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## “Criteria for establishing a model for defining Croatian regions lagging in Development”

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## 1. INTRODUCTION

At the request of the Ministry of Public Works, Reconstruction and Construction, the Institute for International Relations produced the study entitled 'Criteria for the Elaboration of the System for Defining Developing Areas of the Republic of Croatia'.

The Institute and the Ministry agreed to divide the project in two stages due to the short time available for the production of the study and the lack of data resulting particularly from the fact that the demographic situation of Croatia could not be determined before the census. Indicators depending on the data obtained from the census would be used in the second stage, as well as others that could not be processed in such a short period of time.

The results are in accordance with the goals set for the first stage of the project and they contain the following: a survey of the basic principles of regional policy in the EU; the definition and explanation of the criteria for developing areas; the list of these areas (municipalities and towns) and the guidelines for the elaboration of a model to evaluate suitability for entry in areas of special state care. Because of limited space, this study will present an overview of the applied criteria and development indicators, as well as the evaluation and classification procedure for developing areas.

## 2. CHOICE OF CRITERIA (STANDARDS) AND GROUPING OF DEVELOPMENT INDICATORS

### 2.1. Basic approach

Since the basic aim of the project is to offer guidelines for the elaboration of a system of criteria, selection procedures and the combination of indicators that would represent them best, one should start with the goals of stimulating development in developing areas. Bearing in mind European criteria and Croatian particularities, it is advisable to concentrate funds and measures on a smaller number of clearly defined goals.

One must also bear in mind the differences in development needs of municipalities and the financial possibilities of direct and indirect state subsidies of development. The research team proposes defining four groups of development criteria for municipalities and towns with a view to devising measures to stimulate their development:

1. **economic underdevelopment criterion:** for areas lagging behind in terms of per capita economic wealth measured by personal, municipal and town revenue;
2. **structural difficulties criterion:** for areas with marked unemployment problems;
3. **demographic criterion:** for areas with markedly unfavourable demographic indicators (age structure, population density), or isolated areas with poor traffic communications;
4. **special criterion:** related to overcoming the consequences of the war, in view of the limitations connected with the termination of the reconstruction process and stimulation of the return of the population (mined areas, success of the reconstruction process of areas destroyed in the war).

After the basic goals and criteria were defined, it was necessary to determine which data and indicators could serve for the evaluation and classification of municipalities and towns according to their development. It is necessary to adjust the established system to the indicators that can be obtained, sorted by municipalities and towns. This should be done both during the first stage of the project and in the long term, and linked with periodical censuses and specific additional research.

The basic difficulty in the elaboration of the project task was the question of the availability and quality of authentic data that had to be analysed in a very short period of time. Most parameters for monitoring development indicators are obtained in the census, the results of which will mostly be known in 2002. The turbulent movements of the population in the past ten years make most data from the previous census unusable.

The starting point of the research was to determine a relatively reliable replacement source of population data by municipalities. The Ministry of the Interior provided residence registration data and the Ministry of Administration provided electoral rolls. According to the estimate of experts in demography, the best replacement source was the database of the Croatian Health Insurance Institute, comprising the number and age structure of inhabitants by municipalities.

## 2.2. Economic development criterion

### A. Applied indicators and explanation

#### 1. Share of persons earning an income $P_{(inc)}$ in total population of towns and municipalities $P_m$

$$P_1 = \frac{P_{(doh)}}{P_o}$$

Data source: Croatian Health Insurance Institute (register of insurants)

Explanation:

For lack of a key indicator of economic development - income per capita of the population of municipalities, or personal income - the best replacement indicator was the share of persons earning an income (employed or retired persons, and persons paying for their own taxes and contributions) in the total population of towns and municipalities.

#### 2. Main source of revenue of municipal and town budgets $I_{(o)}$ in proportion to total population of towns and municipalities $P_{(o)}$

$$P_2 = \frac{I_{(o)}}{P_o}$$

Data source: Ministry of Finance of the Republic of Croatia, Croatian Health Insurance Institute (register of insurants)

Explanation:

An additional criterion of economic development is the per capita revenue of towns and municipalities. These data serve as a corrective of the ones calculated beforehand, on the assumption that they are in a strong positive correlation with the relative economic development of territorial units.

