

PROBLEMS OF THE INTERRELATIONSHIP BETWEEN SETTLEMENT NETWORK AND ENVIRONMENT

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The investigation of human impact on environment has come into the forefront in research in recent years. The basic reason for this is that the environment transformed by man during his economic and non-economic activities, exerts, in many cases, a harmful influence on man himself, (especially in areas of contrast). The investigation of the man — environment relationship, resulting from the regional concentration of the forces of production, is primarily centred around relations between settlement and environment.

Attempting at the summary of this topic and at detailed elaboration of some of its implications, the definition of some relevant terms cannot be avoided, (primarily because previous international scientific publications differ when defining the essential or less essential features of these terms). These differences in approach were manifest at the investigation of CMEA Topic 1.3 when researchers of socialist countries tried to harmonize their opinions on the settlement — environment interrelationship.

Between 1976 and 1980 agreement has been achieved, in large measure. The ideas below stem from general agreement but some differences still exist.

Definition of Terms

1. Settlements

A settlement is defined as a system of close economic, social and technical structures in certain geographical environs, existing in intensive interrelationship with the elements of those structures (J. TÓTH 1979c). This approach, in the optimal case of harmoniously developed structures, can be best demonstrated by a tetrahedron, the base being the geographical environment, the three other planes being economic, social and technical infrastructures, respectively (Fig. 1).

Along the edges the intensity of the interrelationship between structures depends on their level of development; a settlement is the system of all these structures (and their interrelationships) which is in a strong interrelationship with the geographical environment as a uniform organism. Settlement types, including the most natural ones: towns and villages, can be differentiated according to the complexity level of these systems (with reference to the common features of all settlements in the area, and the deviation of individual elements).

Conceiving a settlement in this way (considering the settlement—environment relation), the following can be stated:

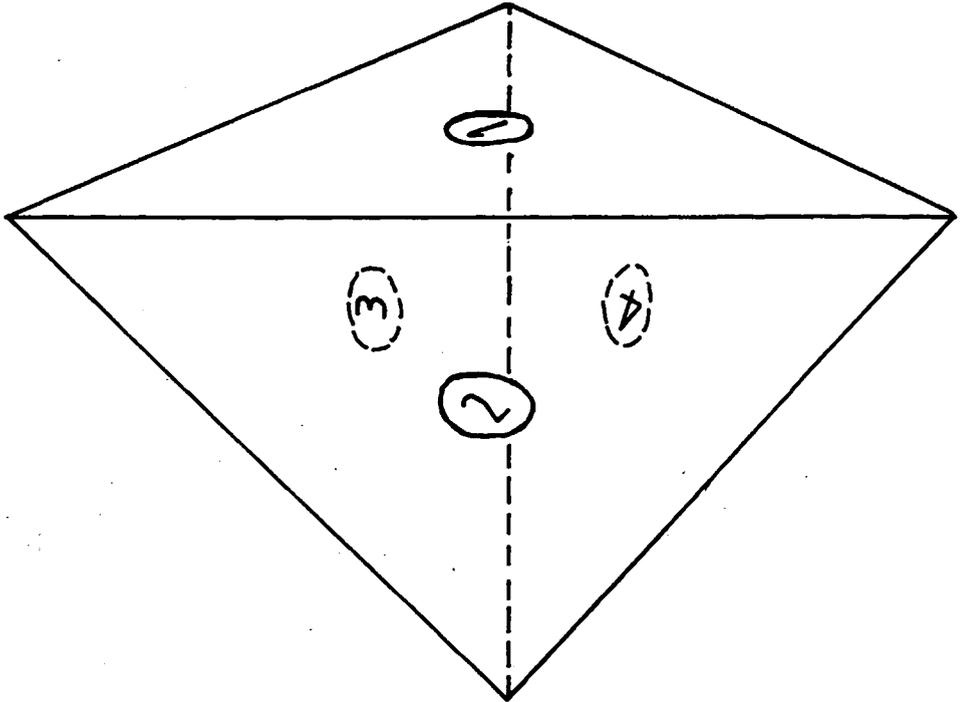


Fig. 1. The tetrahedron model of settlements

1: economic sphere 2: social sphere 3: technical (infrastructural) sphere
4: physical sphere

- a) the level of development (complexity) within structures differs;
- b) the dynamism of structures is different;
- c) in the long run and as a tendency, there is more or less a correlation between the development (intricacy) level and the dynamism of structures;
- d) changes in the elements of structures (accelerated progress or decline) or perphas the appearance of a new element can modify the whole structure;
- e) this modification influences, in an indirect way, the system of structures;
- f) the level of development (complexity) of settlements as systems differ.

2. Environment

Environment is the part of the Earth's biosphere where the settlement functions and where, beside natural ones, social laws operate, also modifying the effects of the former. So environment in our approach is a part of biosphere with both natural and anthropogeneous impacts.

Resulting from the above conception of environment (considering settlement — environment relation), the following can be stated:

- a) elements of geographical environment are in close connection with all the three structures of a settlement;

- b) this is an interrelationship: elements of environment influence the development of structures and structures react upon environment;
- c) the operation of the system transforms geographical environment at various depth and with various intensity;
- d) the transformed environment reacts in a different way upon the settlement;
- e) in the environment of the settlement, apart from modified natural processes, social-economic-technical processes are more and more effective;
- f) the intensity of the effect is approximately proportional to the size and level of development (complexity) of the settlement;
- g) the nature of the effect is different between settlement types;
- h) with the growth, development and functional transformation of settlements; with the rearrangement of constituent structures, various elements of geographical environment may become of greater importance;
- i) at the present level of the forces of production the need for environmental conditions favourable for life can be regarded a general one;
- j) the preservation, purposeful transformation and reconstruction of the environment and its elements needs a complex approach and comprehensive environmental management.

3. Urbanization

Urbanization means the process running parallel to and being a projection of the uninterrupted development — though with varying intensity — of the forces of production and the widening and deepening division of labour. In our conception, urbanization includes the occupational restratification of population as well as the regional concentration of population and with continuous changes as a way of life (J. TÓTH 1978b). This definition enables us to emphasize (from the aspect of settlement—environment interrelationship) the peculiarities below:

- a) urbanization is an uninterrupted process which, runs parallel, as a necessary concomitant, to the development of forces of production;
- b) urbanization is an all-embracing process affecting settlements from the very smallest ones to metropolitan agglomerations;
- c) urbanization involves the mobility of population (the most important force of production) into activity groups of different character, i.e. occupational restratification;
- d) urbanization includes the regional concentration of population;
- e) urbanization covers the changes in the way of life of the population which is a direct corollary of changes in occupation and residence.
- f) urbanization contains the level and structure of demands of population from environment.

4. Unification and Universalization of the Settlement—Environment

Interrelationship

With the development of forces of production and primarily due to urbanization process, interrelations of settlements are ever intensifying and becoming bilateral. Settlements are losing their previous independence, autonomy and autarchy;

they are becoming organized into a uniform settlement system with dominant hierarchical relationships. A settlement network is forming of settlements in which the more developed the forces of production and the more advanced the urbanization process, the stronger are the connections between the elements.

From another aspect: influences on the environment are getting more and more universal and intensive, with the utilization of environment as a whole. In contrast with the previous situation characterized by a geographical environment where natural laws operated uninterrupted, and the settlement—environment interrelationship was isolated, a uniform relationship between settlement networks and environment has been established. In this new environment zones and centres of intensive settlement—environment interrelationships are surrounded by areas of less intensive interrelationships, though these are organic parts of the interrelationship zone.

In its present development phase Hungary, resulting from the dynamic progress of the last decades, an effect generated from any part within the settlement network, exerts an influence on environment, and any process of the latter affects, directly or indirectly, settlements and their inhabitants. In this phase the investigation of the relationship between individual settlements and the surrounding environment, the planning of a cause- and effect-centric environmental management in that area is not sufficient any more; but the whole settlement network and the whole environment of settlements as a system should be examined in its multilateral complex inter relationship. In man's interference into this interrelationship, these multilateral relations should be considered.

General Features in the Interrelationship between. Settlement Networks and the environment

1. With the development of the forces of production and the spreading of the urbanization process, the exploitation of the environment is getting more intensive and general. The fundamental feature of the settlement network—environment interrelationship is its general character.
- 2 The intensity of the settlement network—environment interrelationship varies in spatial relations. These variations of intensity are rooted primarily, from the side of the settlement network, in the different character of settlement network elements.

So this interrelationship differs with the type, size, character of settlements. At the same time, the settlement network—environment interrelationship shows variations from the side of the environment as well, because the environment of settlements tolerates pressure in varying degree without considerable damage.

Consequently exploitation of different intensity from the side of settlement networks results in changes of the environment at varying depths and necessitates various degrees of environmental management, depending on the original and the way that social influences have modified environmental conditions.

3. The influences of the heaviest exploitive impact on the environment radiate into the farther areas of the environment. The phenomenon can primarily be observed in the spreading of the pollution of the environment by population and industrial concentrations. The social and economic importance of this is of the greatest significance.

From the aspect of environment, especially attractive spaces can be detected which attract recreational functions and influence the permanent or provisional migration of population in a wider area.

So from this aspect, the settlement network—environment interrelationship appears spatially the following way. Certain points in the space enclosing the interrelationship acquire a special significance as foci regarding the intensity of the interrelationship. From these foci the settlement network—environment interrelationships radiate, extending with a decreasing intensity.

4. The regional spreading of the settlement network—environment interrelationship is a linear one. Elements of the settlement network are interlinked by various infrastructural networks. Among them transport networks are the most important but pipelines and other networks for conveying materials also have a role to play.

