

C-EKS-A: 7461  
December 20, 1988

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Dear Prof. Dr. Aydemir,

I cannot trace that you ever received an acknowledgement of the receipt of your manuscript "Rural development potential: A factor analysis approach. The Artvin province case". We apologize for this oversight.

Your paper has been classified for consideration for an issue of our journal on Rural settlements but this will still take some time because there is a considerable delay in the publication of previous issues of the journal due to financial and technical reasons. If you do not object to our keeping the article until the issue on rural settlements or another suitable issue appears, we will get in touch with you again when work starts systematically on the subject.

Thanking you again for your interest in EKISTICS,

Yours sincerely,

*A. Sklirou*

(Mrs) A. SKLIROU  
Secretary to P. Psomopoulos



RURAL DEVELOPMENT POTENTIAL: A FACTOR ANALYSIS APPROACH. THE ARTVIN PROVINCE CASE.

Abstract: The province of Artvin has been selected to investigate the rural development potential by using factor analysis. 19 variables used related to population, rural economy and housing. Six factors produced, explaining 64.8 pc. of the total variance. The factors named as: agricultural potential (F1), centrality (F2), forestry potential (F3), migration (F4), stock-breeding (F5), and settlement (F6).

The rural population of the nation has been declining since 1960, and the ratio of rural population decline were 50.8 pc. in 1980, and 47.0 pc. in 1985. The most rural parts of the country are east, south-east and north-east regions. Comparatively, Black Sea region has much diversified settlements than the other regions of the country and the Artvin province lies in one of the most rural part of the Black Sea Region.

The Turkish Five Year Development Plans have given special attention to the rural area. However, it is hard to say that this attention was comprehensive.

All the development plans stated general policies for rural development, policy implementations seen as upgrading of the various ministerial organization's services in rural areas (Geray, 1974).

I. National Development Plan showed the foundations of rural policies and stated standards and ways for community development, but nothing more (DPT, 1963).

II. National Development Plan gave emphasis on the interrelationships between agricultural and industrial sectors and also rural-urban continuum. As a principle, it had a tendency towards agglomeration of rural settlements to perform their functions as good as possible by giving importance to the growth poles (DPT, 1967).

III. National Development Plan clearly stated that diversified rural settlements influence negatively community development studies and national development efforts due to inadequacy of resources of rural, local and central governments (DPT, 1973). It is understudied that

the welfare of peasants and the development of villages have to be considered in the framework of the national development (Ge - ray, 1974).

IV. National Development Plan gave emphasis on the hierarchies among rural and urban centres, and the quality of service centres. To provide rational distribution of resources at the regional and provincial levels as anticipated in the national plans and the ways of increasing the contribution to the national development are to be searched for (DPT, 1979)

V. National Development Plan states that ' rural development projects will be handled, so as to accelerate the regional development (DPT, 1985).

Keeping these in mind, Artvin Province being the most underdeveloped province has been chosen as a micro regional case study (DPT, 1973., Şanlı, 1980). As being the components of economic development, population and agricultural potential, and the related variables of them used to see what would be the groupings of the villages according to their development potentials.

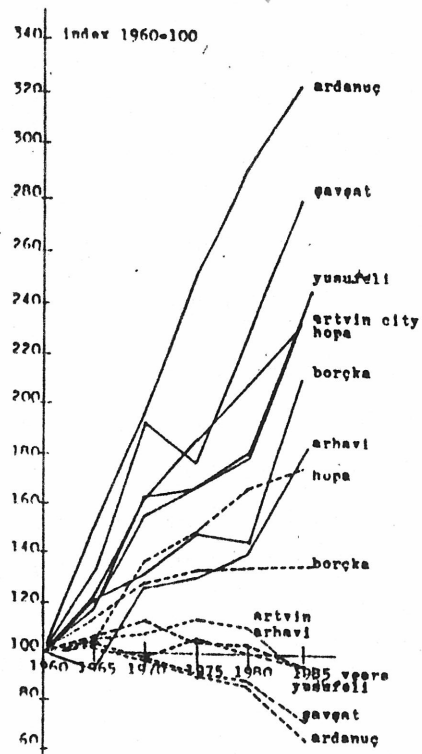
#### Population Growth In The Artvin Province:

The growth of the Artvin Province's rural and urban populations showed comparatively slow increases for the last 25 years (graph 1), 79.8 pc. of the Artvin Province's population lived in rural areas in 1980, and 74.2 pc. in 1985. The rate of population growth in the province decreased from 6.77 pc. to -1.17 pc., also rural and urban population growth rates decreased from 5.15 to -9.42, and 16.99 to 20.2 respectively between 1960-1985. The population growth showed rather unstable trend. The distribution of rural population by settlement sizes and the distribution of villages by size groups are shown in graphs 2, 3. It is seen that there is a correlation between the rural population trends by settlement sizes and the number of villages by village size. 61.8 pc. of the rural population of the province lies between villages of 400-1250 population size group in 1980 and 58.0 pc. in 1985.

