SECOND EUROPEAN CONFERENCE OF AGRICULTURAL ECONOMISTS

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THE ROLE OF ECONOMIC ANALYSIS IN PLANNING THE ALLOCATION OF LAND BETWEEN AGRICULTURAL AND URBAN USES

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I INTRODUCTION

Conflicts over land use have existed as long as mankind has exploited land resources; people have gone to war to defend their rights to land or to gain control over new land. However, the urban threat to land is of a much more recent origin. Scarcity of land has always been a problem in densely populated areas, but what is particular about the land use problem in recent years is the manner in which urban development has spread over rural areas, putting fertile land under concrete and intervening in the function of nature and rural life. The conflicts are often felt most strongly on the urban fringe. On the one side there is the demand for land for urban uses; on the other side there are interest of agriculture, the supply of food and protection of the environment to be considered. These are vital, but to a certain extent conflicting functions of the society. It is the purpose of land use planning to limit these conflicts and to further orderly utilization of land resources in accordance with economic, social and other objectives of the society.

Many of the problems of land use are the result of changes in economic and social structures during recent decennia. The migration of rural labour to urban industries has created needs for more homes and space for the growing urban population. To this come the effects of increasing welfare: Demand for larger and better homes, space for recreation and out-door life and public facilities, factors which have enhanced the demand for land. In discussing urban use of land, however, one should not forget that it has been a major policy objective of many countries to further industrial development and to reduce labour in agriculture. The loss of farm land is a cost which the society has had to pay to achieve this objective. It is in this context that the role of economic analyses should be seen: As a means to evaluate the consequences of alternative uses of land and a guide for politicians to solve conflicts over land use (1).

(1) Schultz (1974) has treated these questions in relation to changes in resource scarcity.

II URBAN DEVELOPMENT AND LAND USE

Statistics on land use for urban development are incomplete. Pilot studies of land use in selected areas show increases in urban areas of as much as 2 per cent per year; however, this figure is certainly bound to vary from area to area depending on the potentials for urban growth. In the Rhein/Ruhr Region of West Germany, urban areas increased by 2 per cent annually during the 1960s (OECD, 1978, p. 12), and a similar trend is observed for England in the Slough-Hillingdon area between 1961 and 1971 (OECD, 1977a, p. 4). The percentage change in farm land is much smaller. For England and Wales as a whole, total farm land fell annually by less than 0.2 per cent during the above mentioned period. A similiar trend is observed in Sweden (Uhlin, 1977, p. 13), whereas in Denmark, total agricultural area declined by about 0.5 per cent during the 1960s. Not all of this fall was the result of urban development; some has been due to abandonment of less fertile land, and quite large areas, along the beaches and in rural areas, have been converted into recreation areas or used for country homes. Some recreation areas could be taken into farming again if an emergency situation should call for such a step.

The development within urban areas has been characterized by two main tendencies. During the 1950s and up through the 1960s, there was a rapid migration of people moving out of agriculture and into urban occupations, increasing the urban population. At the same time, there was a movement on the way in the opposite direction as urban people, looking for more spacious homes, started to take residence in suburban areas. This latter movement has in particular marked the situation in many larger cities where depopulation of town centres has become somewhat of a problem in recent years, at the same time as there has been an explosion of new residential areas on the urban fringe. The result of this development is indicated by Table 1 showing, in the case of West Germany, a noticeable increase in the town area per inhabitant during the investigated period.

Table 1. Population and areas of the Federal Republic of Germany by types of region

Type of region	Area in per cent			Resident population in per cent			Inhabitant/sq. km		
	1950	1961	1970	1950	1961	1970	1950	1961	1970
Cities	3.0	3.4	4.2	31.4	35.9	36.0	2,030	2,336	2,013
Peri-urban regions	8.9	14.0	21.8	14.7	20.2	27.3	391	313	294
Total	11.9	17.4	26.1	46.1	56.1	63.3	750	703	572

Source: OECD, 1977b, p. 19.

