

# SUSTAINABLE STRATEGIES FOR CONTROLLING THE POVERTY PROBLEMS IN FORMER MINING INDUSTRIAL SITES IN VALEA JIULUI

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**Abstract:** Article discusses a topical issue in Jiu Valley - the problem of poverty in former mining areas and which are the sustainable strategies to combat. This paper is composed by four parts. In the introductory part is presented the current situation; in the second, social and environmental consequences caused by mining that induce the poverty; in the third are detailed possible strategies of regeneration, all these projects requiring community involvement. In order to prevent a negative effect of the implementation of strategies, it is studied the perception of former mining sites. Results of studies pointing out a positive response from the communities involved.

**Keywords:** poverty reduction, growth, wealth, mining, regeneration solutions, Romania, Jiu Valley



Figure 1 – Lupeni exploitation from Jiu Valley

## 1. INTRODUCTION

The Romanian society it's not a traditionally poor one, but the process of massive industrialization and fast deindustrialization, caused by economic and social changes, had it depleted [6]. The most affected regions were those where industrial activities were the principals once. A region of this type is Jiu Valley, in the department of Hunedoara, coal extraction. In 1990 a necessary, but with lack of strategy reform had begun. The results were: mining closure and massive unemployment..

The statistics highlight that starting with 1997 the production dropped dramatically. In 1989 the production was of 21. 5 millions of tones, in 1997 – 9.9 millions tones and in 2007, 0. 05 millions of tones. This drop had a huge impact on Romanian deficit. Studying this numbers we can get to the conclusion

that mines closure has affected and still affects a big number of communities, families and individuals.

Regardless in the world it is localized a former mining industrial site; there are some common elements that have an impact on the population and on the environment: lack of education, oppression, lack of infrastructure, problems with water and soil treatment. All this factors exacerbate the poverty and the environmental degradation. It is practically impossible to ask a community to heal the environment or even just mind it, if they can't even sustain themselves and their families. The environment and the society as a whole tend to be in a risk in the poor areas. Poor communities are usually composed by less educated people, because they don't have resources to obtain an education and they are less politically powerful. This article aims to reveal the current situation of coal fields in Jiu Valley, located in Hunedoara department.

The history of coal fields in Jiu Valley starts in 1869 with the “Brasoveana” Mining Industry. Starting with 1920 the industry was formed by four independent enterprises: a state corporation (Campa de Sus, Campa de Jos), “Petrosani” Exploitation (Petrița, Petrosani, Dilja, Aninoasa), the “Valea Jiului de Sus” Society Vulcan and the “Uricani – Valea Jiului” Society (Lupeni) (figure 1). In 1948, all the mines were nationalized, including this area conform “The nationalization Law 1948”. This law represented the transition from the capitalist economy to a centralized economy. It was written that all the underground and surface resources that were not in the state property were nationalized: the factories, industrial associations, were transferred to the state. This was not a real nationalized law; it was more like a confiscation of properties. From 1945 – 1952 the coal from Jiu Valley was one of the principal sources of energy for the entire industry in Romania. To achieve these thousands of people were relocated from Moldova to answer the working force demand. In 1979 the number of miners was 179 thousands. In the 80 when Nicolae Ceausescu, former leader of Romania, decided to have no debts, the mining sector was even more oversized. At beginning of the 90 the decline of mining sector in Jiu Valley was obvious, due to a lack of strategy, in which concerns the exploitation and the working force. A big percent of

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the workers were therefore put in the situation of job lost and incapacity of requalification.

In 2005 it has been recorded the first mine closure in Jiu Valley, Aninoasa (figure 2). In the present six more are still open, at least until, we hope 2018: Petrosani, Uricani, Lupeni, Petrila, Vulcan and Paroseni.



Figure 2 – Aninoasa

Geographically speaking Jiu Valley is situated in the central – western part of Romania, in the Petrosani Depression, with a total of 954 skm. The altitudes increase from 555km to more than 1600 m. The population is 146750 inhabitants.

