



## CHAPTER 5

### LAND USE IN URBAN AREAS

#### 5.1 INTRODUCTION

The purpose of this chapter is to show that land use is an important factor in urban economic growth and development because land-use patterns contribute to the desirability and productivity of a city. The ability to influence land-use decisions is therefore an essential economic development instrument. The most basic justification for land-use controls is the prevention of resource misallocation. This may be through unregulated private markets because of external economies or diseconomies, monopoly of power or other factors. The misallocation of urban land inevitably entails misallocation of other valuable resources such as transport.

Most urban areas use some form of land-use planning to determine the best present or future use for each area of land in the region. Planning for land use involves the drawing of maps of the specified area to determine suitable locations for houses, industries, businesses, open spaces, roads, water and sewer lines, reservoirs, hospitals, schools, etc. An overall zoning plan is used to control and regulate the use of land. A distinction is drawn between land and property: land refers to an undeveloped natural factor of production, while property refers to land and improvements. The application of land use within urban areas will now be investigated further.

#### 5.2 HIGHEST AND BEST USE

One of the main problems of land use in an urban area is the question of the optimal use of a specific site. This should be combined with the most profitable use of that specific site. To address this problem the concept of the highest and best use is applied. The most profitable use of a specific site will be that which provides the highest residual to that piece of land. The residual may be calculated by subtracting the

conversion costs from the present value of that piece of land. The residual may vary depending whether the site is used as a parking space or a grocery store. The highest and best use is not necessarily the most socially desirable use because various negative and positive spillovers may arise in different land uses (Blair, 1995: 212). The most profitable use may be to erect a supermarket in a specific site although it may not be the best (optimal) in a social and ethical sense.

It is thus important to be aware of the effect on any other parties that may be helped or harmed when land-use decisions are made. There is, however, a link between the most profitable and the most socially beneficial use of land. The profitability of a particular site is normally due to the willingness of consumers to purchase at that specific site. The market for land reflects societal demand for products at particular places. The most profitable use of land is not necessarily the most intensive use of that land. The key problem in determining the highest and best use is to determine the greatest return to land (residual) after construction and operating costs have been subtracted. The market mechanism reinforces the tendency of land to be put to its highest and best use. The principle of highest and best use can be applied to the use of land prior to development. It can, however, also be applied to changing pre-existing structures. The use that will provide the greatest residual after additional capital costs such as remodelling or demolition have been subtracted from the total value of the renovated property is the highest and best use. This assumes that existing construction costs must be paid even if the building is demolished. Like land, the pre-existing structures are immobile and are also treated as land. The residual is now attributed to land and pre-existing buildings.

It may be costly to determine the highest and best use for a piece of land because information is costly and imperfect. The amount of effort that goes into a land-use study depends on the scope of the project and the value of the land. It may be very costly to evaluate each possible land use for a particular site, although this may ensure an optimal application of land.



### 5.3 LAND-USE PLANNING

Land-use planning is a complex and controversial process involving competing values. It is based on the assumption that substantial growth in population and economic development will occur and should be encouraged. This view is derived from the fact that local governments receive revenue from residential taxes, business taxes, etc. to provide the public infrastructure. The more residents and the more businesses in an area, the greater the prospects for a higher level of revenue. This may lead to uncontrolled or weakly controlled urban growth without regarding the consequences on the infrastructure and environment (Miller, 1994: 247). In the long run, this factor alone may then motivate residents and businesses to move away, decreasing the tax base and reducing tax income. This may cause further environmental and social decay because governments are forced to cut the quantity and quality of services or raise the tax rates.

The principle of "all growth is good" endorsed by most land-use planners is not shared by environmentalists. Comprehensive, regional ecological land-use planning in which all major variables are considered and integrated to anticipate present and future needs and problems and to propose solutions is urged. A blend of economics and the ecology is vital to control the nature and speed of urban and suburban growth. In this way environmental degradation, pollution and social decay may be addressed and minimised. There are several reasons why ecological land-use planning is not widely used (Miller, 1994: 247):

- i) There is tremendous pressure to develop urban land for short-term economic gain without regard to long-term effects such as ecological and economic losses.
- ii) Local officials normally concentrate on short-term rather than long-term problems.
- iii) There is an unwillingness to pay for costly ecological land-use planning, even though this could save money in future.
- iv) Municipalities in various areas do not always co-operate in planning efforts.