The use of land for urban development has been of serious concern to many people who have claimed that a continuous decline in farm land would put future food supplies in jeopardy. A look at the trend in farm land does not support this fear. In the case of Denmark, the fall in farm land culminated in the early 1960s (Figure 1), and there are good reasons to believe that this trend will persist. Firstly, considerable areas were converted into urban disposal areas during the 1960s, not all of which have been exhausted yet. Secondly, the construction of residential buildings and roads has fallen in the wake of the late economic crisis and lowered the demand for land for such purposes. Thirdly, there is no longer a large rural population to transfer as was the case before the great expansion in the fifties and the sixties. These factors in combination make one believe that the demand for land for urban development may stabilize at a somewhat lower level in the coming years (1).

(1) A similar tendency is observed in the U.S.A. (Brubaker, 1977, p. 1041).

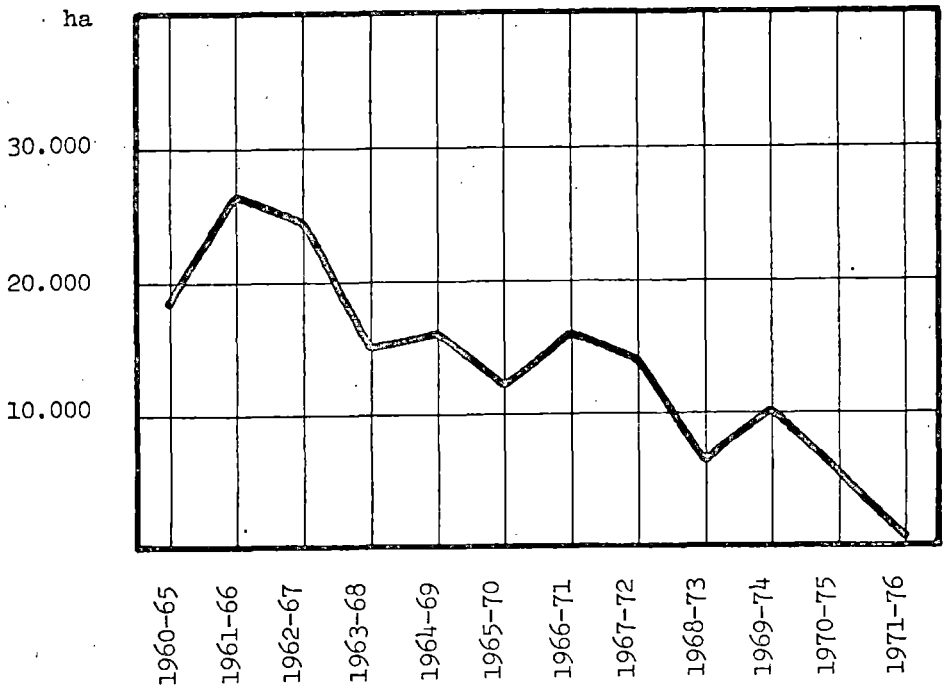

Figure 1. Average annual decrease in farm land in Denmark

Source: Bjerre Andersen, 1978.

III LAND PRICES AND LAND USE PLANNING

In a free market economy with private ownership of land and with no restrictions put on land use, market forces would allocate land resources according to the principle of economic optimum allocation of resources. However, maximum profit, as it means, may not always serve the interests of society. To do so it would require that (Mishan, 1978, p. xi):

" - all effect relevant to the welfare of all individuals be properly priced on the market, and
- perfect competition prevail in all economic activities".

In such an ideal world, market forces alone would assure an optimum allocation of land resources with respect to the different needs of society, and there would be no need for land use planning.

The problem is that the above mentioned assumptions do not hold in real life. Perfect competition (a homogenous and disparent market with many buyers and sellers) is seldom fulfilled for the land market. This need not be due only to private monopoly; examples can easily be found where the public, being the sole buyer or seller of land in an area, is in full control of the market. Even more serious is the lack of reflection in the market of certain needs for land use. The questions of recreation and protection of the environment are examples of such factors which do not reflect directly on the price of land.

These and other examples show that it cannot be left to market forces alone to allocate land resources. As said by Hirsch (1977, p. 156): "-- we should never forget that the sole economic and legal justification for all land use control, including exclusionary zoning, is circumvention of resource misallocation by private markets --". This does not mean that land use planning can ignore the market forces. On the contrary, the economic forces behind the demand for land are ever present and should be taken into consideration when planning the use of land (1).