Their testing yielded solid results with small deviations, with individual municipalities standing out significantly, probably due to concession or ecological rent payments.

**B. Indicators that could not be used in the first stage of the research**

**3. Incomes per inhabitant**

$$D_{(ST_0)} = \frac{P_1}{P_0}$$

Data source: Ministry of Finance of the Republic of Croatia, Croatian Health Insurance Institute (register of insurants)

Explanation:

The Ministry of Finance provided data on the incomes of employees, sole traders and retired persons by municipalities of residence. The data, shown with respect to the number of inhabitants, which were supposed to approximate economic development by municipalities, turned out to be almost completely useless because numerous areas found themselves among the worst municipalities although it is known from experience that they cannot be classified as the least developed areas, and vice versa.

The reasons for this unrealistic results are most probably hidden in the grey economy (failure to register activity or registration of only minimum wages in agriculture, trade and companies), while the overstatement of development of certain cases, according to the Ministry of Finance, is probably the consequence of the fact that a large number of inhabitants who used to live in special state care areas were registered with the Tax Office according to the codes of municipalities where they lived before the aggression on Croatia, while in reality in the observed year (1999) they earned their income in municipalities and towns of their temporary residence.

The usability of data on incomes as indicators of relative development is also partly limited by the salary stimulation system of state and public employees in the special state care areas, which are hence not directly correlated with the development level but are negatively correlated. The need arises to further research the discrepancy of the above stated indicator with other indicators of development,

while in future stages, upon the termination of the process of return of displaced persons, the income indicator will be the key indicator of the development of municipalities and towns.

#### 4. Gross product per inhabitant

This figure, the key figure in the European Union for the determination of the economic development level, cannot be classified according to municipalities and towns within the present system, since it is monitored on the level of the Republic of Croatia.

#### 5. Dynamic indicators of economic development

They were not used because it was not possible to solve the problem of the change in the territorial organisation of towns and municipalities in such a short time. Their inclusion would require more complex analytical methods.

#### 6. Other indicators

The figures showing total revenue of municipalities and towns were obtained from the Ministry of Finance and enabled the calculation of per capita state subsidies and the shares of these subsidies in the total revenue of municipal and town budgets. However, since these funds were allocated in an arbitrary fashion, this figure does not have analytical force of direct development evaluation.

### 2.3. Structural difficulties criterion

#### A. Applied indicators and explanation

1. **Unemployment indicator– share of the unemployed in the work force (total number of employed and unemployed) by territorial units**

$$P_{3(n)} = \frac{N_{(o)}}{RS_{(o)}}$$

Data source: Croatian Employment Office, Croatian Health Insurance Institute (register of insurants)

2. **Employment indicator– share of the employed in the population fit for work (the population aged 20-64) by territorial units**

$$P_{4(z)} = \frac{Z_{(o)}}{P_{(20-64)}}$$

Data source: Croatian Health Insurance Institute (register of insurants)

## **B. Indicators that could not be used in the first stage of the research**

The unemployment dynamics indicator (1999/95), which could be used with a corrective regarding the change of geonomenclature, was used experimentally, but later analysis showed that the analytical force of unemployment status is much bigger than that of indicators of change in terms of percentage, which is much bigger in the case of low unemployment rate in the basic period or moment.

Further research could monitor regional differences in restructuring processes, retraining, development of entrepreneurial activities and special aspects of rural and urban areas.

