

P O L S K A A K A D E M I A N A U K
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ZESZYT 3

THE AIMS, CONCEPT AND METHOD
OF POLISH LAND UTILIZATION SURVEY

JERZY KOSTROWICKI

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JERZY KOSTROWICKI

HOJER A. A. A. B. M. I. A. N. A. F.
INSTITUT GEOGRAPHICUS

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BY W. H. H. H. H.

THE AIMS, CONCEPT AND METHOD OF POLISH LAND UTILIZATION
SURVEY

I. The Development and State of Research.

Studies on land utilization were begun in Poland in the inter-war period. The first map, the contents of which fully corresponded to the contemporary maps of land utilization, was a coloured economic and settlement map of the Tatra mountains and adjacent submountain basins^{1/} on the scale of 1:75 000; it was prepared in 1926 by Z. Hołub-Pacwiczowa and published as an annex to her study of trans-humance problems in the Tatra Mts. Much reduced black-white maps of land utilization have also been prepared by S. Leszczycki^{2/} and appended to his studies. Similar maps have also been done by W. Przepiórski^{3/} and E. Rühle^{4,5/}.

In the after-war period, already in 1946, Polish geographers encouraged by their British colleagues have started the preparations for land utilization survey of the whole country. The initiative has been done by the Central Office for Physical Planning. Methods of the works have been elaborated by A. Jahn in 1947^{6/}.

Works were to be directed by the mentioned Central Office for Physical Planning. The survey had to be done in field and be based on topographic maps on the scale of 1:25 000, as well as on the plans of the taxation commission of the Agrarian Bank and on the plans of the qualification commission of the Finance Offices, etc. The land utilization map had to be issued in 1 : 100 000 sheets.

This method was used only in 1946 when surveying under the guidance of A. Jahn the valley of Vistula River on a rather small area between Solec, Kazimierz and Dęb-lin^{7/} and again in the years 1947-1948 by K. Bromek who directed the land utilization survey for the city of Cracow. In the latter case a larger scale 1 : 5 000 has la-

ter on been accepted, due to the requirements of town planning. Also the classification has been adjusted to urban problems^{8/}.

However the project of detailed surveying of the whole area of Poland has been abandoned. Poland could not undertake such a serious task lacking then proper institutions, instruments and also, to a higher degree, scientific staff. Also financial means were not sufficient for the purpose. It was, therefore, decided to prepare a general land utilization map at the scale of 1 : 300 000, based on the pre-war topographic maps on the scale of 1 : 100 000. All Polish university centres participated in this task for a number of years. The works were co-ordinated by a special commission of the Polish Geographical Society, and afterwards by a special section of the Institute of Geography of the Polish Academy of Sciences /PAN/ which put the materials together and prepared them for printing according to the methods of Professor F. Uhorczak and under his guidance.

Works were completed in 1956 and resulted in a set of basic maps, each of them showing one form of land uses /arables, meadows and pastures, forests, waters, settlements/, 17 further ones presenting various combinations of the said elements, and one map combining all uses together.

Those maps have been published as micro-copied on the scale of 1 : 1 000 000 for whole Poland and a separate map for the Lublin voivodship was published at the scale of 1 : 300 000^{9/}. The map gives highly precise, although somewhat obsolete today, picture of the distribution of main land uses in the whole country.

A number of land utilization maps in various scales have also been drawn up by planning institutions in connection with their elaborating of regional

plans. None of those maps, however, gave a larger scope than an office made presentation of the distribution of the main land uses on the basis of topographic maps^{10/}.

The concept of a detailed survey was, however, discussed again and again in connection with various scientific and practical needs. New trials have been initiated by K. Dziewoński. Under his guidance, first surveys were done in the Sandomierz region in the years 1953 and 1954. Those experiences were the base for elaborating by the Institute of Geography PAN of the method of works^{11/}, and then, in 1955, further studies on a larger scale were started in Mragowo county /Olsztyn voivodship/. The method of works has been presented at the International Geographical Seminar at Aligarh, India /K. Dziewoński/ and also at a session of the section for agricultural geography of the XVIIIth International Geographical Congress /J. Kostrowicki/^{12/}.

In the result of the reorganisation of the Institute of Geography PAN, works on land utilization survey have passed in 1956 to the newly established Section of the Geography of Agriculture /Head: J. Kostrowicki/. Only work on land use in urban settlements has been carried on by the Section of Geography of Population and Settlement /Head: K. Dziewoński/.

The investigations greatly developed in the years that followed. Thus, in the period of 1956-1959, in the framework of the works of the Institute of Geography PAN, 22 counties were surveyed and the area of about 9 000 sq. km. was mapped. Department of economic geography of the universities in Warsaw, Cracow, Toruń and Łódź, and also that of the Higher Pedagogi-

cal School in Gdańsk cooperated with the Institute. In that period of time the method of the works has been twice presented in Moscow^{13/}, once in Bucarest and it was discussed quite recently /September 1959/ at the Anglo-Polish seminar on geography in Mieborów /near Warsaw/. In 1959 Polish methods were also discussed in several geographical institutes of French universities. To acquaint themselves with the land use surveying some Soviet, British, Hungarian and Yugoslav geographers visited Poland and some of them took part in field studies.

The years of 1955 - 1958 have been considered a period of testing, aiming to collect experience from different parts of Poland, from various physical conditions and various types and forms of farming. This resulted in obtaining an important number of materials and experiences which, consequently, made possible the final establishing of the method and technique of the survey, the classification of the forms of land utilisation, as well as the working out of the key of symbols^{14/}. An article has been published discussing the development and present state of investigations, and also the aims and tasks, scope, method and technique of the detailed land utilisation survey in Poland^{15/}.

First copies of land use maps are in course of preparation for printing. Simultaneously, the survey materials collected during the field work, are now being elaborated. Some studies are already available as printed matters^{16/}, further ones being in print.

R e f e r e n c e s

1. Z. Hołub-Pacewiczowa. Economic and Settlement Map of the Transhumance in the Tatra Mountains. *Compte-Rendus du II Congrès des Géographes et Ethnographes Slaves en 1927. Cracovie 1930 /In Polish and French/*. The map is included to a more extensive study by the same author: *Transhumance Settlement and Migrations in the Tatra Mountains and the Sub-Tatra Region. Prace Komisji Geograficznej PAU No.1. Kraków 1931 /In Polish, French summary and explanations to maps/*.
The following elements have been distinguished in that map: arable lands /pink colour/, meadows for cutting /yellow-brown/, pastures /yellow/, forests /green/, unproductive lands /white/, and combined categories. Also settlement has been shown in the map in details.
2. S. Leszczycki. Geographical Studies on Settlement in the Beskid Wyspowy. *Prace Instytutu Geograficznego Uniwersytetu Jagiellońskiego. Kraków 1932 /In Polish/*. The same author: *Podhale Region. Geographic-economic Bases of Regional Plan. Kraków 1938 /In Polish, French summary and explanations to maps/*.
Arables, meadows, pastures and unproductive lands have been distinguished there. Forests were marked in black, arables - in white, other elements - by appropriate dots.
3. W. Przepiórski. Waste Lands in Southern Poland. *Prace Komisji Geograficznej PAU No.3, Kraków 1933 /In Polish, French summary/*.
The same author: *On Geography of Rural Settlement in the Carpathian Czeremosz River Basin. Czasopismo Geograficzne 13 /1935/ /In Polish/*.