The main hindrance for agriculture in peri-urban areas is the high price of land which increases the cost of production and discourages investment in normal farming activities. These difficulties become serious in urban development areas (Figure 2), where agriculture must compete more or less directly with urban interests, and where land prices exceed by far the return to land in agriculture (2). In Denmark at present (spring 1978) farm land for urban construction is paid in the range of Dkr. 20-25 per m^2 ($ 3.60-4.50) whereas the price of land in rural areas (without buildings) is about Dkr. 2-4 per m^2 ($ 0.35-0.70) depending on soil fertility and location.

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(1) For a discussion of land use planning see e.g. OECD (1976) and Walters et al. (1974).

(2) The effect of location on land prices has been investigated by a number of authors, see e.g. Lloyd (1972) and Alcaly (1976). Found (1971), in his analysis of rural land-use patterns, analyses the effect of location on economic return and the pattern of production in agriculture.

In the vicinity of larger cities, the price may be even higher. In Sweden it is found that agriculture will have to pay as much as Skr. 24-36 per m^2 ($ 5.20-7.80) to compete with urban development for land (Uhlin, 1977, p. 123).

From what has been said it is quite clear that agriculture has little chance of survival in areas where urban development has a potential and where the economic forces behind such interests are let free to work. If, for reasons which have been mentioned before, it is in the interest of society to maintain agriculture in such areas, this can only be achieved through restriction on the use of land and by protecting agriculture against the urban influence. Where and when to intervene is a question for politicians, but the decision on such actions will have to rest on a thorough investigation of the costs and benefits to society of alternative land use plans.

IV RESTRICTION ON LAND USE

The efficiency of a policy measure is expressed by its success in achieving certain objectives of the society (1). In the case of land use, there are different objectives to be considered, some of which are in conflict with each other. Conflicts may exist between different interests of the same group of people (one cannot build on land and at the same time have the land available for recreation), and there are divergent interests of different groups of people (some want to build, others prefer recreation). The more scarce land is, the more difficult it is to meet the various interests and to maintain a balanced policy with respect to land use. This is in particular true when strong economic interests are involved as it is often the case in areas of urban development.

The land use problems are illustrated by the diagram in Figure 3, showing an urban area located in the midst of a rural

(1) Hirsch (1977) has investigated the effectiveness of restrictive land use instruments. For a more comprehensive discussion of restriction on land use see e.g. Andrews, ed. (1972).