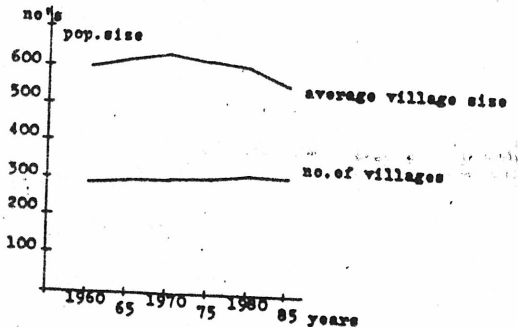
The ratio of villages over 2000 population size group is only 4pc in 1980, 8 pc. in 1985. Graph 3 also shows where the population potential lies.

Population potential is greater along the coastal part and the

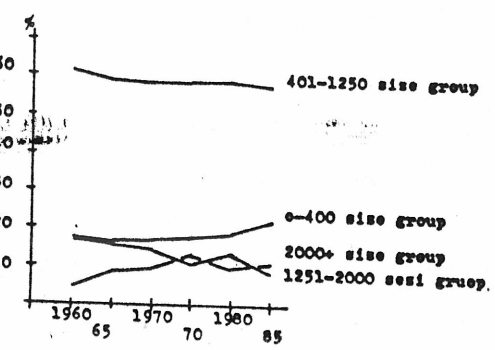




Graph 1: Population growth in urban and rural areas in the Artvin Province.



Graph 2: Development of the Artvin Province's Rural Pop., and Villages.



Graph 3: Development of Villages By Size Groups.

mining areas of the province (see map 1).

Rural economic and spatial organization have not been completed in the province. Functional organization is stronger between the coastal settlements than the other parts of the province. Spatial organization according to road system shows similarities with dendritic and solar patterns and the Tiv market system as functional organization except for the provision of durable goods (Aydemir, 1979., Smith, 1976), the intermediate centres have not been developed yet.

#### Land Use And Agricultural Potential:

The main purpose of this article is to investigate the possibilities of the rural development in the province of Artvin. For this purpose, firstly, the potentials of rural land in terms of agriculture (traditional and modern), forestry (lumber, timber, timber products), stockbreeding, in general, are investigated. Division of the land uses, such as grazing and cultivable land defined from various land use maps and figures produced by the Forestry Department (OR-KÖY) on the village base.

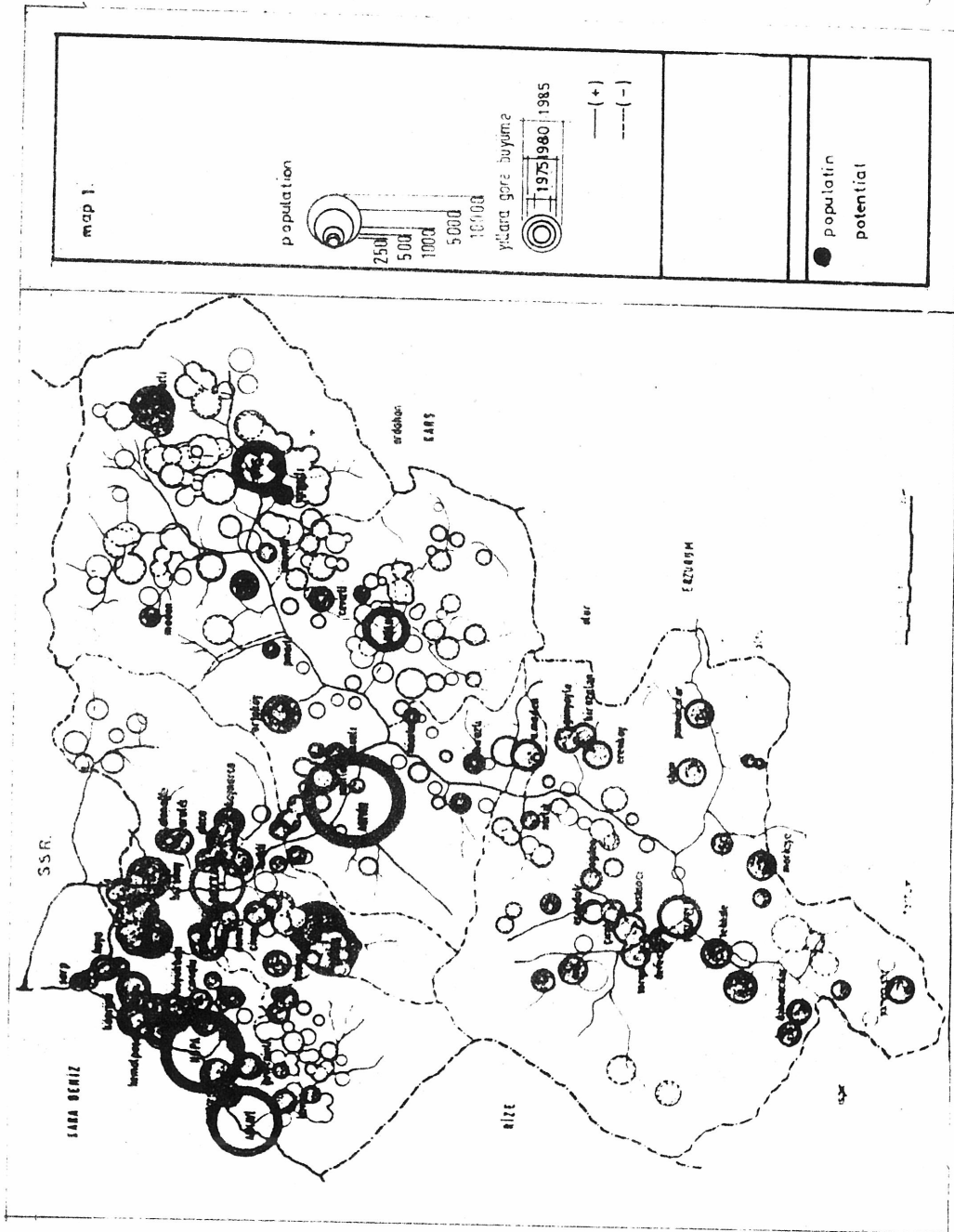
The distribution of the factual figures and their visual inspection show general outlook of the province's land use pattern. The coastal region of the province has greater potential in industrial crop production such as tea growing. The average land size devoted to tea growing in coastal villages is more than the other villages. On the other hand, cultivable land for crops and grazing are important in the inner areas of the province (see map 2).