4. E.Rühle. Land Use and Population Distribution in Western Polesie. Wiadomości Służby Geograficznej /1930/ v.3 /In Polish, French summary/.
A colour land utilization map is annexed to this study. It shows the following elements: arable land /yellow/, grassland /pink/, forests /green/, unproductive lands /white/ and waters /blue/.
5. E.Rühle. Study on the Kowel County. Rocznik Wołyński, Vols. VI and VII. Równe 1937 /In Polish/.
6. A.Jahn. Studies on Land Utilization in Poland. Present state of research. Project of Instruction.1947, mimeographed /In Polish/.

According to A.Jahn the classification of uses was to be based on the British experiences in this field, with modifications resulting of their being adopted to Polish conditions. Also the colours accepted had to be applied to the Polish topographic map which was the basis of the survey. Besides giving the full contents of the topographic map, the land utilization should present by colours the main uses, viz.:

1. arable lands and fallows /orange/,
2. gardens and orchards /brown/,
3. meadows and pastures /light green/,
4. forests /dark green/,
5. non-agricultural areas /red/,
6. unproductive land /pink/.

A detailed instruction, annexed to the survey, recommended the necessity of recording supplementary informations as regards particular cultures, their connections with soils and relief, their relations with settlements etc., either based on observations or obtained through interviews with local people.

7. See above.

8. K.Bromek. Elaboration of a Detailed Land Utilization Map for Cracow. Przegląd Geograficzny Vol.27 /1955/ No.3-4 /In Polish, English summary/.

9. Poland. General Land Utilization Map, 1:1 000 000.
Directed and edited by Professor F.Uhorczak. Warszawa 1957. 22 maps /Explanatory notes in Polish, English and Russian/.
The following colours have been applied: yellow-brown /arables/, light-green /meadows and pastures/, dark-green /forests/, blue /waters/ and red /settlement/.
10. There were prepared, for instance, land utilization maps for the Warsaw region /1946/, for the Cracow voivodship, the region of Łódź, the Świnoujście area /1949/, the Goczałkowice Dam vicinities, the Dunajec Valley /1953/ and others.
11. K.Dziewoński, J.Kostrowicki, H.Piskorz, R.Szczęsny. Preliminary Instruction for drawing up detailed maps of land utilization /Project/. Dokumentacja Geograficzna 1956, No.1, pp.39 /In Polish/.
12. K.Dziewoński. The Detailed Land Use Map in Poland. XVIIIth International Geographical Congress. Brazil 1956. Abstracts of Papers. Rio de Janeiro 1956, p.150-151 /In English/, and by the same authors: Detailed Survey of Land Utilization in Poland. Polish Geographical Review Vol.28 /1956/, Supplement, p.26-31 /In English/.
13. J.Kostrowicki. Polish Investigations on Land Utilization. Izvestia Akademii Nauk SSSR. Seria Geograficzeskaya /1958/ No.4 p.131-134 /In Russian/.
14. Polish Land Utilisation Survey. Instruction to the detailed survey of land utilization. Prepared under the direction of J.Kostrowicki by: W.Biegajło, S.Hauzer, D.Kowalczyk, W.Kusiński, J.Pasznicki, H.Piskorz, R.Szczęsny, W.Tyszkiewicz. Dokumentacja Geograficzna 1959, No.2, pp.129 /In Polish/. Second edition in Dokumentacja Geograficzna 1960, No.2.

15. J.Kostrowicki. Studies on Land Utilization in Poland. Przegląd Geograficzny Vol.31 /1959/, No.3-4, pp.517-530 /In Polish, English summary/.
16. W.Biegajło, J.Tobjasz. Three-field Farming System with Fallow. Village of Grabowiec. Przegląd Geograficzny Vol.29 /1957/, No.1, pp.111-141 /In Polish, English summary/.
- W.Biegajło. Farming in Suburban Zone. Horodniiany Commune. Przegląd Geograficzny 29 /1957/ No.1 p.143-158.
- R.Szczęsny, H.Piskorz, J.Rakowicz. Studies on Land Utilization in the Mrągowo County. Dokumentacja Geograficzna /1959/, No.1, pp.103 /In Polish/.
- W.Biegajło. Farming in Żuławy Gdańskie. Village of Radunica. Przegląd Geograficzny Vol.31 /1959/, No. 3-4, p.345-360 /In Polish, English summary/.
- R.Szczęsny. Farming in the Lower Beskid. Commune of Cergowa. Przegląd Geograficzny Vol.31 /1959/, No.3-4, p.629-644 /In Polish, English summary/.
- W.Biegajło. Land Utilization in the Gdańsk County. Dokumentacja Geograficzna 1960 No.1 p.1-59 /In Polish/.
- R.Szczęsny. Land Utilization in the Myszkow County. Dokumentacja Geograficzna 1960 No.1, p.60-101 /In Polish/.

II. Detailed Land Utilization Survey.

1. The Aim and Concept of the Survey

Research connected with land utilization has a double aim: a scientific and practical one, but it is difficult to separate these two aims. The most general scientific aim is, above all, the search of forms and ways in which man's economy utilises its natural environment. This is "par excellence" a geographical aim which can most probably be best explained by a method of land utilization survey.

The comparison of the cartographic picture of ways and directions of the utilisation of land /scilicet the natural environment/ with the conditions and possibilities of this environment can already reveal a lot about the level of the development of human economy, about the intensity or extensity, as well as about the rational or irrational land utilization in the given technical, social and economic conditions. If we add the wealth of material and observations collected during the field work which did not find their reflection on the map - then the survey can serve as an important foundation for the drawing of conclusions aimed towards a more rational utilization of the conditions of a given geographical environment, i.e. the forces and resources of nature in a given area. And this is the actual source of its great practical significance. Obviously, research on land utilization do not touch equally all the forms of man's economic activity, though all of them find their reflection on it. Its very nature makes it imperative that research deals more with those of forms of economy which are spatially located and are more directly connected with

the utilization of the forces and resources of nature than forms located in certain points and less directly connected with nature. The research work, for example, is more keenly interested and penetrates deeper in geographical problems of agriculture, forestry or fishing than those of industry, transportation or trade. That is why land utilization survey related to agriculture and forestry is of such scientific and practical significance, while detailed geographical examination of industry, transportation or services requires also other specialized methods.

The scientific and practical significance of detailed land utilization survey finds its expression also in the fact that if the proper methods are used, they turn into a good foundation for research on the geographical typology of agriculture.

As it is perhaps well known the work on the geographical types of agriculture^{13/} reaches back to the end of the twenties and the beginning of the thirties of the current century and develops today successfully both in the West as in the East. A great contribution in this field was made by the American geographers who published in the years 1926-1943 a huge series about the agricultural regions of the globe as well as by other scientists workers of that country. French, British, German, Swiss, Italian, Portuguese and Soviet scientists made also considerable contributions promoting the development of this trend in agricultural geography.

