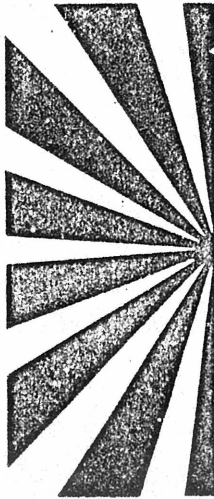


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XXI EUROPEAN CONGRESS-REGIONAL SCIENCE ASSOCIATION
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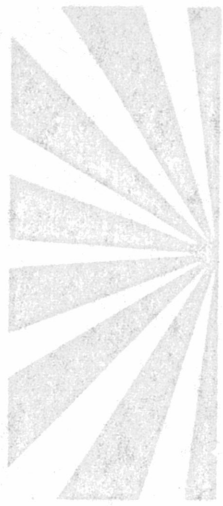
SECTION 3. SPATIAL INEQUALITY: THEORY AND METHOD

MULTIVARIATE APPROACH TO SPATIAL INEQUALITIES
FROM MACRO TO MICRO SCALE : INTERREGIONAL
AND INTRAREGIONAL INVESTIGATION (TURKISH CASE)

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FROM MACRO TO MICRO SCALE: INTERREGIONAL
MULTIVARIATE APPROACH TO SPATIAL INEQUALITIES
SECTION 3. SPATIAL INEQUALITY: THEORY AND METHOD

Downswing
Area
(DIA)

1. Introduction

General approach to the problem of inequalities in Turkey:
The planning regions in Turkey were delineated on the bases of the active relations that the areas have with each other. In a country like Turkey where there is wide spatial inequalities and also areal differences in the rate of social and economic transition over a time, the regions of interdependency cause frustration on the regional policy formulations. Moving from the assumption that the best result may be achieved by superimposing interdependent regions with the development regions, which have similar level of economic and social development, pose common problems of growth and are dynamic in character (Friedman, 1966), an attempt was made for the identification of the development regions of Turkey. This regionalization was based on the economic, social and resource characteristics of the provinces.

Development is a multidimensional phenomenon, hence in this study, on which our paper is based, multivariate techniques will be used to investigate the rates of development and to delineate the regions in which we aimed at to clarify the problems of spatial inequalities. So, this paper will investigate the problem on three different phases:

- 1st phase: Investigation of spatial inequalities in Turkey by using factor analysis and identifying development regions.
- 2nd phase: Investigation of intraregional spatial inequalities in the Black Sea planning region in terms of functions performed in urban centres, by using centrality indices and frequency of visits made among urban centres.
- 3rd phase: Investigation of intraregional variation in development potential in the region delineated as special problem areas within the Black Sea planning Region by basing on the detailed analysis of the manufacturing activities.

2. Spatial inequalities on macro scale:

2.1. Findings of factor analysis: Factor analysis was performed on 24 development indices, indicating mostly the provinces level of economic growth, modernization and urbanization. In addition to these, a few indices of agricultural development reflecting rural development and indices of government

induced change with the objective of achieving balance growth were also included.

From the analysis 4 factors were derived, which together account for 74.5 % of the total variance (Table I). The factors were associated in order of importance, with economic development, social development, public investment and agricultural production. These factors explained 45.4 %, 14.1 %, 9.2 % and 4.3 % of the total variance respectively.

The patterns of the factor scores of economic, social and agricultural development factors, which were used in this paper, indicate the existence of pronounced spatial development variations over the country. It is evident from the economic development factor scores that Istanbul is a primary centre followed by Ankara and Izmir (Fig.1). The next highest scores (0.75 and over) are found in Eskişehir, Bursa, Adana and Gaziantep. The former is located on the main rail road routes and has enjoyed considerable State Economic Enterprise (SEE) investments since the 1930's. Bursa, which has a long tradition of industry, has also received SEE investment and lately overspill industries from Istanbul, Adana and Gaziantep are growing mainly as a result of government incentives and resource advantages. The most of other significant scores (0.20 and over) occur roughly around the axis of Istanbul-Izmir and Istanbul-Ankara-Adana.

By referring to the development literature the low scores of development around the national centres may be interpreted as a backwash effect of the centres. The inhibiting effects of such centres, however, varies with time. Eventually the polarization effect slow down and net spread effect may occur in the hinterland (Richardson, 1976). The relatively higher scores on either side of Istanbul and Izmir and along the axis between Istanbul-Eskişehir can be attributed to such spread from the main centres.

The significant feature of the Social Development Factor is a gradual decline in the level of development as one moves from the Thrace to South-East Anatolia (Fig.2). The rate of decline, however, is more rapid in the high mountainous area of the north-east and the central-east.

The factor scores of the Agricultural Production Factor indicate that in the southern and western region marketable surplus is high and agriculture is much more diversified (Fig.3), whilst northern and eastern Anatolia specialized in extensive animal husbandary and a few industrial crops, especially the eastern Black Sea coastal belt, where nuts and tea productions are of national importance.

