Environmental considerations for sustainable development of the coastal region of Makri in the Evros prefecture, Greece

M.-V. Apostolopoulou & K. Abeliotis

Department of Home Economics and Ecology, Harokopio University, El. Venizelou 70, 17671 Athens, Greece

Abstract

This paper refers to the perspectives for sustainable development and the consequent environmental impacts in the coastal region of Makri-Dikella-Mesimvria of the municipality of Alexandroupolis, in the prefecture of Evros in Thrace, Greece. The characteristics of the region are presented first.

During the last 3 decades the region has experienced a remarkable growth. However, the main concern of the people nowadays, is the proposed operation of a gold mine in the neighbouring area of Perama. This operation will certainly affect the region under investigation. The possible adverse impacts to the natural environment as well as to human health from the installation and operation of gold mines are reviewed and presented based on published information in various literature sources.

The attitude of the local residents towards the proposed operation of the gold mine is recorded in the paper via a survey. The results of the survey, which indicate a strong opposition to the proposed gold mine installation, are presented and discussed. Finally, certain measures are proposed for the sustainable utilisation of the natural resources and the development of the region in such a way that conserves the ecological balance.

Keywords: sustainable development, gold mining, field survey, Makri, Alexandroupolis, Evros, Greece.

1 Introduction

During the last 3 decades in Greece, the coastal zones close to large urban centres are experiencing a remarkable growth. This fact is the result of the need
of urban people for short take-aways in locations that are close to their permanent homes and works. This is the case of the coastal zone under investigation. It extents from the town of Makri up to mount Ismaros in the Evros prefecture. The exact location of the town of Makri is 25°40’E, 40°40’N. It is located on the southern coast of the Evros prefecture, 12 km west of Alexandroupolis, a major city and port, capital of the Evros prefecture in the far northeastern corner of Greece.

The region was populated since the Neolithic age, as it is proved from the excavations that took place there. Nowadays, it is practically a summer resort. However during the last decades an increasing number of people are permanently relocating there. In other words, heavy building activity is taking place especially close to the coast. Agriculture, a traditional activity in the region, is more and more being abandoned. Furthermore the region is being aggravated from the use of land as quarries, military installations, olive oil mills, and livestock farms.

During the last couple of years a new factor came up to upset the everyday life in the region: the proposed operation of a gold mine in a location that is located only 3 km away. The aim of this paper is to present the threats to the environment that are posed by the proposed gold mining activity based on the international experience and literature, and to survey and report the opinion of the people of the region on it.

2 Characteristics of the examined coastal region

Thrace, the most eastern province of mainland Greece, is a place with remarkable natural resources, fertile plains, and considerable natural water potential. Thrace is famous for its rich historical and cultural heritage, as well as for its scenic places such as forests, wetlands and coasts. More specifically, the Evros prefecture is home to two internationally known national parks: the Dadia-Soufli forest and the delta of river Evros. Both areas have been classified as Natura 2000 special protection areas.

The coastal zone that is examined extents to the west of the town of Makri, through the towns of Dikella and Mesimvria and up to mount Ismaros (alt. 678 m). The natural boundary to the north of the coastal region is mount Tsopanos (alt. 628 m), which is full of bushes and it is used as a grazing ground. Along the coastline, there is mainly bushy and dry grass vegetation. 7 km north of the coastline there are areas planted with oak and olive trees.

In the region the ground slopes are small. The maximum altimeter in the area is 336 m from the sea surface, found northwest of the Makri quarry. The coastal zone has an altimeter of less that 70 m. More specifically, Makri is at 70 m. Dikella at 50 and Mesimvria at 60.

3 The proposed operation of a gold mine in Perama

Despite the fact that gold mining has been reported in Greece since the ancient times, there is no such activity during the modern period. In Thrace, nowadays,
two investment ventures are aiming at the exploitation of the gold ores that exist in Sapes (Rodopi prefecture) and Perama (Evros prefecture). The proposed installation in Perama is located 25 km NW of Alexandroupolis, i.e. it is very close to the target area of this study. Based on published data of the mining company [1] responsible for the Perama project, the total investment cost is 104 million Euros, the project duration is 10 years while the land reclamation phase will last 1-5 years. During the mine operation phase 220 jobs will be created while 70% of the 4 tons of the extracted gold value will remain in Greece. In addition, according to the mining company, several advantages will be created for the construction workers and companies in the area during the realisation of the project. For the extraction of gold, the advanced sodium cyanide extraction process will be used. The estimated gold concentration is estimated to be 3.7 g of gold per ton of ore [1], which is very close to the typical concentration of gold found in contemporary gold mines [2].

