

10. Electrical system
11. Plumbing system
12. Cooling system

The above classification of the construction process made it possible to evaluate the relative costs of the different items of the house construction. This evaluation was based on the average unit cost of the main construction operations of house building in Baghdad by the private sector, adjusted to 1972 prices. This average was worked out by the author from different constractors and architecture consultant firms in Baghdad; see, Appendix (12.1).

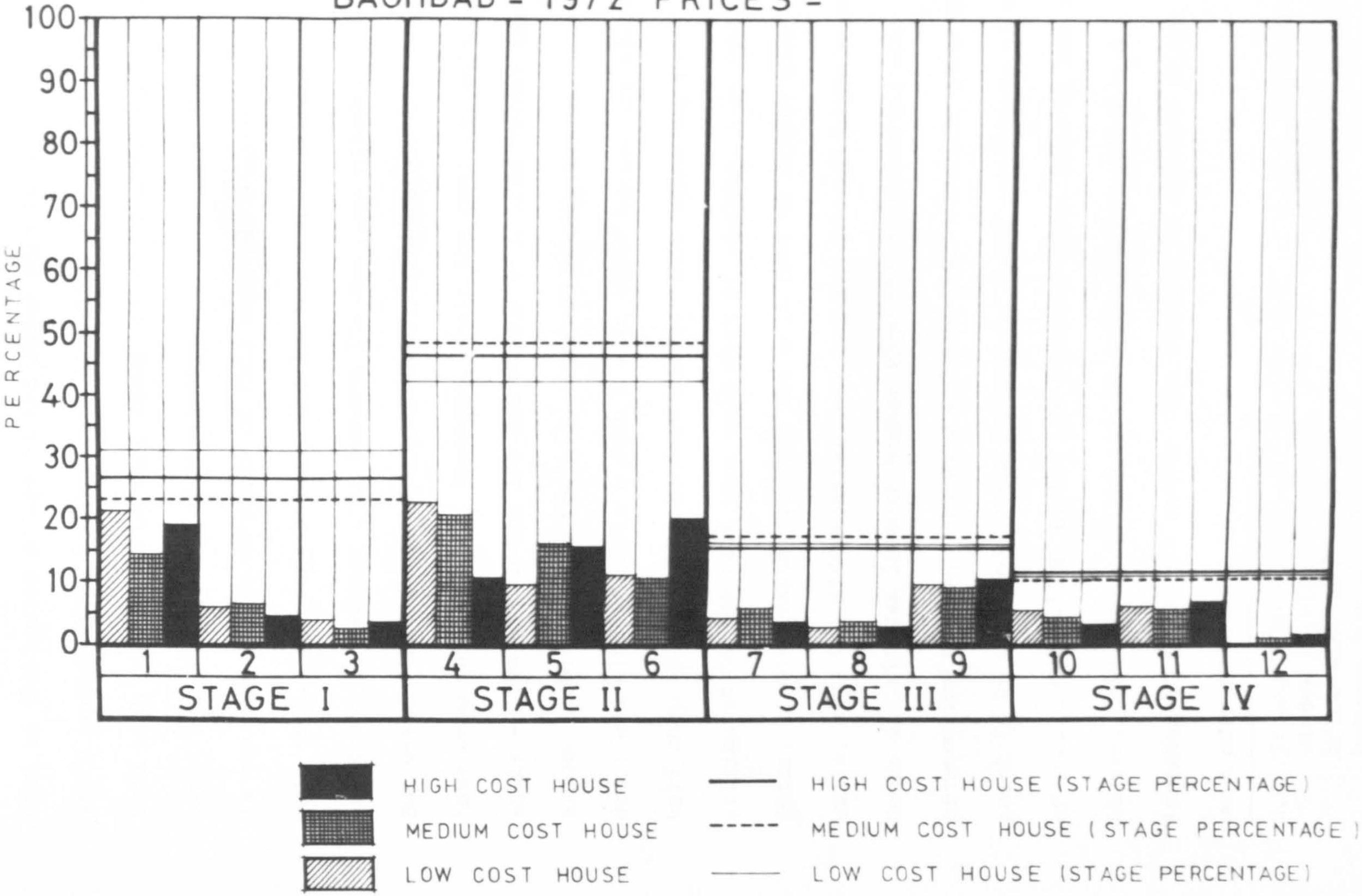
The following table illustrates the distribution of construction costs, which includes, the costs of building materials, labour and profit: see, Fig. (12.6) and Appendix (12.4)

Table (12.5)

The Distribution of Construction Costs for Low, Medium, and High Standards Houses in Baghdad, 1972 Prices: (see, Figs.

Stages of Construction	Low Standard		Medium Standard		High Standard	
	Cost ID	Per Cent	Cost ID	Per Cent	Cost ID	Per cent
I :						
1	200	20.0	510	14.3	1200	19.0
2	60	6.0	230	6.4	270	4.2
3	40	4.0	100	2.5	200	3.1
Sub-Total	300	30.0	840	23.2	1670	26.3
II :						
4	225	22.5	770	21.4	700	10.5
5	95	9.5	570	16.0	1000	15.8
6	105	10.5	400	10.8	1300	20.0
Sub-Total	425	42.5	1740	48.2	3000	46.3
III :						
7	40	4.0	190	5.3	200	3.1
8	25	2.5	130	3.6	170	2.6
9	95	9.5	320	9.0	660	10.1
Sub-Total	160	16.0	640	17.9	1030	15.8
IV :						
10	55	5.5	150	4.3	200	3.1
11	60	6.0	190	5.3	450	6.9
12	0	0.0	40	1.1	100	1.6
Sub-Total	115	11.5	380	10.7	750	11.6
GRAND TOTAL	1000	100.0	3600	100.0	6450	100.0

FIG.(12.6) COSTS RATIOS ACCORDING TO CONSTRUCTION STAGES FOR LOW, MEDIUM, HIGH COST HOUSES IN BAGHDAD - 1972 PRICES -



The main conclusions which might be drawn from Table (12.5) and Fig. (12.6) are that in general the bulk of the construction cost of the houses occurs in the super structure - Stage II - which includes the construction of walls, roofs, doors and windows. This high percentage of cost seems not to be affected by the construction standard of the houses, for instance, the differentials in the percentages of costs of this stage of construction amounts only to 5.7 per cent between the low and medium standard houses, and drops to 3.8 per cent between low and high standard houses. But within this stage of construction, significant differences have been observed, for instance, while the cost percentages of walls - item 4 - in the low and medium standards houses are almost double that in the high standard house, the percentage of doors and windows costs - item 6 - in those houses are almost half that in the high standard house. This trend may be attributed to the fact that unit cost of windows, i.e. square meter, is more expensive than the unit cost of bricks work for walls, also the differential cost between low and high standard doors and windows is much higher than the differential cost between low and high standard brick works.[9] Another interesting point to be observed is the relatively lower percentage of cost of roof construction in the low standard house than in the other houses, this is due to the use of jack-arching system and Asbestos in the roofs rather than reinforced concrete which is much more expensive material.

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9. It has been estimated that the cost of 1 sq.m. of high standard window is almost 10 times the cost of building 1 sq.m. of 36 cm. brick wall with cement as morter; similarly the cost difference between 1 sq.m. of low and high standard doors and windows is estimated to be about 10 ID, while the cost difference between 1 sq.m. of low and high standard brick work, 36 cm. thick, is estimated to be only 1 ID. See, Appendix (12.1).

12.5.0 Housing Area and Cost:

As it has been discussed in Chapter (11) the general trend in the relationship between the provision of utility services such as water, sewerage, drainage, lighting, roads and footpaths, public transport etc. and costs, is that as housing area densities increases the cost of providing these services will fall, and vice versa. Neverthless, this trend cannot be generalized to cover all housing areas, since it is technically possible, at certain density levels and depending on local conditions, to modify the whole or part of the services system, thus effect counterbalancing economies. Similarly, at high densities where blocks of flats are used, the cost of providing utility services may increase as a result of higher standards of services needed in such type of buildings.