In the majority of cases we deal but with studies based on research conducted in small areas by various methods which cannot be compared with each other, a fact has already been noticed a long time ago.

Land utilization survey, provided it includes the essential elements for such a classification, can become the basis for this kind of scientific geographical typology of agriculture. This can be of great significance for science as well as for practical life.

It is precisely the elaboration of such a typology of Polish agriculture which is one of the aims of Polish research on land utilization. At present we are in the stage of describing the forms, systems and types of agricultural economy, but this takes place already in a uniform and methodical way based on such a uniform foundation as is provided by the land utilization survey. We have no illusions or intensions to cover the territory of Poland with detailed surveying, though this could be useful from the scientific or practical point of view, since we have neither forces nor the means to do it. What is involved here is rather the familiarization and analysis on the basis of the proper representation, of the mechanism of activity of various types of rural economy. This knowledge will in turn permit on the basis of worked out indices, to define the areal extent of various systems and types of economy.

Typological research in the sphere of agriculture is also of considerable practical significance. Changes in the systems and directions of agriculture, despite the fact that sometimes a number of elements undergo rapid changes, occur, as is generally known, gradually, in the form of evolution. Slowly and gradually feudal three field agriculture in West-European countries was transformed into a capitalistic mixed agriculture as a certain type which slowly undergoes further transformations and changes. Despite a number of even revolutionary changes in social relations the types of agriculture in socialist countries change only slowly. Forty years after the Revolution many kolkhozes in the USSR still use similar system of farming, maintain the same or similar

directions of economy and even obtain only slightly better results. In Polish agriculture, after 15 years of planned economy also not much has changed in this regard. Although each country aims at the transformation of its rural economy to make it most productive and efficient, it seems incorrect even in countries with planned economy to plan the development of agriculture, overlooking type of rural economy in a given area. That is why it seems to be pure idealistic thinking if one does not take into consideration the existing systems and directions in agriculture and bases plans exclusively on the natural conditions and expected requirements which in result often bring failure to such plans. In addition, the systems and directions in rural economy used today and in the past are based on rich and connected with the knowledge of local natural conditions, centuries-old experience which should not be neglected because some of its elements may prove very valuable even for the future transformed, mechanized and socialized economy. This should be applied particularly to difficult environments where natural conditions require special ways of farming. We have in Poland a bitter experience in this regard, for example, from the Żuławy or some Sudeten areas where an outlandish type of rural economy, introduced after the war, yielded deplorable results and where, after years of trials and errors, one was forced to go back to the former type of farming.

Polish land utilization surveying tries to combine the scientific aim of getting acquainted with the ways, directions and results of the utilization of geographical environment with the practical purpose of defining the degree of rationality in this

utilization and of drawing conclusions regarding the introduction of changes in it. The scientific and practical purpose of surveying, for the time being only as regards agriculture, is also the elaboration of the typology of this utilization, the geographical typology of agriculture.

The concept of survey and the ways of preparing the collected material serve to achieve this aim.

2. The Scope of Research.

Land utilization is here understood in the broadest sense of the concept as the utilization of natural environment i.e. of natural forces and resources by man in all fields of his economic and social activities.

The survey comprises physical as well as technical and economic aspects of land utilization, among which the following categories may be distinguished:

1. Object of land utilization, viz. forces, resources and conditions of the geographical environment evaluated out from the economic point of view.

2. Subject of land utilization i.e. social and ownership relations connected with land use /state or cooperative or private properties; size of farms; tenancy etc./.

3. Form of land utilization, or the kind of use i.e. the destination of the land for a concrete human activity /arable lands, grasslands, orchards, forest uses, water utilization etc./.

4. Way of land utilization i.e. technical and organizational methods as well as the expenditure of human and mechanized labour /intensity/ used for obtaining production from the given form of land use

/systems of farming, systems of forest and water economies etc./.

5. Orientation /direction/ in land utilization i.e. the purpose the land use is aimed at /various plant or animal production in agriculture, wood and other forest products in forestry, water products etc./

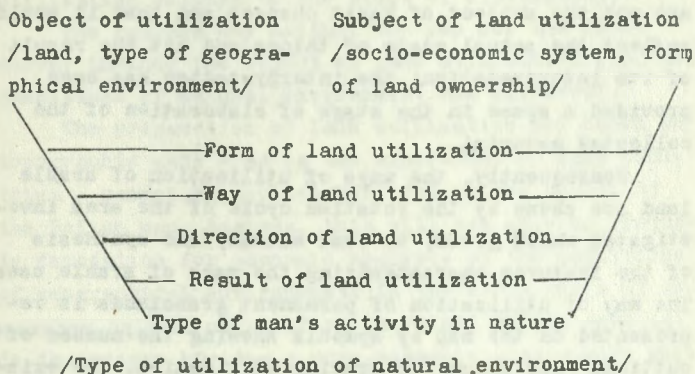
6. Effect of land utilization i.e. the results of production obtained in the given land use after having applied determined ways and orientations in land utilization /productivity of agricultural or forest or water economies etc./.

These six categories taken together form the type of land utilization understood as the shaped in the given physical conditions by the determined socio-economic processes combination /ensemble/ or forms, ways, orientations and effects of land utilization. Besides this generally outlined type of land utilization, or the type of man's economy in nature, also different types of agricultural land use i.e. of agriculture and those of forestry or fishing may be distinguished; they all are connected with defined forms of land utilization i.e. with various forms of man's economy.

These six categories are obviously closely inter-related. Natural conditions i.e. the object of land utilization exert their influence on both the way and orientation of land utilization as well as on the results obtained. Similarly the subject of land utilization i.e. the form of ownership exercises influence upon the way, orientation and the results of land utilization. And finally the techniques of land utilization are interrelated with its orientation and exert influence on the yields the latter being dependant on both the techniques and the orientation in the utilization of the land.

The relations between particular categories are however different. Besides being interrelated they are connected also in some way with the geographical environment which is a separate category. A somewhat different category is also the subject of land utilization understood microscopically as the form of land ownership, and macroscopically as the socio-economic system of a given areas. All these categories taken together form a foundation to define the type of man's economy.

These connections are schematically shown in the following diagram:



Particular categories of land utilization find their expression in various stages of the elaboration of the survey material and only some of them are presented on the land utilization map. This map may for instance present :

1. the form of land utilization - in groups of colours, as laid by the Land Utilization Commission of the IGU, with only a few unavoidable modifications;

2. the subject of land utilization - shown by property boundaries;

3. the way of land utilization shown with the help of corresponding symbols;

4. the orientation of land utilization shown by means of suitable colour gradations within groups of colours established for the main forms of land utilization.

The limited capacity of the map makes it possible - as regards the last two categories - to represent only some chosen elements, either most characteristic or synthetic. Attention is being given to the fact that the map would show elements relatively invariable which are not the subject of rapid changes and that it would reflect the actual state of things and not the result of its interpretation; the interpretation has been provided a space in the stage of elaboration of the collected material.