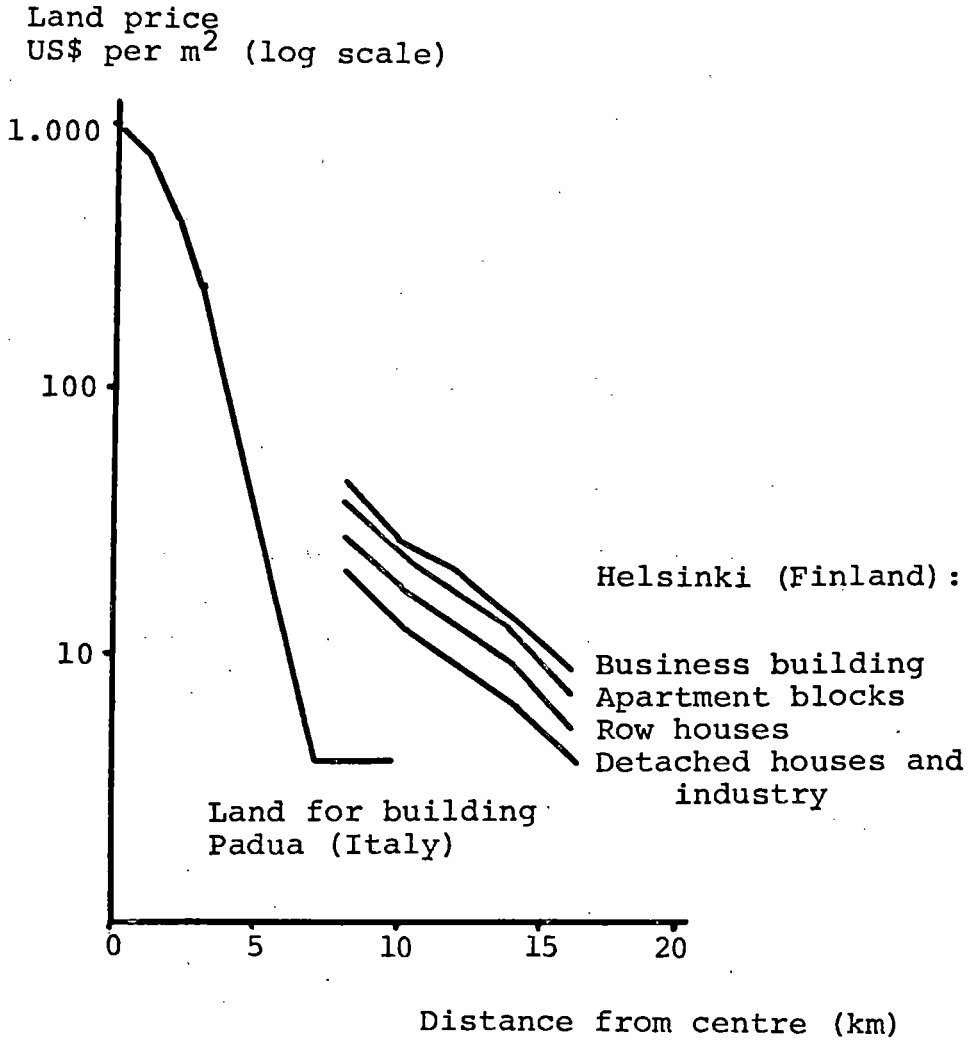

Figure 2. Land prices according to use and location, 1974

Source: OECD, 1978, p. 16.

environment. The value of land (measured as economic rent) is shown in the lower part of the figure for agriculture (constant values) and for urban uses (increasing values towards the town centre) (1). Provided that no restriction is placed on the use of land, we should expect adjustment in the market to take place

(1) The example rests on an assumption of perfect competition so that economic rent is reflected in the price of land in all uses.

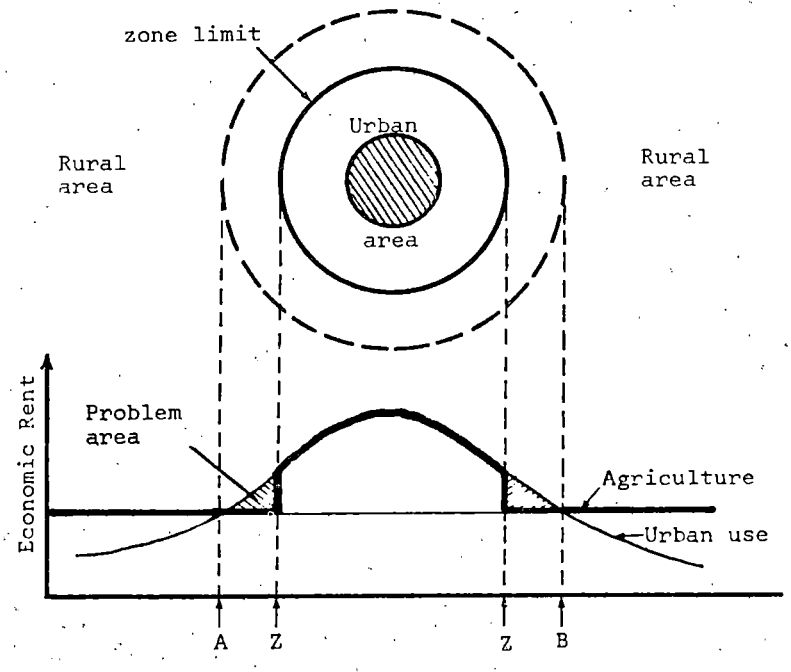

Figure 3. Restriction on land use and land values

around the dotted circle which indicates locations where the return to land is the same in agricultural and urban uses. The actual location of this limit, which can be taken as the limit for urban influence on land values, will depend on the potentials for urban development in the area. In some areas the limit will be situated close to the town, in others further away. The influence of a large city is felt at a longer distance than the influence of a small village. In the extreme case, the limit for urban influence may stretch beyond national borders, raising the price of land above its value in agriculture throughout the country.