This, however, should not prevent a comprehensive ecological land-use approach. There are ways to control land use, the most widely accepted approach being the principle of zoning. This will now be analysed further.

## 5.4 ZONING

Zoning can be defined as the division of a community into districts in which certain activities are prohibited and others are permitted. Zoning can be done in two separate ways. The first type, namely cumulative zoning, introduces a hierarchy of uses ranked from the least restricted to the most restricted, normally on the basis of perceived negative externalities arising from land use. The second type, prescriptive zoning, prescribes the allowable use for each section of property. In this case a special exception must be made if the property is used for anything other than that for which it is zoned (Bogart, 1998: 208). In theory, the purpose of zoning is to promote public health, safety and welfare. The principal means of promoting this is the separation of incompatible land uses (O'Sullivan, 1996: 288). The following principal categories could include:

- i) Commercial (various categories),
- ii) residential (various categories),
- iii) industrial,
- iv) utilities,
- v) transport,
- vi) recreation (parks and forest reserves),
- vii) bodies of water,
- viii) floodplains and
- ix) wildlife reserves.

Zoning laws regulate the height and bulk of the buildings permitted on each site. They specify that buildings are not to be located too close to property boundaries. They often require that residential plots be of a certain minimum size. First and foremost, zoning



laws specify the basic use for each piece of land (McDonald, 1997: 98). Zoning can also be used to control growth and to protect areas from certain types of development. Local governments can be influenced in zoning decisions because they depend on property taxes for revenue. If zoning policies are too strict, they may discourage innovative ideas for solving certain urban problems. In addition to zoning, some local governments use land-use policies to limit population growth. The purpose of a growth-control policy is to control undesirable spillovers such as pollution, congestion, crime, etc. Two growth-control policies can be implemented to limit the rate of development. The first way to limit population growth is to limit the land area of the city. The city can refuse to extend its urban services (e.g., sewers, roads, schools, parks) beyond an urban service boundary and in this way limit growth to the area within the boundary. The second way is to control residential growth by limiting the number of building permits issued (O'Sullivan, 1996: 285).

#### **5.4.1 Types of zoning**

There are many types of zoning, each having at least one purpose. Three types of zoning will be explained below.

##### **5.4.1.1 Externality zoning**

The principle of externality zoning is the practice of separating land uses that are considered incompatible. The main objective of this type of zoning is to reduce the total social cost of externality-generating production (Bogart, 1998: 216). Industrial firms generate all types of externalities such as noise, air pollution, odour and glare. Retailers generate externalities like traffic congestion and noise. High-density housing leads to traffic and parking problems and obscuring of views and light. Low-income households are likely to spend less on upkeep and external appearances of housing, so housing quality leads to an externality to others in the same area. The value of a house depends to a certain extent on the appearance and quality of neighbouring houses. Poor maintenance implies a potential negative externality from low-income housing



(Bogart, 1998: 217). Establishing a zone for each separate land use reducing the exposure to air and noise pollution could contribute to control these externalities. Zoning is thus very appealing as an environmental policy because it is the easiest way to separate polluters from their potential victims. The problem in this case is that zoning does not reduce the total amount of pollution, it merely moves it to another venue. In Table 5.1, a summary of externalities associated with various land uses is shown.

**Table 5.1: Externalities from various land uses**

| Land use                 | Externalities                                    |
|--------------------------|--|
| Industrial               | Noise, odour, vibration, pollution               |
| Commercial               | Noise, congestion, parking, obstruction of views |
| High-density residential | Noise, congestion, parking, obstruction of views |
| Low-income residential   | Fiscal burden, deteriorating housing quality     |

Source: Bogart. 1998.