There is severe restriction for agriculture and forestry and grazing because of heavy pollution from copper processing plant in Göktaş (Murgul). The rest of the villages are in the forestry regime in which there is limitations on human settlements. The eastern part of the province is suitable for stockbreeding.

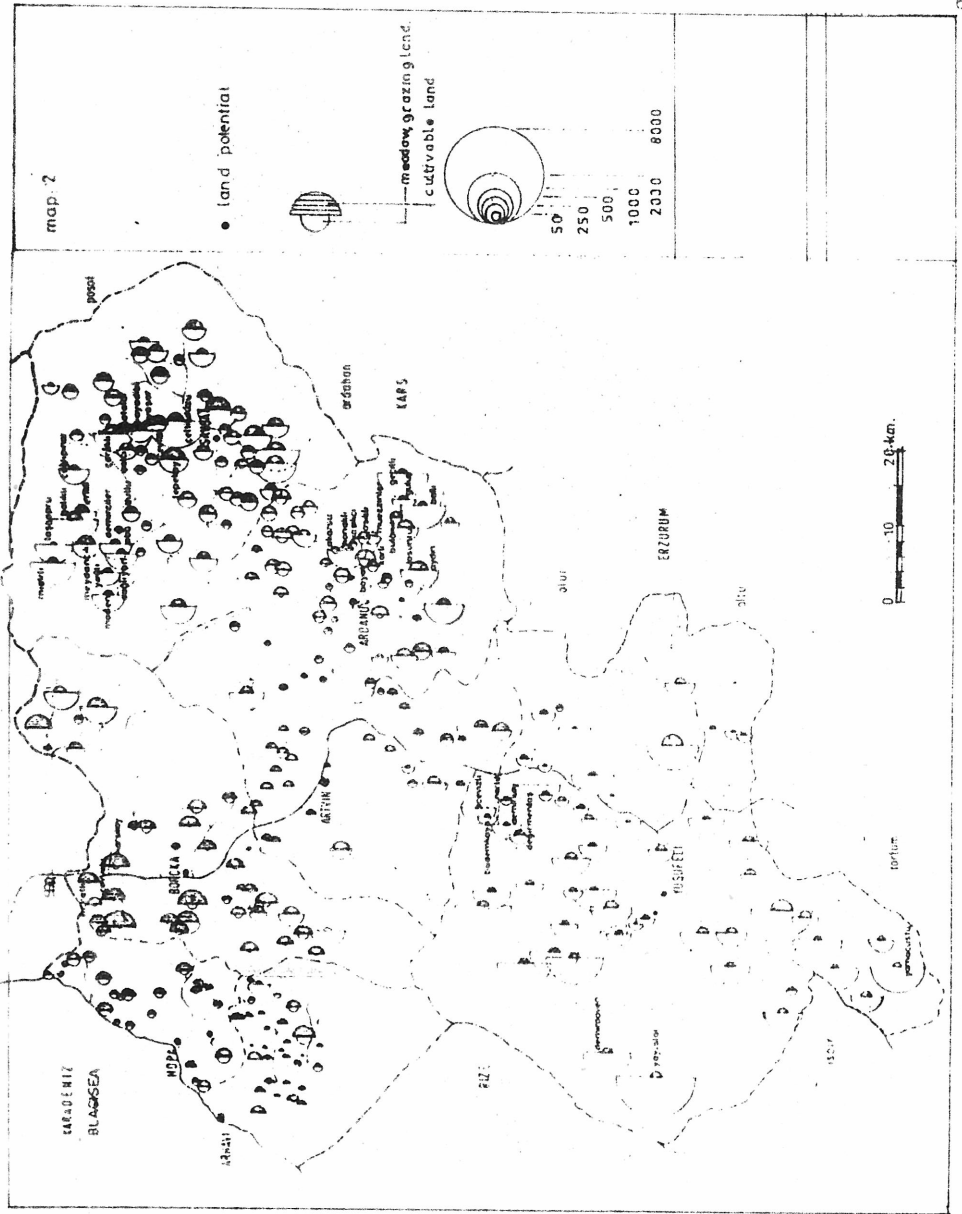
However, visual evaluation of land potential map does not reveal the exact potential areas and groupings for which a quantitative technique is necessary.