Exclusionary zoning, marked in the figure by the zone limit Z, will influence the market for land both in rural and urban areas. Supposing that the zoning is permanent, i.e. the

area outside the zone limit to be reserved for agriculture in all future, it would be tempting to believe that the price of land would fall to the level of what agriculture can pay for land. Such a fall would be to the benefit of the buyer of land, but a loss to the owners who would no longer be able to sell this land for urban uses.

In practice, however, the price may fall less than that. Firstly, it is unlikely that the zoning should be fixed for all future, i.e. a later gain from sale of the land to urban uses will be capitalized into the value of the land. Secondly, the location close to the town will attract urban buyers, who would like to use the farms for residential purposes or as an object of speculative investment. Both factors will increase the price of land on the urban fringe, and we may therefore conclude that zoning, being an important policy instrument for protecting farm land, has a limited capacity of restricting the urban influence on land prices in agriculture. It will require other measures in combination with zoning to seclude agriculture from the influence of urban areas; in fact, that is what land policy for a large part is concerned with.

One solution would be to reduce urban demand for farm land outside the zone limit. In theory this may sound easy, but it is not. In Denmark since 1973, the buyer of a farm must a) be 20 years or more; b) take up residency on the farm within six months from the time of purchase and c) have farming as a main occupation. Smaller farms are exempted from the latter restriction, and farms acquired in family trade or by inheritance are exempted from both b) and c). The main conclusion from the use of this legislation is that it has not been very effective in limiting the purchase of farms by non-farmers (1). For one thing, it has been difficult to control

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(1) Non-farmers' purchase of farms fell from about 50 per cent of total sales before the restriction was introduced to 36 per cent in 1975. The latter figure corresponds approximately to the percentage for 1960-70.

whether a farmer has residence on the farm and has farming as main occupation. Another thing is that there is a common interest for alleviating the access for young people educated in agriculture to buy farms. The law is under revision and a proposal has been put forward to supplement the above mentioned restrictions with a requirement of education in farming. It is not yet clear what the result will be.

Even a complete ban on non-farmers' purchase of farm real estate would not eliminate the effect which the sale of land for urban purposes has on land prices. The main instruments used in this connection are taxation of capital gains and land transfer taxes (tax on land transferred from rural to urban zones). Both measures are applied to the sale of farm real estate in Denmark, but as far as known, no quantitative assessment has been made of their effect on the price of land. Speaking in general terms, the taxation measures have not been applied very restrictively, although the mere use of such measures has been heavily criticized by farmers. In 1975, 17 per cent of all farm sales gave rise to capital gain taxes, the average amount of tax being about Dkr. 1.300 per ha ($ 230 per ha). Sales of farms in free trade were more often subject for taxation than were sales between relatives, and so was the sale by elderly farmers who had possessed their farms for a long period (1).

The above mentioned examples illustrate some of the problems which land use planning is facing in peri-urban areas. Similar examples will be found in other countries illustrating the complexity of the problem. The striking feature of the problems is that land use planning cannot be separated from the question of land prices, they are intertwined and they will have to be solved in common.

Now, turning back to the question of zoning, we may find that the main opposition against restriction on the use of land comes from the urban sector, where zoning is felt as a reduction in the supply of land. The looser will in this case be

(1) Betænkning nr. 795, Suppl. No. 2, p. 251 f.

the buyer who will have to find his land in a smaller geographical area and possibly at a higher price. To the extent that this will release an uncontrolled speculation in the shortage of land, it may put a limit to how restrictive a land policy governments are willing to accept. Indeed, it is a question whether it will be possible to restrict the use of land for urban development to any higher degree (1); so far, most land use planning in peri-urban areas has been concerned with the location of urban development rather than restricting the global use of land.

V COMPETITION OF AGRICULTURE FOR LAND

The interest in land use planning from the point of view of agriculture is related mainly to the protection of land and the conditions for farm production. Closely related to these factors are the questions of environmental protection and maintenance of the landscape.

A. PRODUCTIVE VALUE OF LAND

It is part of the policy of most countries to protect good farm land. This question is accentuated by the fact that from old time many towns have been located in the better farming areas. This is typically the case in Denmark where the best land is threatened most by urban development (2). To avoid such loss of land, some countries require special approval of the use, before farm land can be used for urban development (3).