The implementation of the project is yet to be decided. Due to the complex nature of this project and the bureaucratic structure of the Greek public administration, there are numerous permits that have to be granted to the company by the Greek authorities. In addition, the Technical Chamber of Greece, which is the principal technical advisor of the state, declares that the mining code that governs the exploitation of ores in Greece is obsolete since it was placed into force in 1973 [3]. Therefore, the decision on the final operating permit is a political one that has to be taken at the central government level by a number of ministries. The ministries of a) National Economy, b) Development and c) Environment, Public Works and Urban Planning are the three major players in this decision. However, the local administration committee of the Evros prefecture has also to agree if the mining company is to proceed with the implementation of the project.

The Thrace regional branch of the Technical Chamber of Greece has proposed the rejection of the Environmental Impact Assessment study [3] submitted by the mining company to the Ministry of Environment, Public Works and Urban Planning. The proposal for rejection is based on the claim that the project is against the goals of sustainable development for the region and that the risk/profit balance is very unfavourable.

4 Environmental considerations on gold mining

Environmental impacts from different methods of gold production vary. The scale of the facility is also important in determining the degree of impact [2]. The adverse environmental impacts of the modern gold mining operations result from the fact that most of the real gold mines, where gold can be isolated by typical mining procedures, are exhausted today. The present sodium cyanide leaching gold recovery process, a chemical process with extensive use of hazardous chemicals, cannot be regarded as a typical mining process and should be handled according to the rules accepted by the chemical process industry [4]. Cyanide is used at nearly 90% of the gold mines in relatively high quantities and is potentially toxic. Although numerous physical, chemical and biological
treatments exist for the sodium cyanide effluents, they are often expensive, complex to operate and certainly not risk free [5]. The sources, toxicity, and fate of cyanides in soil and groundwater is discussed extensively by Kjeldsen [6].

The problems resulting from the cyanide use are so important that recently triggered actions from major international bodies: the United Nations Environment Programme recently developed an international Cyanide Management Code. For this voluntary industry code, most participants are from the gold mining industry [7]. Also, the European Union is taking a closer look on the cyanidation plants in Europe especially after the Baia Mare (Romania) gold mine tailings pond overflow on January 2000 that polluted river Danube [8]. Furthermore, because of the serious impacts and risks on the environment from gold mining and production, some countries, like the Czech Republic, have totally banned gold extraction by the cyanidation technique [2].

The majority of the problems in gold mining result from the use of sodium cyanide. However, other adverse environmental impacts exist too. The numerous environmental implications related to gold extraction and recovery facilities are summarised by Müezzinoğlu [2]:

- Negative impact or even destruction of the surrounding land and natural habitat,
- Changes in land use capacity, visible impacts, and destruction of landscape,
- Remains and junks of unusable equipment, solid and liquid waste,
- Air polluting emissions,
- Mine gallery wastewaters and acid mine drainage,
- Sludge formation and changes in flow regimes of adjoining creeks in watersheds,
- Quality changes and pollution in ground waters,
- Hazardous chemicals risks by transportation, storage and accident risks on and to the plant site,
- Impacts on the cultural, archaeological, and historical heritage,
- Public health problems at the local settlements.

5 Description of the survey structure

The residents of the coastal region are very concerned about the future of the quality of their lives and the devaluation of their properties as well. However there is also a debate on the possible economic advantages that such a mining activity will bring to the region. The citizens are facing the well documented dilemma, that any person living close to a major infrastructure facility is facing: on one hand, there is the development of the region and the creation of new jobs, while on the other hand the protection of the environment is at stake. In order to investigate the public attitude towards the possible installation of the gold mine, a survey was scheduled and subsequently conducted. The aim of the field survey was to investigate the following topics:
The degree of public acceptance of the proposed gold mine operation

The degree of public knowledge regarding the adverse environmental impacts of gold mining

The public opinion on the macroeconomic effects of gold mining

Data collection was based on interviews with people in the area of Makri taken in the form of a closed-type questionnaire. The objective of the interview was to gather information on the socioeconomic profile of the respondents, their attitude toward the economic development of the region, and their opinion about the perceived environmental impact of the proposed gold-mining installation. Based on the most recent census of 2001 [9], the population at Makri was 820 persons, at Dikella 288 and at Mesimvria 149, i.e. a total of 1257. 110 questionnaires were completed in total during July and August 2003, from people in all three of the aforementioned towns.