2.2. Development Regions of Turkey: The development regions were identified in two steps. In the first step, 67 provinces of Turkey were regionalized basing on the economic and social development factor scores by using an agglomerative hierarchical grouping method. Despite the different contribution of the two factors to the total variance in the grouping, the factor

scores were used without weighting. Because development is a function of both economic and social growth, so the two components are complementary and there are also some variables which are loaded similarly on both factors.

The optimum number of grouping was selected on the bases of the criterion that none of the groups would consist a single province and also that the groups should include provinces which have similar characteristics at what is considered to be acceptable level to the author. Seven groups were obtained from the procedure (Fig.4).

In the second step, in order to recognize the type of regions the groups was examined according to the average social and economic development scores, change in the level of social and economic development, agricultural resource availability, performance of both small and large scale manufacturing industries in relation to total manufacturing activities (Table 2), urbanization and population growth (Table 3).

As a result of the critical examination, the seven groups were identified as core, upward transition, preupward transition, downward transition, problem and peripheral problem areas (Table 4).

TABLE 2. Location and some of the main characteristics of the development regions.

Type of region	Location	Main Characteristics
Core areas	3 provinces of eastern Marmara* (Istanbul, Ankara, Izmir).	The highest economic development, the fastest economic growth & population increase, major centres of industry, trade, finance & government activities.
Upward Transition Area (UTA)	6 provinces of Mediterranean area.	High economic, but low social development, fast economic growth & population increase, high resource potential, higher level of urbanization than national average.
Preupward Transition Area (PUTA)	15 provinces of western Anatolia.	Favourable social, infrastructural & resource conditions, slower economic growth and population increase than UTA, lower level of urbanization than the national average.

* Two provinces of eastern Marmara, Bursa and Kocaeli, were originally grouped together with UTA's. But, due to vertical and horizontal linkages between their economic activities these two provinces, which grew faster than Istanbul, were reclassified, within Istanbul core area.

Continue:

Downward Transition Area (DTA)

15 provinces of central Anatolia which lie between Ankara and UTA's. Lower economic and social development than PUTA, relatively less intensive development than in the past, heavy dependency on agriculture (on dry farming in DTA 1, on animal husbandary in DTA 2) net out migration, lower level of urbanization than PUTA (DTA 2, in general, is more poorly developed than DTA 1).

Special Problem Areas (SPA)

7 provinces of Black Sea Coastal belt. Low economic development, but faster economic growth than DTA, high social potential, extremely scarce cultivable land, net out migration, lower level of urbanization than DTA.

Peripheral Special Problem Areas (PSPA)

13 provinces of eastern and south-eastern Anatolia. Least development from all aspects, existence of different ethnic groups, feudal socioeconomic structure, higher demographic urbanization than PUTA, DTA & SPA.

3. Intraregional analysis of spatial inequalities in the Trabzon Sub-Region (Special Problem Areas):

The Special Problem Area which was identified by factor analysis coincides mostly with the region delimited by the state organizations called Trabzon Sub-Region (DPT, 1971), and consists of five provinces: Trabzon, Rize, Giresun, Gümüşhane, Artvin.

As it is known the methods of determining the regions differ with the aim and there are various techniques to deal with this problem (Minshull, 1968; Dickinson, 1967; Perloff and Wingo, 1968; Haggert, 1969). What is intended in here is to develop an interaction oriented frequentation model to show how people have access to urban central functions with the least effort in a behavioural sense.

In the Trabzon Sub-Region the spatial inequalities were analysed in terms of, first, urban services and central functions such as number of shops, education facilities, health services, finance and insurance services, etc. (Palomaki, 1963; Hautenaki, Siirila and Sippola, 1968; Atalik, 1971; Fleming, 1954; Abiodun, 1967), and of second, frequency of visits among centres.

A regionwide survey was carried out to gather data related to urban services and the volume of interactions among all types

The existence of the potential centres and their area of influences show us the pattern of spatial inequalities, which makes it possible to put a threshold for urban functions.

The functional area of influences, field force and dependency indices showed the possibility of re-drawing and re-defining of regional boundaries of the Trabzon sub-region (Fig. 6).

4. Spatial Inequalities at the micro scale:

The pattern of urbanization, the distribution of urban central functions and the importance of the field forces of each centre gave a broad perspective of intraregional variations in development. For further clarifications, however, the importance of manufacturing activities in each centre should be looked at.

To analyse the importance and the distribution of manufacturing activities by sectors, workplaces, plants and employees in the Trabzon sub-region the data were obtained from the unpublished 1980 census of trade and industry. The information obtained from the census, however, were not sufficient for detailed analysis and did not cover the whole sub-region. Hence, our survey in the region is still continuing. Within such limitations the manufacturing activities were analysed only for a part of Trabzon sub-region (Trabzon-Rize), and for this purpose, the data of a more than 2000 work places, which employ some 30 000 workers, were used.