As an alternative to zoning, pollution may be countered with an effluent fee that is basically a tax on pollution. For this fee to be efficient, it should be set equal to the marginal external cost of pollution that is basically the cost to society of an additional unit of pollution (O'Sullivan, 1996: 289). If one ton of sulphur dioxide generates a social cost of R20, the fee should be R20 per ton. The effluent fee *internalises* the pollution externality, which leads to a decrease in pollution to avoid an excessive fee. In theory, this fee would generate an optimally low level of pollution and the optimum spatial distribution of pollution. The effluent fee may vary from place to place, making it possible that fees would be higher near sensitive areas such as residential regions. If a system of spatial effluent fees were operating, a firm would base both its location and production decisions on effluent fees.

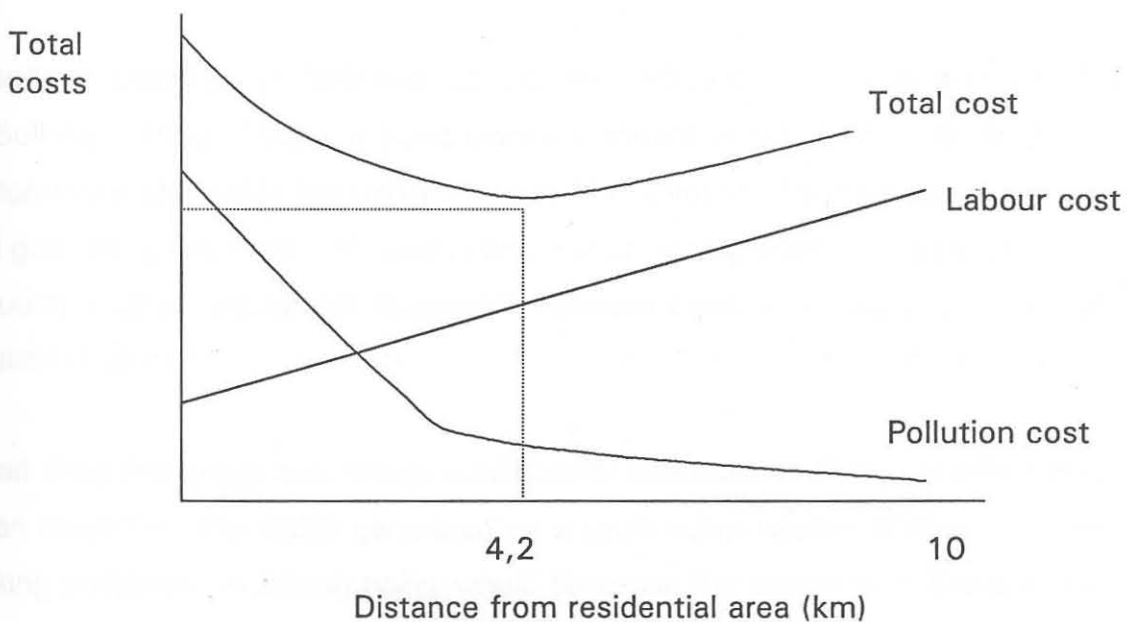
To understand the difference between zoning and effluent fees, consider the following example:

A city has the following characteristics (O'Sullivan, 1996: 289):

- i) The residents live in the western part of the city and commute eastward to a polluting timber mill.
- ii) The further the distance between the residential area and the timber mill, the higher the wages. Workers are thus compensated for commuting costs with higher wages. The total labour cost of the firm is the wage times the total quantity of labour.
- iii) The further the distance between the residential area and the mill, the lower the effluent fees.
- iv) The city starts with an industrial zoning policy, locating the mill 10 kilometres away from the residential area.