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(1) In Denmark, urban zones should comprise enough land for 15 years of urban use.

(2) This may not always be the case. In an investigation of land use in England, no evidence was found of a disproportionate loss of good quality agricultural land (CAS, 1976, p. 49).

(3) This is for instance the case in Norway, where the use of farm land for urban purposes is subject to approval by the County Agricultural Board (OECD, 1977c, p. 28).

Such a policy is most easily carried out if there exist alternative areas which can be used for urban development. One can without difficulty find examples where urban development has been banished, for instance in areas where the amenity values of culture or nature are at stake, but it is much more difficult to exclude urban development for the sake of protecting agricultural land. In areas where topographical or geological factors cause large variation in the productive value of land, it may not be difficult to find alternative locations for urban development. But in the better farming areas with predominating good fertile soil, there will be no such alternative available.

The cost to society of moving urban development to less fertile land is a complex question which cannot be dealt with here in depth. In the extreme case, we may expect a difference in harvest yields of barley of 25 to 30 hkg per ha from the best to the poorest land (Aslyng, 1976). Such a difference may be large to the farmer, but it is trivial in comparison with the cost of moving urban development from one area to another. Furthermore, the difference in yield may to some extent be reduced through improved technique of cultivation or by the use of irrigation. The importance attached to the protection of farm land will vary from country to country depending, among other things, on the amount of farm land at hand. For Denmark, being an exporter of agricultural products, it would hardly be feasible to restrain the global use of land for urban development, just to save some hectares of fertile land.

B. AGRICULTURAL PRODUCTION

It is a well known fact that the location in relation to the town has an impact on production in agriculture. The classic example is Von Thünen's model which builds on the observation that the intensity of farm production increases when moving towards the town. The main characteristics of peri-urban agriculture today are (OECD, 1978, p. 34):

" - greater capital and labour intensity than rural agriculture where farming conditions are favourable, but less intensive use of land or idling where conditions are unfavourable and uncertainty is greater;

- decline in the importance of animal production, especially in the urban proximity;

- greater importance of vegetable production;

- greater percentage of farmland rented;

- higher rate of part-time farming."

The particular structure of peri-urban agriculture is the result of an adjustment to higher cost of production, in particular of land and labour, uncertainty of production and the importance of environmental conditions in such areas.

The role of agriculture in peri-urban areas cannot be judged solely from the situation of individual farms. Agriculture has an impact on economic activities and employment beyond the farm gate, as buyer of goods and sevices from other sectors and as supplier of farm products for processing industries and food dealers. These factors must be taken into account when considering the function of agriculture in peri-urban areas. Agriculture cannot be saved just by protecting farm land; land use planning must consider the needs of agriculture as an industry and give it a decent chance to function and survive in the areas reserved for farming (1).

C. PROTECTION OF THE ENVIRONMENT

Agriculture is increasingly expected to take part in the preservation of the landscape around urban areas. This applies both to the maintenance of the open landscape and pollution from the farm production itself. Agricultural production in its modern form is most often not acceptable in the near vicinity of residential areas, where smell from animals and noise

(1) In an investigation of agriculture on the urban fringe (Walter-Jørgensen, 1977), it is found that many of the problems in these areas are due to lack of long term planning which makes investments in farming uncertain.

from farm machinery or ventilators often give rise to complaints. Many of these problems may find their solution in an improved technique of production. One such example is the development of methan gas from animal waste which, at one time, may help alleviate the energy problem, solving the waste problems of agriculture and reducing contagious diseases among animals. In urban zones where land is reserved for other purposes it is the responsibility of the public to make provisions for the maintenance of the open land. Agriculture in such areas can merely be a question of cultivating remaining farming areas or tending a few animals which is in the interest of the public to keep in the area.

VI CONCLUDING REMARKS

It has been shown that agriculture has little chance of survival in areas where urban development has a strong potential, that restrictions on the use of land have economic implications both in rural and urban areas and that the market forces alone cannot be expected to solve the land use problems in peri-urban areas. It is in this context that land use planning should be seen as a means of framing a model for the use of land, taking the different objectives of society into consideration. From an overall point of view, it is desirable to keep urban development under control and to promote an orderly transfer of land for such purposes so as to preserve the country's resources of land and amenities of nature. However, it may not always be good economics nor politically aceptable to restrict urban development just for the sake of protecting farm land.