#### Factor Analysis Approach To Development Potential:

Neither population nor economic potential revealed adequately clear picture of the province of Artvin. The need aroused to use some qualitative techniques by using aggregated data from a field survey



Map 1: Population Potential in the Artvin Province



Map 2: Land Potential in the Artvin Province.

done by different departments of central government agencies in the region.

As a multivariate technique, factor analysis used with some 19 variables related to population, income, land use, households, etc, (see appendix).

Variable 2 shows population potential, variable 3 shows seasonal out-migration and active male population remaining after migration. On the other hand, economically active male population indicate the functional specialization in rural areas (however, female population at work shows urbanization in urban studies, but here in rural analysis, it is not the same thing). The variable 4 indicates the housing conditions either in terms of housing stock or housing shortage and is an indicator of the type of occupation. The variable 5 shows whether a village has diversified or concentrated physical form and the centrality of rural centres. Variables 7, 8 are indicators of dependency on land and the income levels of the peasants. The variables related to incomes show the sub-sets of agricultural income by expressing the tendency towards adaptation of innovations in agriculture and the probabilities of entering to the urban area markets which again is an indicator of income levels.

This is not a place to discuss the essence of factor analysis and the previous factor analytic studies in detail, but to mention some of them are: Hadden and Borgatta (1965), Harman (1967), Maxwell (1967), King (1969), Murdie (1969), Berry and Horton (1970), Goddard (1970), Goddard and Kilby (1976), Taylor (1977), Johnston (1978). Some of studies done mainly on Turkey are Album, and Davies (1973), Şanlı (1980), Erkonak (1980). Studies mainly related to rural areas are Tarrent (1974), Clock (1977).

In this study SSPS factor analysis programme is used with principal factoring without iteration (PAI). Six factors came out explaining 64.8 pc. of the total variance with over 1.00 eigen values (see table 1). Factors named according to their factor loadings as follows:

- F1: Land Potential Factor (agricultural factor),
- F2: Centrality (non-agricultural activities) Factor,
- F3: Forestry Potential Factor,
- F4: Migration Factor,
- F5: Stockbreeding Factor,

### F6: Settlement Factor(density).

The value of the factor loadings of variables are quite small due to the data sources.

Table I: Factors and communalities.

Factor No.	Eigenvalue	PCT. of VAR	CUM. PCT.
F1	3.370	17.7	17.7
F2	2.354	13.3	31.1
F3	2.150	11.9	42.2
F4	1.708	9.0	51.4
F5	1.429	7.5	58.9
F6	1.121	5.9	64.8

Six factor spaces produced only for the first three factors. Each of them gives some clustering of the villages and the clustering show the land potentials(see table 2).

Table 2: Factor loadings.