Consequently, the ways of utilization of arable land are shown by the rotation cycle of the area investigated which gives, to some extent, the synthesis of the features characterizing the ways of arable uses. The way of utilization of permanent grasslands is represented on the map by symbols showing the number of cuttings /per annum/ or grazing utilization. The existing system in forest economy /exploitation or economy, felling and non-felling systems/ shows the way of forest utilization etc.

The orientation in utilization of arable land is presented through mutual proportions of the main groups of crops and relative dominance of particular crops within a group, the orientation in utilization of grasslands is shown by the types of grassland characteristic of their peculiar vegetation, that of forests

- by species composition of the trees etc.

The rest of collected materials dealing with the mentioned four categories, as well as the data concerning the other categories namely the object and results of land utilization, constitute the material for further elaboration.

As regards the results of land utilization i.e. the size of plant or animal production, they are the subject to constant fluctuations each year; moreover, data obtained through interviews or from statistics which are at the disposal of the survey is greatly uncertain.

It is why the definition of productivity in land utilization belongs to the stage of elaboration.

The reasons why neither the map nor the field survey include the object of land utilization i.e. the conditions of natural environment are different.

The preparation of land utilization map based on topographic maps - as is the experience of many countries - cannot be applied here due to the wealth of the Polish map. Besides, this will not give an adequate foundation for economic analysis of the conditions of geographical environment! In the early years of researches on land utilization in Poland trials were made to prepare besides a more economic also a more physical map of natural environment drawn out of the point of view of economic requirements. The map has partly been elaborated on the basis of soil maps and others, and partly on field observations. Although the land utilization survey continues to observe some facts and phenomena either being or, more frequently, not being of advantage to the economy which are scarcely obtainable from a map /these are e.g. erosive processes

still in action, swampy and arid areas, frost-pockets, weed-grown areas, intensity of infestation of vermin or pests etc./ all works dealing with physical conditions of the economy and their cartographic presentation have been left to a monographic elaboration of land utilization of the area examined.

A number of reasons have caused this decision. Since in Poland /and probably elsewhere/ it is impossible for one researcher to carry on equally responsible studies in all fields of physical and economic geography, the elaboration of economic appraisal of the conditions of geographical environment had to be based on the researches by specialists who are concerned with particular elements of this environment /viz. geologists, geomorphologists, hydrologists and hydrographers, climatologists, soil scientists, geobotanists, phytosociologists, zoogeographers etc./. As a rule, the value of these researches is not uniform being dependant on the state of examination of the given area by particular disciplines. To obviate this disadvantage there might be organized team investigations to be simultaneously carried on with respect to all these disciplines. This would undoubtedly be the best foundation for any interpretation.

Apart, however, from the difficulty in organizing such investigations and from their expensiveness, they are - as the experience has already proved - greatly labour-absorbing. They obviously could not comprise more extensive areas which fact would hamper or even render impossible the applying of a comparative method and drawing of scientific and practical conclusions that could be largely utilized. Moreover, the present farming system in Polish agriculture with small individual peasant holdings prevailing makes

little demand for greatly detailed studies. When necessary, detailed researches are sporadically carried on to obtain the data needed. On the other hand, insufficiency in examination of the object, forms, ways, directions and effects of land utilization in Poland and also of its natural conditions, makes urgent the necessity of more general studies /even more general than those carried on by the land utilization survey/ comprising large portions of the country. Such demand may, however, appear quite soon. Intensification and rationalization of our rural economy which are greatly desirable, may bring changes in this respect.

A perfect foundation for any work of this kind, including a detailed land utilization survey, would be taxonomic complex maps of geographical environment and their interpretation. These works are, however, still being in Poland in their very beginning.

Another reason of such a system of researches on natural environment within the land utilization survey is the aim of these investigations. We frequently speak about an economic appraisal of the natural environment or its particular elements. Trials were undertaken to prepare a map of this environment presented out of the point of view of man's economy. Different environmental elements come however to the fore relating to the branch of economy under investigation. It is why the presentation on a map or even the appraisal of the geographical environment out of the point of view of the human economy with all its aspects, is very difficult if possible at all. Such a task is not easy even when relating to a single economic branch. Various branches of industry are characteristic of various relations and requirements of the conditions of geographical environment. Various cultures reveal dif-

ferent requirements as regards soils, water or climate. Quite different elements of natural environment play the most important role in land, or water, or air transport, etc.

It seems, therefore, that neither the appreciation of the natural environment nor the drawing of maps of this environment with respect to the entire economy are purposeful or possible. To assure, however, appropriate results, both scientific and practical, the elaboration of the materials of land utilization survey should include a number of maps of the natural environment under investigation, each one dealing with important branches /or even sub-branches/ of economy of the given area. Such evaluation cannot be done by a physical geographer, whereas this may be a task of a geographer who is a specialist in a certain branch of economic geography and as a geographer understands sufficiently the problems of natural environment as well as technical and economic conditions of the given branch of economy or its section exerting their influence upon the localization of the establishments of the area examined.

Anyhow, although the survey and particularly its further stages of elaboration largely involve the problems of natural environment, the survey and especially the land utilization map are a geographic-economic work.

Any interpretation of the compiled materials, namely the definition of systems, directions and types in utilizing of arable land, forests, water or settlement areas understood as systems, directions or types of man's economy in nature, belong also to the stage of elaboration.

3. The Technique of Research

Land utilization survey is as a rule done in the field, mainly by special expeditions.

Before departure to the given area the basic cartographical material is prepared /working maps at the scale 1 : 10 000 or 1 : 25 000 and aerial photos/, blanks, instructions, keys of symbols and material related to the examined area /statistical data, material related to forests/ and other material that helps an understanding of the problems. The expeditions are made up of scientific workers or more advanced university students. The task of surveying is sometimes given as a commissioned work to the graduates in geography or to geographers employed as school teachers. Such expeditions are made up of groups of 10-20 people who have a truck at their disposal, motorcycles and bicycles. In charge of the expedition as a rule, is a more experienced scientific worker of the Institute or University. The participants are divided up into small groups, usually of two people /commonly the assistant and a student/ and their task is to survey land utilization within one gromada /commune/. The time allowed for surveying one commune varies depending on the area to be covered and the natural and economic conditions. Mountainous areas take more time than flat country, private farms more than socialized farms covering large areas. As an average a medium-sized commune /approximately 40 square kilometres/ with two people working on it takes 10-15 days. An expedition usually lives together in one building /usually the school/, the groups are transported to and from the field of operations by truck. Material is obtained both by means of observation and by interviewing the population, and is also obtained from the commune and county administrative authorities /statistical

data and other official data/, the managements of socialized farms, the chief forest offices and so on. Material is collected and accumulated to be recorded on forms especially prepared for this purpose, with separate forms for each type of land utilization in a given economic unit /village, state farm, forestry, fishery and so on/A set of forms for one commune, together with statistical data and field sketches drawn up on the basis of a topographical map, constitutes the fundamental material on the basis of which a draft land utilization map is prepared.

The various stages in the preparation of the material may be listed as follows:

I. Preliminary assemblage

/1/ A set of basic material including filled out forms, statistical lists and descriptions as well as field maps, for the given commune.