It is of vital importance for a society that its urban population is provided with good housing conditions, a healthy environment to live in and, not least, job opportunities. To achieve this objective, space is needed for urban development. There are good reasons to believe, however, that past years' heavy charge on land resources will not continue, and that agriculture will have ample opportunities to make up for the loss

of land by increasing the efficiency of production on remaining land. In evaluating these questions it needs consideration whether money and effort would not be better spent on solving the problems of agriculture in rural areas than by defending an agriculture in urban development areas which is bound to disappear anyway.

LITERATURE

Alcaly, Roger E. (1976), "Transportation and Urban Land Values: A Review of the Theoretical Literature", Land Economics, Vol. 52, p. 42-53.

Andrews, Richard B. (1972), Urban Land Use Policy, N.Y. 1972, 285 p.

Aslyng, H.C. (1976), "Jordklassificering og høstudbytte i Danmark" (Soil classification and harvest yields in Denmark), Tidsskrift for Landøkonomi, Vol. 165, p. 345-358.

Betænkning no. 795 (1977), En fremtidig landbrugspolitik (A future farm policy), Betænkning fra Udvalget for den fremtidige landbrugspolitik, København 1977, 142 p. + 3 Suppl.

Bjerre Andersen, G. (1978), "Facts og forventninger vedrørende arealanvendelse" (Facts and expectations concerning land use), Byplan, Vol. 29, No. 6, 1978, p. 172-78.

Brubaker, S. (1977), "Land - The Far Horizon", Amer. Journ. of Agr. Economics, Vol. 59, 1977, p. 1037-1044.

CAS (1976), Land for Agriculture, Centre for Agricultural Strategy, Report 1, University of Reading, 1976, 101 p.

Found, William C. (1971), A theoretical approach to rural land-use patterns, London, 190 p.

Hirsch, Werner Z. (1977), "The Efficiency of Restrictive Land Use Instruments", Land Economics, Vol. 53, p. 145-156.

Lloyd, Peter E., & Peter Dicken (1972), Location in space: a theoretical approach to economic geography, N.Y. 292 p.

Mishan, E.J. (1978), Cost-Benefit Analysis, 2nd ed., London, 454 p.

OECD (1976), Land Use Policies and Agriculture, Paris, 84 p.

OECD (1977a), "Peri-Urban Agriculture in the Slough-Hillingdon Area", Contribution paper by the Ministry of Agriculture, Fisheries and Food, London, for meeting of experts 14th-18th November 1977, OECD Directorate for Agriculture and Food, Paris, 32 p.

OECD (1977b), "Peri-Urban Agriculture in the Rhein-Ruhr Region", Contribution paper by Dr. Edmund Mrohs for meeting of experts 14th-18th November 1977, OECD Directorate for Agriculture and Food, Paris, 46 p.

OECD (1977c), "Peri-Urban Agriculture in the Hønefoss District", Contribution paper by Inge Brørs, Olav Felland & Kristen Øyen for meeting of experts 14th-18th November 1977, OECD Directorate for Agriculture and Food, Paris, 31 p.

OECD (1978), Agriculture in the Planning and Management of Peri-Urban Areas, Synthesis Report, AGR/WP1(78)1, (dupl), Paris 1978, 84 p. (Restricted).

Schultz, Th. W. (1974), "Conflicts Over Changes in Scarcity: An Economic Approach", Amer.Journ. of Aqr. Economics, Vol. 56, p. 998-1004.

Uhlin, Hans-Erik (1977), "Tätortsutveckling på jordbruksmark" (Urban development on farm land), Rapport från Institutionen för Ekonomi och Statistik, Nr. 122, Dec. 1977, 154 p + app.

Walter-Jørgensen, Aa. (1977), Landbruget i tætbebyggede områder (Agriculture on the urban fringe), Økonomisk Institut, Den kongelige Veterinær- og Landbohøjskole, København, 51 p.

Walters, A.A. et al. (1974), Government and the Land, IEA Readings 13, The Institute of Economic Affairs, London, 95 p.