The development of manufacturing industry in the area is not uniform. There are spatial inequalities either in the number of work-places and workers or in the types of manufacturing activities. The sectoral distribution of employees among centres given by location quantifiers showed that almost all of the coastal centres were engaged in the tea processing industries, timber, furniture and construction material productions and metalworks (i.e. household appliances and tools) Trabzon and Rize, however had share in almost all sectors (Table 8, Fig. 7).

Looking at the workplaces by size and number of employees, among the centres, only Trabzon, Rize, Of and Çayeli become dominant. Trabzon, Akçaabat and partly Rize, however, had even share in each size groups. If the tea processing industry which heavily employs seasonal workers was excluded, then Trabzon would become the only important centre in the area. This pattern shows similarities with the pattern of urbanization in the area which will be mentioned later on.

The distribution of work places by sectors indicated that the most developing sectors were leather wear (except footwear), clothing, timber and metalwork (i.e. household appliances and tools) (Fig. 8). During the last five years the number of work-places had almost doubled in these sectors. Similarly, the number of workplaces with less than 3 employees were also increased by two folds during the same period. Most of the development, however, occurred in the 2-3 workers size group (Fig. 9).

of settlements-urban and rural. In order to provide such data people were asked where and how often they visit different level of centres for the provision of their needs.

Basing on the Davis' centrality formula intraregional urban hierarchy, in other words spatial inequalities, in terms of urban services was established (Table 5). Five groups of central places were identified using within group and between groups differences of centrality indices. These groups formed as follows:

- 15th order centres: Trabzon.
- 14th order centres: Rize, Giresun, Artvin.
- 13th order centres: Vakfıkebir, Çayeli, Bulancak.
- 12th order centres: Bayburt, Görele, Kelkit, Tirebolu, Akçaabat, Pazar, Of, Tonya, Gümüşhane, Sürmene, Espiye.
- 11th order centres: Remaining 16 urban centres.

The correlates of centrality were urban size and no. of functional units ($r=0.986$), urban size and no. of central functions ($r=0.842$), centrality and no. of functional units ($r=0.957$).

The second analysis, the analysis of the distribution of frequency of visits among centres, yielded another urban hierarchy which was quite different from the hierarchy established above. The differences between the two hierarchies stem from the intraregional inequality of visits within province, among the provinces of the Trabzon Sub-Region and intraregional visits. The different field force indices produced from intraregional and interregional frequency of visits (Table 6). The spatial inequalities in terms of location, accessibility, attraction and volume of visits generated by behavioural differences showed the following hierarchical groupings:

- 5th order centres: Regional centre : Trabzon.
- 4th order centres: Competing centres : Rize, Giresun, Bayburt, Gümüşhane.
- 3rd order centres: Centres with limited influence : Of, Vakfıkebir, Görele.
- 2nd order centres: Self contained centres : Şiran.
- 1st order centres: Dependant centres : Remaining centres.

The volume of the frequency of visits also revealed the range of urban functions, in other words, functional specialization among the urban centres (Table 7). The analysis of the frequency of visits made from Trabzon Sub-Region to the surrounding regions was also yielded the dependency indices for the urban centres. That made clear the spatial inequalities in and around Trabzon Sub-Region (Fig. 5).

In terms of manufacturing industry the spatial variations over the area is obvious. Trabzon appears to be regional centre and Rize is the competing centre. Akçaabat, Vakfıkebir, Yomra, Sürmene and Pazar also show a limited potential for growth.

Summing up, the settlement hierarchies derived by the 3 different methods, centrality, field forces and location quotient of manufacturing industry, imply the existence of the spatial inequalities. Hierarchies are:

Centrality	Field force	Location Quotient
Trabzon	Trabzon	Trabzon
5th. Rize, Giresun, Artvin.	Giresun, Rize, Çamışhane, Bayburt.	Rize
4th. Rize, Giresun, Artvin.		
3rd. Vakfıkebir, Çayeli, Bulancak.		Akçaabat, Vakfıkebir, Yomra, Ardeşen, Pazar, Sürmene, Fındıklı, Çayeli.

The high correlations between the urban size and number of workplaces ($r=0.095$) and again urban size and number of workers ($r=0.823$), if tea processing workers were excluded the c. co. decrease to ($r=0.607$) indicate the importance of size of settlement and the existence of diversified manufacturing structure for the development of a centre. Accessibility of a centre however, having correlation co-efficients of 0.642 and 0.445 appeared to be less significant factor affecting no. of workplace and workers in a centre. This may be explained by the predominantly resource base characteristics of the area's industrial sector.

