

THE HUMAN RISKS CAUSED BY DEINDUSTRIALISATION. CASE STUDY: CERNA RIVER BASIN (HUNEDOARA COUNTY)

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ABSTRACT. - Human Risks caused by deindustrialisation. Case Study: Cerna River Basin (Hunedoara County). Industrial restructuring during economic transition has affected the population, causing loss of jobs, reduced income, increased poverty and emphasizing social inequalities and marginalization phenomenon. These have led to population decline, massive emigration, difficulties in finding a job as well as an increased incidence of certain diseases, negatively influencing socio-economic development of the area.

1. INTRODUCTION

The aim of this work is to highlight how the population experienced the deindustrialization process as a result of the transition from centralized economy to a market economy through the reorganization and modernization of the industry. The area analyzed is the Cerna river basin, located in central-western Romania, between the Southern and Western Carpathians, where the socio-economic life was centered on the extraction and processing of iron ore since ancient times.

The measures implemented for industrial reorganization of the Cerna basin, which was aiming to shut down excess capacity, modernize the equipment, draw new investments, and reduce the number of employees, led finally to its decline.

Human risks include demographic risks, social risks, medical risks (health)¹The decline of the industry had major consequences on the population. The most significant human risks generated by the deindustrialization process for the area analyzed are depopulation, ageing, deterioration of demographic structures, unemployment, and the health status of the population.

2. DATA AND METHODS

Analysis of the phenomenon of deterioration of demographic structures was done by comparing specific indicators (indicator of demographic aging, femininity indicator, economic dependency ratio). These indicators were calculated for 1966,

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when the industry was booming, for 1977, when the industry strengthened and Hunedoara was the main supplier of iron ore and steel products for the national economy, for 1992, when economic decline began, and for 2011, when the steel industry barely existed anymore, and mining was stopped.

3. RESULTS AND DISCUSSIONS

3.1. Demographic Risk.

3.1.1. Depopulation

One of the main effects of deindustrialization process is the depopulation of the Cerna river basin, with the number of inhabitants recording a decline since 1990. The population decrease was due to overall negative demographic balance amid increasingly low birth rate and increased emigration.

The number of residents fell from 108,471 inhabitants in 1989 to 72,804 inhabitants in 2011. The absolute deficit (the difference between the number of inhabitants at the end and at the beginning of the period) was 35,667 inhabitants, with a rate of decline over the entire period (ratio of absolute deficit and population at the beginning of the period, expressed as a percentage) of 32.88%; the average annual deficit (ratio of absolute deficit and the number of whole years of the reference period) was 1550.74 inhabitants, corresponding to an average annual rate of decrease (ratio of average annual deficit and the population at the beginning of the period, expressed as a percentage) of 1.43%.

Table 1. Evolution of the number of inhabitants in the Cerna basin (1989-2011)*

Year	1989	1992	2002	2011
Cerna river basin	108.471	97.697	86.238	72.804
Hunedoara	90.129	81.337	71.257	60.525
Rural	18.342	16.360	14.981	12.279

* Source: Department of Statistics Hunedoara,
Department of National Archives, Hunedoara County

The negative dynamic in the number of inhabitants is observed in both urban areas represented by Hunedoara, and the rural areas. In Hunedoara the number of inhabitants decreased from 90,129 inhabitants (1989) to 60,525 inhabitants (2011), which amounts to a noteworthy absolute deficit of 29,604 inhabitants; the decrease rate for the entire period was 32.84%, the average annual deficit had a value of 1287.13 inhabitants, and the average annual rate of decrease was 1.43%.

The rural areas showed a decrease in the number of inhabitants from 18 342 / 1989 to 12279 / 2011, with an absolute deficit of 6063 inhabitants, and the

decrease rate of 33.05% during the same period. The average annual deficit recorded was 263.60 inhabitants, with an average annual decrease of 1.44%. The decrease in number of inhabitants in rural areas recorded since 1990 is due to an accelerated depopulation process that started in the '70s, and led to total loss of population in 5 localities. A proportional decrease in the number of inhabitants, of approximately 1/3, for urban and rural areas is thus apparent.

3.1.2. Ageing

Population ageing is a phenomenon that affects the entire population of Romania. Low living standard, social insecurity, and external migration, as well as legislative changes aimed at family planning, contraception techniques and sex education, have led to declining birthrates in the Cerna river basin. In the rural areas, the phenomenon was accentuated by the "exodus" of the second half of the last century, when many families moved their residence to Hunedoara.

The aging process was analyzed based on demographic aging indicator, namely the ratio of residents aged 60 years and over and the number of inhabitants under 20 years, expressed as a percentage.

Table 2. Evolution of demographic aging indicator (%) Cerna Basin during the period 1966-2011*

Year	1966	1977	1992	2011
Cerna river basin	19,32	21,83	39,13	134,65
Hunedoara	8,37	13,21	29,71	122,05
Rural	43,76	58,22	99,59	208,70

*Source: Department of Statistics Hunedoara,
Department of National Archives, Hunedoara County)*

The values recorded in the beginning of the period indicate a very young population in the area analyzed, and Hunedoara. In rural areas, the population is considered middle-aged, with the young and adult population migration to urban and industrial centers in and outside the basin being just started. Values recorded at end of the period shows a very aged population across the whole area, the phenomenon being very pronounced in rural areas.

3.1.3. Feminization

The feminization of population was analyzed based on the evolution ratio of femininity, which indicates the number of women per 100 men; it is calculated as the ratio between the number of females and the males, expressed as a percentage.