In Figure 5.1, the optimum location and spatial effluent fees are shown (O'Sullivan, 1996: 290):

**Figure 5.1: Optimum location and spatial effluent fees**





Benefits and costs have to be calculated as the firm moves closer to the residential area. As a benefit, labour costs would decline but effluent fees would increase because more people would be affected by the pollution. Total cost would be minimised at a location 4,2 kilometers from the residential area. If the city introduced an effluent fee instead of a zoning policy, the firm would move from the industrial zone to a location 4,2 kilometres from the residential area, decreasing its total costs. The effluent fee is more efficient than the zoning policy for two reasons. The effluent policy enables the firm to choose a location that minimises its production costs. The social benefit is that the savings in commuting costs exceed the increase in pollution costs. Secondly, the firm is now forced to pay for pollution, which it thus decreases to an optimally low level. A firm will only stay in the industrial zone if the increase in pollution costs is greater than the decrease in labour costs. The question now is why cities still prefer zoning policies to effluent fees. Industrial zoning is easier to administer and the calculation of the marginal external cost for different locations in the city is a complex matter. The monitoring of polluting firms is also a major task and it is easier to locate all polluting firms in an industrial zone. Secondly, the effluent policy system may increase pollution in some areas because firms may locate closer to residential areas. Those affected by the pollution are rarely compensated, and local opposition to effluent fees remains.

A sort of compromise between zoning and effluent fees is performance zoning (O'Sullivan, 1996: 291). A performance standard is set by the city for each zone. Performance standards set upper limits for the amount of smoke, noise, glare, odour and gas emitted by firms. Although performance zoning does not force firms to pay for pollution, it does encourage abatement because firms with less pollution have more location choices.

Retail shopping areas also create a number of externalities that may affect residential areas close by. The traffic generated by a retail outlet causes congestion, noise and parking problems. A zoning policy would decrease the exposure to these externalities and prevent the invasion of quiet residential areas by delivery trucks and shoppers. If performance zoning is used, performance standards force developers to provide





adequate parking, street improvements, and landscaping to control noise. Under this policy, the mixing of commercial and residential land use is possible because retailers shield residents from the undesirable effects of commercial development. High-density housing generates most residential externalities, as it increases traffic volume, congestion and noise. Performance zoning can help soften the effect of high-density housing by providing more parking, improving streets to minimise congestion, while landscaping can form a buffer between apartment buildings and single-family homes.

#### 5.4.1.2 Fiscal zoning

This type of zoning occurs because local government finances public services via property tax. A fiscal burden is generated when the tax contribution is less than the cost of local public services. Low-income housing, high-density housing, households living in the fringe areas of the city and new commercial and industrial development may generate fiscal burdens (Bogart, 1998: 217).

##### i) Low-income housing

Low-income households normally pay less in local taxes than the value of the public services supplied and consumed, causing a fiscal burden. This requires that higher-income households pay more than the value of services they themselves consume.

##### ii) High-density housing

A household's tax liability increases with its housing consumption and therefore a household in a small house or apartment pays a relatively small amount in taxes. This household is thus more likely to impose a fiscal burden on local government. A local government may therefore reject an application to zone a piece of land for high-density housing purposes.

##### iii) Fringe land use

New housing is usually built on the fringe of the metropolitan area. If the costs of providing public services to these areas are higher, the tax contributions may be less

than the costs of public services. New housing may then impose a fiscal burden on the city. A simple way to prevent the new development and the associated fiscal burden is to zone the vacant land for agricultural use.

#### iv) Commercial and industrial development

In certain areas in some cities, commercial and industrial development generates fiscal burdens. The city may restrict development by limiting the supply of commercial and industrial land as well as building heights. By limiting the height of buildings, less people can be employed, resulting in less traffic, congestion and pressure on the existing infrastructure.

The city may pass on the cost of new infrastructure to consumers or new firms, which may help to restrict development.

#### 5.4.1.3 Design zoning

This type of zoning is a form of macro-architecture where the city planner designs a city, arranging activities to promote the efficient use of infrastructure such as streets, sewage and water systems. Residential and employment growth is allowed in areas where the infrastructure can be provided efficiently. Some cities use zoning to direct residential development to particular areas. Design zoning is also used to preserve open spaces. Certain cities zone areas of land as *open space or green belts* (O'Sullivan, 1996: 296). This type of zoning provides open spaces in cities.