In the case of the U.K. for instance, the general trend in the relationship between housing area densities and costs follows a hyperbolic pattern, where it has been estimated by Dr. P.A. Stone, that at a density of 4 dwellings per acre, about 10 dwellings per hectare, the cost of site development for roads, sewers, and other utility services per dwelling is about £700, this cost falls to about £150 at densities of 48 dwellings per acre, about 120 dwellings per hectare. These costs were at 1964 prices.[10]

Although it has been proved in the U.K. that the relationship between housing area densities and costs follows a hyperbolic pattern,this cannot be assumed to be the case in Baghdad without carrying out an empirical analysis on specific housing areas.

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10. see, Dr. P.A. Stone, op.cit, Table (9.4) p. 151.

In order to examine the relationships between housing densities and costs of providing utility services, such as roads, footpaths, sewerage, drainage, water and lighting in Baghdad; five housing areas were selected; see, Figs. (12.7, 12.8, 12.9, 12.10 and 12.11). Two of them - Case Study (3) and (4) - were neighbourhood units proposed by Polservice as part of the master plan for Baghdad; and Case Study 2 and 5, were designed and implemented according to Doxiadis Associates proposals in the Basic Foundation Plan. Case Study (1) was implemented according to Minoprio-Spencely and MacFarlane plan for Baghdad; see Appendix (1.5)

The main factors governed the selection of these housing areas were:

1. They are of different housing area density, ranging from 27.7 to 160.8 inhabitants per hectare; see, Table (12.6).

2. They are of different layouts; see, Figs. (12.7, 12.8, 12.9, 12.10 and 12.11).

3. They have been developed according to different systems, for instance, Case Study (1) was developed by individual households using their own resources in respect to capital- without government subsidy - employing their own architects and engineers; while Case Study (2) was implemented directly by the government for the army officers.

4. They are occupied by different socio-economic groups - except Case Study (3) and (4), where they are still proposals - for instance, Case Study (1) is occupied by socio-economic (D), i.e. over 200 ID monthly income per household; Case