Along the networks the settlement—environment interrelationship is more intensive than in areas lying between. This linear character can be noticed in the influence on the elements of the settlement network from the of environment as well, primarily along rivers which are the media of an exceptionally strong interrelationship and they give a linear character to the settlement—environment interrelationship from the side of environment as well.

5. The settlement network—environment interrelationship varies with time. This is, in the first place, related to the temporally varying development of settlement network controlled by the progress in the forces of production and by the advancement of the urbanization process. As a consequence of this variation, settlement networks mean a heavier and heavier exploitation of the environment on one hand and demands are manifest in various concrete structures on the other. Settlements specialized in exceptionally attractive environments; resorts, appear. These settlements are able to use the very favourable conditions for their special function better than others. The interrelationship between settlement networks and the environment has temporal variations also because, with the development of the forces of production, different elements of environmental conditions are coming into the forefront in the customs and way of life of the population.

Temporal changes should be important targets of the investigation of the settlement network—environment interrelationship. The knowledge of their main trends promotes prognostication.

Contributions to the Peculiarities in the Settlement Network—Environment Interrelationship in Hungary

Viewing the elements of settlement networks in relationship to environment, towns are in the limelight.

Urban criteria differ with countries; legal conditions of granting town privileges are different. This legal system is responsible for the few and the low ratio of urban dwellers in Hungary even today, in an international comparison.

As a result of the peculiar history of settlement network, Hungary has only one city: Budapest, the capital. This metropolis of 2 million inhabitants presents an excellent example for the settlement—environment relationship. The planning, management

and veldeopment of the Budapest agglomeration necessarily involves solutions for several environmental management problems.

Among other Hungarian towns the so-called 'counterpole-towns' are conspicuous. They have 100 to 240 thousand inhabitants. Their character is diverse; they differ in the level of industrial development, location and the relationship to the natural environment. Some of them, like e.g. Miskolc or Pécs, are built in an upland area near forests, others, like e.g. Győr or Szeged on river-banks, but Debrecen, for instance, lacks both of these environmental factors.

Resulting from the history of urban criteria in Hungary, a number of settlements with the legal status of a town have less developed structures than plenty of legally non-urban settlements. Thus urban status has a significance, as for the settlement network—environment interrelationship, only in the case of larger towns.

The minimal size of these larger towns can be determined in about 50 thousand inhabitants, making the comment that the settlement—environment interrelationship can be decisive for several towns or other settlements with less population in case they are in the urbanization zone or in a highly industrial area.

Therefore, the towns of Hungary can be divided into two large groups: towns lying in the industrial axis of the country or generally to the west from the Danube (they are, in a good part, industrialized and have developed structures) and Great Plain towns.

In the Great Plain towns complex structures arose only after the Liberation, caused by large-scale industrialization and the widening functions. The interrelationship of these towns with their environment had been weak before; only elements of the settlement networks and not the whole network had been in connection with the environment. Though, resulting from accelerated industrialization, these settlements have started to irradiate effects on environment but, as it can be seen from the above, problems of the settlement network—environment relationship in the Great Plain are not so prominent as elsewhere in the country; in this respect the Great Plain represents an earlier stage of development.

Hungarian towns have a more or less even regional distribution which has remained practically the same after new settlements were declared towns in the last decade (Fig. 2). This does not mean that the nature and intensity of the settlement network—environment interrelationship is uniform. There are large differences between towns in this respect, and, apart from dissimilarities of individual towns, regional varieties are also considerable. This applies primarily to the Great Plain towns.

Beside the differences in size, type and function, considering environmental effects, territorial configuration also differentiates. In this territorial configuration the generally observed ring-like character of the Hungarian town network is remarkable. The so-called inner ring of towns extends to 60 to 100 km from the capital. Towns in this inner ring have about 40 to 100 thousand inhabitants (Salgótarján, Hatvan, Szolnok, Kecskemét, Dunaújváros, Székesfehérvár, Tatabánya and the adjacent Tata and Oroszlány). These are mainly industrial settlements; the Great Plain section of the ring contains two of the most advanced industrialized towns. This inner ring is also important for the alleviation of Budapest and this circumstance has implications to environmental management as well.

The other formation in the configuration of Hungarian town network, the outer ring, contains the 'counterpole-type' towns (Miskolc, Debrecen, Szeged, Pécs,

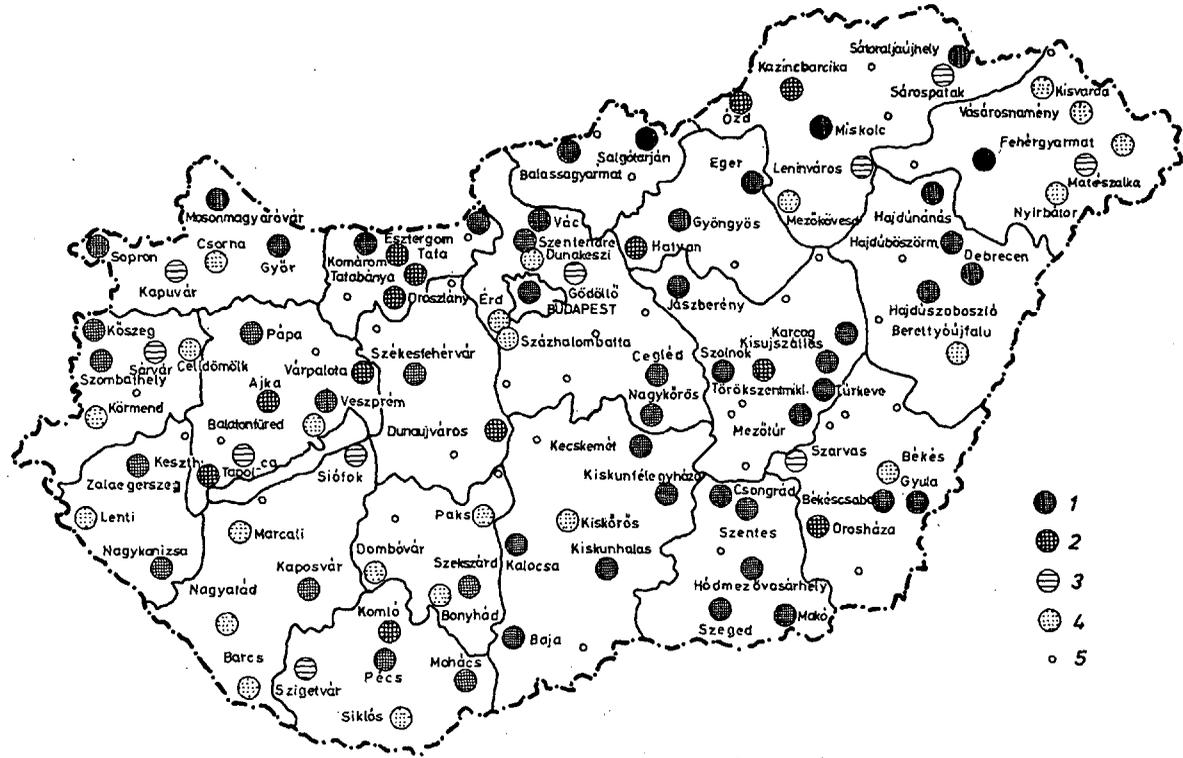


Fig. 2. Hungarian settlements of urban status
 1: settlements with urban status declared before 1945
 2: settlements with urban status declared between 1945 and 1960
 3: settlements with urban status declared between 1960 and 1970
 4: settlements with urban status declared between 1970 and 1979
 5: settlements to be developed into towns

Győr and some other developed county seats, like Nyíregyháza, Szombathely and alternatively Nagykanizsa, Zalaegerszeg, Kaposvár, Békéscsaba, Baja). This outer ring is constituted partly of large towns (in national comparison) and partly of numerous less industrialized Great Plain settlements. Among them there is the Mid-Békés town assemblage (Békéscsaba, Békés and Gyula) resembling in problems, from many aspects, to the Tata town assemblage of the inner ring.

The emergence of settlement groups in the Hungarian town network, of which they are important elements, points to a phase of development new in quality when settlements are not only foci of intensive irradiation but systems of exceptionally close interrelationships. Therefore, the influence of these elements in the settlement network needs new detailed investigations to measure this interrelationship, to reveal its peculiarities and to make prognoses (Fig. 3).

In many among small settlements, but also in 15 among the selected ones, have a higher than 65% ratio of wage-earners in industry and construction. These are mainly industrial settlements situated along the NE-SW industrial axis. But some of them are so-called 'socialist towns' and, in spite of the more or less developed other functions, various industrial activities give their nature and control their development. The degree these settlements pollute their environment depends on the inner division structure of their industry but, at any rate, it is larger than for other settlements; the exploitation of the environment in their immediate surroundings is greater than near other settlements. These settlements are, in a good part, centres of mining or of important chemical industry. Settlements like Tatabánya (70 thousand inhabitants) or the largest Hungarian socialist town Dunaújváros can be referred to this class. Some others, especially Martfű in the Great Plain (which started as an industrial site and the adjacent housing area), do not exploit the environment heavily.

Another large group of industrial settlements consists of towns with more developed structures where other functions than industry are also developed. Here Debrecen, Kaposvár, Pécs, Szeged, Szolnok, Szombathely, Veszprém and Zalaegerszeg can be mentioned which are centres of regions or counties and have manifold structures, compared to towns in the previous group.

The third group of settlements can be characterized by the balance of industry, tertiary sector functions and agricultural production.