## 2. POVERTY, VULNERABILITY, SOCIAL EXCLUSION AND FACTORS THAT GENERATE THEM.

In this chapter of the article I will try to focus on the definition of poverty, how this situation is being born and which are the factors that induce the state of vulnerability and furthermore the poverty.

The notion of poverty is written in different ways by various institutions. For example: United Nations High Commissions for Refuges defines poverty as an individual condition that is characterized by sustained or total lack of choices', security, resources, and social rights". Another definition is formulated by the Copenhagen Declaration 95: "a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health shelter, education and information". Poverty can not and doesn't have to be reduce only to income poverty, because there are some other aspects that determine the well – being of people (figure 3). Therefore there can be highlighted different types of poverty: economic poverty, that is characterized by income poverty (lack of food, cloth and shelter); cultural poverty (lack of coming together in a society, a disconnection between members of a community); spiritual poverty (lack of feeling or brotherhood, that plays a very important role in bringing people together); political poverty (lack of understanding on how the system works) and societal poverty (lack of social connectivity).



Figure 3 – Uricani housing

There is a very sensitive link between vulnerability and poverty. There are both multi – dimensional concepts. Vulnerability has always been seen like a component of poverty "... vulnerability can be seen as a cause of poverty, as a reason why the poor remain poor, or as an effect of poverty" [5]. Poor people are the most vulnerable group to the negative effects of any kind of hazard. This is the main relation between vulnerability and poverty. The main three form of vulnerability are: natural, climate factors and the economic changes of situations.

What factors generate the poverty problem in Jiu Valley.

Following this steps a certain conclusion can be drawn about Jiu Valley. **Vulnerability** is the main feature of the region and it is determined by multiple factors (economic, social, ecological and political). A review of factors that could maintain the poverty situation, points out two principals and bonded sources: social and environmental. By environmental understanding: a change of situation and ecological problems [4].

Environmental factors - **land deterioration** caused by anthropic activities – mining exploitations. They occur more frequently in wate dumps, but also in natural slopes. Another consequence of underground coal exploitation deposits is the **mass movement**: induced falls and induce subsidence. These movements obviously affect buildings and agricultural land [3], especially in Lupeni and Petrila. Another problem is: **land use change** caused by deforestation, overgrazing, built areas and development of mining activities. From all, urbanized areas represent only 4%, being restricted by the expansion of unsafe sites [1].

**Floods** are one of the most important and natural hazards that effect the region "...there were analyzed the features and frequencies of the floods, within the interval 1980 – 2002, from five hydrometrical stations [1]. The result was that most of the floods take place in the spring and one of the principal factors being the abandoned forest roads turned into extremely active torrents. "The social and ecological effects of floods differ in accordance with their characteristics. In the last ten years, the western part of the Jiu Valley was the most affected by floods (Campu lui Neag, Valea

de Brazi, Uricani, Lupeni) and in the eastern part the floods occurred at: Petrosani and Livezeni”[1]. It is very important to know and formulate applicable strategies that should reduce negative consequences. For example the floods from 1999, 2004, 2005 caused damages to a lot of households and blocks of flats, had a negative impact on transportation infrastructure and water supply. Some of the most exposed sites are: Lupeni until the confluence of Jiu de Vest with Jiu de Est; the flood plain from Petrila to Petrosani.

Another problem caused by the mining industry is **water damage**. The main source of pollution is the extraction and processing activities (Figure 4). The insufficiently purified water that was drained in the Jiu River caused the disappearance of specific aquatic flora and fauna. All this natural factors cause problems in the: agricultural sector, urban development, tourism, critical deterioration of the land and the forests.