FIG.(2.7) CASE STUDY NO.- 1 -

AL-MANSUR HOUSING AREA

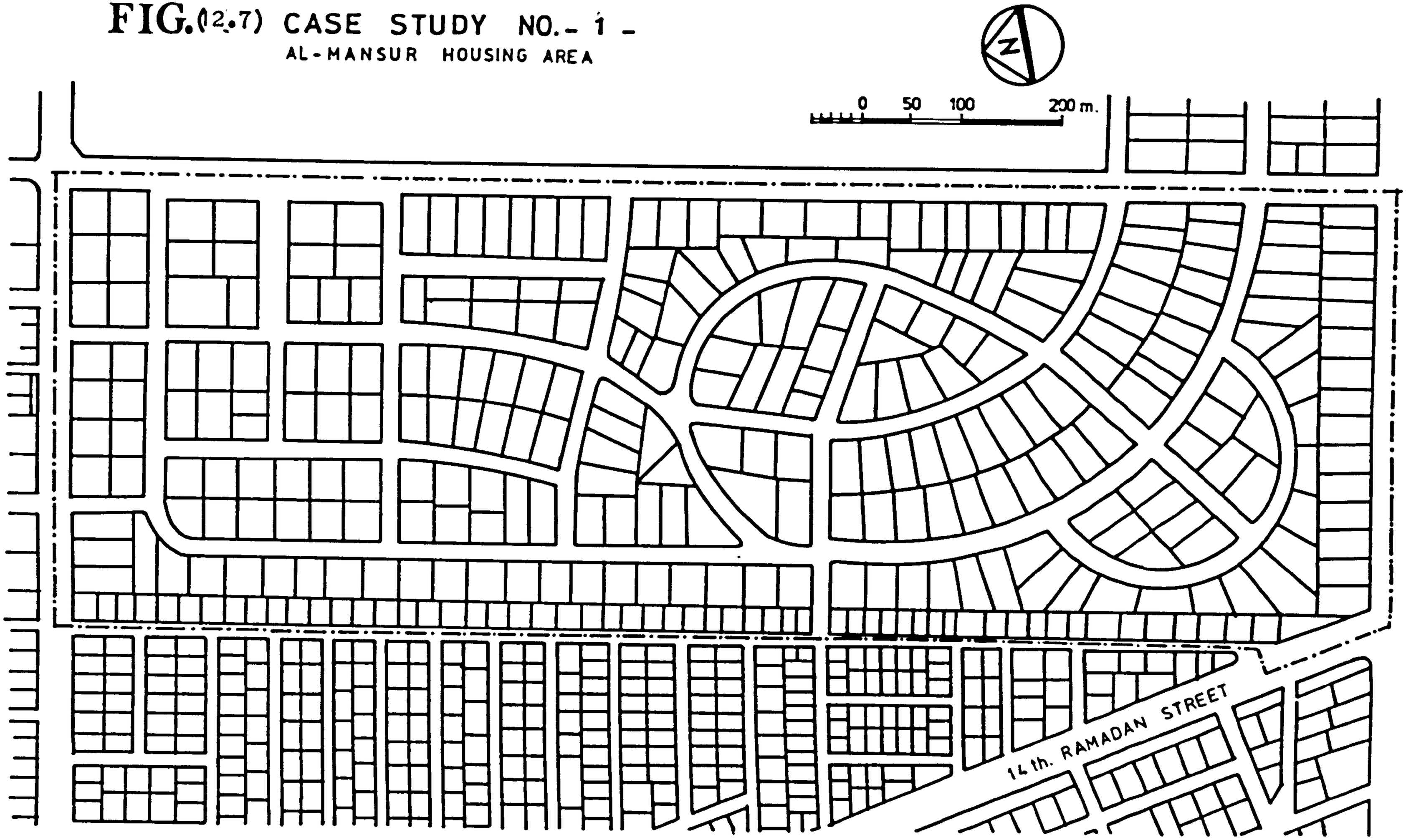


FIG.(12.8) CASE STUDY NO.- 2 -

AL-DHABAT HOUSING DEVELOPMENT

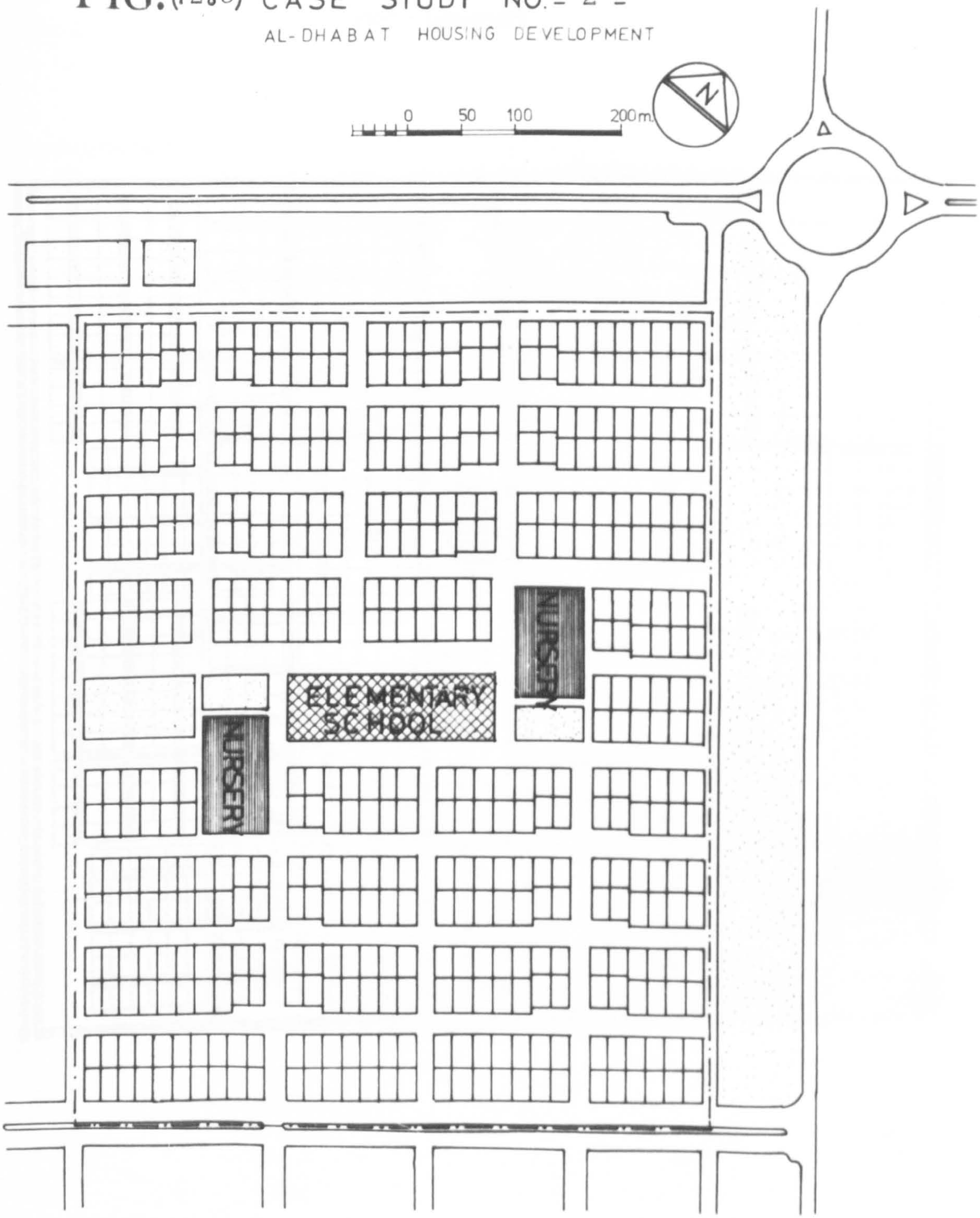
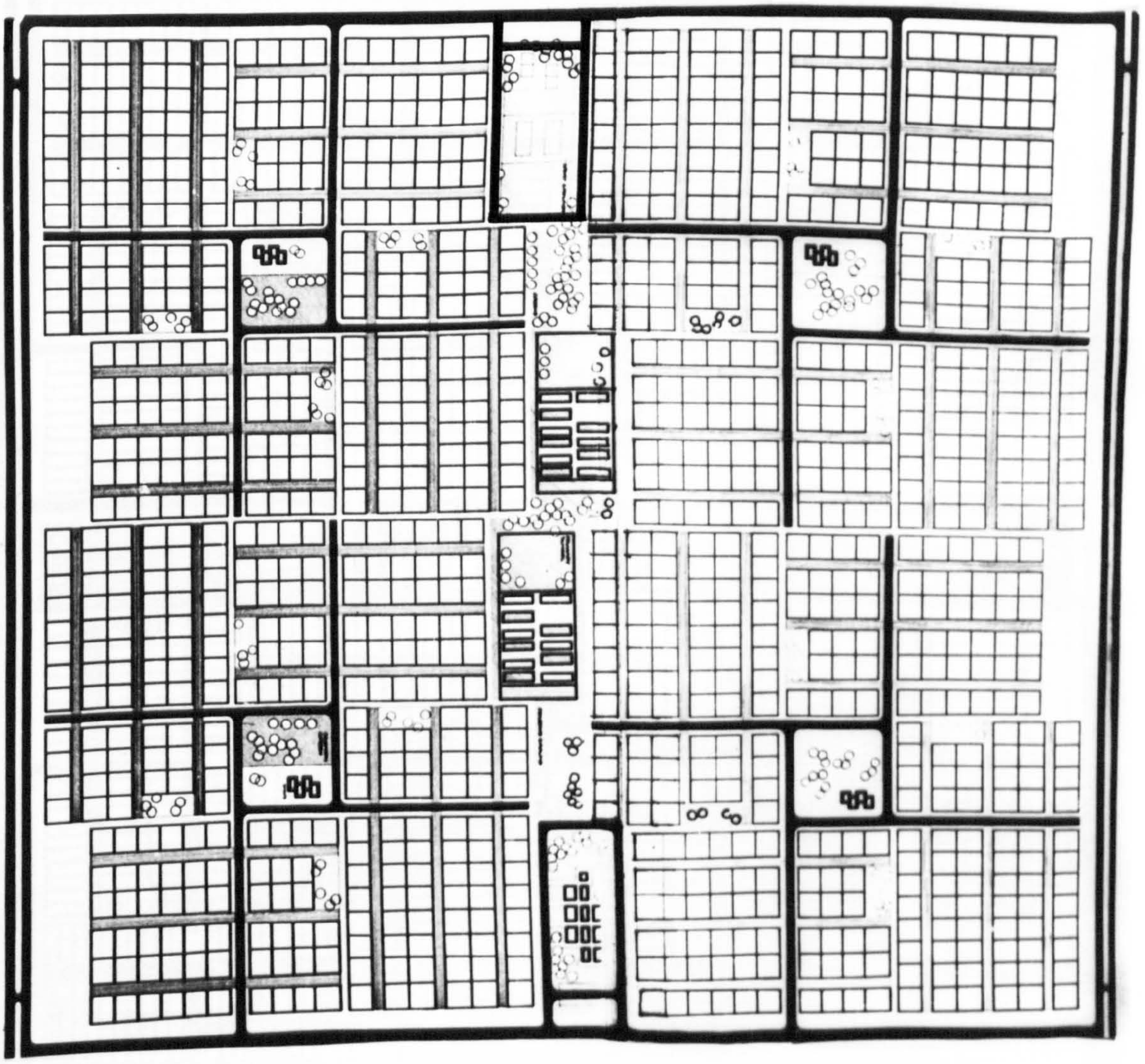