A considerable part of settlements of urban character can be referred to these groups which has an important implication for us, i.e. the population here is highly structured and qualified; therefore (as social structure is developed), their demands concerning the environment are more subtle. In this situation, in settlements where special production results in the largest scale damages and pollution of the environment, demands concerning the environment as a recreation area are the heaviest. This means the simultaneous concentration of production and claim for recreation — these seemingly contradictory demands in connection with the environment. All these underline the special urgency and importance of the solution of complex environmental management tasks in these areas. In other groups of towns, viz. in industrial-agricultural or mixed type towns as well as in central places with the dominance of agriculture, the emphasis on environmental management tasks is generally less in comparison. There are only one or a few factories in these towns (economy being relatively backward) which represent a large demand from and heavy exploitation of the environment. Their social structure is also relatively undeveloped, qualified people are scarce, the demand from environment as a recreation place is less. Planning

of settlement networks and its elements is important here since in their progress they will follow the path beaten by presently more developed settlement groups. Therefore, environmental preservation and management are more promising here than at places where damages are irreversible or improvement would not be economic.

This is especially important for the settlements of the group where socialist industrialization or other functional transformation lead to dynamic changes. The structure and intensity of demands concerning the environment alter rapidly subordinated to the transformation.

The investigation of the regional distribution of settlement types leads to the general statement that settlements of larger population numbers in areas backward, less industrialized and with fluid structure are equivalent, from the aspect of demands from environment, with smaller settlements of the industrial axis. Regional differences can be revealed, from the aspect of the settlement network—environment interrelationship, in settlement size and economic activity, and, consequently in the rate of transformation of the technical and social structures (Fig. 4).

Examining industry, the activity with the most intensive impact on environment, this statement can be confirmed. The regional distribution of industry, judging by employment figures (but regarding the funds invested in industry as well) shows great variations on a national scale. More than a third of industrial capacities are concentrated in the capital, in spite of the planned conscious pressure of the last decades to eliminate the predominance of Budapest which is a major disproportion in the country.

Apart from the capital, the large centres of the industrial axis, especially towns in the Borsod basin and in Mid-Transdanubia (but smaller settlements lying between them as well) are prominent as concentrations of industrial workers. Outside the industrial axis, large towns are isolated phenomena; some smaller industrial centres are attached to them. The regional distribution of industrial workers underlines the statement made at the study of settlement types: economic activity, a major exploitive power of the environment, is concentrated in the same parts of the country. As a result of the developed structures formed by the advancement of tertiary functions and the emergence of quaternary ones, in these areas special demands arise for a favourable environment. Peculiarities of the industrial axis does not exist only in settlement types but it is the zone of the most intensive settlement network—environment interrelationship, even if we only take the dimensions of the concentration into account. The solution of environmental management problems here is urgent not only for structural reasons but for the large population numbers as well (Fig. 5).

The importance of the NE-SW industrial axis of the country is underlined by the fact that it is the destination of the major part of national interregional migration (E. SZAUTER 1975). Thus population numbers change much more rapidly in the selected settlements than elsewhere. The population numbers of smaller settlements do not always alter according to the national tendency; this is very expressed e.g. in the Great Plain, that in order of size, from the largest to the smallest, settlements lose their population in increasing proportion. Many can be found with a dynamically increasing population number. In several settlements along the industrial axis population grew 6 to 8 times more rapidly between 1960 and 1970 than the natural average rate (Fig. 6).

Among these settlements there are large industrial centres, like Miskolc, Székesfehérvár or the Budapest agglomeration. It is obvious that in areas where the struc-

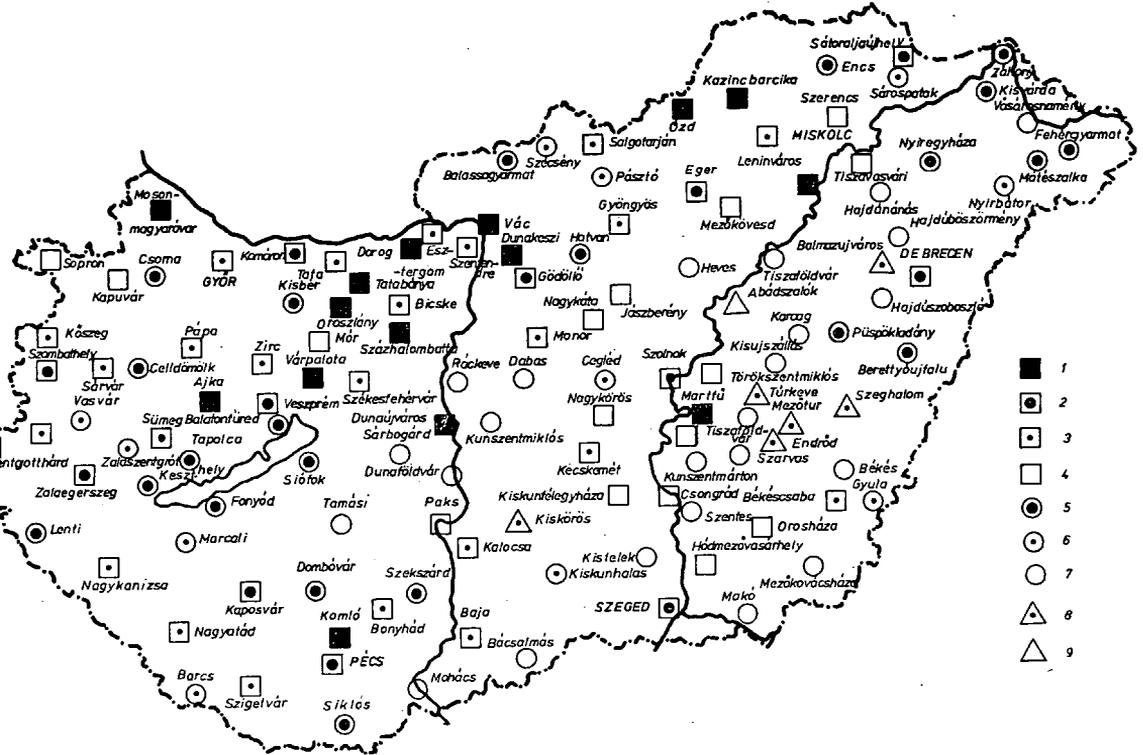


Fig. 4. Types of selected settlements in Hungary according to economic function (occupational structure 1970)

- 1: dominantly industrial (the ratio of active wage-earners in industry and construction above 65%)
- 2: of industrial and other character (the ratio of wage-earners in industry and construction between 45 and 65%, and in tertiary branches above 40%)
- 3: industrial-mixed (the ratio of active wage-earners between 45 and 65%, in tertiary branches below 40%, in agriculture below 20%)
- 4: industrial-agricultural (the ratio of active wage-earners in industry and construction between 45 and 65%, in tertiary branches below 40%, in agriculture between 20 and 45%)
- 5: of mixed and other character (the ratio of active wage-earners in industry and construction below 45%, in tertiary branches above 40%, in agriculture below 45%)
- 6: mixed-industrial (the ratio of active wage-earners in industry and construction below 45%, in tertiary branches below 40%, in agriculture below 30%)
- 7: mixed-agricultural (the ratio of active wage-earners in industry and construction below 45%, in tertiary branches between 30 and 45%)
- 8: agricultural mixed (the ratio of active wage-earners in agriculture between 45 and 65%)
- 9: one-sidedly agricultural (the ratio of wage-earners in agriculture above 65%)