Social factors - social problems are added to environmental and ecological ones. Due to the study made on Jiu Valley population, some conclusions need to be marked. First of all, due to the big period of time, when mining activity was principal it can be observed a **sensitivity to change and adaptability problems**. The most affected categorized are: the unemployment, aged population (proxy. 17%) and NHCC<sup>1</sup> dependents. Although people or communities that live from agriculture or forestry are very vulnerable to environmental change. The category of unemployed people is the most sensitive, because among them more than half are not benefiting from social security measures. “The large share of the long standing unemployment (41,5%) was caused mainly by the **lack of stable jobs**, by the **mono-specialization** of the labor force and by the **passive social security actions**” [8]. The educational level has an important effect on the economic characteristics and on the regeneration process of the region. “The system of technical and vocational education and the local university curricula were aimed to satisfy the training requirements of the mining industry” [8], this being an important growing factor of the unemployment rate. In terms of social factors, the consequences affect the way communities function; the way individuals collaborate and purchase power.

Health factors - in what it concerns the health problems, **the health status** in Jiu Valley deteriorated after 1990. The number of children mortality, tuberculosis cases had increased, also the life expectancy is under national average like is presented in the studies made by Alexandrescu in 2001. This leads to a reduction in workforce and family instability.

Analyzing all this factors I can draw some conclusions: the local economy is still dominated by the National Hard Coal Company, where more than 40% of working force is concentrated; another important percent works in activities that are indirectly connected with the mining process; for consolidating a sustainable development strategy ecological and environmental measures have to be

taken; to take measures we have to determine what kind of poverty is manifested in Jiu Valley – put a diagnostic.

After studding the local situation, the biggest problem is: economic poverty, generated by all the environmental and social factors previously stated; but certainly there is a particular percent also of: cultural, societal, spiritual and political poverty. In Jiu Valley case the last ones are a result of the first. Eliminated the vulnerability state of the community in front of the natural and anthropic (job lost) factors will lead to the poverty reduction.

Another process associated with poverty and vulnerability is social exclusion. The causes are almost the same: job lost income depreciation and sometimes concentration of the social services only in the bigger towns, for example Petrosani. For promoting social inclusion it is required a national and a regional strategy. A first step is the recognition of the connection between poverty and exclusion. Highlights of strategies should be: decentralization and encouraging local initiatives for identifying and managing social services; reducing vulnerability; economic revitalization; provide minimum health and social services; community forces enabled by engaging in projects; and promoting an inclusive society [6].

### 3. POSSIBLE SUSTAINABLE STRATEGIES FOR REDUCING THE VULNERABILITY FACTORS, THE POVERTY PROBLEM AND SOCIAL EXCLUSION.

Before beginning to imagine possible sustainable strategies for this area, that combat the existing problems or utilize some negative factors (like floods) it has to be done a distinction between reducing temporary poverty and chronic one [2].

All the strategies are built on the following premises:

1. In Jiu Valley are still open six extraction points. These will be subsidized until 2018 by the European Union. They will be closed in this time period only if they will be considered unproductive.
2. Even if some of the mining sites will be reorganized, there will certainly be some mining closure.
3. Jiu Valley has problems in present with unemployment caused only by: the closure of Aninoasa mining site and dismissal from all others six centers. The closure of the whole exploitations will have major impact on the entire region. The poverty problem will increase.

<sup>1</sup> NHCC – National Hard Coal Company

mine creation	extraction activities	refining
<ul style="list-style-type: none"> <li>- destruction of forests and animal habitats</li> <li>- use of officially protected natural areas</li> <li>- creation of potentially toxic waste rock</li> </ul>	<ul style="list-style-type: none"> <li>- creation of mine waste with toxic emissions</li> <li>- water contamination: disposal in rivers deep water disposal</li> <li>- acid mine drainage: sulfides in waste rock react with water and produce sulfuric acid is linked with: skin cancer, liver disease, tumors and lungs</li> </ul>	<ul style="list-style-type: none"> <li>- big energy consumer</li> <li>- air polluter release green house gases contributes to respiratory illnesses and possibly other diseases.</li> </ul>

Figure 4 – Polluting mining process

In consequence some important changes have to be done and the population has to be educated in the spirit of sustainability. I think next lines have to be followed: profitability and operating efficiency of the mining process – coal extraction; sustainable tourism based on visiting the industrial sites and the natural landscape; reuse of some of the existing industrial buildings for the production of energy; also it has to be done a circuit of reutilization of water from floods for the agricultural processes; reforestation; resources economy.