Table 3. Evolution of femininity indicator (%) Cerna Basin during the period 1966-2011*

Year	1966	1977	1992	2011
Cerna river basin	81,97	93,17	99,84	106,50
Hunedoara	78,84	91,89	99,61	107,14
Rural	88,08	97,60	101,01	103,40

* Source: Department of Statistics Hunedoara, Department of National Archives, Hunedoara County)

The indicator values highlight a predominantly male population at the beginning of the period, which is explained by the specific of industrial activities (heavy industry, like mining and steel industry) that attracted especially male workforce. The situation changed at the end of the period, with a predominantly female population. The decline of heavy industry gave way to other industrial activities (manufacturing of clothing, knitwear, footwear, electrical cables) which requested mostly female workforce. Thus, the predominantly male labor force which was released from the heavy industry had to emigrate in search of employment, either in the steel industry or other economic activities.

3.1.4. The economic dependency

The economic dependency indicates the number of persons supported by 1,000 active people.

Table 4. Evolution of economic dependency ratio (‰) Cerna Basin during the period 1966-2011*

Year	1966	1977	1992	2011
Cerna river basin	967,34	1073,27	1136,48	1238,19
Hunedoara	1022,59	1104,18	1078,16	1315,77
Rural	871,46	975,21	1482,93	920,99

*Source: Department of Statistics Hunedoara, Department of National Archives, Hunedoara County)

The number of active people in the early period, throughout the whole area including the rural areas, exceeded that of the inactive people, due to the high share of adult population of working age. In Hunedoara, with a high percentage of the young population, the inactive population was barely larger than the active one (table 4).

Cerna river basin shows a higher share of inactive population compared to the working population at the end of the period. In Hunedoara, a much higher share of inactive population is noted. In rural areas, active population exceeded inactive population due to very low share of young inhabitants. The increase in the economic dependency ratio is a consequence of the ageing process and indicates an increase in pressure from the inactive population on the working population.

3.2. Social risks

Unemployment is defined as a social and economic phenomenon that is characterized by the forced inactivity of a large number of employees as a result of the imbalance between supply and demand of labor.

Following the closure or downsizing of production capacity, a significant part of the population employed in industry was released since 1998. Previously, surplus labor has been reduced by the early retirement of personnel.

Table 5. Evolution of unemployment rate (%) Cerna Basin during the period 1992-2011*

Year	1992	2002	2011
Cerna river basin	3,22	16,84	7,53
Hunedoara	3,24	17,24	8,06
Rural	3,08	14,72	5,37

* Source: Department of Statistics Hunedoara

The value of this indicator at the beginning of the period is small because the programs of industrial restructuring and resizing had not been implemented yet, so that the indicator refers only to people looking for their first job. The effects of these programs, implemented by the end of the last decade of the twentieth century, were visible in the early 2000s, when the unemployment rate reached high values. In Hunedoara, the value of this indicator was 1.75 times higher than the county average and more than twice the national average. Although the value was slightly lower in the rural areas, it was still higher than the county and national average.

The unemployment rate (table 5) decreased in all analyzed area at the end of the period, following the development of new economic activities and external migration, which have improved the situation of the labor market, but the values of this indicator, which are higher than the county and national average, show that unemployment remains a major social problem in the area analyzed.

3.3. Medical risks

Health status is defined by the standard of living, environmental quality and access to health services.

Due to the industrial activity, the air was polluted by dust (suspended and deposited) and gaseous pollutants (CO, NO and NO₂, SO₂ and SO₃)(table 6). Atmospheric environment pollution was reflected over the health of the population of Cerna river basin, with respiratory illnesses being the most common occurrences.

The process of deindustrialization has had the positive effect of reducing air pollution. Until 1989, the maximum permissible concentration (MPC) was exceeded for dust whereas gaseous pollutants were below MPC. Since 1990, as the industrial activity (especially steel industry) decreased, the pollution level began to fall, with dust still exceeding the maximum permitted level. At the end of the period all pollutants were below the maximum permissible concentration.

Table 6. Evolution of air pollution in the city of Hunedoara, between 1991-2010*

Year	Unit of measurement	M.P.C.	1991	2010
Polluting substance				
NO ₂	mg/m ³	0,10	0,0218	0,002501
SO ₂	mg/m ³	0,25	0,0190	0,000331
Suspended particles	mg/m ³	0,15	0,1840	0,029452
Sedimented particles	g/m ² /month	17,00	35,97	7,080555

* Source: Environmental Protection Agency Hunedoara

Air pollution was monitored only for the city of Hunedoara, and the data presented for both pollution and the health of the population refers only to the administrative unit and not the entire area analyzed. However, data on the health of the population can be considered applicable to the Cerna river Basin as the Hunedoara Municipal Hospital serves the population of almost the entire analyzed area.

Table 7. Evolution of frequency (‰) respiratory diseases in the city of Hunedoara, in the range of 1991-2010*

Year	1991	2010
Respiratory diseases	470,71	724,34

* Source: Public Health Department of Hunedoara

Although the air pollution has decreased significantly, the health of the population has not improved, and the frequency of respiratory diseases was much higher in 2010 compared to 1991 (table 7). Thus, the phenomenon of pollution was not the determining factor of deterioration of the population's health, but the effects of pollution contributed to this deterioration, along with other factors such as the decline in living standards, weakening social policies, limited access to food, housing, and services of all kinds, including medical ones.

4. CONCLUSION

Deindustrialization influenced the community of Cerna river basin, which was centered on the mining and processing of iron ores. The main effects of deindustrialization such as unemployment and decrease in the standard of living, led to a decline in population, and deterioration of the demographic structures, by ageing of the population and increasing economic dependency ratio, and worsening of the population's health.

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