

CLUSTER LAYOUTS:  
A BASIS FOR THE DESIGN OF (EARTHEN) STRUCTURES IN  
URBAN DWELLING ENVIRONMENTS

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**ABSTRACT:** The paper is focused on the task of physical planning in the context of developing countries, the low income majority and rapidly urbanizing areas. Specific aspects of the problems of land use and the provision of infrastructures are explored. The design of buildings must have a basis in the urban plan. A cluster design which groups individually owned lots around a shared common court is proposed as answering many of the problems. Cost, social, cultural and administrative advantages are outlined for the clusters. A model development is presented illustrating various densities in a flexible development.

## CONTEXT: LOW INCOME PEOPLE, DEVELOPING COUNTRIES, RAPID URBANIZATION

The paper is focused on the task of physical planning in the context of developing countries, the low income majority and rapidly urbanizing areas. The planner must be able to address the complex problems of rapid urbanization where the direct implications of the growth of poverty are not only that more and more dwellings, land and services are needed, but also, which is more critical, that these dwellings, land and services should be provided to a growing population that has less and less capacity to pay for them.

Although the paper does not directly discuss building design or use of materials in dwelling construction, it provides a planning framework for the consideration of construction systems or building types to be used in conjunction with the use of adobe structures in seismic regions.

Urbanization is occurring in developing countries at a rate far beyond that which the limited resources and abilities of cities can cope. These new populations, consisting primarily of unskilled, uneducated, and extremely poor people migrating from rural areas in search of employment, are in the midst of a fierce struggle for shelter and security. This struggle is creating an urban crisis all over the World. Until the cities are able to respond to the needs of these new populations, spontaneous urbanization (squatter settlements) and general discontent will continue to intensify the struggle. Resources are limited, urban land is scarce, and the burden on the public sector (government) is becoming more unmanageable.

The urban immigrant in search of shelter has the two basic options of locating in a decaying (slum) area of the central city or squatting in illegal settlements on the periphery of the city. Governmental response to this situation has normally been the adoption of an attitude of benign neglect towards slums, squatter and other illegal settlements.

Programs for the legalization and rehabilitation of many existing squatter settlements have been undertaken with only marginal success. Improvement of infrastructure networks is costly because of inefficient layouts and only limited money is available.

Governmental programs have in some instances been initiated for the relocation of urban slum and squatter populations from valuable land/locations. Unfortunately most of these programs, having limited resources and being oriented to the task of providing specific quantities of conventional or prefabricated dwelling units usually in the form of medium to high rise structures on government land, have been inappropriate and at the same time have not been able to reach down to the low income majority.

## ALTERNATIVES

It is clear that the alternatives in "Housing" are to provide complete dwellings to a few beneficiaries, or to provide only basic utilities and services (infrastructures) to a much larger section of the population. If the latter course is taken, major efforts of the

government should be shifted from the provision of shelter to the provision of utilities and services. Regardless of the many other considerations, the latter course has the following in its favor: the construction of a shelter can be done within the limited resources of individuals because inexpensive materials can be utilized, no special skills are necessary and simple tools only are required, self-help or artisans or small contractors can be employed, and the shelter can always be reduced to a bare minimum.

While the construction of a shelter is a relatively simple operation, the provision of utilities to a community is not because it demands more than individual effort. It demands a collective effort both from the community and from the government in planning and mobilizing political, economic and technical resources. In short, the choice is clear; construction of utilities will always be a government task, but housing may be left to individuals.

### PHYSICAL PLANNING INDICATORS

The task of the physical planner is complex; urban land is scarce, money is limited, and the time factor is very short. If the governments cannot provide planning guidelines for future growth quickly, the immigrants by necessity of shelter will continue to develop squatter areas without benefit of formal planning. This necessarily means that during the rehabilitation process when infrastructure is incorporated into these areas it becomes unnecessarily expensive for both the user and the public sector. In many cases it even precludes the availability of certain services to the areas. The lack of planning for the future growth and needs of a community only increases the burden of both the government and the user.

The public sector will substantially minimize its capital investment and continuing maintenance/operation costs and at the same time improve upon the potential amenity of developing urban areas by initially providing an efficient framework within which urbanization can occur. The criteria used for the evaluation of efficiency of physical layouts are:

LAND UTILIZATION DISTRIBUTION - Proportions of public, private and circulation areas within the layout. This determines maintenance, responsibility, user control, and functional efficiency. e.g. A high percentage of circulation means higher cost per person and therefore indicates an inefficient layout.

LAYOUT - Lot configuration, blocks and circulation. This determines the infrastructure network. e.g. Certain layouts result in complicated infrastructure networks requiring excessive lengths of networks and therefore higher cost per person.

DENSITY - Number of persons and dwelling units per hectare. This determines the intensity of use. e.g. Low density means a higher cost of development per person.

SITE ANALYSIS - Site attributes that define the economic and practical feasibility of development and site determinants that define the constraints of physical planning.

Use of the above criteria in the evaluation of urban dwelling environments will demonstrate that the design of buildings must have a basis in the urban plan.

In the discussion of physical planning in the context of developing countries, the low income majority and rapidly urbanizing areas, we are by definition, addressing ourselves to situations where population densities tend to be relatively high. High densities in general are viewed as being negative, but determining what specifically is inappropriately high is difficult. The lower the density, the larger is the land area required for a given population, which results in higher cost per person in land and infrastructure. At the opposite extreme, very high densities not only may put an excessive load on the infrastructures and services, but more serious, it could create negative and destructive social conditions. It is possible to determine a range of density limits compatible with adequate services and infrastructure. But very little can be done to determine similar indices to anticipate or forecast social and behavioral implications of population densities in a given physical environment.