### 3.1. Profitability and operating efficiency of the mining process (figure 5).



Figure 5 – Example of machines from Lupeni mine

After making a very simple mathematical calculation – the result is that: it's almost impossible to replace jobs from mining exploitation with those from: tourism or small enterprises. Taking into account, that one of the problems is that for sustaining in the 80 the work, people have been relocated in Jiu Valley, from all over the country. In my theory coal exploitation at least in some of the six points have to remain, but the way of exploiting has to change.

I find this a sustainable proposal; because endangering the social and economic families' situation in the present, means that we can't talk about future generations.

There are a few mining corporate in the world that tries to use and apply the following concept: "The

concept of corporate sustainability" (Angelo American, BH Billiton, Inco and Rio Tinto). They are not claiming to be a complete assessment of sustainability in the sector, but they focus their attention also on environment and development "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission)". It is considered that the mining process is from start unsustainable activity, since it is based on the exploration for and development of non – renewable resources. This has presented a challenge for the industry leaders, who have met this challenge with innovative responses.

Key sustainability in the mining sector:

3.1.1. Environmental – among the most pressing environmental concerns of mining activities are: energy and water use and the impact of mining on biodiversity and air. "We also believe that the soundest strategy is to pursue a comprehensive sustainability agenda immediately, to see returns both in the short and long term. Therefore, this report argues that, rather than diminishing from the company's bottom line, sustainability practices will add value to the company and ensure its social "license to operate" [6]. Furthermore there are benefits from these practices.

The methodology that needs to be followed in this case is: making public all the development plans to ensure the untapped of World Heritage listed proprieties; biodiversity action plans; application of the following operations on the affected lands and not used ones: capping (covering waste rock or tailing with an inert material to prevent water infiltration or to provide a plant growth medium); reclamation (reclaiming land for a productive purpose: food crops) including monoculture plantations; recolonisation (re-establishment of plants that are self – sown or by vegetative growth); rehabilitation (improving disturbed land, including development of new plant communities that may include some of the original plant species and may, or may not, have economic outcomes ); land stewardship; water management policy; water recycling; monitors that quantifies water use; decreased water usage target. It is of major

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importance for companies to have a policy on mine closing.

3.1.2. Social - focuses mostly on three ideas: official safety policy – the company has goals to eliminate the fatalities; companies have to provide “Safety Excellence Awards” and operational health

standards. Of social importance is also important to have a policy against creation of new mining towns – that force the reutilization of the existing housing and facilities. They have to systematic consult the community (figure6).