### **2.4. Demographic criterion**

#### **A. Applied indicators and explanation**

##### **1. Density of population** (general relative density, number of inhabitants/km<sup>2</sup>)

$$P_5 = \frac{P_0}{P_{km}^2}$$

Data source: Croatian Health Insurance Institute (register of insurants), Aleksandar Toskić, Faculty of Science, Zagreb

##### **3. Age structure of the population (senescence index) – number of persons older than 65 versus number of persons younger than 20**

$$i_s = \frac{P_{(65+)}}{P_{(0-20)}} \cdot 100$$

Data source: Croatian Health Insurance Institute (register of insurants)

- The age structure of the population is one of the most important demographic characteristics according to all socio-economic implications. It reflects the biodynamic and potential vitality of the population of an area.
- In the past decades, the age structure of the population in Croatia got noticeably worse; the share of *young* age groups decreased, while the share of *old* age groups increased. A good analytic indicator of the age structure and one that is often used is the **senescence index (i<sub>s</sub>)** (also known as the old age index), which shows the number of those that are “65 or more years” *old* (or “60 and more”) versus the number of inhabitants aged 0-20.

4. **Natural trend (vital index)** – average number of live births per 100 still births for 1998 and 1999

$$P_5 = \frac{R_{1998} + R_{1999}}{U_{1998} + U_{1999}} \times 100$$

Data source: Vital statistics, Central Statistical Office

- A good indicator of the direction of a population's reproduction is the **vital index (Vi)**. It shows the number of live births per 100 still births ("life and death" balance). If it is greater than 100, it is called extended reproduction, while if it is smaller than 100, it is called falling reproduction (natural depopulation). The critical numerical value of the vital index is 100 (natural stagnation, zero "natural growth"). It can be shown for a particular series of years or as an average value for two or more years. We have used the average vital index for two years, 1998 and 1999. **The smaller the value of the vital index, the bigger the degree of natural depopulation.** The importance of this indicator is supported by the fact that in future the regional demographic picture of Croatia will be determined by the present (and future) degree of reproductive depopulation.

**B. Important indicators that could not be used because they are tied to the census data**

**1. Types of general movement of the population**

Data source: The census and vital statistics

- In the period between 1981 and 1991, out of a total of 6,694 towns and villages, 30.40% recorded a growth in the number of inhabitants, 1.55% a standstill, and the remaining 68.05% a decrease; 2,914 towns and villages or 43.5% marked a significant decrease in the number of inhabitants (10 and more percent), while 66 villages (1%) remained without permanent inhabitants ("dead villages").
- In order to get a better insight into the dynamic characteristics of the population, it is not sufficient to mark the change (index) between the censuses; more complex (synthetic) indicators are necessary since they offer a more detailed picture of the observed area. Depending on whether the number of inhabitants of a certain area in a certain period (between two censuses) has increased, decreased or remained the same, we define (population) **progression (P), regression (R) or stagnation (S)**. The relation between the **natural change** ("growth") of the population and **migration** enables the definition of the scale of progressive and regressive types of the general movement of the Croatian population. Moreover, it is possible to indicate general future trends of the population.

2. **Educational structure of the population** (share of educated inhabitants, education levels)

Data source: The census

- The educational structure is a significant characteristic from the point of view of general development, especially economic development. In many areas and towns and villages, the education level of the population is an important limiting factor of development.

**C. Important indicators that have not been used because they demand more time for their preparation and processing**

1. **Criteria of (traffic) accessibility**

Data source: traffic maps, feasibility studies of the Traffic Institute, timetables and similar

- Accessibility shows the quality of a town's (location's) or area's connections with the surrounding areas. There is a close connection between the development and accessibility of an area; it is direct and positive. Moreover, it has been proved that areas that are difficult of access have a poorer demographic picture and unfavourable trends.
- Relevant indicators are **isothela** (distance in km) and **isochrona** (distance in temporal units). Isochrona is without doubt a more important indicator of a place's accessibility. Another important indicator is the frequency of public transport (road and railway) services.

## **2.5. Special criterion**

This refers to additional development indicators that are mostly connected with particularities of Croatia – the repair of war damages, the reconstruction process and the return of displaced people.

- 1) The fact that there are mined territories is an important criterion for Croatia in the definition of developing areas because:

- it is a long-term and extremely strong limiting factor of economic and overall development;
- it represents a particularity of Croatia with respect to Western European and other Central European countries.