However, there are many positive factors to higher densities: lower costs per person for land and the provision of infrastructures and services; advantages of better job opportunities, more viable transportation systems, higher access to social and commercial services in a high density area and potential social advantages for less alienation, loneliness.

Proper land utilization is extremely important in high density areas. The key to proper adequate land utilization is a coherent relationship among users, responsibility and physical controls. This coherence should unequivocally be reflected by the physical design or plan. Proper, adequate controls of the land should define the extent of a territory, facilitate its specific function, allow/encourage the users to assume their responsibility in terms of maintenance and operation. Neglect of these aspects is very common in the design of public housing everywhere. It takes the form of land waste, particularly in developments where walk-up apartments stand in open spaces of undefinable use. The most common consequences are misuse of the environment, destruction, vandalism, unsafety, crime, poor maintenance, garbage thrown everywhere. In low population densities of around 50 persons per hectare the proportion of land per person is large enough to avoid conflicts but when densities reach magnitudes of 200 persons per hectare or more as happens in any settlement with a low and very low income population the portion of land per person has shrunk so much that conflicts are inevitable if the proper physical conditions are not created.

The physical expression of densities and associated land utilization percentages required for a urban dwelling environment must be developed in the design of the layout. As stated earlier, the prime function of the public sector must be to provide an efficient framework within which urbanization can occur.

The scope of this paper being limited to the presentation of the general principals that must be considered in the physical planning process, the topic of site analysis will not be discussed.

The layout incorporates the two major functions of land utilization and circulation and related infrastructures. The layout should strive to minimize public costs in land, construction, maintenance and operation of streets and related services and to increase community initiative, responsibility and participation in the utilization of land. It is imperative that initial and continuing costs as well as control responsibilities to be born by the public sector be minimized.

In most cases the public sector has only very limited funds available for construction of infrastructures and where control of land/circulation is the responsibility of the public sector these areas will again in most cases in reality be without any control by the fact that there is just not enough money available to the public sector to provide this service.

An initial circulation network must be provided that allows for the possibility of both incremental as well as instant development of infrastructures and provides maximum amenity to the user.

In land subdivision, land utilization must be very specifically defined by use as:

**PUBLIC LAND** - The area for circulation of pedestrians and vehicles. It includes streets, pedestrian lanes, open spaces.

**SEMI-PUBLIC LAND** - The area of community utilization. It includes open spaces, playing fields, schools, etc.

**SEMI-PRIVATE LAND** - The area of shared utilization held in condominium by a group.

**PRIVATE LAND** - The area of residential, commercial, or small industries utilization. It includes lots and dwellings.

A comparison of typical existing situations will demonstrate the importance of proper land utilization and that in the context of the low income majority of urban dwellers in developing countries that the design of buildings must have a basis in the urban plan. The following examples are all located in Istanbul, Turkey.

Osmaniye, typical of public housing projects all over the World, achieves high density by concentrating apartment units on a very small percentage of the land, in Osmaniye 9% of the total land area. This type of layout is efficient in the provision of infrastructures but excessive public space, besides being a costly problem of maintenance and responsibility of the government, does not recognize the urban users need for private/semi-private open area. The layout discourages future development. The public sector has made a large investment that benefits only a few.

In contrast to the Osmaniye public housing project, the

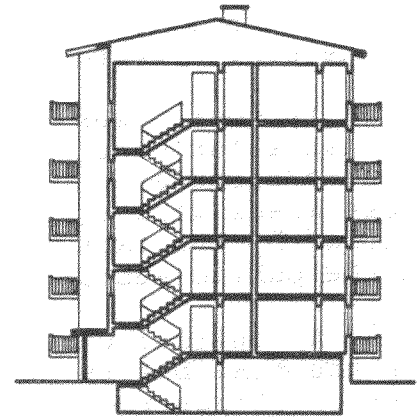
## OSMANIYE - Public, Low Income, Block Apartments

DENSITY - 333 persons/hectare

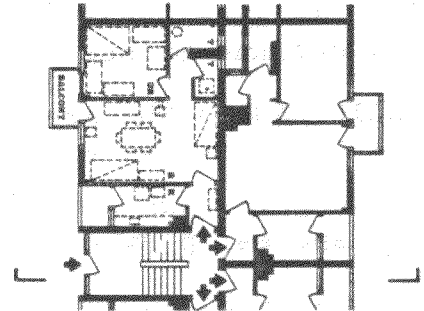
PRIVATE AREA - 9% of total land area

DWELLING AREA - 45m<sup>2</sup> average

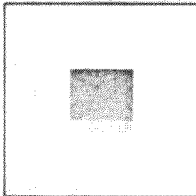
HEIGHT OF DWELLINGS - 5 stories



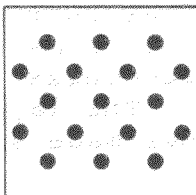
SECTION



PATTERNS	
Public:	streets/roadways
Semi-Public:	playgrounds
Semi-Private:	cluster courts
Private:	lots
	Dwellings
	Hectare



PERCENTAGES	
Streets/Roadways	20%
Playgrounds	2%
Cluster Courts	1%
Dwellings/Lots	9%
	Hectare



DENSITY	
Persons/Hectare	333
	20 persons



LOCALITY SEGMENT LAND UTILIZATION