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TABLE 1. Factor loadings of rotated factors (Varimax rotation)

Variables	Factor 1 (Econ. Develop.)	Factor 2 (Social Develop.)	Factor 3 (Public investm.)	Factor 4 (Agricult. production)
V. 1 Population growth (1965-70)	0.618	-0.627	0.128	-0.033
V. 2 % of town population (1970)	0.885	0.088	0.184	0.158
V. 3 % of pop. born in the same province (1970)	-0.859	-0.229	-0.164	-0.007
V. 4 % of active population (1970)	0.470	0.730	0.040	0.075
V. 5 % of agricultural working pop. (1970)	-0.904	-0.275	-0.185	-0.009
V. 6 % of service working pop. (1970)	0.943	0.153	0.099	0.067
V. 7 % of industrial working pop. (1970)	0.716	0.445	0.246	-0.066
V. 8 Per capita agricultural product (1971-73)	-0.135	0.397	-0.037	0.782
V. 9 Per capita animal product (1971-73)	-0.328	-0.146	0.127	-0.708
V. 10 Per capita value added (1974)	0.337	0.135	0.779	-0.111
V. 11 Insured workers per 100 pop. (1974)	0.652	0.316	0.554	-0.153
V. 12 Per capita electricity consumption (1973)	0.562	0.322	0.083	-0.347
V. 13 Tarmac road density (km per 100 sq km)	0.123	0.600	0.493	-0.023
V. 14 No. of motor vehicle per 100 pop. (1974)	0.764	0.382	0.210	0.242
V. 15 No. of radio per 100 pop (1974)	0.521	0.767	0.059	0.139
V. 16 Per capita general public invest. (1963-70)	0.080	0.139	0.570	-0.324
V. 17 Per capita public invest. in industry (1963-70, 73-75)	0.102	-0.036	0.842	0.066
V. 18 Per capita public invest. in education (1963-70)	0.540	-0.266	0.276	-0.302
V. 19 % of female literates (1970)	0.452	0.759	0.021	0.339
V. 20 No. of doctors per 100 pop. (1973)	0.922	0.130	-0.051	-0.088
V. 21 No. of hospital beds per 100 pop. (1973)	0.490	0.503	-0.207	-0.052
V. 22 Room density (1970)	-0.152	-0.839	-0.237	-0.157
V. 23 % of dwellings with water (1970)	0.616	0.300	-0.334	-0.130
V. 24 % of villages with electricity (1975)	0.514	0.511	0.033	0.374

----- Main variables, - - - - - secondary variables.

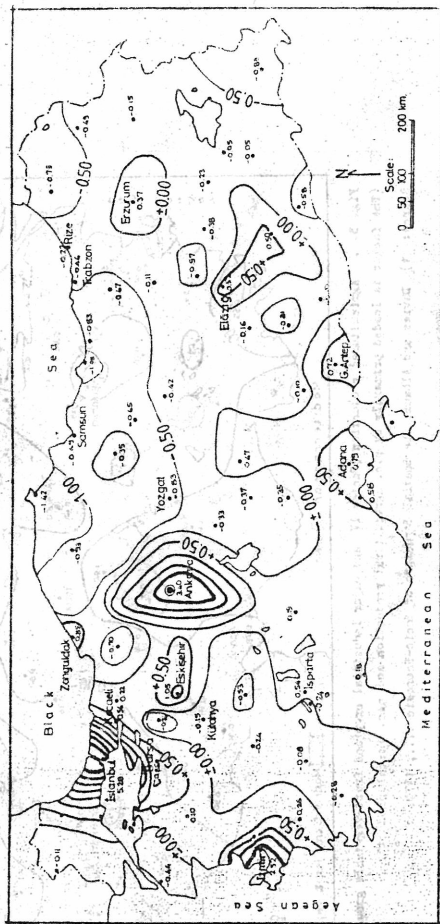


Fig. 1. Economic development (Factor I).

(The factor is loaded primarily by 7 variables, i.e. % of population born in the same province, % of agr. service and ind. working populations, number of motor vehicles p. 100 population and number of doctors p. 100 population. The secondary loaded variables are population growth, insured workers p. 100 population, p.c. electricity consumption, p.c. public investment in education, % of dwellings with water and % of villages with electricity.)

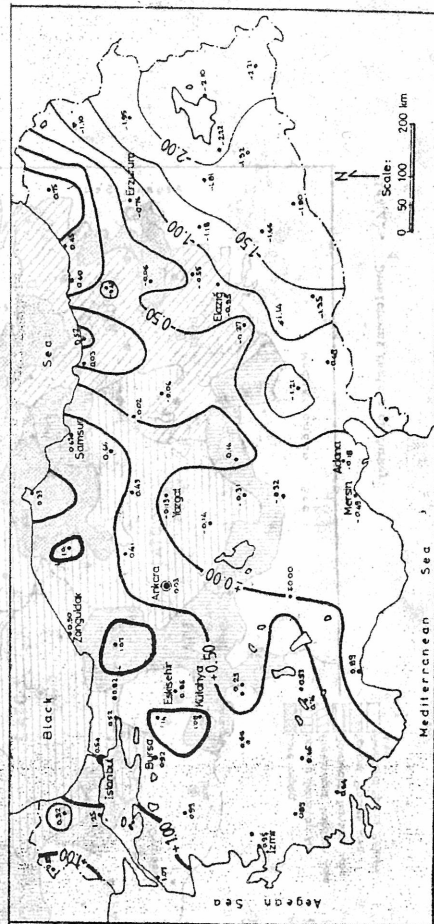


Fig. 2. Social development (Factor II).