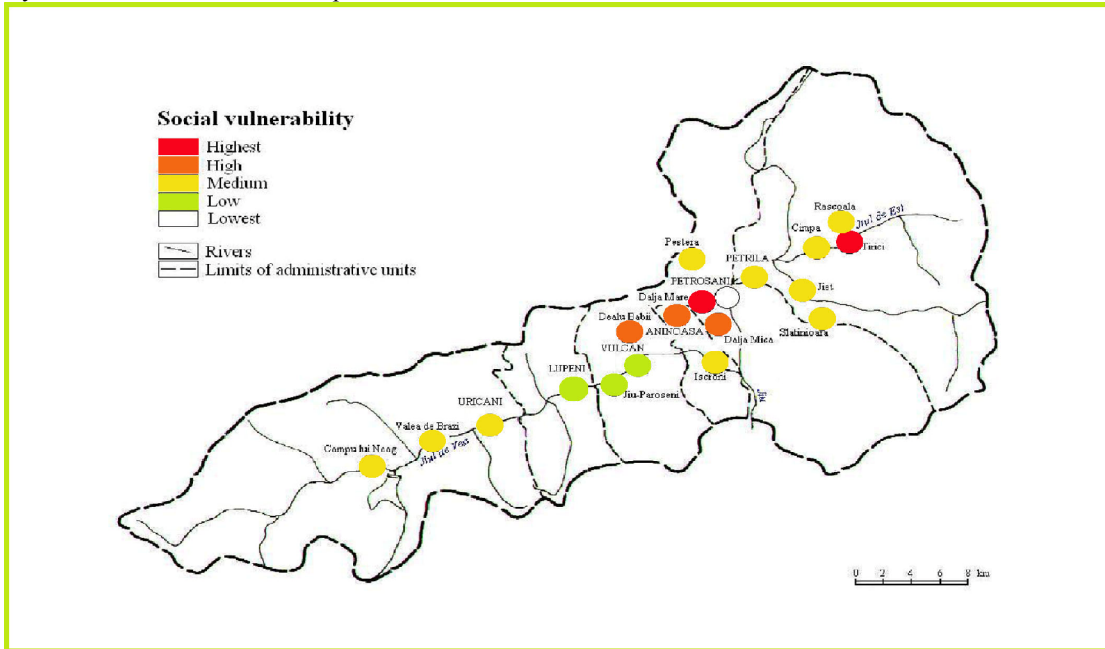


Figure 6 – Map of social vulnerability level in Jiu Valley

After this study some conclusions can be drawn: use of new technologies to reduce energy use ; conversion of waste water into potable water; preservation of water resources by conservation, recycling and minimizing pollution; reclamation of biodiversity in areas impacted by mining operations and maintenance of existing biodiversity in land holdings; reduction of emissions and waste products, and reuse of waste materials in smelting operations; employment of community members, including women of community and employee health, even in areas not directly impacted by mining activities; provision of training programs for community members; identification and protection of subsistence-related resources of local communities, including water, plants, and wildlife; planning for mine closures before the beginning of any mining activities; use of mine closure as an opportunity to rehabilitate land [7].

**3.2. Sustainable tourism based on visiting the industrial sites and natural landscapes.**

Jiu Valley has a big potential in tourism, both in exploiting the industrial heritage and natural landscape. But for tourism to remain sustainable it has to remain soft, in other words, comfortable, consensual, non – controversial to history. There are a few principles that can be taken into account when we have to maintain tourism to a sustainable level:

1. Recognize the importance of the heritage places; this can be materialized in heritage conservation that ensures the long – term protection of

the assets. The scope of this process is also to retain the natural and cultural significance of places. It is of big importance that people implicated in tourism routes planning to take full responsibility in avoiding impact on natural and cultural significance of the place.

2. Develop partnerships between local and central government, associations implicated in conservation, private sector and community. Working with local people in the management, preservation and operation of tourism activities will foster ownership and understanding of the process.

3. Incorporate the heritage issues into business planning. This can generate mutual benefits for people involved, local and regional community “This can include use of local goods and services, providing corporate contributions to conservation initiatives, technical assistance, training and education programs [12].

4. Responsible promoting of the products. Marketing and promotion needs to respect their identified significance and wishes of local communities – and don’t create unrealistic targets.



Figure 7 – Mine extraction well in Lupeni



Figure 8 – Petritu mine view

We all know that in Romania there are really big problems with promoting and conservation of any kind of heritage. The industrial heritage (Figure 7, Figure 8) has even a more difficult story; to make it work you have to convince the community first that it is a good possibility for regeneration. The motivations are: the uniqueness of this kind of attractions, there are very different from theme parks, for example; the big difference is that they are real and they have a palpable history; the uniqueness of former mining sites turned attractions is that they tell the history of a time when exploiting a region's resources was something common (figure 9).



Figure 9 – Different levels of tourism interest in heritage

For our country this could be a real chance of revitalization, because we have the heritage, we have interesting landscapes, we have the people and the history [9] (figure 10).