/2/ The land utilization map of the commune, drawn up during field work on the basis of a topographic map, aerial photographs and filled-out forms on the scale of 1 : 10 000 or 1 : 25 000 depending on the differences of local natural conditions /for example mountains/ or economic conditions /for example suburban zone/.

II. Fragmentary elaborations.

/1/ Land utilization map for larger areas on a scale of 1 : 10 000 or 1 : 25 000 /to be published at 1 : 50 000/ drawn up in the office, according to the sheets of the topographical map, on the basis of material mentioned in Point I, 1 and 2.

/2/ Scientific report on research conducted in a given area, emphasizing the most important or most interesting scientific and practical problems of land utilization survey. This report includes a certain number of analytical maps based on the material collected du-

ring the survey.

/3/ Elaboration of particular problems, interesting from the scientific or practical point of view, on the basis of material from field survey. This work includes a number of analytical or synthetic maps which help to elucidate the given problems.

III. Full conclusions.

/1/ Monographic land utilization study, fully utilizing the material obtained as a result of field survey and also other data characterizing the natural and economic conditions of the area under investigation /as a rule a county/ in order to supply answers to the questions: a /how are the natural conditions of the county under investigation utilized /the analytical part/; b/ whether and to what extent could the present land utilization in the given county, in the present technical, social and economic conditions, be considered as rational /the synthetic part/; c/ what could eventually be done to make the land utilization of a given area more rational. The prepared work includes profuse cartographical material, made up of a considerable number of analytical maps, a number of synthetic maps and land utilization maps /Point II, 1/ which serve as an annex to this work.

This stage of elaboration of the collected material is not yet clear enough since the first elaboration of this kind /Mrągowo/ based on the material compiled at the very beginning of the survey does not fully answer the principles accepted later on. Further monograph studies are however being prepared.

As already mentioned, the detailed character of the Polish land utilization survey makes it impossible to cover larger areas, and for this reason it is planned in the near future, using the methods already proved,

to prepare a simplified land utilization map at the scale 1 : 100 000 /in print 1 : 300 000/ with which the entire country could be covered.

In that case Poland would have three kinds of land utilization maps accomplishing different scientific and practical aims.

1. A general land utilization map at the scale 1 : 1 000 000 /basis 1 : 300 000/, prepared in the office, representing the distribution of the main forms of land utilization /already published for the whole of Poland/. This map is informative and didactic in character. It may also serve as a basis for scientific analyses and further detailed studies of particular elements.

2. A general land utilization map at the scale 1 : 300 000 /basis 1 : 100 000/, partly office work, partly based on fieldwork, which gives a much more detailed picture of the various forms of land utilization. The method is being discussed. Besides its being informative and didactic in character, this map will be of scientific and practical significance as the basis for agricultural planning on both state and voivodship levels.

3. A detailed map at the scale 1 : 50 000 /basis 1 : 25 000 or 1 : 10 000/ entirely prepared on the basis of field work, presenting an exact picture of land utilization in specially selected areas /this work, method being elaborated, is at an advanced stage/. The map is of importance as the basis for scientific research and also for agricultural planning on the county /powiat/ level.

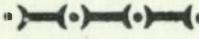
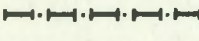
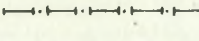
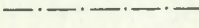
Besides maps of greater areas also land utilization surveys of selected towns are being done in Poland generally on the scales of 1 : 5 000 or 1 : 10 000 /basis 1 : 2 500 or 1 : 5 000/. Up to date 10 small or medium-sized towns have been surveyed.

THE KEY OF SYMBOLS TO THE DETAILED LAND UTILISATION MAP




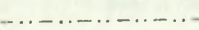
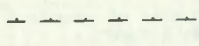
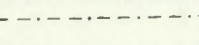
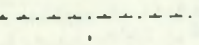
/1:25 000/

I. BOUNDARIES

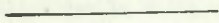
A. Administrative boundaries

- | | | |
|----------------------|---|---|
| 1. state |  | length 1 cm,
width 2 mm,
distance 3 mm,
dots ϕ 2 mm |
| 2. voivodship |  | length 7 mm,
width 1 mm,
distance 3 mm |
| 3. powiat /county/ |  | length 7 mm,
distance 3 mm |
| 4. gromada /commune/ |  | length 7 mm,
distance 3 mm |

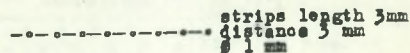
B. Ownership boundaries

- | | | |
|-------------------------|---|--|
| 1. state |  | length 5 mm
distance 3 mm |
| 2. cooperative |  | length 3 mm
distance 2 mm |
| 3. private |  | dots
distance 2 mm |
| 4. other |  | strips length 3 mm
distance 6 mm |
| <u>Tenancy</u> | | dots, distance 2 mm |
| 1. private from state |  | horizontal strips length
5 mm, distance 3 mm,
vertical strips length 1 mm |
| 2. private from private |  | strips length 3 mm
distance 2 mm |
| 3. state from private |  | dots, distance 12 mm
horizontal strips length
3 mm, distance 2 mm,
dots, distance 12 mm |

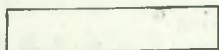
C. Limits of major uses



D. Other boundaries

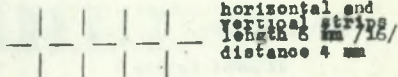


1. openfield

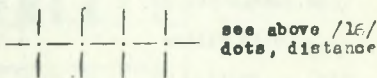


2. enclosed fields

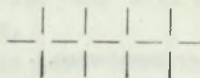
a. bocages



b. hedges

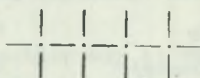


c. walls



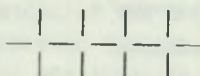
see above /23/

d. fences



see above /23/
dots, distance 10mm

e. ditches



see above /10/

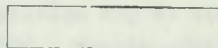
II. AGRICULTURAL LAND

A. Arable land

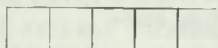
1. Agrarian structure

a. Fragmentation of holdings

up to 5 lots of arable land for 1 farm



5 to 10 lots of arable land for 1 farm



strips
distance 10 mm

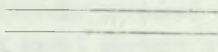
over 10 lots of arable land for 1 farm



strips
distance 5 mm

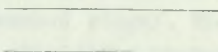
b. Fragmentation of agricultural land

farms up to 5 hectares
over 50% of agricultural land



strips
distance 5 mm

farms up to 5 hectares
30-50% of agricultural land

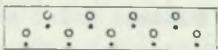


strips
distance 10 mm

2. Crop rotation

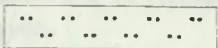
a. two years

with fallow



dots \varnothing 2 mm
points \varnothing 1 mm
distance 10 mm

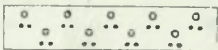
without fallow



dots, distance
2 mm and 10 mm

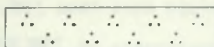
b. three years

with fallow



dots \varnothing 2 mm
points \varnothing 1 mm
distance 10 mm

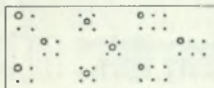
without fallow



∅ 1 mm
distance 10 mm

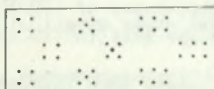
c. many-year irregular rotation
/4,5,6... or more years/