(The factor is loaded primarily by 4 variables, i.e. % of active population, number of roads p. 100 population, % of female literates and room density. There are also 4 variables with secondary importance, i.e. population growth, tarmac road density, hospital beds p. 100 population, % of villages with electricity.)

Development area	Year	Total manufacturing employment	% of off-farm economic units in ind. employ.		Share of total ind. employ. in man. ind. employ.	Share of total ind. employ. in man. ind. employ.	Average firm size	
			1953	1972			1953	1972
Istanbul	1953	141	1.7	1.7	31	64	503	42
	1972	215	3.1	3.1	81	88	288	69
Ankara	1953	146	1.8	1.8	26	22	578	30
	1972	171	3.4	3.4	46	42	575	40
Izmir	1953	257	3.0	3.0	29	76	579	53
	1972	324	4.5	4.5	65	75	580	59
UT1	1953	103	1.3	1.3	30	70	569	90
	1972	145	2.5	2.5	46	79	491	117
UT2	1953	138	1.5	1.5	39	31	1923	95
	1972	142	1.6	1.6	59	42	1162	77
UT3	1953	125	1.5	1.5	27	11	197	36
	1972	210	1.8	1.8	35	10	1526	37
UT4	1953	64	0.8	0.8	21	10	731	16
	1972	67	0.9	0.9	21	20	229	23
UT5	1953	155	1.9	1.9	51	12	82	77
	1972	232	2.9	2.9	46	13	723	80
Region	1953	100	0.8	0.8	19	50	549	59
	1972	110	0.7	0.7	23	53	448	52
DIA1	1953	54	0.21	0.21	11	31	159	28
	1972	60	0.27	0.27	22	25	550	30
DIA2	1953	64	0.46	0.46	28	37	738	62
	1972	65	0.45	0.45	27	18	726	30
Region	1953	61	0.30	0.30	13	24	316	30
	1972	67	0.35	0.35	12	14	459	33
Region	1953	39	0.09	0.09	23	44	147	26
	1972	39	0.07	0.07	12	20	244	25

Sources: SIS, Manufacturing census of 1953 and 72.
SIS, Population census of 1950 and 72.

Table 3. Population and urbanization by development regions.

Development area	Square of Region in population	Annual population growth rate				% of pop. in urban area				
		1927-1940	1950-1956	1960-1970	1970-1975	1965-1970	1970-1975			
Istanbul	13.2	1.8	2.0	3.1	4.8	4.9	63.4	3.9	5.3	4.4
Ankara	6.4	3.8	3.6	6.1	5.5	5.2	75.6	8.0	8.3	7.7
Izmir	4.1	1.7	2.0	3.8	3.4	3.3	52.0	3.5	4.3	4.2
UT1	8.6	4.1	2.1	3.6	3.6	3.5	40.1	6.0	6.6	6.4
UT2	1.2	3.0	3.4	3.6	2.5	1.4	52.4	2.7	4.9	3.8
Zonguldak	2.1	2.3	2.2	3.3	3.1	2.4	28.1	7.8	9.6	3.7
Erzurum	1.9	2.0	2.4	2.3	2.0	1.3	27.8	3.4	7.8	8.5
Elaşığ	1.0	-	1.2	3.0	3.5	2.5	35.0	9.4	7.7	3.8
Region	16.0	2.2	-0.9	5.0	2.6	1.3	28.2	4.0	4.2	4.0
DIA1	9.4	2.0	1.8	2.9	2.3	2.0	26.9	5.6	4.7	5.4
DIA2	9.5	3.2	1.8	1.5	1.9	1.3	21.4	7.2	7.7	5.7
SIA, Black Sea	9.4	2.2	1.4	2.3	1.5	1.0	16.0	3.1	9.1	4.7
PFA	17.0	2.5	2.1	4.8	3.1	2.2	30.4	7.5	10.8	6.9
Turkey	100.0	2.4	1.6	3.2	2.8	2.5	36.0	5.1	7.1	6.8

Sources: SIS, Population censuses
High fluctuation in population growth in PFA between 1950 and 1960 is due to exchange of minorities.