FIG. (12.9) CASE STUDY NO. - 3 - NEIGHBOURHOOD TYPE (B), POLSERVICE MASTER PLAN FOR BAGHDAD



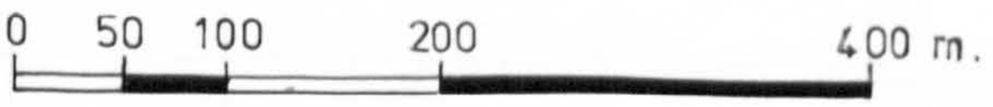


FIG. (12.10) CASE STUDY NO. - 4 - NEIGHBOURHOOD TYPE (A), POLSERVICE MASTER PLAN FOR BAGHDAD

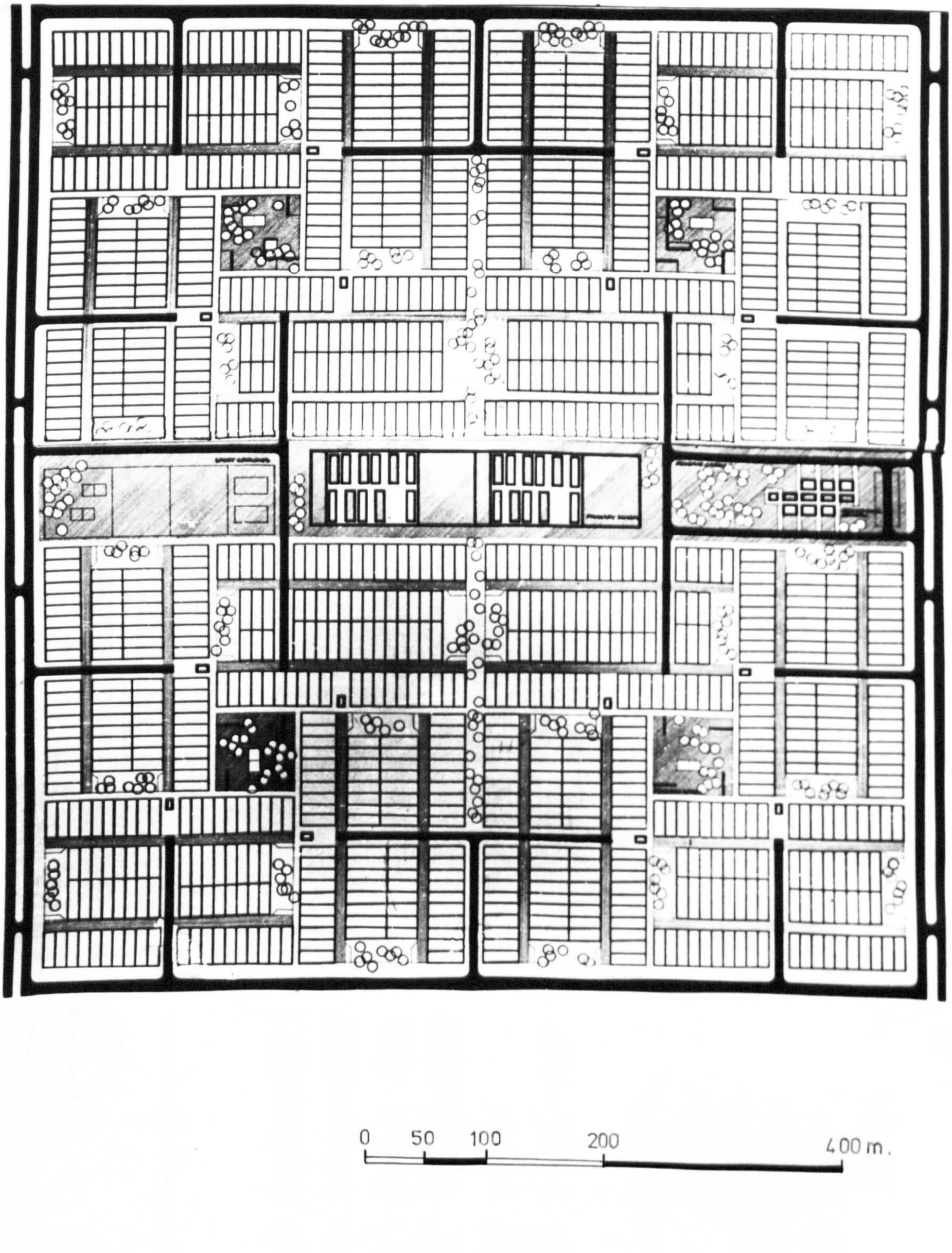
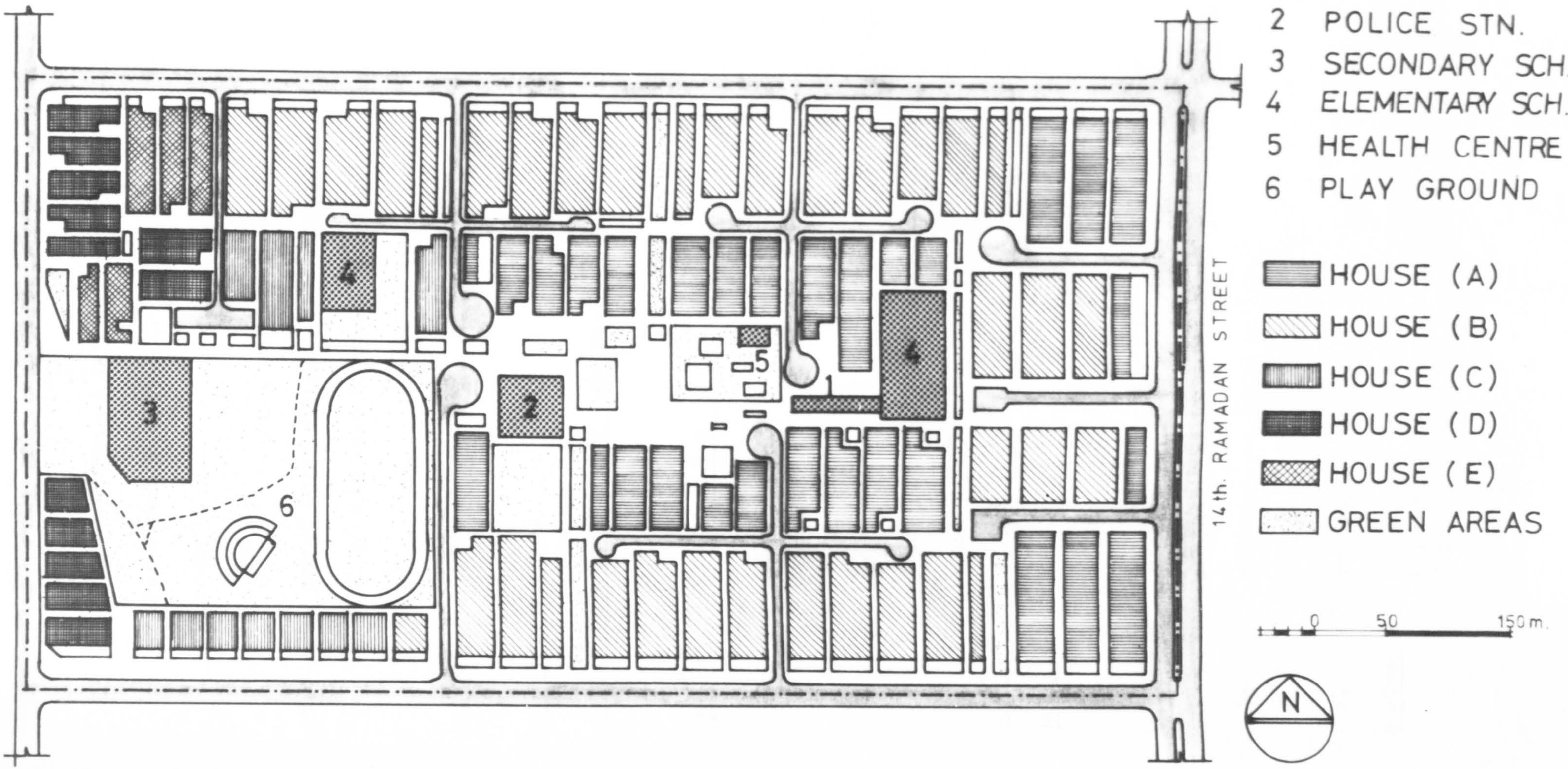


FIG.(12.11) CASE STUDY NO. - 5 -

WESTERN BAGHDAD HOUSING DEVELOPMENT (SECTOR 10)



Study (2) is occupied by group (C), i.e. between 100-200 ID monthly income per household; and Case Study (5) is occupied by groups (A and B), with a monthly income per household of up to 100 ID.

5. They are of different plot sizes ranging from 900 sq.m. in Case Study 1 to only 95 sq.m. in Case Study 5; see, Table (12.6).

6. They are basically of similar ground conditions.

Table (12.6)

Basic Characteristics of Case Studies:

Case Study	A	B	C	D	E	F
1	330	62.0	5.2	900	1720	27.7
2	476	46.5	5.9	450	2800	60.0
3	1008	57.9	6.0	360	6050	104.4
4	1152	50.6	6.0	252	6960	137.5
5	1000	42.3	6.8	95	6800	160.8

Notes:

A. Number of Dwellings

B. Housing Area - gross, hectares.

C. Average Household size.

D. Average Plot Size, sq.m.

E. Number of Inhabitants.

F. Housing Area Density, Inhab/ha.

Source: Data based on the works of Doxiadis Associates; Polservice; and the publications of the Central Statistical Organization, Baghdad.