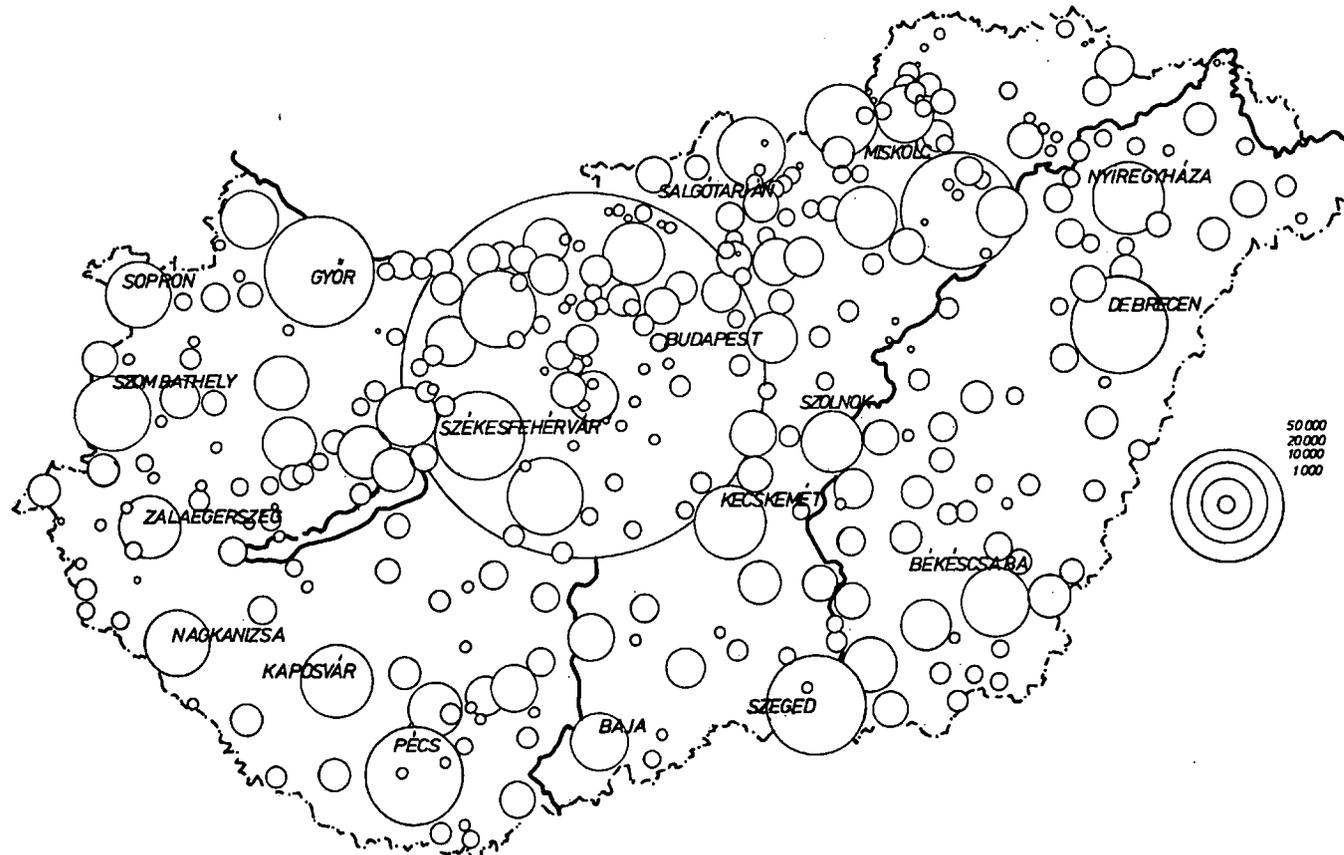


Fig. 5. Employment in socialist industry by settlements

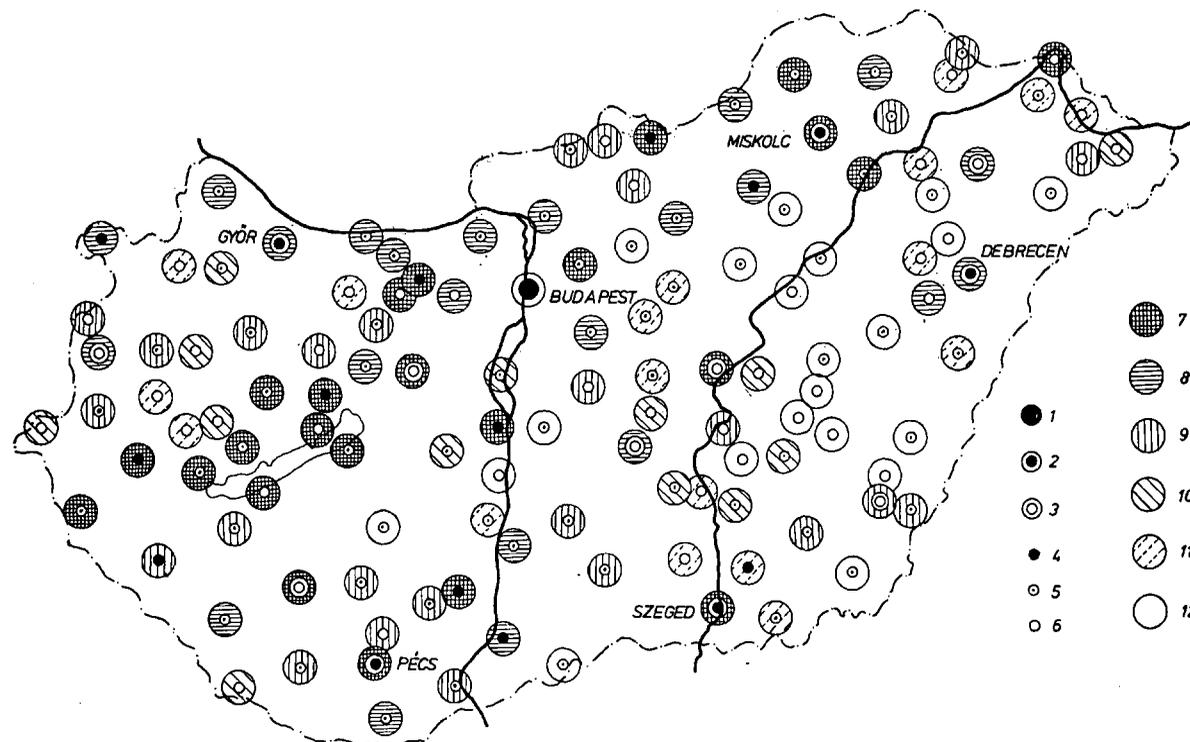


Fig. 6. Population changes of selected settlements in Hungary between 1960 and 1970
 1: capital 2: selected primary centre. 3: primary centre. 4: partial primary centre. 5: secondary centre. 6: partial secondary centre. 7: growth above the average of all primary centres (24,6%). 8: growth between the average of all settlements with central place functions (14,6%) and the average of all primary centres (24,6%). 9: growth between the increase of Hungary's total population (3,6%) and the average of settlements with central place functions (14,6%). 10: growth below th). national average. 11: decrease below the decrease rate of settlements without central place functions (-5,8%) 12: decrease above the decrease rate of settlements without central place functions (-5,8%)

ture of production is appropriate and industry has a proper weight in it and large scale production is characteristic, the infrastructure and the social structures of settlements exploit the environment in an intensive and manifold way.

These areas remain to be destinations of interregional migration in the country; processes strengthening the settlement network—environment interrelationship continue to operate. Here production involves intensive exploitation of the environment; at the same time, the qualification level of the inhabitants and the advancement of tertiary functions and the emergence of quaternary ones requires the environment most as high level recreation area. The concentration of these two opposite functions induces tension in the settlement network—environment interrelationship within a relatively small area.

Migration had a similar direction between 1970 and 1978 (Fig. 7) but several new features can be observed in the process of interregional migration indicating a long-run future process. The conspicuous character of settlements along the industrial axis has been somewhat reduced owing to the new intensive phase of economic progress and, in accordance with the requirements of planned proportional development, regions formerly and, in many respects, still backward, were developing dynamically.

This accelerated progress resulted in the situation that differences in the rate of population change between the 1960s and the 1970s contradict the main tendency. In settlements along the industrial axis the rate of population growth had decreased by the 1970s; while in formerly backward areas a slight increase took place. This has not changed the situation that settlements along the industrial axis show a more rapid rate of population increase than other areas (J. TÓTH 1979a). But the first signs of change point to the growing importance of the settlement network—environment interrelationship in presently backward areas of the country. With the accelerated progress and transformation of their economic, social structure and infrastructure, the settlements in backward areas will intensify their demands from the environment and modify its exploitation. It is the interest of society, even in the initial phase to govern these changes in order to preserve the environment and to establish a rational environmental management (Fig. 8i).

The Development Plan for the National Settlement Pattern validated by the 1007/1981 Council of Ministers resolution, selected the settlements with central place functions; those which during their history have acquired these functions and those which, by indispensable concentrated development, will achieve them in the future.

Hierarchical levels in the Development Plan for the National Settlement Pattern (Fig. 9) were determined so that settlements with central place functions should be equally distributed over the area of the country. But at higher levels of this settlement hierarchy differences exist depending on the region the settlement is situated in and from the aspect of demands from or exploitation of environment as well.

Therefore, equation should not be made or or close correlation supposed between the hierarchical levels of the Development Plan and classification according to different parameters of the settlement network—environment interrelationship. Influences on and demands from environment are much more dependant on settlement type and the economic activity there than on its hierarchical level. At higher levels of hierarchy, though social differences do exist, demands concerning environment are basically the same. It is another matter that the population of settlements at the

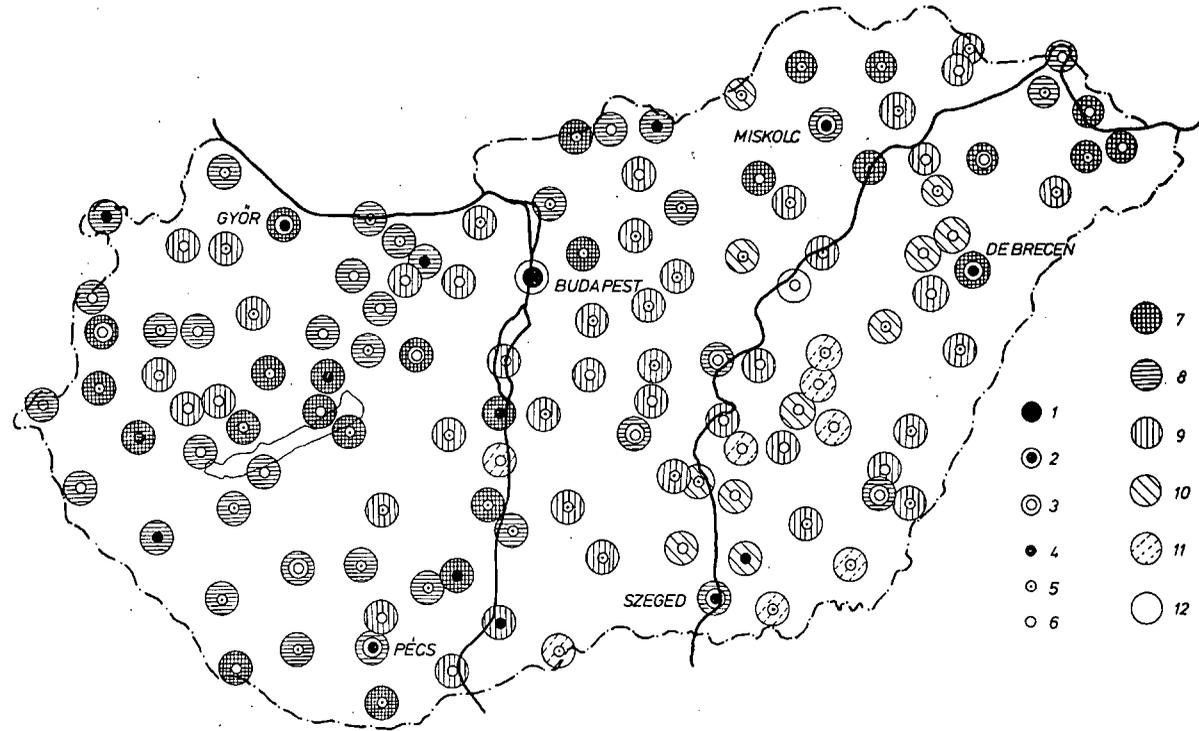


Fig. 7. Population changes of selected settlements in Hungary between 1970 and 1979

