Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	95
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Campeni, 26.07.2006
RMGC internal unique code	MMGA_0226

Proposal

As regards the fact that no agriculture may be developed, the questioner believes that only lazy people can't perform agriculture at Rosia Montana.

Solution

It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable.

The current base-line conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities and mainly consists of 18 spoil piles and old tailings pond facilities.. They however do support a subsistence level of agriculture based primarily on producing hay (60 % of the industrial area PUZ 1,646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods.

The following paragraphs present conclusions regarding the suitability of the lands for various agricultural crops and fruit growing [1]:

- *"For pastures* – The lands are suitable on only 157.56 ha (9.58%). These lands are situated within Roşia Montană area and on the right interfluve of the Corna valley;
  - The class IV is dominant with 314.60 ha (19.12%). These surfaces are situated preponderantly in the northern part of the perimeter;
  - Classes V and VI of suitability totalizing 751.38 ha (45.61%) are dominant within site. These lands are situated both on Corna valley and west and north of Cârnic – Cetate area;
  - The remaining lands are of low suitability (classes VII – X), totalize a surface of 298.19 ha (18.12%) and are encountered all over the site.
- *For hayfields* – The lands are classified in classes V – VIII of suitability, have a surface of 1,213.84 ha (73.71%) and are scattered all over the site.
  - Classes V – VIII are prevalent south of Cârnic – Cetate area and in the north-western part of the territory, while the class VII is encountered west and north of Cârnic – Cetate area;
  - Classes III and IV with a surface of 166.91 ha (10.15%) are preponderantly encountered to the north of territory and on the right interfluve of the Corna valley;
  - The lands from classes IX and X with a surface of 140.98 ha (8.57%) are frequently scattered in the northern part of the investigated perimeter.
- *For potatoes* – The lands are of very low suitability. Classes IX and X occupy a surface of 1,183.11 ha (71.85%). The other lands are classified within the classes VI - VIII of suitability, have a surface of 338.62 ha (20.58%) and are situated north of Roşia Montană area and on Corna valley's interfluves.
- *For apple tree* – The lands from the classes IX and X of suitability are dominant, having a surface of 1,083.74 ha (63.07%). Classes VI – VIII of suitability occupy about the third part of the territory with a surface of 482.99 ha (29.36%). The lands from these classes are scattered on the whole investigated territory"

Given the natural conditions (climate, relief, geology, soils) of the area, the categories of prevalent use of the lands are represented by natural meadows (pastures, hayfields) and forests. There are also the mining sites with depones, waste rock dumps and rock falls accumulated on versants or at their lower part.

In these circumstances, the land and soil management involved the use of the natural resources for domestic purposes. The landowners use their lands and soils for grazing, breeding, hayfields, green and fodder hay [2].

Other agricultural cultures, excepting those mentioned above, are not suitable for Roşia Montană area, nor were encountered within the area during the site investigations. The most part of the soils are acid allowing only sustenance agriculture, uncompetitive in EU [3]. The Roşia Montană's lands don't allow a modern, mechanized and efficient agriculture which could economically develop the area.

References:
[1] - Sub-chapter 3.3 "Soils *Suitability for Various Crops*" – p. 23, Vol. 13 EIA
[2] - Sub-chapter 3.3 "*Types of soil management*" – p. 24, Vol. 13 EIA
[3] - Chapter 2"*Soil Cover*" – p.12, Vol.13 EIA

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	280
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Cluj Napoca, 07.08.2006
RMGC internal unique code	MMGA_0597