The result of the analysis of the relationship between housing area densities and utility services costs - which was based on unit costs provided by the Municipality of Baghdad and the Boards of Water, Electricity and Sewerage, see, Appendix (12.5) - shows that this relationship follows a hyperbolic pattern; see, Table (12.7) and Fig. (12.12), utility services per dwelling decreases as housing area density increases. For instance, while the increase in housing area density from Case Study 1 to Case Study 2 was about 116 per cent, the decrease in the cost per dwelling was about 30 per cent; on the other hand in the higher housing area densities such as in Case Study 4 and 5, while the increase in the density was around 16 per cent, the cost per dwelling decreased by only 3.5 per cent.

The hyperbolic trend in the relationship between utility services costs per dwelling and housing area density may lead to the conclusion that it is not always economic to develop at higher densities, since increasing the number of dwellings or the reduction in the plot sizes will involve additional costs presented in the provision of extra access, sewerage outlets, water supply and lighting units. This conclusion leads to the assumption that if housing area density will increase even further, say 200 inhab. per hectare or more, the cost per dwelling will start to rise again as a result of the involvement of more complex layouts which demands higher standards of service and maintenance costs. This is based on the assumption that the basic health and environmental factors will be maintained. Finally, it must be stated that the lower costs per dwelling obtained from increases in housing area density should not always be the determinate factor in evaluating the

FIG.(12.12) RATES OF UTILITY SERVICES COST PER DWELLING ACCORDING TO HOUSING AREA DENSITY IN BAGHDAD _1972 PRICES_

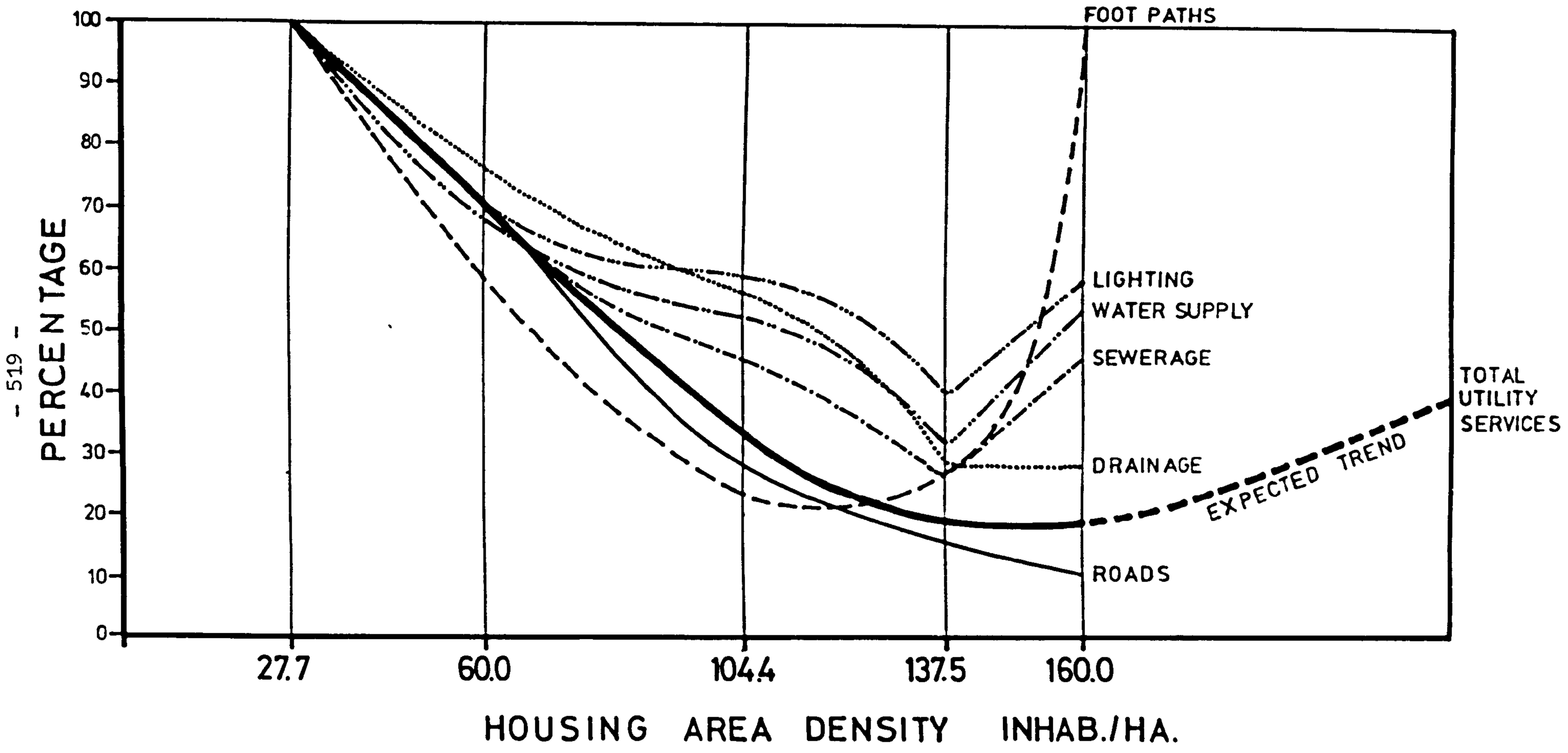


Table (12.7)

Total Cost and Cost per Dwelling of Utility Services, According to Case Study; 1972 prices; See, Fig. (12.12) and Appendix (12.6)

Case Study	H.A. Density	I		II		III		IV		V		VI		Total	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
1	27.7	1385200	4200	28000	85	123000	370	115200	350	113000	340	35000	100	1799400	5445
2	60.0	1425000	3000	24100	50	123000	260	130000	270	112000	235	35000	70	1849100	3885
3	104.4	1217000	1200	21500	20	169000	170	198000	200	182000	180	57600	60	1845100	1830
4	137.5	814000	700	16500	23	120000	100	123000	100	134000	110	43600	40	1261100	1073
5	160.0	439000	440	86100	86	171000	170	100000	100	183000	183	58000	58	1037100	1037

Notes:

A. Total Cost, ID.
B. Cost per House, ID.

I Roads
II Footpaths
III Sewerage
IV Drainage
V Water Supply
VI Lighting.

housing area, since there are other factors of equal, if not of more importance involved such as privacy, the availability of adequate private and public open spaces, which in general demand lower housing area densities. Therefore, the planning decision on housing area densities should be based on the consideration of all the factors involved in housing densities, and the values given to them by the inhabitants themselves; see, Chapter (11).

12.6.0 Conclusions:

The main conclusion to be drawn from the analysis of the relationships between housing and costs is that housing costs are not affected by one factor alone, but by many factors acting at the same time; for instance, housing costs are not only affected by the standard of construction, but by their form, the density at which they are developed, and the size of the individual houses. Another significant result emerged from the analysis, was that not all the factors affecting housing costs proportionately; for instance, densities and size tend to follow a hyperbolic pattern in relation to costs. This trend in costs relationships implies that careful analysis must be made by the planners before taking any decision concerning the densities of housing areas and plot sizes.

As it has been mentioned earlier the main objective of the analysis of housing costs is to arrive at a better understanding of the relationships between the various factors affecting housing costs so as means and measures may be devised to reduce the costs in areas of housing building, thus helping the low income groups in their strive to acquire a shelter.