It is estimated that there are between 1 and 1.2 million mines planted in Croatia. The exact distribution and precise locations are not known for most mines, nor is their kind. The areas and locations are known only approximately, while data are gathered and processed by the Croatian Mine Clearance Centre in Sisak. With the present dynamics, it is estimated that 10 years will be necessary to clear the estimated number of mines following the mine clearance programme.

There are mines in 121 municipalities in Croatia, out of a total of 546.



2) A specific criterion that can be used is the possibility of creating indicators of the direct influence of war destruction through calculating the degree of reconstruction of housing and infrastructure compared to the pre-war state. This criterion can also be integrated implicitly by determining the transitional period that the areas covered by the existing legislation spend within the support system.

### **3. CLASSIFICATION OF MUNICIPALITIES AND TOWNS – RESULTS OF THE ANALYSIS**

#### **3.1. Evaluation and classification procedure**

As described in the previous chapter, a set of meaningful indicators was created on the basis of the available data. The seven chosen indicators had to be combined according to the three basic criteria (economic, structural and demo-geographic) with the aid of a particular algorithm that would enable distinction for the purpose of inclusion or exclusion of extremely underdeveloped areas on the list. For this purpose, all the values of the indicators were given rank value, so that the lowest numeric value (the highest rank) was given to the territorial units that were the least developed according to the indicators. The following indicators were ranked in an ascending sequence: share of persons with a personal income, state aid, employment, population density and vital index; and the following in a descending sequence: unemployment and old age index.

A large number of simulations of different calculation algorithms were performed with rather varied final results. The elaboration of a unique composite indicator as a simple average of all rank values seemed to be successful at the top of the list of developing areas, but municipalities with extremely bad individual indicators but very good key indicators of development also entered the list. At the same time, municipalities that had markedly favourable values of individual indicators were not listed, although total indicators clearly show that they are very underdeveloped municipalities.

In order to remove the possibility that an individual indicator controls the ranking of municipalities, the following collective indicators were chosen instead of a unique composite indicator:

#### **1. DEVELOPMENT INDEX**

-the average of the rank values of the ascending sequence of the share index of persons earning an income in the population and the rank values of the ascending sequence of the main source of income of the municipal budget per capita

#### **2.STRUCTURAL DIFFICULTIES INDEX**

- the average of the rank values of the ascending sequence of the employment indicator and the rank values of the descending sequence of unemployment.

### **3. DEMO-GEOGRAPHICAL INDEX**

- the average of the rank values of the ascending sequence of the vital index, the rank values of the descending sequence of the old age index and the rank values of the ascending sequence of the population density.

### **4. SPECIAL CRITERION**

-in the first stage of the research, the mine criterion was reduced to the evaluation of whether there is an identified mined territory in the area of a municipality or a town (regardless of other factors related to mines) and whether accidents were identified. In all the described cases, this criterion can serve as a criterion of maintaining an area in the system of special state care areas.

The following picture shows the approach of the qualification method of development evaluation and emphasises the used indicators, as well as those that should be used in a more thorough analysis.

<i>INDICATORS</i>	<i>CRITERION</i>	<i>FINAL DEVELOPMENT CRITERION</i>
<b><u>1. the share index of persons earning an income in the population</u></b> <b><u>2. the main source of income of the municipal budget per capita</u></b>	<b><u>1. ECONOMIC DEVELOPMENT CRITERION</u></b>	<b><u>CRITERIA FOR INCLUSION IN THE SPECIAL STATE SUPPORT SYSTEM</u></b>
3. incomes per capita 4. dynamic indicators of economic development 5. other indicators		
<b><u>1. the unemployment indicator</u></b> <b><u>2. the employment indicator</u></b>	<b><u>2. STRUCTURAL DIFFICULTIES CRITERION</u></b>	
3. dynamic structural indicator 4. entrepreneurship ability  5. special aspects of industrial, urban and rural areas		
<b><u>1. density of population</u></b> <b><u>2. age structure of population (senescence index)</u></b> <b><u>3. natural trend (vital index)</u></b>	<b><u>3. DEMOGRAPHICAL CRITERION</u></b>	
4. type of general movement of the population  5. educational structure of population 7. criteria of traffic accessibility		
<b><u>1. the mine criterion</u></b> <b><u>2. previous participation in the state support system</u></b>	<b><u>4. SPECIAL CRITERION</u></b>	
3. level of succes of reconstruction and return processes 4. other special criteria		