with fallow



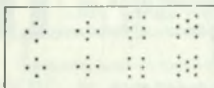
see above

without fallow



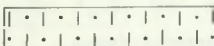
see above

d. many-year regular rotation /4,5,6... or more years/



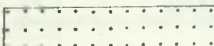
see above

e. mixed grassland and farming rotation



length 3 mm
dots and stripes
distance 7 mm

f. flexible rotation



dots - distance
5 mm

g. monoculture



h. special rotation



∅ 2 mm
distance 7 mm

3. Orientation of land utilisation

a. Cereals occupy more than 60%, 40% or 20% of arable land

relative preponderance
of wheat among cereals



strips width 4 mm
distance 4 mm
/19/

relative preponderance
of rye among cereals



see above /21/

relative preponderance
of barley among cereals




see above /20/

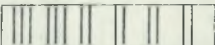
relative preponderance
of oats among cereals




strips
distance 2 mm and
4 mm /21/

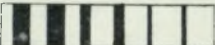
b. Root crops occupy more than 30%, 20% or 10% of arable land

relative preponderance of potatoes among root crops  width 4 mm /22/
distance 4 mm

relative preponderance of fodder root crops among root crops /beets, turnips etc./  strip /22/
distance 2 mm
and 4 mm

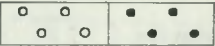
relative preponderance of root industrial crops among root crops /sugar-beet, tobacco, etc./  middle strip/e/
other /22/
distance 2 mm
and 4 mm


c. Fodder crops occupy more than 60%, 40% or 10% of arable land


relative preponderance of many-year crops among fodder crops /clover, alfalfa, grasses etc./  width 4 mm /18/
distance 4 mm

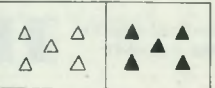
relative preponderance of one-year crops among fodder crops /seradilla, lupin, vetch etc./  strip /18/
distance 2 mm
and 4 mm

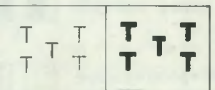
d. Share of industrial crops

rape and agrinomy prevailing  dots ϕ 2 mm /8/
distance 10 mm

flax prevailing  length 3 mm/8/
width 0,2 mm
and 10 mm
distance 7 mm

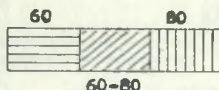
hemp prevailing  see above /8/
distance 1 mm
and 7 mm

sugar-beet prevailing  triangles ϕ 3 mm /8/
distance 10 mm

tobacco prevailing  length of horizontal and vertical strips 3 mm /8/
distance 10 mm

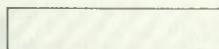
4. Stock raising

Number of animal units per 100 hectares of agricultural land



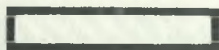
5. Gardens

a. small farmhouse gardens /together with settlements/



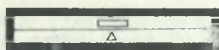
background /5/

b. market gardens



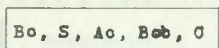
background /22/
border width 2 mm
/7/

c. heating arrangements:
hot-beds
greenhouses

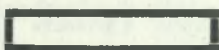


see above

d. prevailing species



e. many-year plantations /rhubarb, strawberries etc./



background /22/
border width 2 mm
/7/

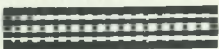
6. Uncultivated arable land

a. not used



width of horizontal/21/ and vertical/23/ strip 1 mm distance 2 mm

b. used as pasture

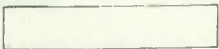


border/4/width 2 mm strip see above

B. Perennial crops

1. Orchards

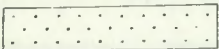
a. small farmhouse orchards /together with settlements/



background /5/

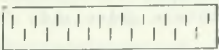
b. market orchards

non-productive age



background dots /6/ distance 5 mm

productive age



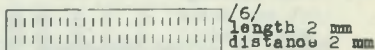
background /6/ length 3 mm distance 5 mm

prevailing species

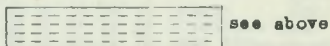
M, P, PD, Cv, Ca

c. field perennial crops

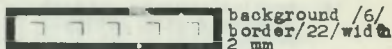
vineyards



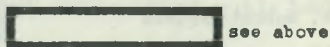
small fruit plantations



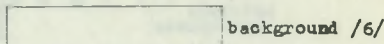
hop fields



other fields



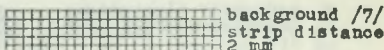
d. nurseries of fruit trees



e. nurseries of other trees

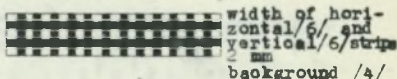


f. urban workers' allotments

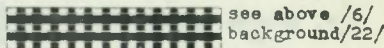


2. Mixed utilisation

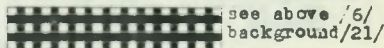
a. orchards with grassland



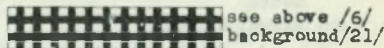
b. orchards with cultivation of root crops or vegetables



c. orchards with cultivation of cereals



d. orchards with cultivation of fodder crops



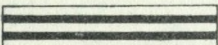
C. Permanent grassland

1. Natural grassland

a. high mountain grasslands /over the limit of trees/

alcalic



acid  width 2 mm /4/
distance 2 mm

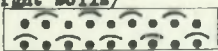
b. xerothermic grasslands


on hard rocks  see above

on soft rocks /steps/  see above

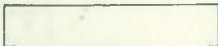
2. Artificial grasslands

a. dry /not flooded, water only from precipitation/
postcomiferous /on light soils/

on hills  arcs/23/ di-
stance 5 mm
dots/4/ 2 mm
distance 5 mm

on plains /Nardeta/  dots/4/ 2 mm
distance 10 mm

postdeciduous

fertilised from arable land  background /4/


fertilised from forest  strip /4/
distance 2 mm

without natural fertilisation  see above

b. humid /water from floods/

flooded /with current water/

on rich alluvial soils  background /3/

on marshy alluvial  strip /3/
distance 2 mm

on poor alluvial soils  see above

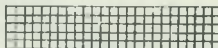
marshy /flooded with stagnant water/

on peat-bogs



background /2/

flooded with spring water



strips /2/
distance 2 mm

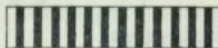
3. Reeds and other aquatic vegetation

a. on land



streak width
/2mm /2/
distance 2 mm

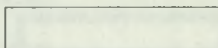
b. on water



see above /2 and
12/

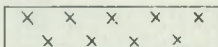
4. Improvement

a. not improved



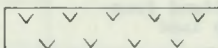
b. improved

entirely /mowing,
reseeding etc./



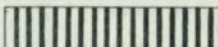
strip length
2 mm
distance 10 mm

partly



see above

c. degraded

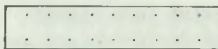


streak width
1 mm /23/
distance 2 mm

5. Way of utilisation

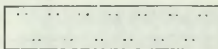
a. cutting

once yearly



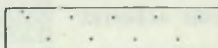
dots
distance 5 mm

twice yearly



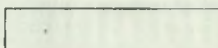
dots
distance 2 mm
and 5 mm

b. mixed cutting and grazing



dots
distance 10 mm

c. grazing

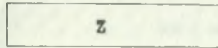


III. WOODLAND

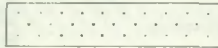
A. Age of trees

1. Cut by clearing

a. felled



b. young



dots
distance 5 mm

c. immature



strips length
2 mm
distance 5 mm

d. mature



length 4 mm
distance 5 mm

e. old



length 4 mm
width 1 mm
distance 5 mm

2. cut without clearing

f.