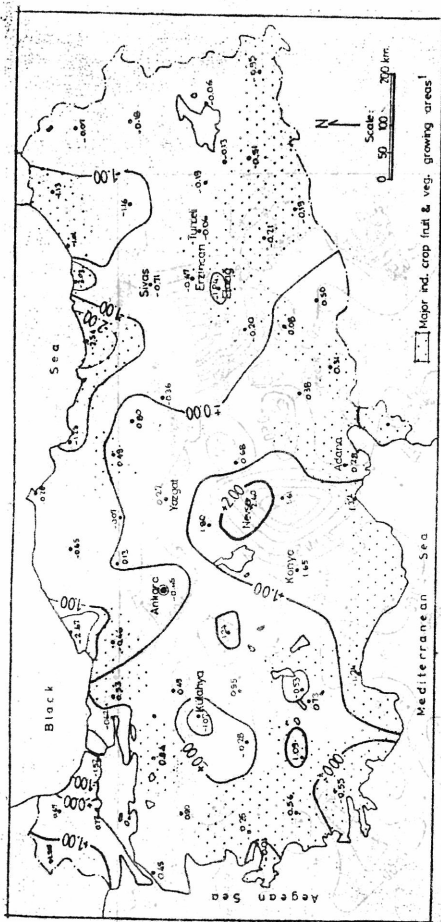


Fig. 3. Agricultural production (Factor IV) and major industrial crop and fruit-vegetable growing areas. (The factor is loaded primarily by p.c. agricultural production and p.c. animal production.)
Sources: 1) Davies and Albaum, The Spatial Structure of Socio-Economic 1973.

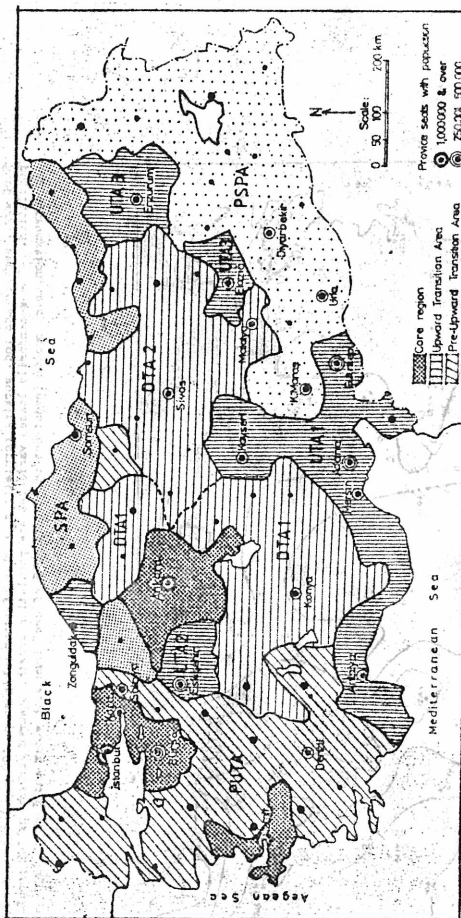


Fig. 4. Development regions of Turkey.

TABLE 5. Urban Hierarchy by centrality indices. $C = t/r \times 100$

Urban centre	Centrality
Trabzon	2013
Rize	642
Giresun	545
Artvin	479
Vakfaköy	278
Göveli	259
Emlaköy	221
Barbar	167
Özü	164
Keiküt	160
Tirebolu	151
Aksabat	147
Pazar	146
Hopa	142
Arhavi	140
Tonya	139
Gümüşhane	123
Siran	123
Dereci	123
Heisdere	115
Çaykara	114
Ş. Karahisar	97
Fındıklı	95
Arslan	90
Kalkandere	79
Borçka	75
Aluora	73
Eynesil	67
Ardeşen	67
Yunuseli	62
Kesap	61
Şiran	60
Dereci	54
Heisdere	51
Çaykara	49
Şaygat	48
Arslan	42
Forul	39
Ardeşen	39
Yonca	33
Yemreli	22
Çamlıhemşin	20

TABLE 6. Functional area of influences of centres.

Urban functions (x)	Range of urban functions (km)		
	Trabzon	Rize	Gümüşhane
f111	221	165	116
f131	192	118	123
f141	197	118	110
f151	219	115	131
f171	108	58	28
f1111	225	98	169
f1121	220	115	110
f211	212	190	112
f221	134	73	59
f241	286	127	72
f331	160	77	110
f111-1121	215	168	112
f211-331	217	146	109
f111-331	216	175	116

(x) Urban function considered to be important are the followings:
 Retailing in clothing, food and drinks, household goods (tools and machinery, furnishing), agricultural supplies, construction materials, personal goods and services, health services, lawyer, banking and insurance, advisory services.