Proposal	The questioner asks the following questions:Why do the company's specialists say that agriculture cannot be performed in the area at present, while the same specialists propose the implementation of organic farming once the mine exploitation is completed?
Solution	It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable. The current conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities which mainly consists of 18 spoil piles and old tailings pond facilities. . They however do support a subsistence level of agriculture based primarily on producing hay (60 % of the industrial area PUZ 1,646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods. Given the natural conditions (climate, relief, geology, soils) of the area, the categories of prevalent use of the lands are represented by natural meadows (pastures, hayfields) and forests. There are also the mining sites with depones, waste rock dumps and rock falls accumulated on versants or at their lower part. In these circumstances, the land and soil management involved the use of the natural resources for domestic purposes. The landowners use their lands and soils for grazing, breeding, hayfields, green and fodder hay [1]. RMGC never has stated that within the Roşia Montană area, organic agriculture may be or will be able to be practiced. The following paragraphs present conclusions regarding the suitability of the lands for various agricultural crops and fruit growing [2]: • *"For pastures* – The lands are suitable on only 157.56 ha (9.58%). These lands are situated within Roşia Montană area and on the right interfluve of the Corna valley; - The class IV is dominant with 314.60 ha (19.12%). These surfaces are situated preponderantly in the northern part of the perimeter; - Classes V and VI of suitability totalizing 751.38 ha (45.61%) are dominant within site. These lands are situated both on Corna valley and west and north of Cârnic – Cetate area; - The remaining lands are of low suitability (classes VII – X), totalize a surface of 298.19 ha (18.12%) and are encountered all over the site. ▪ *For hayfields* – The lands are classified in classes V – VIII of suitability, have a surface of 1,213.84 ha (73.71%) and are scattered all over the site. - Classes V – VIII are prevalent south of Cârnic – Cetate area and in the north-western part of the territory, while the class VIII is encountered west and north of Cârnic – Cetate area; - Classes III and IV with a surface of 166.91 ha (10.15%) are preponderantly encountered to the north of territory and on the right interfluve of the Corna valley;

- The lands from classes IX and X with a surface of 140.98 ha (8.57%) are frequently scattered in the northern part of the investigated perimeter.

- *For potato* – The lands are of very low suitability. Classes IX and X occupy a surface of 1,183.11 ha (71.85%). The other lands are classified within the classes VI - VIII of suitability, have a surface of 338.62 ha (20.58%) and are situated north of Roşia Montană area and on Corna valley's interfluves.
- *For apple tree* – The lands from the classes IX and X of suitability are dominant, having a surface of 1,083.74 ha (63.07%). Classes VI – VIII of suitability occupy about the third part of the territory with a surface of 482.99 ha (29.36%). The lands from these classes are scattered on the whole investigated territory"

References:
[1] - Sub-chapter 3.3 "*Types of soil management*" – p. 24, Vol. 13 EIA
[2] - Sub-chapter 3.3 "*Soils Suitability for Various Crops*" – p. 23, Vol. 13 EIA

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	296
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Turda, 09.08.2006
RMGC internal unique code	MMGA_0627

Proposal	The questioner wants to know what the company will offer people in15 years'time. Rosia Montana will no longer be Rosia Montana. If agriculture will be possible in 15 years' time then why isn't it possible now?
Solution	Roşia Montană Gold Corporation proposes a project of economic development with proven social benefits. Having as starting point the 2000 years old tradition in area, the project represents an exemplary modality to perform further on this tradition through the responsible mining of the local natural resources based on the best available technologies, observing the legal requirements in force regarding the environmental protection existing at national and European level and in conformity with the Best Available Technology (BAT) as defined by EC Directive no 96/61/EC. **It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable.** **The current base-line conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities which mainly consists of 18 spoil piles and old tailings pond facilities.. They however do support a subsistence level of agriculture based primarily on producing hay (60% of the industrial area PUZ 1,646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods.** In these circumstances, the land and soil management involved the use of the natural resources for domestic purposes. The landowners use their lands and soils for grazing, breeding, hayfields, green and fodder hay [1]. The entire area (with a total surface of 1,257 ha) included in the Industrial Zonal Urbanism Plan (PUZ) from Roşia Montană has been designated as being destined exclusively for mining activities (mono-industrial utilization) during whole lifetime of the Project. Other activities inside this area during the mining project implementation (including those agricultural) are forbidden because of the procedures and restrictions due to the labor protection. After the mine closure, a new PUZ will designate the future utilization of the lands from area. References: [1] - Sub-chapter 3.3 "*Soils Suitability for Various Crops*" – p. 23, Vol. 13 EIA

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	300A
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Turda, 09.08.2006
RMGC internal unique code	MMGA_0639
Proposal	The questioner makes the following comments: How can anyone say that agriculture cannot be performed in Rosia Montana because of the poor soils and then go back and talk about the "Land-based livelihoods - creation of an extension services program to strengthen organic-based animal husbandry, vegetable, fruit and hay growing; sustainable fuel, wood and other land-based livelihood strategies", (The questioner quotes from chapter 8: page 102 in the Romanian version of the EIA/page 100 in the English version, the Community Sustainable Development Management Plan)
Solution	It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable. The current conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities which mainly consists of 18 spoil piles and old tailings pond facilities. They however do support a subsistence level of agriculture based primarily on producing hay (60 % of the industrial area PUZ 1,646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods. But whether the people who make up the community choose to pursue these particular opportunities depends upon them. The RMGC has made a significant commitment to support sustainable development in the area, including the establishment and funding of a micro-credit lending institution, and funding of training programs. This could offer a substantial benefit to Roşia Montană, in several sectors, including tourism and agriculture. But which opportunities the people of the community take up depends entirely upon them.