Variables	Factor loadings					
	F1	F2	F3	F4	F5	F6
1		0.35		0.17		
2				0.13	0.19	0.48
3		0.17	0.16	-0.17		0.26
4				0.43		
5			0.14		0.17	-0.18
6			0.19	0.48		
7	0.15			-0.11	-0.18	-0.30
8					0.48	
9		-0.23				
10			0.44			
11		0.17		-0.28		-0.17
12	0.32					
13			0.13	-0.14	0.51	
14				0.45	0.14	
15		0.37				
16	0.23		0.16		0.15	
17	0.22					-0.17
18	0.26					0.15
19	0.11			0.14	-0.19	0.30

### Interpretation Of The(Potential) Factor Spaces:

#### F1: Land Potential Factor Spaces.

Ataköy village has the highest land potential score(2.40). Co. ce. between total income and income from industrial crops are quite significant( $r=0.789$  and  $0.785$ ). The high co. ce. indicate that there is a movement from traditional agriculture towards modern agriculture, and also growing products for semi-urban and urban mar-

kets. Comparatively, developed and underdeveloped villages are shown in map 2. The villages with lower factor scores deserve actions and policies such as promotion to industrial agriculture.

### F2: Non-agricultural Activities (Centrality) Factor Spaces.

This factor is named as non-agricultural activities factor (centrality) because the incomes generated by activities which come from services, handcrafts, money sent from seasonal workers outside the province (from other regions and Europe). Clustering of the villages by factor scores show concentrations of interactions around some central villages. That is why this factor is named as centrality factor (see map 4).

### F3: Forestry Potential Factor.

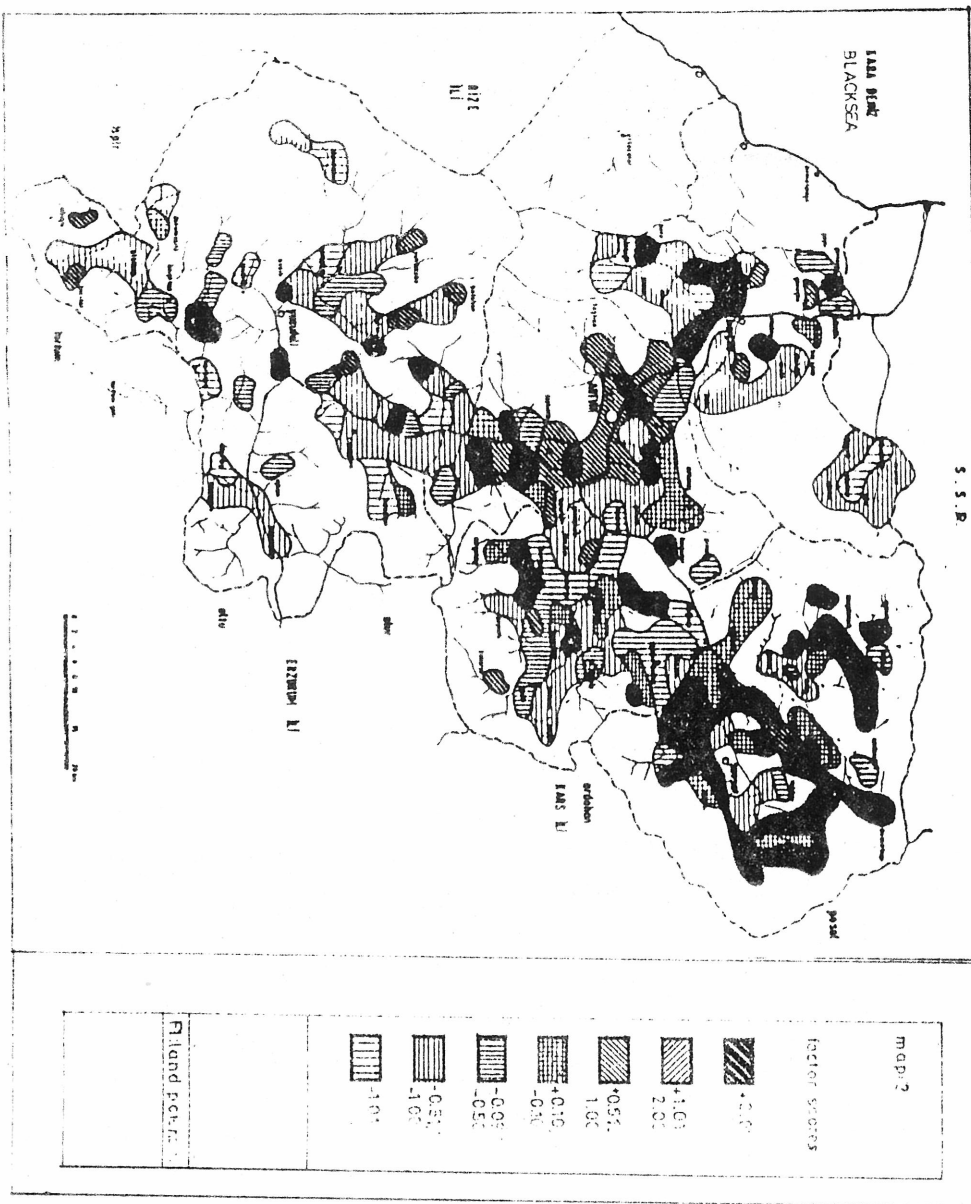
The forestry factor made up by the variables of income from forestry works per head, population working in forestry works, the ratio of the seasonal migration, the ratio of male population, total income per head, the ratio of settled area to total households, income from stockbreeding.