$r = 686/5 = 137.2 \text{ km}$

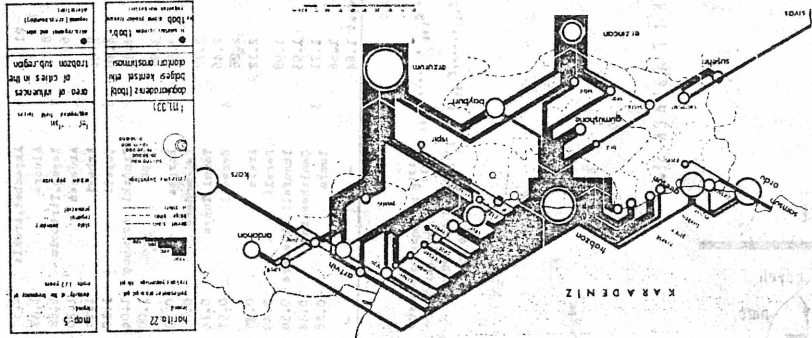


FIGURE 5. Urban field forces and dependancies in and out of Trabzon Sub-Region

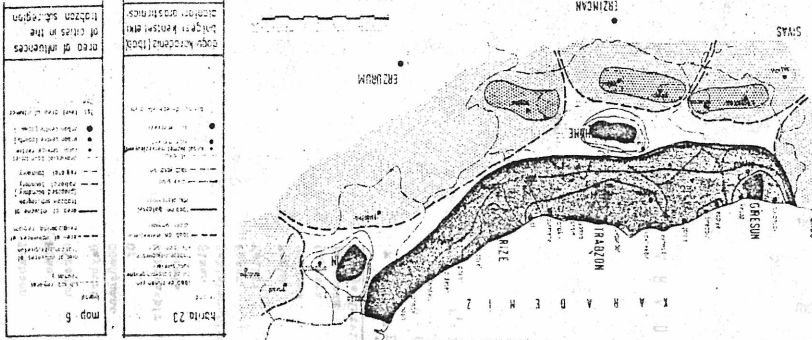


FIGURE 6. Proposed boundary alterations in Trabzon Sub-Region

TABLE 6. Distribution of location quotients

Sectors	Locations																		
	Trabzon	Akçaabat	Araklı	Arsin	Saykara	Maçka	Of	Sirince	Tonya	V.kebir	Yomra	Rize	Ardeşen	Çamlıhem.	Şayeli	Finikli	İzidere	Kalkandere	Pazar
311-312	0.24	0.32	0.33	0.02	0.15	0.31	1.27	0.99	0.69	0.19	0.35	1.24	1.13	0.34	1.34	1.21	0.36	1.26	1.20
313	-	-	-	-	-	-	-	-	-	-	-	2.67	-	-	-	-	-	-	-
314	3.71	10.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
321	0.31	1.85	1.39	3.85	4.27	7.77	0.45	1.39	-	4.08	0.53	0.59	0.48	-	-	0.32	6.11	0.29	0.61
322	2.76	1.98	0.70	16.45	4.37	5.90	0.35	1.03	10.82	4.13	0.31	0.28	0.69	-	-	0.24	6.18	0.32	0.57
323	4.86	0.55	-	-	-	-	-	-	-	-	1.03	0.22	-	-	-	-	-	-	-
324	4.87	-	0.52	2.58	2.58	5.97	0.03	0.70	1.52	1.41	-	0.17	-	-	-	-	-	-	0.16
331	1.66	1.96	1.88	2.42	10.25	7.20	0.31	1.25	5.43	3.81	0.99	0.36	0.99	-	-	1.31	5.33	0.53	0.91
332	3.87	2.04	0.75	2.18	-	-	0.22	0.68	-	1.49	0.17	0.27	0.57	27.24	-	0.10	-	0.27	0.31
341	5.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
342	3.86	1.06	-	-	-	-	0.07	-	-	-	-	0.57	0.61	-	-	0.47	-	-	0.13
351	1.35	1.38	-	-	-	-	-	-	-	3.01	28.91	0.29	-	-	-	-	-	-	-
352	4.71	-	-	-	-	-	-	-	-	1.86	-	0.32	-	-	-	-	-	-	-
355	4.40	-	-	0.56	-	-	-	0.13	-	-	-	0.17	0.46	-	-	-	-	-	-
356	4.12	-	-	-	-	-	-	1.20	-	-	-	0.58	-	-	-	-	-	-	-
362	2.89	-	-	-	-	-	-	-	-	-	29.65	-	-	-	-	-	-	-	-
369	2.94	2.26	7.45	0.21	0.51	2.80	0.18	0.36	-	7.01	3.92	0.12	0.43	-	-	0.04	-	-	0.27
381	2.26	3.27	0.94	1.46	7.78	2.93	0.33	1.70	-	4.02	5.73	0.42	0.77	-	-	0.27	5.86	0.32	0.55
382	3.43	-	-	-	-	-	-	-	-	15.77	-	0.52	-	-	-	-	-	-	-
383	1.88	1.91	-	-	-	-	-	-	-	-	19.62	0.76	-	-	-	-	-	-	-
384	3.82	0.70	-	-	-	-	-	1.94	-	0.63	3.34	0.41	0.34	-	-	-	-	-	0.14
390	1.25	-	-	-	-	-	-	-	-	-	-	1.65	0.99	-	-	0.38	-	-	2.31