At the present, housing building in Baghdad is facing the problems of rising building materials costs, the workers in the building industry are demanding higher wages to compensate for the general increases in the commodity prices - this is particularly significant after the increases in oil revenues, where recent information from Baghdad suggested an increase of up to 50 per cent in prices of commodities and services such as, food, transportation, and household's appliances like cookers, air coolers, and refrigerators -, the people are generally demanding higher quality housing, and the cost of imported building materials are soaring due to the general increases in the production costs and inflation in their places of origin, mainly Western Europe. All these problems and many others particularly those associated with urbanization and town planning such as the availability of land suitable for residential purposes and the provision of adequate and economic infrastructure, i.e. roads, water, electricity and sewerage, suggests that there is little possibility of lowering the cost of housing in such a way as to make it within the financial capabilities of the majority of the population. The only hope seems to lie in the reorientation and readaptation of existing building technology, designes and organization of construction industry and in the direct intervention by the government in the form of tax reliefs, provision of subsidised land and building materials, and in the granting of loans with low rate of interest and long periods of repayment.

SUMMARY AND CONCLUSIONS

The housing problem is one of the most serious questions facing society in Iraq today. Despite the steady increase in the wealth of the country and government involvement, the failure of the housing sector to cater for social and economic change is causing increased squalor for a large percentage of the population and widening the gap betweenthose in good housing and those in bad.

Although the housing problem is highly complex it is essentially one of conflict between the changing social and economic environment affecting the demand for housing and the nature of housing itself. Housing is relatively static in terms of quantity and quality. As a result it is slow to respond to changes in population, rising standards of living and the policies of government.

In this context it is of interest to refer to W.F. Smith, where he states that :

> "Housing is a composite, social good. It is not produced or consumed piecemeal. Substantial improvement in housing standards requires extensive restructuring of economic decision-making systems. A housing stock, once created, is a community resource of great importance and, in one way or another, is managed as a whole by the community. The use of one dwelling unit affects the usefulness of others in very material ways. The structure of social, moral, legal, and business relationships in the community is relentlessly relevant to the economics of its housing sector....The real root of any housing problem is the misunderstanding of its cause." 1

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1. W.F. Smith, "Housing : The Social and Economic Elements", University of California Press, 1971, p. xii.

Housing problems in Iraq in general and in Baghdad in particular are caused initially by the rapid population increase due to the mass migration to the main cities accompanied by high natural increases in the urban population due mainly to the relative improvement in the health services. This situation has created high dependency between the families and has been encouraged to a large extent by the extended family structure which characterize Iraqi society. High dependency ratio produced overcrowding and congestion as well as inadequate sanitation which in turn caused low productivity and low income to those families. Low income meant low saving potential for house purchase and minimal investment in house maintenance. These factors combined together with the discrepancy between family income and house cost produced housing shortage, high obsolescence rate in the stock, bad residential environment and generally low standard of living.

In recent years the problem acquired new dimensions. With the increasing incomes as a result of the increased government revenues from oil, there has been an increasing demand for better quality housing, which in turn put the majority of the existing stock below the quality level accepted by the people only a few years ago. Another dimension to the problem has been the tendency by the majority of newly formed families to acquire separate houses, this tendency is partly encouraged by the government through the distribution of heavily subsidized land, and partly due to the real increase in the incomes of those families.

* It appears that the best way to promote housing development in Iraq is to break into the vicious circle of low level of investment caused mainly by low level of incomes and productivity by using capital investment from the oil revenues. With an injection of capital, productivity would rise and the resulting higher incomes would eventually generate higher savings, sufficient to carry on the momentum of capital formation initially created by the injection of capital. Higher incomes would then also increase aggregate demand and so give further impetus to capital formation by creating profitable investment opportunities.

* Rapid urbanization and overconcentration of urban population in a few main cities particularly Baghdad are the main causes of the housing problems. Urbanization is mainly caused by mass migration of people from the rural areas as an inevitable consequence of the lack of balanced investment policies in the fields of education, health, housing, community facilities and industrial development, as well as by the nature of the political and administrative structure which tend to concentrate its activities in the cities particularly Baghdad. This situation caused the establishment of squatter settlements and the rapid deterioration of the housing stock, high demand for housing and related facilities, overcrowdness in parts of the cities with all its bad effects on health, social relations, and the proper development of the urban structures.

All estimates suggest that this trend of urbanization will continue unless proper actions are taken to reduce the flow of people to the few cities particularly Baghdad and to formulate comprehensive

programmes which deal with aspects such as investments in industry and agriculture, housing and community facilities, infrastructure, environmental control, and administration.

This study has proposed that these programmes should consider three lines of action simultaneously. These will concentrate on the improvement and development of the rural areas accompanied by measures to encourage the decentralization of non-agrarian employment. Secondly, these programmes should encourage the development of medium size towns, especially those located within the regional influence of the main cities, thus encouraging them to act as intermediate reception areas for the migrants. Thirdly, these programmes must pay concentrated attention to the reorganization of the cities so as to be able to provide efficient facilities and amenities for their inhabitants, as well as for the future needs caused by the anticipated increases in the living standards and population growth.

It is difficult to decide how far resources should be allocated to meet the conflicting demands of urbanization. A balance has to be established between indispensable short term improvements especially in the fields of housing and community facilities, and long term policies and programmes. In this respect, it is important to determine the administrative and financial needs of each aspect, and then to decide what resources should be allocated and how their administration is to be coordinated.

Despite the problems which urbanization and urban growth created, the study recognized that if urbanization is properly controlled and understood, it could be utilized and becomes a progressive element in the national development programmes.

Another attribute to housing problems in Iraq is the lack of clear and comprehensive housing policy which deals with all aspects of housing and community development. This lack caused primarily by the inadequate planning mechanism capable of revising, redesigning and evaluating the planning process; the tendency to formulate objectives that are difficult if not impossible to achieve; shortages of reliable and timely data and information; instability in the political structure accompanied by frequent changes in the administrative personnel; and finally lack of coordination between different bodies and agencies responsible for housing and urban development and lack of sufficient number of qualified professionals to prepare and execute housing programmes.

Theoretically, there are two distinguished ideal types of housing policy. In the first case, individual households and private builders are completely responsible for building houses; the opposite ideal type of organization of housing and of housing policy is characterized by the basic fact that housing is completely under the responsibility of the government or other public, non-private body or organization. In Iraq, the actual housing policy, in spite of its vagueness, does not correspond strictly to one of these mentioned ideal types, it is composed of different housing systems which form a mixture of the mentioned pure models and it is frequently changed corresponding to the economic priorities adopted in the economic development plans and to the political environment of the day.

The analysis of the government involvement in housing demonstrates that the level of housing investment in Iraq as a whole is relatively low compared with the increasing needs and rising standards. It also demonstrates the unstable trend in the housing investment policy and lack of priorities. Therefore it is of great importance that house production should be substantially increased to meet population increase, to replace the unfit dwellings that are constructed of non permanent materials and structurally unstable. It is also important that priorities should be established for the investment in housing and urban development at large. In this context it seems that the first priority should be given to housing and urban development directly connected with economic development. This may take the form of subsidizing housing for the low income and underprivilaged people such as workers. A second priority may consist of that given to urban housing particularly in the main cities over rural. This is based on the consideration that the most urgent social and economic needs for housing and related facilities exists in the cities especially Baghdad due to the rapid urbanization and metropolitan concentration.

The opportunities for self-help methods are greater in the rural areas and housing and to certain extent community facilities can be made in those areas without drawing off substantial amounts of the monetized economic building resources from the general development investments. Where, however, the general process of national development includes land reform and resettlement a higher priority may have to be given to investment in construction and other works in the rural areas in order to enable such programmes to proceed.

It is difficult to assess the extent to which housing construction has a positive effect on general economic progress. When housing investments are too large, they may impair other forms of investment or create inflationary tendencies; on the other hand, if investment priorities are to be decided upon according to the principle of a free economy or pure economic criteria, too small a share of total investments will be drawn into housing, since other economic projects particularly industrial projects, yield much higher short term benefits.