1: capital 2: selected primary centre 3: primary centre 4: partial primary centre 5: secondary centre 6: partial secondary centre 7: growth above the average of all primary centres (19,9%) 8: growth between the average of all settlements with central place functions (11,0%), and the average of all primary centres (19,9%) 9: growth between the increase of Hungary's total population and the average of all settlements with central place functions (11,0%) 10: growth below the national average (3,4%) 11: decrease below the decrease rate of settlements without central place functions (-4,6%) 12: decrease above the decrease rate of settlements without central place functions (-4,6%)

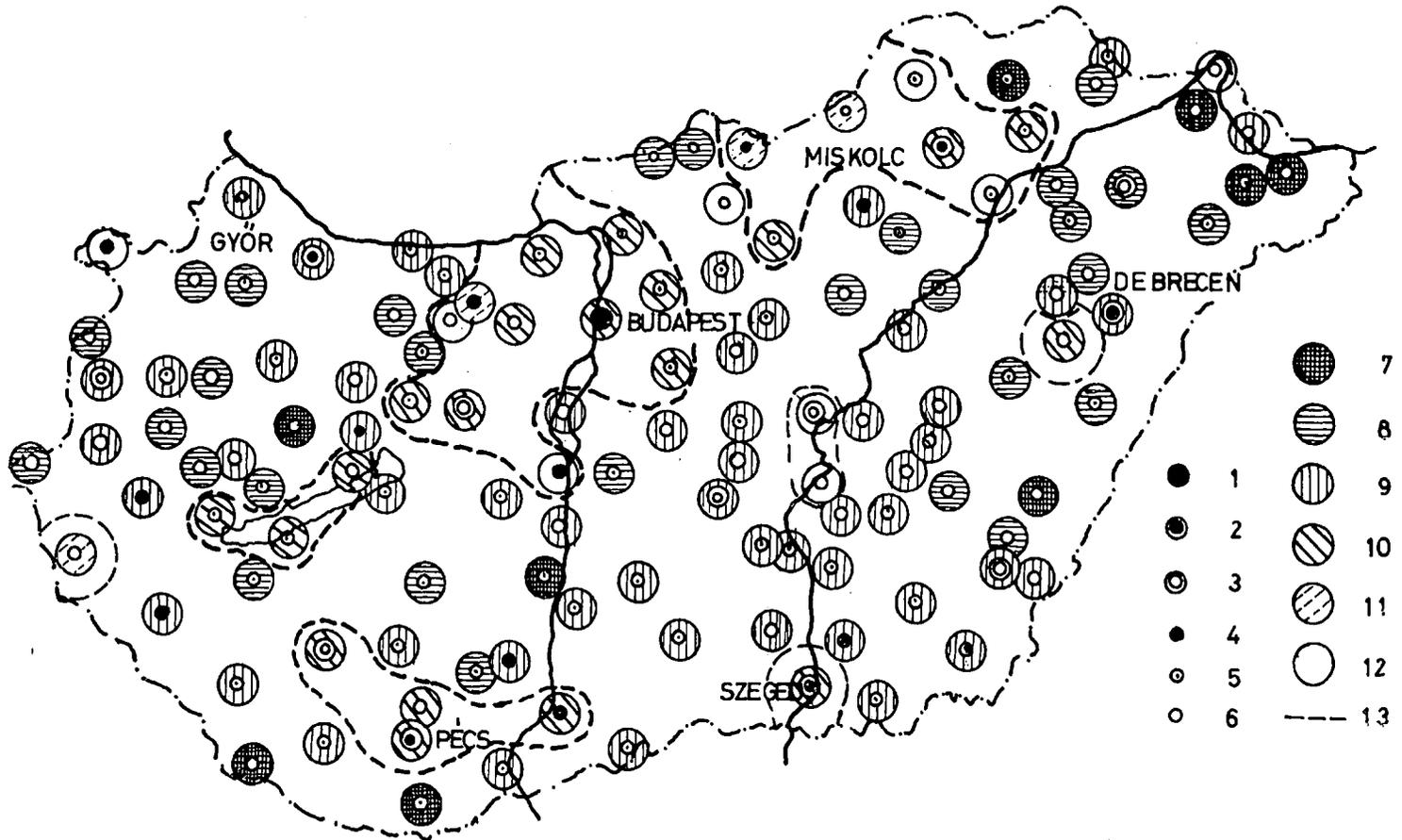


Fig. 8. Differences between the rate of population changes of selected settlements in the 1960s and in the 1970s

1: capital. 2: selected primary centre. 3: primary centre. 4: partial primary centre. 5: secondary centre. 6: partial secondary centre. 7: growth of rate more than 2%. 8: growth of rate between 1 and 2%. 9: growth of rate below 1%. 10: decrease of rate below 1%. 11: decrease of rate between 1 and 2%. 12: decrease of rate more than 2%. 13: boundaries of areas with decrease of rate

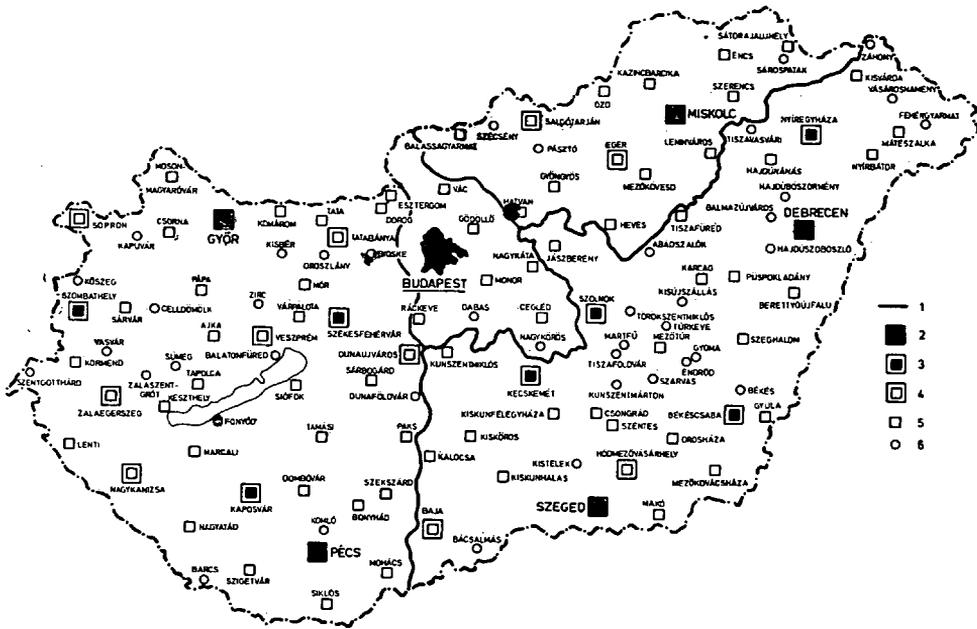


Fig. 9. The hierarchical levels of the Development Plan for the National Settlement Pattern of 1971
 1: boundaries of macroregions. 2: selected primary centre. 3: primary centre. 4: partial primary centre. 5: secondary centre. 6: partial secondary centre

same hierarchical level, e.g. the population of selected primary centres, can satisfy their claims for recreation in the place or in the immediate proximity, attraction zone of the settlement, or perhaps only by travelling to another region 100—200 or more km away. In this respect, there are essential differences between settlements of the same hierarchical level which stem from the regional variations of the natural environment. But from the circumstance that in the close surroundings of settlements of higher hierarchical levels, groups of summer houses are emerging one after the other, we can conclude that this claim becomes general at a certain level of the hierarchy. It has not been satisfied in a well-considered way: it was not sufficiently concentrated as far as the whole region is concerned but, at the same time, over-concentrated in the immediate surroundings of individual settlements, regarding sizes of lots and the crowd at resorts.

The criticism, expressed on many occasions, of the Development Plan for the National Settlement Pattern that this conception assumes settlements as point-like formations neglecting their regional relationships and attraction zones, seems to be founded (K. KÖRMENDI 1979). Therefore, opportunities for the satisfaction of recreation claims were sought for individual settlements, choosing the less favourable alternative.

As it was mentioned in the introduction, as a result of the development in the forces of production, the formation of the settlement network, the intensification

of intercentral relationships and the unification of the exploited environment, attempts at the solution of the settlement—environment problems concerning on or being restricted to single settlements and their immediate surroundings, should be considered mistakes. In our opinion, agglomerations, agglomeration zones and settlements in the initial phase of agglomeration should be taken into account together with the even more incipient settlement groups which also require coordinated development in a certain degree.