TABLE 7. Regional urban hierarchy and grouping by field force indices (f.f.1)

Urban centre	f.f.1 λ(s)	Group	Urban centre	f.f.1 λ(s)	Group
Trabzon	21.73	8	Akçaabat, Araklı	1.58	
Rize	8.32		Ardeşen	1.37	
Giresun	6.76	7	Kesap, Tirebolu	1.32	
Bayburt	5.07		Ardeşen	1.20	3
Çumruluhan	4.76	6	Ardeşen	1.14	
Of	4.36		Cayeli	1.10	
Vakfıkebir	3.97	5	Pandıklı, Ardamp	1.04	
Ordu	3.52		Hope	1.00	
Siran	2.72		Borçka	0.93	
Şebinkarahisar	2.46	4	Kalkandere	0.87	2
Pazar	2.26		Torul, Tonya	0.74	
Kalkit	2.12		Eynesil	0.51	
Maçka	1.98		Arsin	0.45	
Sirince	1.93		Dereci	0.40	
Saykara	1.71	3	Tumfeşi, İkişdere	0.36	
Enleonağ	1.66		Çamlıhemşin	0.34	
Espio, Arvin, Şayeli	1.64		Tonya	0.28	

$\lambda = \frac{F}{F_i} \times 100$
 $F = f_{111} + f_{112} + \dots + f_{11n}$ = Total frequency of visits made to any centre
 $F_i = f_{111} + f_{112} + \dots + f_{11n}$ = Total frequency of visits in the region

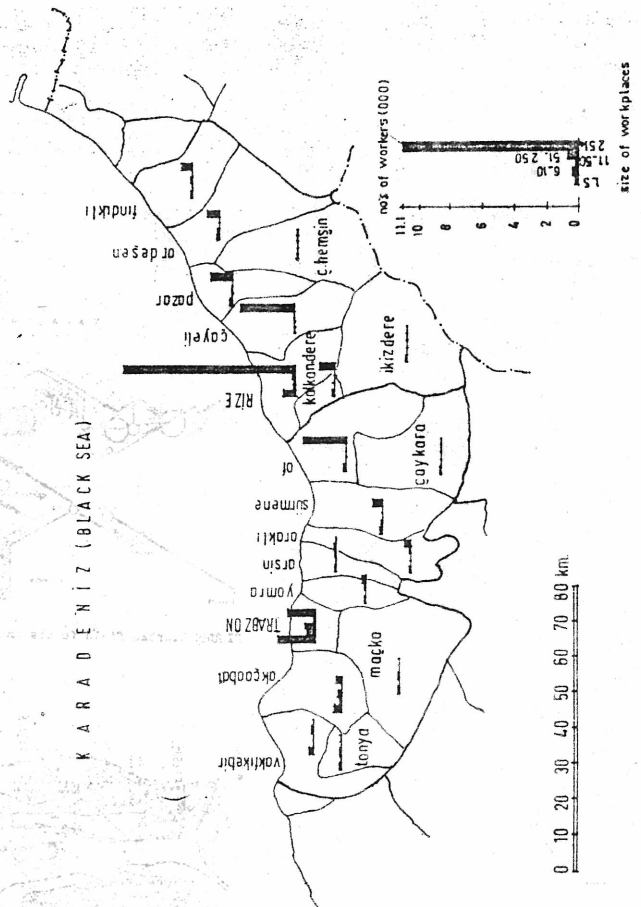


FIGURE 7. Distribution of workers by workplace sizes

FIGURE 8. Distribution of workplaces

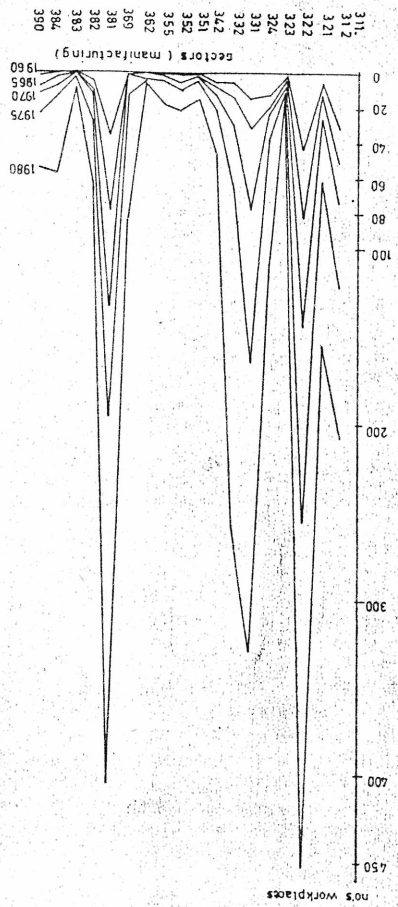


FIGURE 9. Places by sizes
Distribution of work