- In drawing up housing development programmes and policies, the government must realize that housing is not just a product of development, but also a means to accelerate development. Moreover, housing and stable living environment are one of the prime instrumentalities for social development and human development which are essential ingredients of any plan and programme for progress.

- Apart from the need to increase house production and to formulate programmes for housing rehabilitation, there is also the need for programmes to upgrade certain housing areas. These programmes may necessitate a change in the road patterns to eliminate irrelevant traffic, limit the speed of local traffic, improve safety, reduce noise and provide adequate parking. In some areas it may be necessary to replace and add to the sewerage system to meet the increasing loads arising from the anticipated increase in the use of water. It may also be necessary particularly in the low income housing areas such as "Al-Thawra" district of Baghdad, to improve the appearance of houses and the value and efficiency of

the incidental open spaces by removing some of the structurally bad dwellings, improving street furniture, and by landscaping. This upgrading programme may be accomplished satisfactorily without the demolition of satisfactory dwellings especially in the newly developed housing areas. The areas in Baghdad in which the need for such improvement is the greatest are those where the gross residential densities are very high and where the housing conditions are usually bad. In these areas one may expect large number of demolitions. This is in contrast with the areas of lower densities where the need for amenity spaces less pressing. Since no such upgrading has ever been carried out in Baghdad, it is alsmost impossible to assess the likely costs for such programmes.

X A responsible agency or organization should be established to be responsible for the planning and supervision of programmes for housing and related facilities and that this agency should be vested with sufficient authority and support by the necessary legislation to enable it to fully execute its functions. In addition it is also important that municipal and other local authorities should take direct responsibilities in dealing with the urban problems particularly housing and related facilities. At the present these local units are badly organized and poorly equipped for this task and they need sufficient technical, statutory and financial assistance.

Since it was recommended that more powers should be invested in the municipalities particularly in the fields of housing, a close watch must be kept to prevent corruption and misuse of authority.

Although Iraq has a Ministry and other agencies to deal with housing matters, there are usually notable deficiencies with respect to housing finance, with no adequate standards and procedures been established on a national scale for housing finance. There has been little development of free savings and thrift institutions to stimulate and accumulate savings and resources for investment in housing. There are virtually no modern mortgage banks, and scant attention is given to the fundamentals of comprehensive mortgage systems.

The analysis shows that one of the main causes of the continuing blight of houses in Baghdad and indeed in Iraq has been the wide gap between the cost of housing and the financial capabilities of the majority of the people; this situation is worsened by the lack of adequate long term loans system for housing. At the present, the financial system for housing is inefficient in that it is often necessary for the families to accumulate large part of the necessary capital before starting construction. Thus many would be investors have tended to construct as they save, idling capital until the structure is finished, often a process of several years.

Special legislations are, therefore necessary to attract resources for housing purposes, this may include : legislation to induce savings banks, insurance companies, social security funds to invest in housing; measures to provide state guarantees for savings deposits; measures for the establishment of mortgage banks and the development of a secondary mortgage market, measures to enable the government to guarantee mortgages on low and medium cost housing to reduce the risks involved, thus attracting

additional private capital to this type of investment; measures to provide maintenance of value for funds saved in housing, such as linkage to a price index. All these measures should be within an overall national housing policy.

* There is also a need for change in the operational policies of the government agencies responsible for housing development, particularly that of the Real Estate Bank. At the present the working capital of these agencies is relatively small to meet and satisfy the expected increases in demand for houses particularly after the increases in the oil revenues. Greater working capital could also open the way for the granting of small loans to the people for rehabilitation purposes.

* In view of the resources available to meet housing needs of the whole population, and with the expected increases in standards, it seems appropriate that policies to extend low interest rates for housing loans should be proportionate to incomes so that low incomes families can benefit more than those who can afford shelter within a reasonable standard.

* The most serious problem in production of housing for the low income groups particularly in Baghdad is financing, not only for the acquisition of land but also for the provision of building materials, site planning and construction expertise.

In view of the general increases in housing costs, efforts must be devoted to cost reduction of shelter particularly for low income groups. This may be done through forms of aided self-help and land and utility

schemes, site improvement of existing housing areas, core housing schemes, and the establishment of minimum construction standards. While such programmes should occupy an important part of the government's efforts to provide shelter for low income groups, for which no other solutions seem possible at the present, corresponding attention must be devoted to community development, so that cultural, educational, and employment opportunities will improve as well as the shelter.

* Although the government has accepted housing cooperative societies as a means of dealing with some of the housing problems, these societies are still faced with difficulties in obtaining land and building materials. Therefore, it seems essential that available public land "Miri" should be put at their disposal, and that building materials should be supplied on subsidized basis, especially to the low income groups.

Official subsidy system for low income groups are necessary if cooperative societies are to provide housing for them, but such subsidies must be granted with the objective of involving people in the solution of their housing problems. The government may grant subsidies either through low interest long term loans, grants, loans for down payments, or subsidies for monthly payments. In the latter case it is preferable that the subsidy is attached to the family income and not to the house cost.

Apart from the private and central public sectors; commercial firms semi autonomous bodies and trade unions should be encouraged to take a direct interest in housing, especially for their own members. At

the present these bodies are contributing very little to the housing production.

* The study concluded that planning for housing in Iraq generally suffered from the long standing tradition that housing is a matter for private initiative and from the difficulties and deficiencies of the housing finance system. Nevertheless, it is expected that this situation will change gradually particularly after the substantial increases in the government income from oil, where the government will be in a better position to prepare and implement a comprehensive housing policy and programmes to overcome the problems from its very roots. In the context of this expectation, future housing programmes should take into account the following:

1. Higher real incomes with the attendant demand for durable consumer goods including housing.

2. Greater personal mobility through increased leisure time and higher rates of car ownership.

3. Increased desire for active participation in some forms of outdoor recreation.

4. Higher standards of education which may foster an increased desire for communication and personal contact.

* The study also recommends that in assessing housing standards, the natural forces, instinct, habit, desire or necessity, which drive people to live in a particular way must be recognized and the particular effects in any one case assessed. It is fruitless to

plan on the basis of standards derived from theoretical concepts of health and moral issues, if those standards are to be made unenforceable or unrealizable by ignorance, ingrained traditional practice, or sheer economic necessity. This is important since the existing standards expressed in by-laws and building codes in Iraq were originally drawn up without proper analysis to the needs and the changing pattern of the society.

* The study of the land system and policies revealed that they are in fact a series of adaptations and adjustments made by different authorities and largely inherited from different systems of government dated back to the beginning of this century and some of them were as old as the Islamic religion itself, such as the case in the "Waqf" land.

* The increased needs for urban land caused by urbanization and urban development necessitates great attention to be paid in the economic and social policies to the effects of different measures on the supply of land. Moreover, an active land policy is necessary to ensure an adequate supply of equipped land with the desired qualities and a socially accepted distribution of uses.

* Town planning must take into account the present uses of land, ownership and other institutional ties, the possibilities of transfer of ownership and other rights, the prices of land sold or leased, and the cost of equipping the land.

In principle, two approaches seem to be possible for adopting land ownership to the implementation of development plans ; either the

private market will function through its price mechanism and can be influenced by taxation measures; or a considerable part of land ownership can be channeled through public or semi public bodies. Solutions to the problem of ownership and implementation of development plans are closely linked to a number of legal questions, i.e., whether the ownership right includes the right to develop; expropriation rights and practices; legislation and practices concerning leasehold of land.

The cost of land development, i.e. the provision of infrastructure may in principle either be charged mostly, although hardly completely, to the users of the land, or may be provided as public service financed by general taxation.