Their distribution (Fig. 10) shows that these regional formations comprising several settlements are situated primarily along the NE-SW industrial axis. They are partly connected to certain large towns as dynamic centres or they form an industrial zone, like the agglomeration zone along the Danube (between Esztergom and Komárom) and they are partly concentrated to larger towns outside the industrial axis. In areas outside the axis, settlement assemblages deserve a special attention.

The settlement assemblage within the industrial axis (the triad of Tatabánya-Oroszlány-Tata) lies in a highly agglomerated area and it is the best developed among the settlement groups of the country. This means that its interrelationship with the environment is the strongest. Experiences gained here, in one of the experimental areas of CMEA Topic 1.3, can be utilized in the investigation of other settlement groups and in the disclosure and solution of their problems.

Settlement assemblages in other parts of the country (the Szombathely, the Kapos valley or the Mid-Békés settlement groups) differ from each other in many details of their nature and structure.

Their demands concerning the environment are diverse but there is a basic similarity that the settlement—environment interrelationship here exists between a settlement assemblages having more intensive connections than usual and a more exploited space than the wider surrounding. These problems have not been completely revealed in Hungary as yet. In the first place, investigations at Tatabánya, Oroszlány and Tata (S. KATONA—L. RÉTVÁRI 1977, J. KISS 1978) and in Mid-Békés (J. TÓTH 1978a, 1979b; J. RAKONCZAI 1978, J. TÓTH—T. BAUKÓ—J. RAKONCZAI 1979, J. TÓTH—J. RAKONCZAI 1978; T. BAUKÓ—J. TÓTH 1979) may be of help.

These investigations unanimously propagate the coordinated development and, in connection with it, the coordination of environmental management. Beside their most intensive manifestation, special relationships within the settlement network, influencing the settlement network—environment interrelationship, include the important relationship between centres and their attraction zones as well. Thus the nature and the dynamism of medium-rank regions (i.e. a centre and the immediately connected attraction zone), though it depends primarily on the centre, is spreading through relationships. Thus this factor should be taken into consideration in respect of the settlement network—environment interrelationship.

Investigating changes in the population numbers of Hungary's medium-rank regions since 1960 (Fig. 11), it can be stated that these changes are similar to those recognized concerning their centres.

Medium-rank regions along the industrial axis or around a dynamic centre play an important role in the concentration of population. Certain medium-rank regions in manifold connections with a dynamically developing centre and engaged primarily in industrial activity can exceed 3 or 4 times the national average rate of concentration of population. It is obvious that a coordinated, uniform plan embracing the

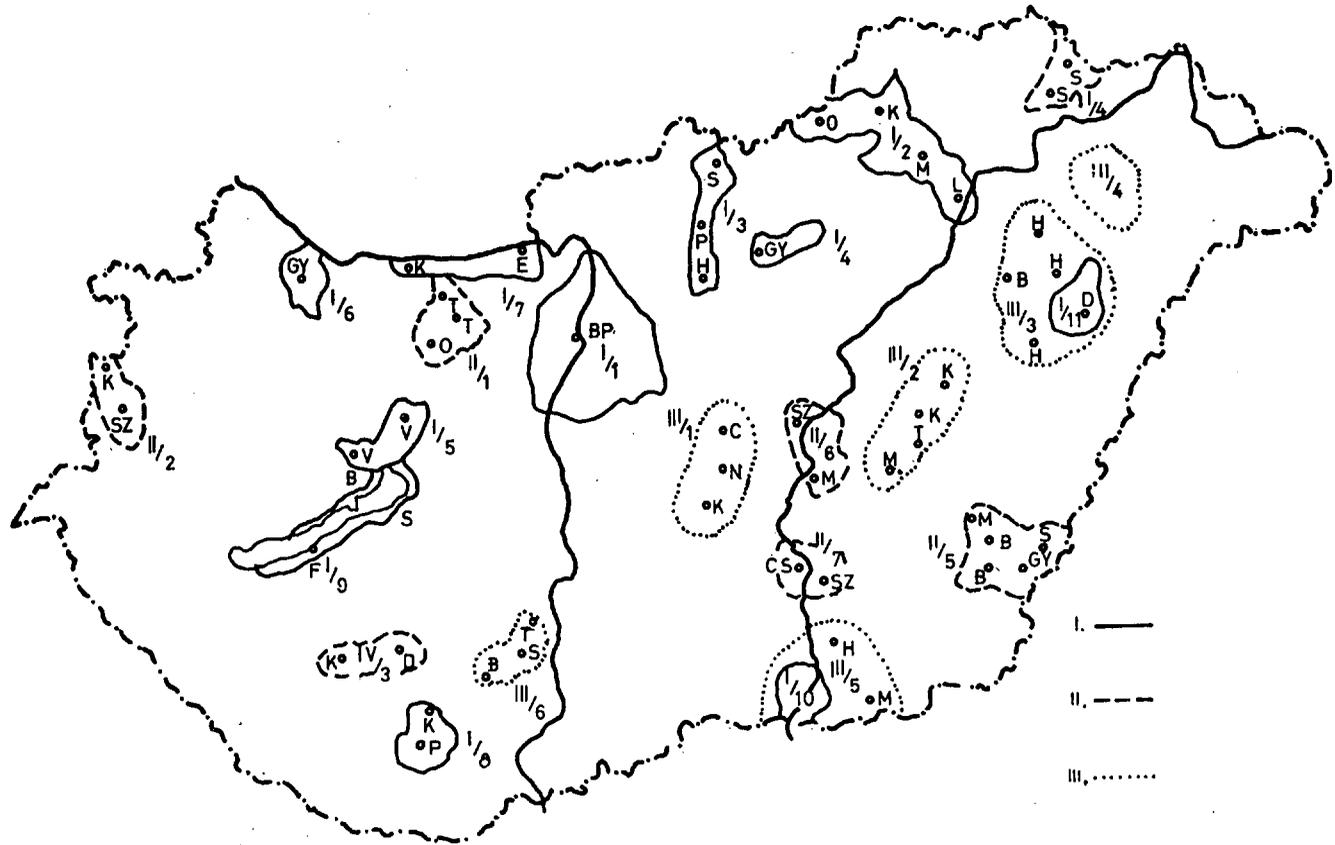


Fig. 10. Agglomerations, settlement assemblages and settlement groups in Hungary
 I: boundary of agglomerations. II: boundary of settlement assemblages. III: boundary of settlement groups

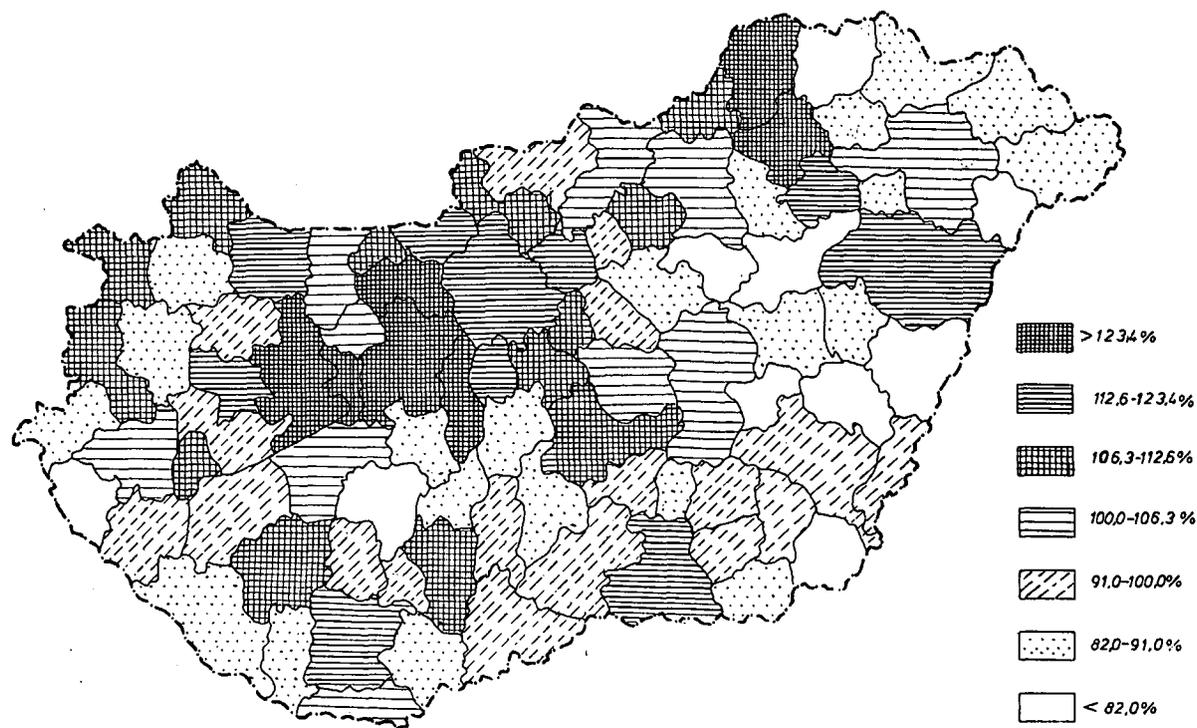


Fig. 11. Population changes in the medium-rank regions of Hungary between 1960 and 1976 (1960=100%)

1: growth above 123,4% (the average of centres). 2: growth between 112,6 and 123,4% (double national average and average of centres). 3: growth between 106,3 and 112,6% (the national average and its double). 4: growth between 100,0 and 106,3% (below the national average). 5: decrease between 91,0 and 100,0% (below the average of settlements without central place functions). 6: decrease between 82,0 and 91,0% (the average of settlements without central place functions and its double). 7: decrease below 82,0% (double average of settlements without central place functions)

settlement with central place functions and its attraction zone, is necessary for the environmental management in these regions.