Legend:

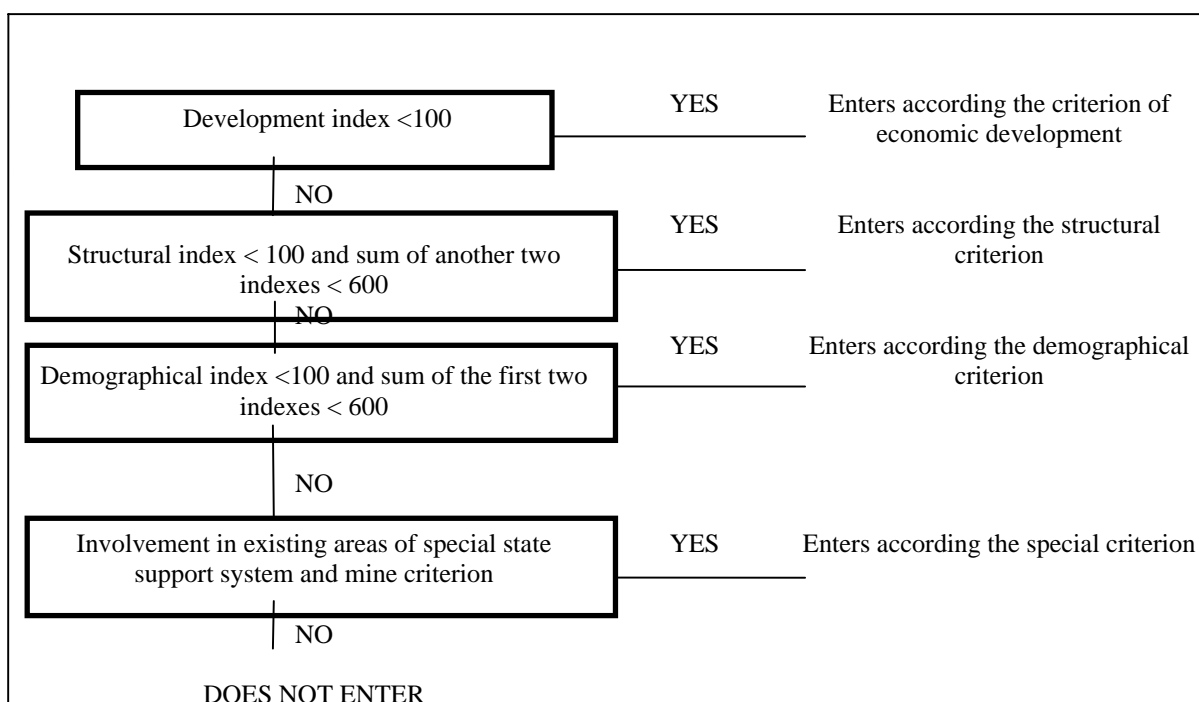
	Applied indicators
	Not applied indicators in the first phase

If the described procedure is carried out, it is possible to evaluate the suitability of territorial units to enter the list according to each of the three basic criteria. It is also possible to distinguish which territorial units enter the list on the basis of which of the three chosen criteria. The intention is to disable the exclusion from the list of those municipalities that have somewhat more favourable other criteria because of their having very unfavourable indicators according to the first or second criterion. For example, developing areas or areas with very big structural difficulties need to be included in special state care areas, no matter whether it is a densely populated area or if the population is young.

Areas that are markedly demographically unfavourable also need to be included in special state care areas although they are not economically or structurally least developed.

However, a problem was encountered in the analysis; namely, a consistent application of this procedure would proclaim as underdeveloped those areas that are relatively rich but are poorly populated and with an older population. Hence, inclusion on the sole basis of the demographic criterion required an additional essential criterion that the sum of the first two indicators is below a certain level.