6 Results

The demographics of the sample population are presented first:

- 53% of the respondents were male.

- Regarding the age distribution, 29% were from 26-40 years old, 25% were 41-50 years old while 35% were over 50.

- 29% of the respondents were permanent Makri residents while 51% were permanent summer vacationers in the region. The rest, were persons which visit the area occasionally.

- 27% have their permanent home in Makri, 44% own summer houses in the region while the rest live on rent or are visiting relatives and friends.

- 53% were born in the region.

The first question of the survey examines the public opinion on the possible installation of the gold mine in Perama. Figure 1 presents the results. These data indicate that a total of 83% of the respondents have a very negative or negative opinion on the operation of the gold mine in the region.

The second question surveys the opinion of the people on how necessary they think that the operation of the gold mine is for the economic development of the region. 71% of the respondents answered that it is definitely not needed while another 14% also say that it is not needed. That makes a total of 85% of the people that think that the quarry has nothing to offer towards the development of the region (Figure 2).

The third question was “How do you rate your informing regarding the possible environmental impacts of the quarry?” In this question only 8% think that they are very well informed of the possible environmental impacts, while 23% rate they informing as good (Figure 3).
Figure 1: Opinion of the respondents on the possible operation of the gold mine.

Figure 2: Opinion on how necessary is the operation of the gold mine for the development of the region.

The fourth question deals with the opinion of the respondents on which are the three major problems affecting the quality of life that the proposed installation will cause to the region. The main problem reported, that 27% of the people think that the quarry will create, is groundwater pollution, while 19% rate the direct impact on human health in the second place. Both landscape degradation and pollution of the sea follow at the third place (Figure 4).

The fifth question surveys the opinion of the people on the possible economic advantages that the operation of the gold mine will add to the region. 42% of the respondents think that new jobs will be created in the region while another 42% think that there will be no advantage at all for the region. 10% of the respondents think that there will be a commercial development in general in the region (Figure 5).
Finally the people of the coastal region were asked which they think that might be some alternative activities and measures that must be implemented towards the economic development of the region in a sustainable way. The operation of new hotels and resorts that are managed in a environmentally friendly way is the most popular answer (24%). 20% think that the renovation of local traditional homes to small hostels is also important, while another 20% think that the improvement of the road infrastructure of the region is essential for the development of the region. Finally, the creation and operation of a centre for environmental education that will promote the natural beauty of the region is also high at the preferences of the people (19%). The survey results on this question are presented in Figure 6.
Figure 5: Opinion on possible advantages that the operation of the gold mine will bring to the region.

Figure 6: Proposed alternative activities towards the sustainable development of the examined coastal region.

7 Discussion and conclusions

It can be concluded that the proposed installation of the gold mine in Perama is definitely against the will of the residents of the coastal region. This opposition results from the fact that the people are afraid of the possible adverse environmental impacts that the operation of the gold mine will have. This conclusion is in very good agreement with what is reported in the international literature in which, the opposition of the local communities against the gold mining plants is well documented [2,10]. For example, the supreme court of Turkey has yet to decide on the continuing operation of the Ovacic gold mine [5] after the appeal of local residents and environmentalists.
However, it must also be noted that the negative opinion of the people seems to be a result of a general NIMBY syndrome, since the majority of them (approximately 70%) replied that their informing regarding the environmental impacts of the gold mine ranges from fair to very bad. It is clear from this finding of the survey that there is a need for better ways of communicating to the people the viewpoints of both parties.

Finally, based on the results of the conducted survey, most of the people think that the sustainable development of the coastal region is mostly associated with the development of the touristic infrastructure in an environmentally friendly way. Improved road networks and promotion of the natural beauty of the region are the major improvements that need to be made towards this goal.

The decision on the final installation of the gold mine in Perama is certainly not an easy one. The possible operation of the gold mine is going to affect the lives of the region residents for sure. However it is good to keep in mind that in our modern societies, economic development and environmental protection can coincide through advanced waste treatment technology, provided that all the needed parameters are taken into account: scientific knowledge, international experience, responsible social behaviour, local needs and, of course, sincere adherence to strict environmental regulations.

References