Figure 10 – Monument of 1929 rebellion

It is quite time for us to realize that we have to get connected to the international matrix that promotes industrial heritage. To achieve this there are necessary some changes in the education (figure 11). School – level has changed a little even in Romania, more emphasis has been placed on languages and information technology in general, mathematics and literacy. This is a problem for heritage tourism, if young people are not spending time learning and understanding at least there local history, there are little chances to be enthusiastic about heritage tourism. But there is also another interesting aspect:

we can see heritage tourism like an interactive learning of history. This can be the way of making the past relevant to the present and future. „ We need to get over the idea that heritage is about the past and has no relevance today. We need to create a heritage continuum, showing how the past helped shape the present and how both will influence the future” [10]. If we think about industrial tourism it is important not to talk only about the past, because this can only remind to some people that the traditional industries have declined, having like results: job losses and social decay. It does little in helping the community develop new industries, instead industrial tourism should be planned in a holistic way. This path can incorporate: visit at mining museums, at workers housing, public constructions that supported the past economic growth; traditional industries that are no more, but focuses on what the industrial sites are now being used for; where traditional industries have survived by automation, visitors should be shown the production process and be reminded that the industry still survives, although it's no longer employs as many people; tourists should see exhibitions of what industries may look in the future. It can be a mixture of old and new, a complete presentation .The steps for making it possible are: the need to make this tourist market more attractive to the younger people; protecting the interests of the heritage and ensuring their conservation; recognizing that heritage is not just about museums, it is also about events and festivals, about trails and routes; heritage attractions have to become flexible; is very important the way chosen for promoting; heritage operators need to utilize the latest developments in marketing, like internet, branding and the relationship marketing; the need of building public – private partnerships.

Having a mining site included in the industrial heritage means a lot. Firstly we would be implicated in the international discussions and industrial paths, but even more we would have an internal pole for regeneration. The process it is called urban acupuncture. This kind of projects are attracting: millions of tourist, new investors, encourages the development of local and national infrastructure, encourages social rehabilitation and forces, if is not wanted ecological rehabilitation. The years ahead will be difficult for the heritage tourism in Romania. Firstly we need to make a full analyze, diagnostic of industrial areas. Point out resources like: traditions, local memories, history, industrial techniques that are unique in the world, infrastructure. And even more success will require creativity, imagination and professionalism.

Another important opportunity for this region is even its location, in the Transilvania Depression. For tourists an entire range of tourist points are offered: Parang, Straja, Retezat and Sureanu, Pasul Valcan, Dragoiu.

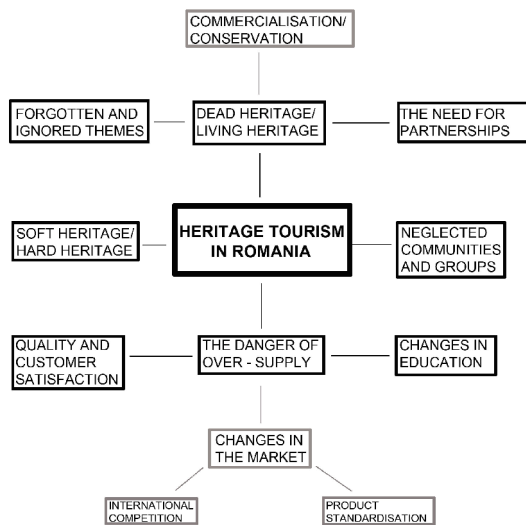


Figure 11 – What is industrial heritage tourism

### 3.3. Reuse of some of the existing industrial building for the production of energy.

Developing a former mining site in this direction has firstly a good impact on the local community economic situation. It can include: job creation, energy cost security, potential proprieties revitalization, in a sentence, new economic development opportunities. What does job creation mean for this kind of projects: for the construction of new facilities and for refunctionalisation it is imposed to use local working force, Larger energy plants can be labor – intensive during both construction and operation. Local – energy security, solar thermal energy, peak – demand power when it is needed, providing a clean and reliable power source for local communities. Solar energy also can supplement energy needs during blackouts and disaster recovery” [11]. Ecologic benefits are also very important: the most usual example can include: reduction of emissions, reduced fossil fuel consumption, greenhouse gas emissions benefits, site cleanup and improved water quality.