The migration variable in F3 seen as flows in to the province and to the other regions as seasonal workers which restricts the population from working in the other activities. Scarcity of fruit growing and horticulture makes stockbreeding important in the province (see map 5).

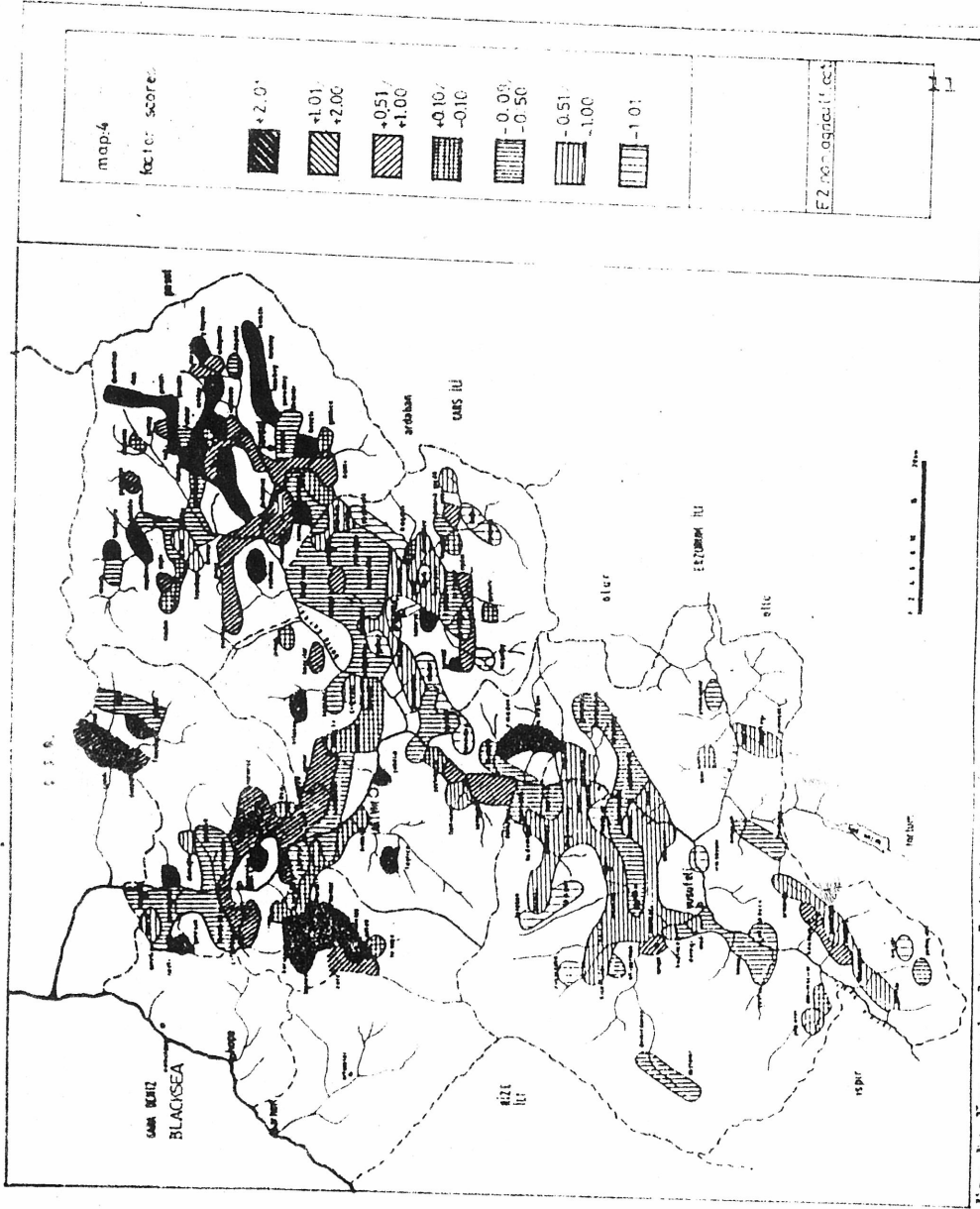
### F4: Migration Factor.

The migration factor formed by positively and negatively loaded ten variables. The positively high loaded variables are; the ratio of seasonal migration to the village pop., income from forestry and horticulture and the negatively highly loaded variables are arable land to per head, the ratio of population increase between 1970-1980, the ratio of population working in handcrafts and artcrafts, the ratio of no. of families to no. of households.