Neither can it be doubted that differences in the rate of the concentration of population lead to a structural and quantitative transformation in the settlement network—environment interrelationship. In areas of concentration the well-known and previously described tendency is supported, and in areas of outmigration new tasks also concerning environmental management emerge. These tasks comprise the utilization of buildings, infrastructural networks and other establishments of the national wealth, especially for recreation purposes, and the planning of the economic exploitation of natural resources. (In this latter respect the problem of fallow lands suffices to be mentioned.)

Similar results can be achieved at the comparative study of the figures for industrial workers in the medium-rank regions of the country. This indicator gives information of the economic structures of medium-rank regions. The centre and its attraction zone may be of strong industrial character as it is manifest in several medium-rank regions along the industrial axis (Fig. 12).

This means that the concentration of production, and of industry inside that, may be considerable but residences of industrial workers are spread over a large area. From this we can conclude that the exploitation of the environment by industry is more concentrated than the demands of industrial workers concerning the environment. In the strategy of environmental management in medium-rank regions, this circumstance should be considered.

Single industrial with their surroundings certainly represent a much smaller concentration, the settlements of the attraction area being mainly agricultural. Thus the intensity and structure of claims of these regions concerning the environment are generally of lower level than of the industrial medium-rank regions.

As a result of the quantification of air pollution in Hungary in the last decades, regional differences in air pollution have been revealed. Within these macroregional differences, the sites of the most important air polluting sources can be found as well. In Hungary settlements with most polluted air are along the industrial axis and their number is decreasing towards less industrialized areas. In the Great Plain macroregion there are hardly any settlements with polluted air. In the way of air pollution also striking differences exist between regions of the country. While in the most developed industrial settlements air pollution with sulphur-monoxide and carbon-monoxide are the most characteristic, in the Great Plain dust is the main factor of air pollution owing to the backwardness of technical-communal infrastructure. To reduce or eliminate this pollution with dust, roads in settlements should be metalled (Fig. 13).

Air pollution is obviously the greatest where demands for recreation from the environment are the heaviest. This fact, as we have emphasized above, necessitates the scientific foundation and appropriate appreciation of environmental management in these areas.

Apart from air pollution, from the aspect of the settlement network—environment interrelationship, sources of water pollution are also important. The majority of Hungary's streams (96%) has its source abroad. Thus water pollution does not entirely depend on our will; their purification can be solved only by international cooperation through multilateral agreements. But it is our task to keep within-the-border stretches of rivers clean; deterioration has taken place in this field recently.

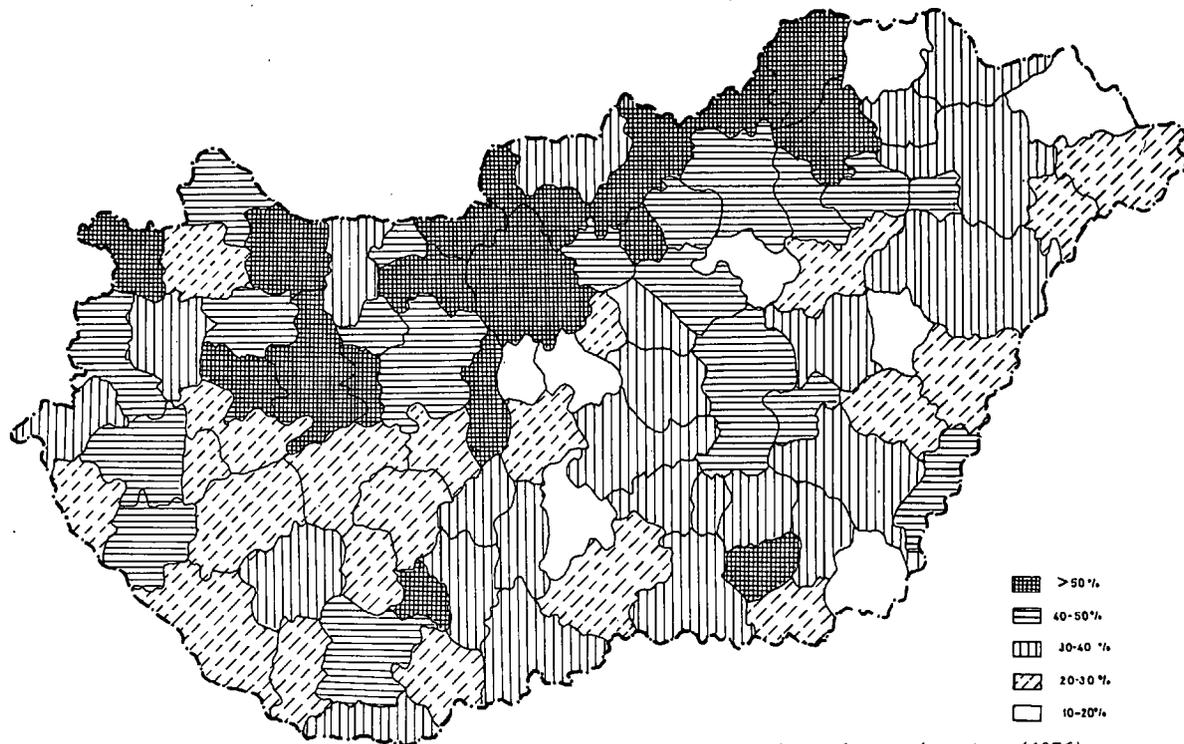


Fig. 12. Ratio of active wage-earners in industry and constructions by medium-rank regions (1976)
:1 above 50%. 2: between 40 and 50%. 3: between 30 and 40%. 4: between 20 and 30%. 5: between 10 and 20%

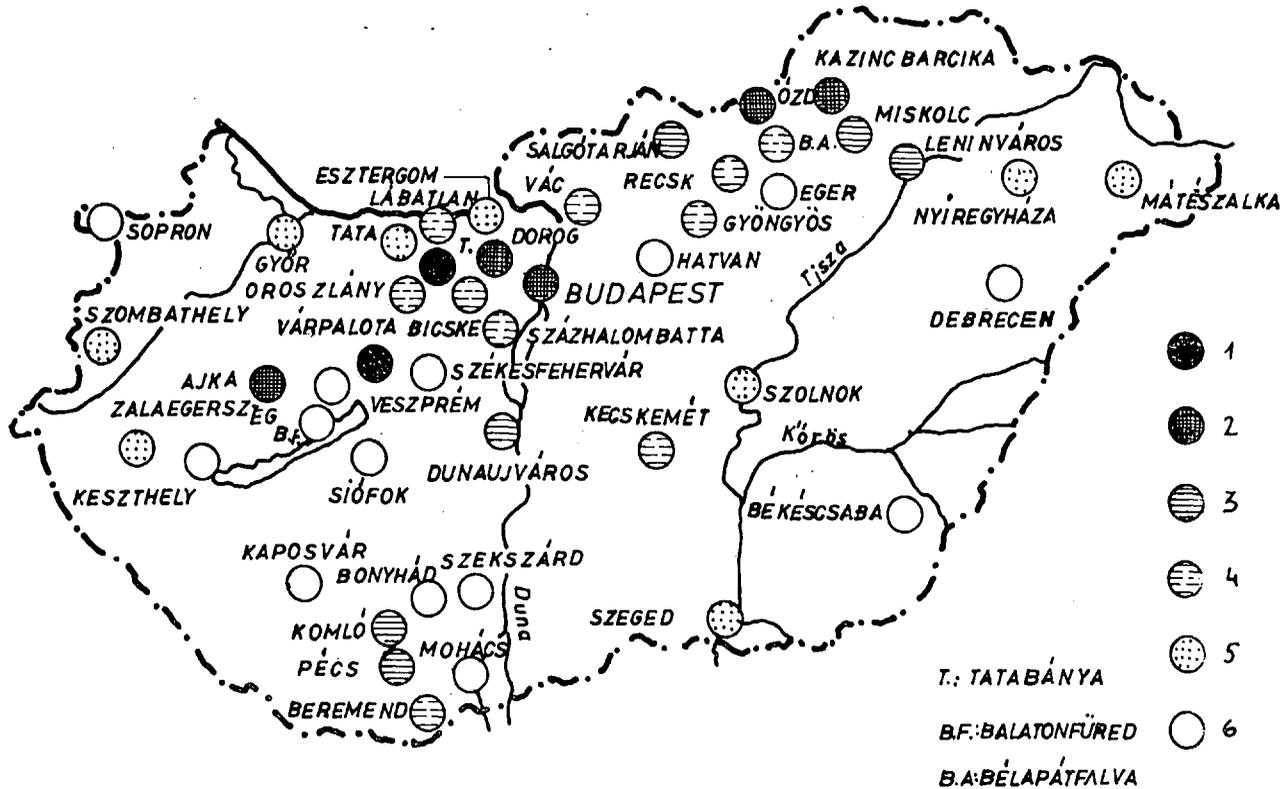


Fig. 13. Air population in major settlements of Hungary
 1: extremely heavily polluted. 2: heavily polluted. 3: polluted. 4: polluted by a single factory. 5: moderately polluted. 6: slightly polluted

Between 1971 and 1976 on certain stretches water conditions have deteriorated one or even two degrees according to international parameters.

The most polluted rivers in Hungary are those in the industrial axis of the country. Water pollution is highly dependant on the discharge of recipients. (E.g. the intensive water polluting effect of the agglomerating settlement zone along the Danube would be more dangerous if the river had a smaller discharge because the Danube, the river having the largest discharge in Hungary, serves as a recipient here.) This connection makes the Sajó river, draining the sewage of the Borsod industrial region into the Tisza river, one of the most polluted rivers in Hungary. The same applies for several smaller streams which drain industrial or communal sewage from industrial settlements or settlement groups into major rivers. Among these smaller streams the Általér brook, the Dongér canal and the streams draining the sewage of Debrecen can be mentioned.