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	300A
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Turda, 09.08.2006
RMGC internal unique code	MMGA_0640

Proposal	How will the mining project improve the situation of the soils and the subsoil in Rosia Montana ?
Solution	It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable. The current base-line conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities which mainly consists of 18 spoil piles and old tailings pond facilities.. They however do support a subsistence level of agriculture based primarily on producing hay (60 % of the industrial area PUZ 1646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods. After mine closure, all surfaces impacted by Roşia Montană project as well as the areas that have remained un-rehabilitated from the RoşiaMin old operation follow to be rehabilitated and monitored, and in time, a part of them will be returned to agricultural circuit. According to expectation, the area intensively impacted by project will be utilized in tourism scope, especially the areas where the four open pits Cetate, Cârnic, Jig and Orlea will be placed [1]. Thus, the entire area will be environmentally rehabilitated and the negative effects caused by irresponsible mining activities both ancient and from the last decades will be mitigated. The project will not modify the situation of the soils from the project perimeter. At the beginning of the placement works of the project objectives at Roşia Montană (the four open pits, tailings management facility, processing plant, rock quarries, roads and auxiliary constructions), the striping of the fertile horizon and of the inferior layers is taken into account. Total stripped volumes will be about 1,361,398 m^3 from fertile (superior) horizon and 4,272,894 m^3 from inferior horizons [2]. This material will be dumped into five separate piles, for fertile material and for subsoil. At the mine closure, this material will be used for soil profile restoration [3]. During the restoration stage, a volume of material higher than that one resulted from stripping phase is not considered necessary, so that fertile soil brought from other place will not be in need. The stripped soil stored some years ago in dumps specially arranged will be used, during the stage of progressive ecological rehabilitation beginning with year 5 of the operational phase, at the restoration of the soil cover from the areas where the soil and rock were moved away for industrial constructions or ore mining. Thus, in the case of open pits, after their filling with rock up to the prescribed level depending on the available rock volume, the soil profile will be restored. Some inferior soil horizons with thickness of 20 – 30 cm and above a layer of fertile soil 10 – 15 cm thick will be performed. If the stored waste rock has ARD potential, above it a layer of compacted clay will be placed and then the inferior and superior soil horizons

will be provided. The same fertile horizon will be constructed on the bermes which follow to be sown first with grass, and after 1 – 2 years, bushes or trees will be planted.

In the case of rock quarries, bermes will be covered with a layer 20 cm thick of material originated from inferior horizons and then with a layer 10 cm thick originated from the superior vegetable soil.

In order to ecologically rehabilitate the tailings management facility, over the tailings a layer of compacted clay with a thickness of 30 cm will be placed. Above this clay layer, the inferior mineral horizons 80 cm thick will be constructed and at the upper part vegetable soil 10 cm thick will be added. The soil will be re-vegetated with grass species from local spontaneous flora and / or with bushes with a superficial radicular system (in order to not penetrate the layer of compacted clay). The processing plant site, after decommissioning, will be leveled and covered with a layer 20 – 30 cm thick of material originated from inferior soil horizons. Above, a layer 10 – 15 cm thick of vegetable soil will be placed and sowed with several species of grass and bushes.

Low grade ore dumps will be covered with about 20 cm of material originated from inferior horizons and 10 cm of vegetable soil which follows to be sowed with grass.

For decommissioned roads, a scarifying at a depth of 50 – 60 cm is recommended. After that, a layer 20 cm thick of inferior horizon is added and at the end 10 cm of vegetable soil [4].

As can be seen, RMGC obliges itself to rehabilitate the area with soil of same class of quality on a surface at least equivalent to that one before the beginning the works. An exact situation of the perimeters which follow to be returned into the agricultural circuit will be established later on.

