

## INDICATOR RESULTS FACT SHEET

### ENV03: COHESION- FRAGMENTATION OF SETTLEMENTS

#### DEFINITION - OBJECTIVE

This indicator determines the potential problems resulting from the fragmentation of organized settlements (settlements with some kind of statutory boundaries) or densely populated areas not included in the town plan, due to the axis' operation. This interruption of communication entails major impacts on the settlements' spatial organization, the unobstructed operation and safety of inhabitants. The road network is the main cause leading to a settlements' fragmentation. The design of closed highways aims among other things at by passing the settlements. The indicator checks the ratio of this fragmentation, as well as the cohesion of settlement unities by designing the axis.

#### RESULTS - ASSESSMENT

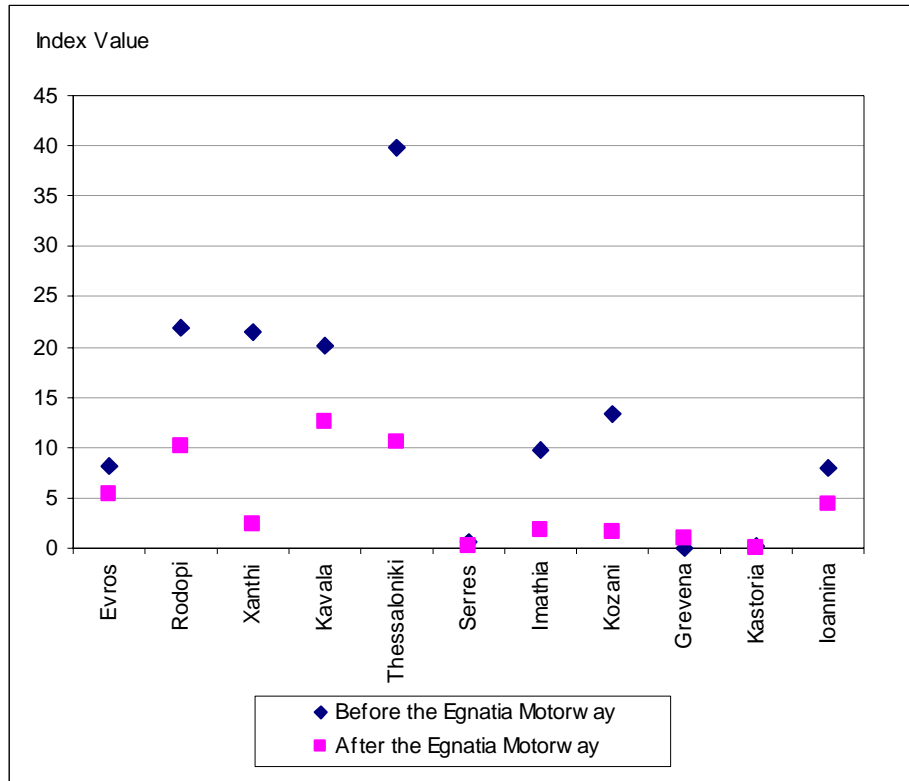
The national road network at certain positions crosses settlements or even city centres, leading to their fragmentation and affecting their unobstructed operation and safety of inhabitants. The settlements located within a distance of maximum 1 km from the axis of the old route Kipi- Igoumenitsa (national road network) and the Egnatia Motorway have been examined in the design.

The number of settlement unities resulting from the fragmentation of certain settlements, due to the national and local road network alignments, has been calculated, in order to evaluate the changes relative to the construction of the Egnatia Motorway. Prior to its construction, the settlements located within a distance of 1 km from the national road network of axis Kipi- Igoumenitsa comprised 486 settlement unities, covering an average area of 35,9 Ha and with an average population of 1.201 inhabitants. With the construction of the Egnatia Motorway, this number is reduced to 255, corresponding to a reduction of 47,5%. This percentage is the result of bypassing all the settlements on the route Kipi- Igoumenitsa and using the Egnatia Motorway for communication purposes between these settlements, instead of the old national road network. The average area and population of these unities is respectively increased.