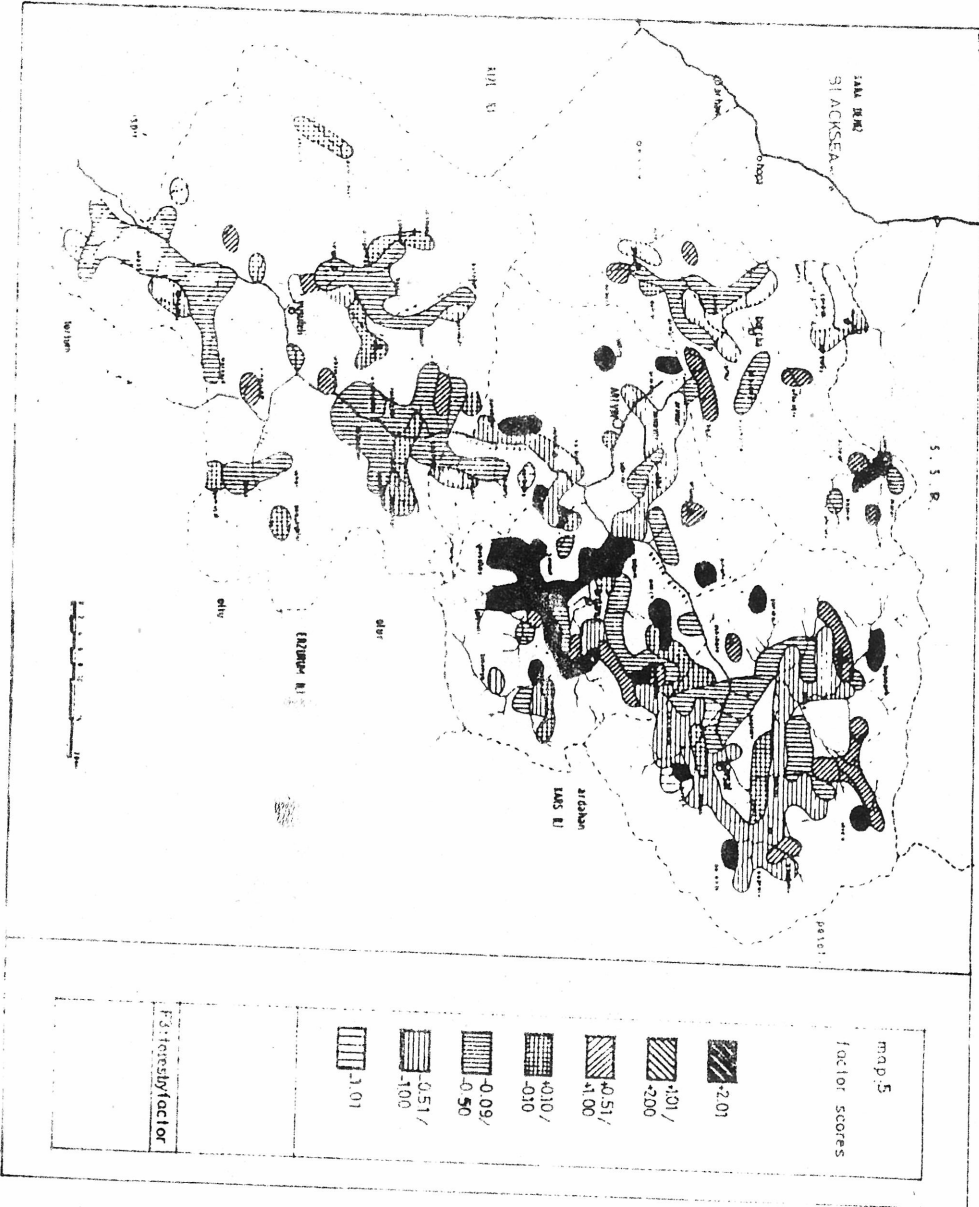
In particular, the increase of the ratio of arable land, the chance of working in handcrafts and artcrafts, the ratio of families to households may result in decrease of seasonal migration. The distribution and clustering of the factor scores on the villages exhibit some differences which are the results of negatively loaded variables and topography, such as low densities and the dispersed nature of the settlements.







Map 5 : Forestry Potential Factor Spaces.



#### F5: Stockbreeding Factor.

The stockbreeding factor is not much important for the peripheral villages of central Artvin. The intensity of forest is a limiting factor for stockbreeding because of the forestry regime. So, this factor is heavily dependant on grazing areas, and the marketability of dairy and meat products, and also livestock. On the other hands, stockbreeding factor is less dependent on the ratio of the inhabited areas to the households and ratio of arable land which are also determinants of rural densities. In fact, stockbreeding in the province is dairy type rather than intensive stockbreeding.