The alternative to open-space zoning is the outright purchase of land for open space. The city could decide to purchase the land instead of zoning it for open space, but this would happen only if the marginal benefit of open space exceeds the marginal costs. If the city has to face the full cost of open space, it would choose the optimum amount of open space. On the other hand, if the city simply zones pieces of land for open space, it is likely that too much land would be allocated to open space. The marginal benefit of open space is the diminishing marginal utility of that open space. The marginal cost of



open space is the opportunity cost of using the land for open space instead of for an alternative use, such as residential development.

## 5.5 REGULATION RIGHTS

A variety of distinct rights is associated with each piece of land or property. These rights represent various tools that a local government has at its disposal to organise an urban area. A government has the following tools: police power, taxation, eminent domain and escheat, of which the first three are very important development tools (Blair, 1995: 232).

- i) "Police power" implies the authority of a government to regulate action to improve health, safety and general welfare. Zoning and building codes are the most important police powers.
- ii) "Taxation levied" by the government affects both the returns that property yields as well as local revenues. Property taxes can affect land use because they lower the return on real-estate investment. Differentiation between various land uses may discourage development and encourage urban sprawl.
- iii) "Eminent domain" is the right of government to purchase property if its use is needed for a public project or purpose such as a road. The exact meaning of "public purpose," can be a source of land-use debate.
- iv) "Escheat" is government's right to all land for which a private owner does not exist. If someone dies without any heirs, the government will claim the deceased's property.

Zoning is still probably the governmental tool most significant as a determinant of land use. Although the need for zoning is widely accepted, it is not without its critics. There is a feeling that zoning is an unnecessary impediment to the operation of the free market. There are at least five definite ways that zoning may restrict economic development (Blair, 1995: 233).



- i) Attempting to change land use becomes difficult and often prevents redevelopment of an area.
- ii) Zoning may inflate land costs because it restricts the availability of land for a specific purpose, e.g. commercial land.
- iii) Zoning sometimes leads to aesthetic and social shortcomings because it detracts from an area's quality of life.
- iv) Public planners sometimes make the wrong decisions which result in inefficient or socially harmful land uses.
- v) Exclusionary and fiscal zoning may lead to the exclusion of certain social groups if all but very expensive housing is prohibited.

An important factor to keep in mind is that zoning is an instrument used by local governments to anticipate conflicts in land use, and to plan accordingly in the interest of the local community.

Other important land-use controls are: a mapped street ordinance which shows existing and proposed streets; subdivision controls which impose controls on developers who want to subdivide or develop undeveloped land; building and housing codes, which regulate construction, maintenance and use of structures; and architectural controls which regulate structure design, mainly for aesthetic purposes (Wheaton, 1979: 513).

## 5.6 SUMMARY

It is very important that urban planners have a long-term vision in terms of allocation of land for various uses. An efficient distribution of land uses contributes to local economic development prospects. The return of land is based on productivity and in the case of urban land, this productivity is a function of access to goods in the environment. Land is in fixed supply and therefore the best and highest use of land should be the ultimate goal in restricting the waste and misallocation of this vital resource. Market forces are an important determinant to reinforce the goal that land be put to its best and highest possible or efficient use.



Land-use patterns are changing in response to urban growth, changes in transportation costs, production processes, values and income. Zoning is the most popular tool for regulating the use of land, although other methods are also used. Zoning is aimed at the reduction of land-use spillovers. Effluent fees are mentioned as an alternative to zoning, especially directed towards limiting externalities such as pollution. Zoning is sometimes criticised as being both ineffective and inefficient.

It is thus important to ensure that zoning policy or effluent fees are directed towards contributing to rather than hampering economic growth and development. Local authorities should use a long-term approach when designing and implementing these methods to determine land use in urban areas. Land use is an important factor when firms make location choices, and may either attract new firms or divert them to other, more acceptable areas.

In the following chapter, the various reasons why firms tend to locate in urban areas will be analysed as well as the economic principles on which these decisions are based.