For example: power towers or chimneys, that are numerous on the mining sites, can be used in a scheme of electricity production. Towers, sun – tracking mirrors (heliostats) focus sunlight into a receiver at the top of the tower. “A heat transfer fluid heated in the receiver is used to generate steam, which is used in a conventional turbine generator to produce electricity” (figure 12) [11].

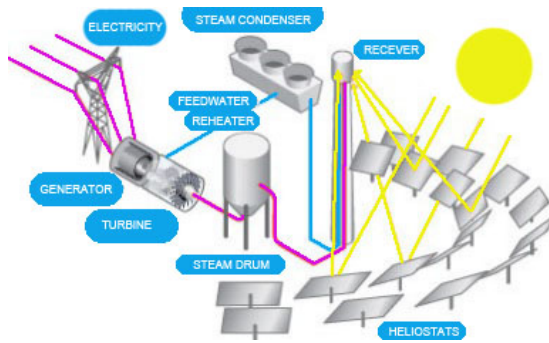


Figure 12 – Possible reuse of a chimney

#### 4. CONCLUSIONS

To sum up the problem of poverty in former mining areas can only be reduced by applying sustainable strategies, but it's very difficult to demand from the community to become conscious of the environmental issues, when: food, water, medicine and sometimes housing are missing.

Jiu Valley is a poor region because of its vulnerability determined by natural causes (**land deterioration, mass movement, land use change, floods and water damage**), social and anthropic (**sensitivity to change, adaptability problems, job lost, mono- specialization, passive social security actions**). Reducing the vulnerability by constructing infrastructure, natural barriers against floods and earth movement, will mean reducing the poverty phenomenon.

It is clear that the future of these areas, foster mining sites is a mixture between the three types of strategies presented: **1. profitability and operating efficiency of the mining process; 2. sustainable tourism based on visiting the industrial sites and natural landscapes; 3. reuse of some of the existing industrial building for the production of energy.** This type of communities can be redeveloped only by learning to wisely use alternative sources of energy and "alternative" industry. To have a positive impact and community to accept them (even if from preliminary studies results that communities are opened to this kind of projects) certain principals have to be respected. For example, sustainability in mining sector can be achieved only by: making public all the development plans to ensure the untapped of World Heritage listed proprieties; biodiversity action plans; land stewardship; water management policy; water recycling; monitors that quantifies water use; decreased water usage target; policy on mine closing. Another important key of the tourism strategies is keeping it sustainable, that means, being responsible for the protection of build heritage and natural heritage.

For Romania, Jiu Valley could be the best prototype for applying these sustainable strategies,

like I have already written communities are opened for this kind of initiatives. In this case there is time for preventing the consequences of mines closure and for structuring this kind of projects. The three kinds of strategies can be implemented one by one.

Of great importance is the fact that these three strategies have to be completed by smaller projects in which the community is more implicated (conceptualization, projects elaboration and implementation). Some examples could be: greening projects, children playgrounds construction, visitor's routes planning.

The successive implementation of the three solutions is clearly a good chance for this region to escape from the poverty situation.

Eliminating or diminishing the economic poverty, spiritual, social and cultural poverty will disappear. It is not mandatory for these to be a reaction of the first one, but in this case, disappearing of the major element: mining, which kept the communities together, is inducing the others effects. By promoting projects in which individuals can work like a community will reinforce the bonds and decrease social exclusion.

With this article I pointed out the relation between factors and vulnerability/ poverty and also I showed that only after analyzing each of them we can achieve to a practice sustainable proposal for the future.

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