B. Species of trees dominating

a. pine

over 80%



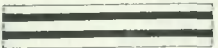
background/17/

over 20%



streak width
2 mm / 17/
distance 2 mm

b. spruce



see above

c. fir



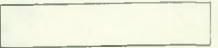
see above

d. larch




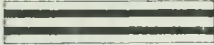


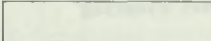

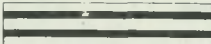


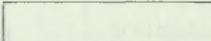
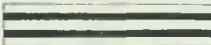
see above

e. beech



over 80%

background/16/

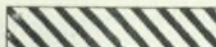
over 20%		streak width 2 mm /16/ distance 2 mm
f. horn-beam		see above
g. birch		see above
h. aspen		see above
i. oak		
over 80%		background/15/
over 20%		streak width 2 mm /15/ distance 2 mm
k. elm		see above
l. linden		see above
m. maple, plane		see above
n. alder		
over 80%		background/14/
over 20%		streak width 2 mm /14/ distance 2 mm
o. ash		see above

p. poplar



streak width
2 mm /14/
distance 2 mm.

r. willow



see above

2. Scattered or degraded woodland

a. not used in another way

pine



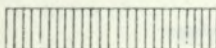
strips /17/
distance 2 mm

beech



see above /16/

linden



see above /15/

willow etc.



see above /14/

b. used in other ways /mixed use/

alder on pasture



background /4/
strips /14/

alder on meadow
etc.



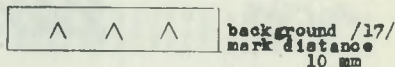
background /3/
strips /14/

3. Species of plants distinguishing various types of pine forest

Cladonia	G
Vaccinium vitis idaea	Vv
Calluna vulgaris	Gv
Vaccinium myrtillus	Vm
Gramineae	G
Ledum palustre	Lp
Vaccinium uliginosum	Vu
Sphagnum	S

C. Bush

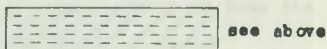
1. Bush exclusively
a. on dry biotope
mountain-pine
/Pinus mugo/



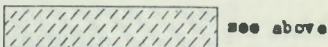
juniper



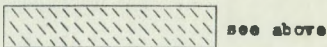
heather moorland



bilberries, whortle-
berries, moorland

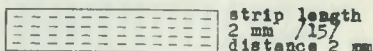


ether



- b. on fresh biotope

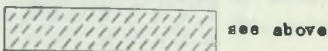
dry deciduous bushes



moist deciduous
bushes

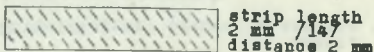


gorse



- c. on wet biotope

willow bushes

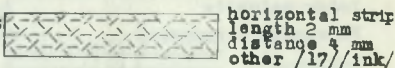


alder bushes



- d. high peat-bog associations

high peat-bog without
trees

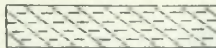


high peat-bog with dwarf pine or spruce



horizontal strip length 2mm/ink/ distance 4 mm vertical strips /17/ distance 6 mm

intermediate high peat-bog with willows, alders or birches



see above diagonal strip /14/

e. osier plantations



border width 2 mm strips /14/ distance 2 mm

2. Mixed use

a. willow bushes on marshy meadow



background /2/ strips /14/ distance 2 mm

b. fresh deciduous bushes on postdeciduous meadow



background /4/ strips /15/ distance 2 mm

c. juniper on postconiferous pasture etc.



dots /4/ strip length 2 mm distance 5 mm

3. Artificial woodland supporting game



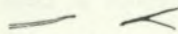
strips /14,15/ distance 2 mm

IV. WATERS

A. Kind of waters

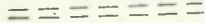
1. Current waters

- a. not managed
- b. managed



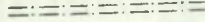
according to topographic map /blue ink/

regulated



strip length 5 mm distance 2 mm

canalised



see above

dams



triangle flank 2 mm

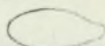
dikes



strips distance 2 mm

2. Standing waters

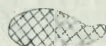
a. natural reservoirs



according to topographic map background according to type

b. artificial reservoirs

ponds



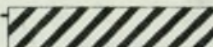
strip distance 2 mm /10/

other reservoirs



strip width 2 mm /10/

3. Land flooded periodically by reservoir waters



streak width 2 mm /10,23/ distance 2 mm

B. Utilisation of waters

1. Source of water

a. from deep-drilled wells



mark size 5 mm /10/

b. from springs

used

not used

ordinary



Ø 3 mm /10/

mineral



flanks 4x2 mm /10/

warm



flanks 3 mm/10/

c. from rivers or lakes



flanks 3 mm /e/

d. aqueducts



long strip/black ink, short strips /10/, distance

e. water pipe-line



see above

f. conduits of water



see above

2. Water disposal

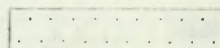
a. conduits of polluted water



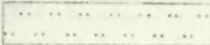
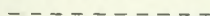



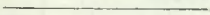
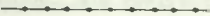


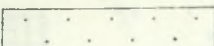
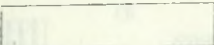

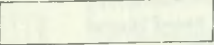
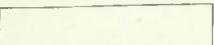
long strip /10/ strips 7/8/

b. water pollution

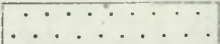
with biological life existing




dots /a/ distance 5 mm

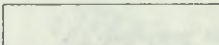
- biological life destroyed  dots /8/
distance 2 mm
and 5 mm
3. For communication
- only for rafting  strip length
5 mm /8/
distance 2 mm
- navigable waters  strip /9/
4. For tourist purposes  background /9/
flank 2 mm
5. For obtaining or producing energy  mark /8/
6. For agriculture
- a. open water reclamation
- drainage channels or ditches  strip /10/
- irrigation channels or ditches  dots /10/
distance 5 mm
- mixed drainage and irrigation  distance of
dots and strips
5 mm /10/
- b. subsurface reclamation
- working  dots /10/
distance 5 mm
- not working or neglected  see above
distance 10 mm
7. For fishing
- a. biotope biological type
- Catch waters
- extremely oligotrophic  background /12/
- oligotrophic eutrophized  background /10/
strip width
distance 2 mm
- eutrophic  background /10/
- distrophic  background /13/