#### F6: Settlement Factor.

The following variables make up the Settlement Factor; the ratio of population increase between 1970-1980, income from horticulture, the ratio of male pop. to the village pop., and income from industrial crops which are positively loaded on F6. The ratio of the population engaged in handicrafts and craftsmanship, the income from cereal crops, the ratio of the occupied land to the households are loaded negatively on F6.

The factor F6 named as settlement factor because the variables forming this factor are the indicators of the settled (densely populated and built up) form of rural life.

Population increase in a place can be valued as an agent factor to accelerate local functional specialization. Increasing population and functional specialization and growth need additional facilities to keep up the pace. As a result of this, in time, semi-urban way of life can be practised (by modernization and diffusion of innovations in rural areas, too.).

For a final look out for the clustering of villages by factors according to factor scores, villages form clusters for the factors F1, F2, F3 and polarization for the factors F4, F5, F6. Settlements clustered in factor F6 play a role as service centres with their facilities such as health centre, post office and shopping.

#### Conclusion:

It is not easy to explain the development of an area only by aggregated attributes. How the variables which form the aggregated attributes of development distributed and how should be the spacial organization in micro scale be answered. If we have the answers to those questions and the answers are sufficient enough, then, they

will be guiding of the pace and the directions of the development. One reason of considering the development in micro scale is to go in to the sources of the problem and, in a sence, to get rid of generality. In other words, it is necessary to show how the nationwide development policies are applicable and useable in the different part of the national space.

The policies developed for macro scale are not appropriate for micro scale, e.i, city or province and there are needs for micro scale development policies, too.

Almost in all comperative studies of development at macro scale, the Artvin Province stands at the end of the lists and identified as the most underdeveloped part of the nation.

In this paper, all the rural settlements of the Artvin Province are taken into consideration, spatial pattern of underdevelopment is examined and an argument opened up on the sources of the problems in micro scale (on the provincial level).

One way of tackling with underdeveloped areas at micro scale is to see how much those areas have potentials for development. The population potential is one aspect of development and the coastline of the province have more potential than the other parts of the province. Even though, the coastal parts of the province have more potential than the nation which forms continious agglomerations from east to west of the province. There are some nodes of population potential also in the inner parts of the province, but also there is population decline in the inner areas, too.

On the other hand, population increase agglomerated around the villages of 400-1200 population size groups. Growth pattern of the bigger villages show similarity with the Trabzon-sub Region as a whole, which corresponds with the national trends.

Besides these similarities, the no. of villages over 2000 population are not much which seemed important as nodal points in the province. The land potential is the second point in development studies which could be termed, also, as economic potential. As it is known, population potential largely depends on economic potential and that slows down the migration.

The analysis of the factor surfaces is another way of examining the development potentials for which factor analysis procedure is

used and meaningful six main factors produced by explaining %65 pc. of the total variance. The factor spaces showed the development potential of each factor over the whole province by indicating the extend of the development policies. Careful examination of the factor surfaces gives clues for development of the villages and also for the groups of villages which are as follows:

.The rural transport system should be rearranged to cause minimization in transport costs and times,

.The land potential should be taken in to consideration in terms of using new agricultural and horticultural techniques, growing new types of products and modern stocbreeding, so to take measures to strenghten the variables in agricultural potential factor (such as trying the ways of increasing productivity and types of products etc.,).

.To establish local plants for forestry products for initial process and benefited from the multiplier effects of those.

.To establish effective marketing organizations for agricultural potential's products,

.The villages, which are more important from the point of view of centrality and population potential factors, should be used as rural service centres for their surroinding areas.

.The optimum village size should be encouraged be around 400 population, the size of the service centres should be 1200 and 2400 pop. (from a markovian approach, Aydemir, 1982).

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## Appendix.

## Variables Used In Factor Analysis

Variable No:	Variables :
1	1980 population of villages
2	Ratio of pop. increase between 1980-1985
3	Ratio of male pop. (%)
4	Ratio of no. of families to no. of households
5	Ratio of occupied area to no. of households
6	Ratio of migration
7	Cultivable land for per family
8	Grazing area for per family
9	Population engaged in agriculture and stock-breeding
10	Population engaged in forestry works
11	Population engaged in handcrafts and similar works
12	Revenue from agriculture (TL/p.h.)
13	Revenue from stockbreeding (TL/p.h.)
14	Revenue from forestry works (TL/p.h.)
15	Revenue from other sources (TL/p.h.)
16	Revenue from vetable and fruit growing (TL/p.h.)
17	Revenue from crops (TL/p.h.)
18	Revenue from industrial agriculture (TL/p.h.)
19	Total income (TL/p.h.)