Settlements are labelled water polluting ones after careful consideration of the proportion between the sewage output and the discharge of the recipient because this determines the degree of the harmful effect.

The regional differences in water pollution and the demand for clean water surfaces suitable for sports and holidaying point to a certain concentration in this field as well. Demands for a large-scale drainage of industrial and communal sewage coincide in area with the heaviest demands for clean water surfaces for recreation. Therefore, the construction of water reservoirs and smaller clean water surfaces and the transformation of gravel and sand quarries and also brickyard ones may be of great importance (L. TAKÁCS 1980). These activities cannot substitute the efficient solution of water purification which is the only way of preventing the general tendency of further pollution. This is a major factor environmental deterioration, not being restricted to points but causing damages spreading linearly along streams (Fig. 14).

Recreation areas are generated by the social demand for an especially favourable environment. But this especially attractive natural environment dominates only at the incipient stage of the formation of recreation areas. For the establishment of a recreation area, infrastructural networks should be formed, reception capacity, i.e. a social environment with a multitude of attendant institutions, designed to provide comfort. According to valid national plans, there are 23 recreation areas in Hungary (Fig. 15). Among these recreation areas, Lake Balaton and the Danube Bend excel from areas of the country with similar functions as for their capacities as well as the level of holiday services.

A considerable part of recreation areas is connected to the industrial axis of the country and to large concentrations of population. That is why they are so frequented but, on the other hand, it represents an increased danger since, being in the proximity of major concentrations of industry and population, they suffer damages from them. At the same time, the recreation function itself and the proportion between the capacity of the given environment and the actual utilization by holidaying and tourism, can lead to environmental damages in case limits of capacity are neglected.

The large number of recreation areas in the country and the very diverse frequentation figures indicate that some areas need environmental protection or perhaps reconstruction, from the aspect of the settlement network—environment interrelationship, while in other recreation areas the establishment of reception capacity or its

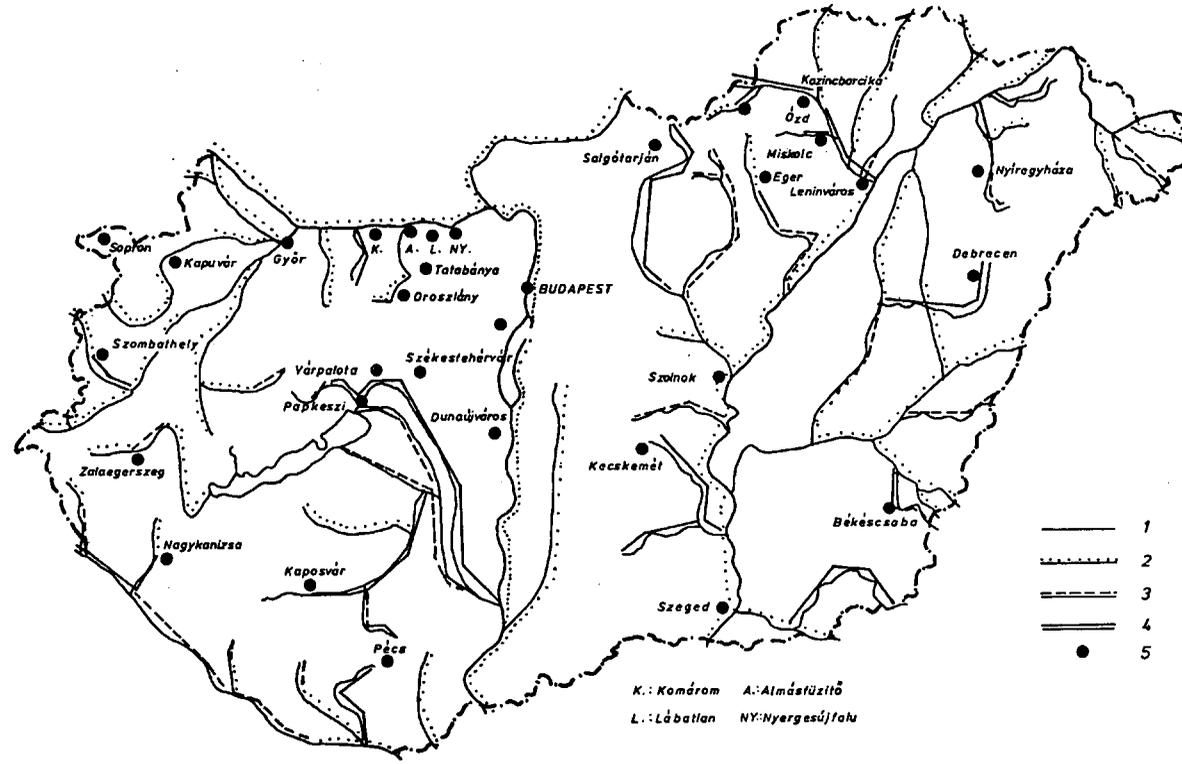


Fig. 14. River pollution and major water-polluting settlements in Hungary
 1: clean. 2: medium polluted. 3: heavily polluted. 4: dangerously polluted. 5: major water-polluting settlement

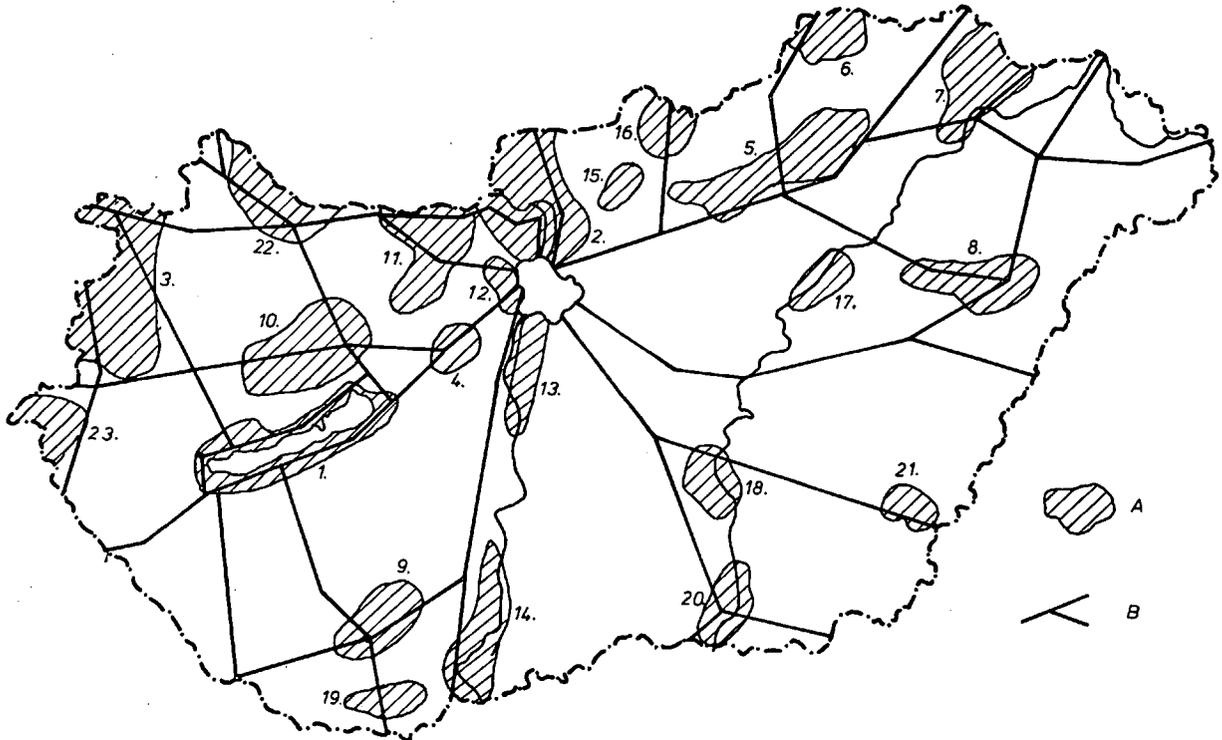


Fig. 15. Recreation areas and major corridors of tourism in Hungary

A: recreation areas. B: corridor of tourism.

1: Lake Balaton. 2: Danube Bend. 3: West-Transdanubia. 4: Lake Velence. 5: Mátra-Bükk. 6: Aggtelek. 7: Zemplén. 8: Hortobágy. 9: Mecsek. 10: Bakony. 11: Vértes-Gerecse. 12: Buda Mountains. 13: the Danube branch of Ráckeve. 14: Lower-Danube. 15: Cserhát. 16: Medves-Karancs. 17: Mid-Tisza region. 18: Köröszug. 19: Villány Mountains. 20: Lower-Tisza region. 21: Szanazug. 22: Szigetköz. 23: Órség

support with infrastructure is the most urgent task. A good example for the former is Lake Balaton, highly frequented by foreigners as well and, for the latter, the Órség or the Szamoszug.

Summary

As a summary, referring back to the introduction and the examples from Hungary, the following can be emphasized:

1. The settlement network—environment interrelationship operates between two uniform, uninterrupted systems with a different texture.
2. The intensity of this interrelationship differs in spatial relations, therefore the degree and nature (reconstruction, protection, prevention) of social interference.
3. In the ever intergrating process of settlement and regional management, the problems of environmental management should have a proper weight.

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