The same procedure was applied to inclusion according to the structural criterion, in order to avoid relatively developed municipalities entering the special state care system due to unrealistic employment data (mostly because of the grey economy).



Although complex at first sight, the procedure is relatively simple in practice. The inclusion limit was intuitively chosen as the average value of rank indicators less than 100 for any of the three criteria. After several simulations, inclusion on the basis of the demographic and structural criteria required not only that the values of these indicators were below the mentioned limit but also that the sum of the first two indicators was below 600.

#### 4. Remarks on the significance and use of the analysis results

This analysis should serve the client who ordered the project as the basis for changing the approach to defining special state care areas. Unlike the present approach, whose sole criterion has been whether an area was occupied in the Croatian Homeland War, the new approach defines economic, structural, demographical and special criteria, as well as a combination of indicators and choice procedures, thus obtaining a better quality development evaluation.

With the application of the described method and the chosen criteria, the Special State Care Areas Act would include 61 new municipalities, or 4% of the total population, which would increase the share of total population included in special state care areas to approximately 10% of the total population.

The mentioned calculation method and the chosen criteria can be modified and amended both with respect to the intended scope and to the possible use of a larger set of analytical data in order to elaborate development indicators that would enable the elaboration of more reliable development criteria. It would be opportune to wait until the next census data are processed and to perform a quality revision of the existing data, as well as to carry out targeted research that could not be done in the exceptionally short time of the project task.

It is therefore not recommendable to mechanically interpret the findings of this study as a reliable basis for demarcating territorial units according to their development, but as an illustration of development by municipalities and towns and as the first simulation of one of the possible procedures for assigning basic underdevelopment attributes with the aim of choosing corresponding incentive measures of development.

Connected with this is the question of determining the limit for the entry of territorial units in the development stimulation system. In this respect it would be possible to set forth goals and basic guidelines as regards the share of the territory or population in all of the Republic of Croatia whose development would be stimulated under the relevant legislation. In that case the procedure would rely on the ranking of territorial municipalities relative to underdevelopment, and the limit would be determined by the number of inhabitants.

Within European indicators and compared to average EU development, almost all Croatia could be proclaimed as a developing area. Nevertheless, since there is a need to stimulate markedly underdeveloped areas and since funds are limited, it will be necessary to define the scope.

Alternatively, it is possible to define precise criteria that need to be met in order to enter the system (for instance, unemployment is twice as high or natural growth is twice as low as the state average). That system would be simpler and more transparent, but before criteria are precisely defined, it is necessary to test the result and its scope. The key drawback of the simplified approach is the inability to evaluate the development of municipalities and towns in a more precise and complex multivariate fashion.

The entire work in this first stage of the project pointed to the great complexity of forming criteria for the elaboration of a system for defining developing areas, but also to the need for further research. The elaboration of this system is of great importance for Croatia and for:

- local development and a regional policy based on sustainable growth, growth from "below" and the principles of partnership, decentralisation etc;
- the efficient and effective economic and total development of Croatia
- adjustment to EU standards and preparations and training for the fast and efficient use of its programmes, both in the present stage and in the stage of associate membership.

The elaboration of this system would at the same time have great motivating importance at the local and regional level in Croatia, because the results of ranking municipalities and towns, counties

and possible wider areas in a transparent, objective and measurable way will show local and regional authorities and stakeholders the following:

- position and dynamics of development of their communities;
- achieved results compared to others, to Croatia as a whole and to international counterparts;
- structural and developmental characteristics and competitive force;
- conditions that need to be met in order to obtain help for development, both Croatian and from the EU.

The beginning of the elaboration of the system for defining developing areas would also have particular importance for relations between Croatia and the EU, because that beginning would represent the first step of Croatia within the process of creating Croatian regional policy, which would facilitate and accelerate EU support and help.

Due to all this, a comprehensive system of criteria for defining developing areas needs to be elaborated, monitored and assessed.

## **5. DATA SOURCES AND BIBLIOGRAPHY**

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