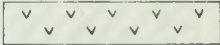
salt waters

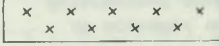
slightly salted  background /10,
dots /11/
distance 5 mm

salt  see above
distance 2 mm
and 5 mm

b. fishing economy

no fishing 


catching only  strip length
2 mm
distance 10mm


full management  see above

V. SETTLEMENTS AND ASSOCIATED NON-AGRICULTURAL LANDS

A. Settlements


1. Compact building

a. over 7 floors  background /5/
strip width
1 mm /ink/
distance 2 mm


b. 3-7 floors  background /5/
strip /ink/
distance 1 mm


c. 1-3 floors  background /5/
strips /ink/
distance 3 mm


2. Scattered building

a. over 7 floors  background /5/
strip width 1mm
distance 2 mm

b. 3-7 floors  background /5/
strips
distance 1 mm

c. single or two-floored
with gardens  background /5/
strips
distance 3 mm


d. single or two-floored with associated agricultural buildings /farmsteads/  background /5/

a. large-estate builded area  background /5/
strip length 2 mm
distance 2 mm

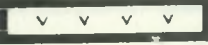
3. Temporarily utilised building  border width 2 mm /5/

B. Industrial areas

1. Built up intensively  background /8/

2. Extensively utilised  strips /8/
distance 2 mm



3. Not utilised  see above

4. Inactive  border width 2 mm /8/

5. Kind of industry

C. Mining areas


1. Deep exploitation
a. mines

B H± W	
active	inactive
	

b. oil wells

	
--	--

c. water wells

	
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2. Surface exploitation

a. active

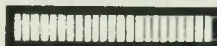
 background /24/
border width 2 mm /8/

b. inactive

 border /8/
strip /24/
distance 2 mm

3. Mining areas

utilised periodically
as arable land



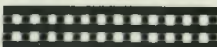
background /21/
border /6/
strip /24/
distance 2 mm

utilised periodically
as pasture etc.



background /4/
border /8/
strip /24/
distance 2 mm

non-utilised



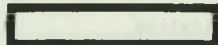
horizontal strip
width 2mm/21/
vertical /24/
distance 2 mm
border /8/

4. Kind of mineral resources

a. energy	W Wb N T G
b. metal	Fe Cu Zn Ni
c. chemical	S Ka
d. ceramic	G P
e. building	Z

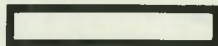
D. Agricultural-industrial areas

1. Technical service for
agriculture



background/8,
border /21/

2. Poultry farms, pig fat-
tening, fur animals hus-
bandry etc.



background/18/
border /21/

E. Commercial areas

1. Warehouses



strip /9/
distance 2 mm

2. Markets



see above

F. Communication areas

1. Railway



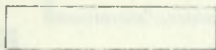
background /9/
strip /ink/
distance 2 mm

2. Motor traffic



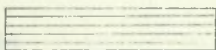
see above

3. Air traffic



background /9/

4. Port installations



background /9/
strip /ink/
distance 2 mm

5. Railway lines

standard gauge



according to
topographic map

narrow gauge



according to
topographic map

for industrial
use only



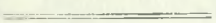
according to
topographic map

funicular



according to
topographic map

6. Roads hard surfaced



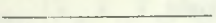
breadth 2 mm

surfaced

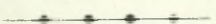


width 1 mm

nonsurfaced /rural
roads/



oil pipe-line



long strip
/8/ ink/
distance /10/ distance 10 mm

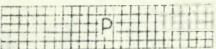
church, monastery



background /5/

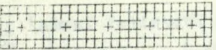
G. Public utilities

1. Parks, green belts etc.



background /15/
strip distance
2 mm

2. Cemeteries



see above

3. Water works

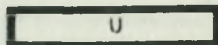


background /3/
strip /10/
distance 2 mm

V. Recreation areas

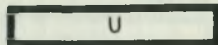
1. Health resort areas

a. built up



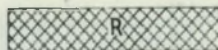
background /5/
border /9/

b. health parks



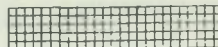
background /15/
border /9/

2. Amusement areas



strip /5/
distance 2 mm

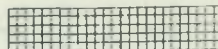
3. Sport or playgrounds



background /3/
strip/black ink/
distance 2 mm

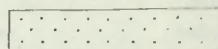
4. Beaches

a. managed



background /23/
strip/black ink/
distance 2 mm

b. not managed



background /23/
strip/black ink/
distance 2 mm

5. Tourist houses and camps



background /7/

VI. UNPRODUCTIVE LANDS

A. Natural

1. Barren mountains, rocks, debris etc.



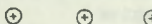
height 4 mm
distance 10 mm
/black ink/

2. Moving sands



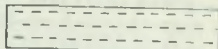
arc /23/

3. Glacial stone heaps



f 3 mm /black ink/

4. Swamps

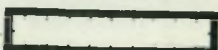


strip /black ink/
distance 2 mm

B. Artificial /derelict lands/

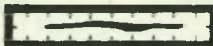
1. Diggings

a. dry



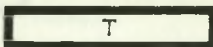
background /23/
border /8/
strip length
2 mm
distance 5 mm

b. covered with water



border /8/
strip length
2 mm /23/
middle strip 10

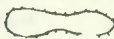
c. peat holes



background /13/
border /8/

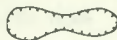
2. Waste heaps etc.

a. barren



background /23/
border and strips
/8/

b. covered with trees
or bushes



see above

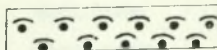
C. Partly used lands /mixed categories/ - examples:

1. Moving sands covered
with scattered dwarf
pine trees



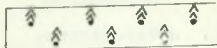
strips /17/
distance 2 mm
arcs /23/
distance 5 mm

2. Moving sands partly
covered with dry grass



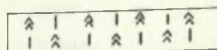
arcs /23/
distance 5 mm
dots /4/
distance 10 mm

3. Rocks partly covered
with grass



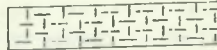
dots /4/
distance 10 mm
mark/black ink/

4. Rocks partly covered
with grass and bushes



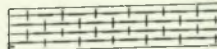
vertical strips
/15/, mark/black
ink/, distance
10 mm

5. Swamps partly covered
with reed-grass, reeds
etc.



vertical strips
/2/, other/black
ink/

6. Swamps partly covered
with reeds, bushes etc.



vertical strips
/14/, distance
10 mm
long strips/2/
distance 2 mm
other/black ink/

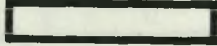
VII. SPECIAL AREAS

1. Periodically used as
arable land



border /24/
vertical strips
/23/, horizontal
/21/, distance
2 mm

2. Periodically used as
pasture



background /4/
border /24/

No. of colour
according to the
Technicolor set of pencils

C o l o u r

1.	white
2.	lemon yellow
3.	yellow
4.	orange
5.	light-red
6.	light-purple
7.	deep-purple
8.	lilac
9.	violet
10.	light-blue
11.	cobalt blue
12.	Prussian blue
13.	navy-blue
14.	blue-green
15.	light-green
16.	medium green
17.	dark-green
18.	olive-brown
19.	yellow-brown
20.	reddish-brown
21.	light-brown
22.	dark-brown
23.	grey
24.	black

/16/ in text means number of colour

Technical set of points
according to the

1	White	100
2	Light yellow	95
3	Yellow	90
4	Light orange	85
5	Orange	80
6	Light red	75
7	Red	70
8	Light purple	65
9	Purple	60
10	Light blue	55
11	Blue	50
12	Light green	45
13	Green	40
14	Light grey	35
15	Grey	30
16	Light brown	25
17	Brown	20
18	Light black	15
19	Black	10