| LIMITATION OF COHESION AND VIABILITY OF SETTLEMENTS BECAUSE OF FRAGMENTATION |                          |                      |       |                  |                       |       |                  |                      |
|--|--------------------------|----------------------|-------|------------------|-----------------------|-------|------------------|----------------------|
| Prefecture / Region / Egnatia Sector   | Without Egnatia motorway |                      |       |                  | With Egnatia motorway |       |                  |                      |
|  | Settlement units         | Average surface (ha) | Index | Settlement units | Average surface (ha)  | Index | Settlement units | Average surface (ha) |
| Evros  | 30                       | 72,6                 | 1.958 | 8,1              | 18                    | 98,9  | 3.006            | 5,5                  |
| Rodopi   | 45                       | 27,9                 | 1.353 | 21,8             | 19                    | 53,9  | 2.881            | 10,2                 |
| Xanthi   | 36                       | 27,4                 | 1.631 | 21,4             | 17                    | 26,1  | 367              | 2,4                  |
| Kavala   | 51                       | 35,4                 | 1.401 | 20,2             | 34                    | 57,1  | 2.107            | 12,5                 |
| Thessaloniki   | 94                       | 50,1                 | 2.124 | 39,9             | 31                    | 112,0 | 3.830            | 10,6                 |
| Serres   | 10                       | 14,2                 | 80    | 0,6              | 5                     | 28,5  | 159              | 0,3                  |
| Imathia  | 33                       | 54,4                 | 1.613 | 9,8              | 24                    | 49,7  | 376              | 1,8                  |
| Kozani   | 67                       | 36,7                 | 730   | 13,3             | 26                    | 38,7  | 230              | 1,5                  |
| Grevena  | -                        | -                    | -     | -                | 5                     | 118,1 | 2.555            | 1,1                  |
| Kastoria   | 3                        | 11,6                 | 97    | 0,2              | -                     | -     | -                | -                    |
| Ioannina   | 71                       | 16,8                 | 190   | 8,0              | 50                    | 29,3  | 259              | 4,4                  |
| Thesprotia   | 46                       | 19,3                 | 384   | 9,1              | 24                    | 23,3  | 515              | 5,3                  |
| Trikala  | -                        | -                    | -     | -                | 2                     | 31,4  | 274              | 0,2                  |
| <b>Epirus</b>  |                          |                      |       |                  |                       |       |                  |                      |
| Epirus   | 117                      | 17,8                 | 266   | 17,5             | 74                    | 27,4  | 342              | 9,2                  |
| <b>Western Macedonia</b>   |                          |                      |       |                  |                       |       |                  |                      |
| Western Macedonia  | 70                       | 35,6                 | 702   | 13,8             | 31                    | 51,5  | 605              | 3,6                  |
| <b>Central Macedonia</b>   |                          |                      |       |                  |                       |       |                  |                      |
| Central Macedonia  | 137                      | 48,5                 | 1.852 | 52,3             | 60                    | 80,1  | 2.142            | 16,0                 |
| <b>Eastern Macedonia &amp; Thrace</b>  |                          |                      |       |                  |                       |       |                  |                      |
| Eastern Macedonia & Thrace   | 162                      | 38,4                 | 1.542 | 65,0             | 88                    | 59,0  | 2.122            | 31,7                 |
| <b>Thessaly</b>  |                          |                      |       |                  |                       |       |                  |                      |
| Thessaly   | 0                        | -                    | 0     | 0,0              | 2                     | 31,4  | 274              | 0,2                  |
| <b>West Sector EM</b>  |                          |                      |       |                  |                       |       |                  |                      |
| West Sector EM   | 120                      | 32,7                 | 858   | 31,5             | 74                    | 27,4  | 342              | 9,2                  |
| <b>Central Sector EM</b>   |                          |                      |       |                  |                       |       |                  |                      |
| Central Sector EM  | 204                      | 44,6                 | 1.483 | 67,8             | 91                    | 70,4  | 1.619            | 20,9                 |
| <b>East Sector EM</b>  |                          |                      |       |                  |                       |       |                  |                      |
| East Sector EM   | 162                      | 27,3                 | 1.101 | 65,4             | 88                    | 59,0  | 2.122            | 31,7                 |
| <b>Total of Zone II<sup>1</sup></b>  |                          |                      |       |                  |                       |       |                  |                      |
| Total of Zone II <sup>1</sup>  | 486                      | 35,9                 | 1.201 | 162,6            | 255                   | 53,7  | 1.411            | 67,1                 |

With the use of the aforementioned data, the fragmentation indicator is assessed, regarding the situation prior to and after the construction of the Egnatia Motorway. The fragmentation indicator for the entire zone of the Municipalities involved is reduced from 162.6 (before) to 67.71 (after), a fact which indicates an undoubted improvement in the cohesion and viable operation of settlements. The reduction of the indicator ranges from 32% in the zone of Evros to 89% in the zone of Xanthi.

<sup>1</sup>Municipalities on the alignment of Egnatia Motorway

**Διάγραμμα 1: Βαθμός αποκοπής οικισμών από οδικούς άξονες πριν και μετά τη λειτουργία της Εγνατία Οδού**


## METADATA

### Sources

Data deriving from the geographical data base of the Observatory, such as the mapping level of the settlement boundaries and linear level of the road network have been used (only the national road network and Egnatia mainline categories), to calculate the indicator.

### Methodology

The application area is Zone 1 km from the axis of Kipi- Igoumenitsa route on the old national road network and the Egnatia Motorway. This is the zone of the selected settlement polygons. The road network is divided in two levels: a) the situation before the Egnatia Motorway construction b) the situation after the Egnatia Motorway construction. With the use of an overlapping procedure, the settlements are fragmented as presented in the above two linear road network levels, to achieve

the settlement unities. For each settlement unity we initially calculate the area and respective population, on condition that the population is equally distributed throughout the settlement. The indicator results record the number of the settlement unities' sections, the average population and average area per municipality, in relation to the situation before and after the construction of the Egnatia Motorway.

The final indicator value is the result of the relation:  $\text{Fragmentation indicator} = [\text{number of settlement unities}] \times ([\text{average permanent population}] / [\text{average surface}]) \times (1/100)$ .

Map 1: Cohesion - Fragmentation of settlements before and after the Egnatia Motorway