If the government decided that land market is to function mainly as a private market, then it seems necessary to go very far in the direction of charging the cost to the users, although this may create social problems which are difficult to solve. However, even in countries similar to Iraq where public ownership of land is extensive, it has, for financial reasons been found necessary to charge a very considerable part of the costs of equipping land to the users. In this situation, the users will be charged partly by a direct cash coverage of the costs involved, and partly by annual payments for land taxation, local rates, etc.

The powers of municipalities over the development and use of land should be greatly strengthened. For instance, although at the present zoning regulations exist, particularly in Baghdad, their lack of specificity and comprehensiveness often created loopholes which private developers and speculators exploited.

At the central level there should be a central agency which could dictate general but effective guidelines for the formulation of urban land policies, in a national context. It should also be considered whether it would be feasible for such an agency to be vested with powers of acquiring land, or distributing government owned land "Miri" in the interests of the municipalities.

The study of the building industry shows that it has a major role in providing employment and should be a basic factor in any national development plan. However, the present inadequacy and irregularity of allocations of the national resources in housing combined with the lack of clear policy with respect to public and private investments in this field has hampered the growth of a sound and efficient industry capable of producing in volume and at a low cost for the increasing housing needs and rising standards. The result is under utilization of resources and a comparatively high level of unemployment. With the increased oil revenues, the government now has in hand not only immediate revenues which can be invested in the building industry but also the possibilities of creating new funds or guarantee mechanism to accelerate investment in projects urgently required for social and economic development. If conditioned by sound standards, the building industry and housing finance are logical fields for such investments.

In the present stage of economic and technical development in Iraq, it seems desirable to support and improve the forms of traditional building. It is evident however, that such course alone cannot

meet the considerable increase in demand for housing and construction in general particularly after the increases in the oil revenues. In this context, the study emphasize the need, at least in the present stage of development, to improve the traditional building methods with the main objective of utilizing effectively the presence of labour. This improvement should be planned so as to facilitate for the gradual transition to more industrial building methods as the economic and technical conditions improved and when the volume of construction has substantially expanded. One of the main problems facing Iraq as a result of the rapid urbanization is the absorbtion of unemployment particularly in the cities where there has been an influx of migrants. When those migrants come to the cities, the majority of them are apt to look to the construction industry as one of their primary sources of livelihood.

* The cost analysis of housing shows that building materials used in house construction represents almost one third of the total cost. This situation calls for more intensive use of local building materials. The use of imported ones cannot but lead to increased housing cost. This is a very controversial issue particularly in the case of high income groups housing, all of which place emphasis on imported building materials. As long as housing construction depends on such materials, the problems associated with high housing costs will remain aggravated.

* The main purpose of studying housing densities has been to help those working in the housing and planning fields in Iraq towards a closer understanding of the significance of housing densities

in the physical and social development of the community. The attempt to analyse in some detail the relationships of the many diverse and in many cases conflicting variables may suggest a useful analytical approach to the determination of density standards appropriate to particular local circumstances.

In the current planning practice in Iraq, the question of housing densities is as a rule settled by virtue of blankets of densities which are spread over large areas of residential zoning and within the overall estimates of population and land requirements without an insight of the implications of such densities on social, health and economic factors which are of direct relevance to the people housed.

In this study, no attempt has been made to suggest specific densities as standards in Baghdad. This is left to the planners who are involved in the planning decision process to determine the various criteria that are pertinent to the particular si tuation with which they are concerned and to interpolate accordingly.

One point emerges clearly from this study and that is the importance of the total living space rate. It is, perhaps, the most significant aspect of housing density. Significant increases in density can only be obtained by considerable sacrifice in total living space standards. This may be tolerable where floor space rates are high, but in the low income housing areas of Baghdad, for instance, where floor space rates are usually in the low range, this sacrifice must reflect adversely on the living conditions, this is in spite of the fact that the hot, dry climate in Baghdad prefers spaces to be compact.

An important conclusion comes out from the analysis of housing densities that it is only too easy to be misled by figures and comparisons. A housing density standard that is appropriate for one particular area may be completely unsuitable for another, even if all the relevant conditions appear to be similar. For instance, the presence of large open spaces just outside the housing area, or even the location of the housing area on the river bank, may have a modifying effect on living conditions expressed in terms of total living space rates. For example, some of the high density development of old Baghdad are situated on the Tigris river bank with an open prospect over water. The living conditinns under this situation will almost certainly be psychologically, if not physically, better than if the same houses were situated further inland, completely surrounded by other buildings.

Another point to emerge is that the quality of the housing area is not uniformly affected by the density of development. Of the aspects of quality, perhaps the most directly affected are privacy, open spaces, individuality, diversity, safety and to certain extents health. Those least affected, if at all are location, site details, and visual impact. Community facilities and integration of housing are influenced under certain conditions, mainly those brought about by very high density development. It is at the higher housing densities that livability of the housing area in general is most seriously affected and threatened, this does not mean that they automatically reduce quality, but they impose a difficult but not impossible task upon planners and designers.

The study appreciates the fact that housing densities are strongly related to the personal preference. The motives which influence individual households to prefer or dislike a particular pattern of living are indeed extremely personal, and in many cases reflect different values and attitudes from those derived from other experiences. These preferences are in many cases motivated by sentimental, religious, social or functional, which may involve households knowingly or unknowingly in some sacrifice to themselves in amenity, convenience, or economy. If these individual preferences are shared by the sufficient large body of public opinion within the society they should be regarded as a decisive factor in any objective analysis of the housing density problems.

The main conclusions drawn from the analysis of housing costs are that housing costs are not affected by one factor alone but by hosts of direct and indirect factors acting spontaneously and not all of them effecting housing costs proportionately. This trend implies that careful and objective analysis must be made before any decision is taken on the form, size, density of housing areas, and these decisions should consider not only the existing socio-economic and political environments but also short, medium and long term expectations.

Finally, the purpose of this study has been to provide a comprehensive view of the housing sector in Iraq and the particular problems in Baghdad. Nevertheless it should be apparent that the housing problems confronting Iraq are both enormous and distinctly different from those encountered in the developed countries. Although the government seem to accept these evaluations, its commitments to change the situation and reverse the trends fall short of what is needed.

* Previous analysis of housing needs, problems and policies in Iraq has many deficiences, and three general points stand out in most planning work on housing done in Iraq : First, analysis tend to be partial or superficial, not comprehensive. It looks at aggregate housing problems and fails to deal selectively with sub-problems as they affect certain aspects of housing; also it views problems from a limited perspective, often missing economic, social and environmental implications. Second, there is a tendency to miss important caus`al relationships, often as a result of partial analysis. Causes of problems are not established albeit in a robus**t** form; thus analysis deals with symptoms, such as low production rates and rising prices, and not the reason for them, and it extrapolates future conditions from current symptoms without acknowledging the changing nature of causes and problems. Relationships between housing problems and between housing and other development problems are not well enough analysed. Third, ineffective policies result. Policies act on problems that are only partially defined, and for which causes and relationships are poorly understood; in particular many policies developed in recent years act on symptoms and aggrevate rather than solve endemic problems. Policy options are not actively enough considered. There is little tradition in Iraq of active and creative interest in the analysis of policy options to tackle planning problems in general and housing problems in particular.

Thus, comprehensive analysis of housing problems and policy in Iraq is required. 'Comprehensive' means, covering all aspects of the housing sector, as well as undertaking a broad and ca usal

analysis of any problem considered. There is also a need for a more active policy analysis, again on a comprehensive basis.

The need to establish principles and processes of comprehensive analysis stems from the importance of housing as a community problem area, since housing is a major land use and its form reflects and influences, in a critical way, the pattern of urban experience and activity. Housing policy, therefore, is an area with often profound influence over the physical environment, and is of a direct importance in determining patterns of social and economic welfare.

It is hoped that this study has provided people concerned with housing and planning in Iraq with adequate base from which further comprehensive research and analysis could be made to eliminate not only the bad effects on housing and the built environmnent but their causes.