Reference:
[1] Chapter 4.4, sub-chapter 5, *"Impact prognosis on soil"*, p.38, Vol. 13 EIA
[2] Table 4.4 – 15 *"Volumes of stripped soil depending on industrial objective nature"* p.42, EIM Report, Chapter 4, Section 4.4 Soil
[3] Sub-chapter 7.1 "*Soil restoration plan*", p.47, Vol.13 EIA
[4] Chapter 4.4, sub-chapter 6 "*Measures for impact diminution*", p.47, Vol. 13 EIA

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	301
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Turda, 09.08.2006
RMGC internal unique code	MMGA_0643
Proposal	The questioner quotes from page 63 of the " Soil Baseline Report": "Losses of any nature, related to soil, which will occur as a result of the construction and development of the industrial sites and gold ore mining and processing activities will be encountered in other forms, even if some of them in historic or geological times in the external circuit of the matter". Thus the final conclusion of the Soil Baseline Report contradicts all the statements related to the direct impact on the soils. The statement related to the rehabilitation of the soil in historic or geological times clearly states that the environment in Rosia Montana cannot be rehabilitated. The questioner considers that RMGC offends the population by stating that a historic time is necessary for the matter to recover. In other words, it will take 20 million years for the nature to restore all the deteriorations made by RMGC in 20 years?
Solution	Here, the study intended to stipulate using one of the thermodynamics laws that in nature nothing is lost but everything is transformed, and the soil losses due to the works from Roşia Montană will be encountered within the external general circuit of the matter as it happened during the historic or geological circuit. Probably, the concise explanation of the phenomenon mentioned above led to the reader's confusion [1]. There is no contradiction between the statements related to the direct impact on soil and those related to the general circuit of the matter. It is normal that the soil restoration at Roşia Montană will not provide, here and nowhere in the world, the same initial parameters, but the same class of equivalence. It is important that through the environment rehabilitation and soil restoration, favorable conditions for the biodiversity re-occurrence to be assured. Roşia Montană project will allow in time an ecological rehabilitation of the areas affected by the ancient mining or by mining activities during the last decades. Thus, beginning with year 5 of activity, the perimeters forbidden for mining operations will be rehabilitated so that the entire area will be completely ecologically improved in year 25 of the project. The statement according to which the destructions caused by RMGC in 20 years will be remedied by nature in 20 million of years is thus senseless. References: [1] point 15, p.63 in the *Baseline Study regarding Soil Impact Assessment*

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	357
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Bucuresti, 21.08.2006
RMGC internal unique code	MMGA_0734

Proposal

The questioner makes the following comments:The questioner warns that RMGC is lying when claiming that the soil of Rosia Montana is polluted and that ecological agriculture cannot be practiced. The study regarding the impact on the soil, Volume IV, clearly indicates on page 32, that the tests made upon the soil cover sampled from the Rosia Montana indicate no pollution with heavy metals.

Solution

The chapter "Soil pollution" from EIA is based on the results secured from the assays of soil samples (153 samples) collected from undisturbed profile and 70 soil samples collected from anthropic impacted areas.

A map with the sampling areas is attached to this document. Thus, it is obvious that soil samples have also been collected from the perimeter of the future open pits.

The chemical assays carried out on the 153 soil samples involved 21 indicators (water pH, NaF pH, $CaCO_3$, SB, SH, T, V, the content of organic matter, total nitrogen, heavy metals - Fe, Mn, Cd, Cu, Cr, Co, Pb, Zn - the content of mobile forms of phosphorus, potassium, aluminum). A total of 1521 chemical assays have been conducted.

The laboratory assays of the 70 soil samples from several areas impacted by mining works have surveyed the identification of 17 chemical elements considered as relevant for this activity (Mo, Cu, Ba, Ni, Mn, Zn, Pb, Co, Cd, Ag, Se, As, Sb, Sn, Be, V). As far as the assessment of soil fertility is concerned, the following parameters have been determined: humidity, pH, N – nitrate, C/N ratio, mobile phosphorus, and mobile potassium.

Based on the analysis of all available documentations:
"Environmental Balance Sheet - level II and Report on Environmental Balance Sheet – level II for CNCAF Minvest SA Deva – AGRARO, 2003"
"Study on Acid Base Accounting *(ABA)* for Roşia Montană area – Knight Piesold Limited, July 2001"
"Soil Baseline Report – ICPA, 2003"
the conclusions from the Chapter 4.4 "Soil" became evident.

Percentage repartition of soil samples (n=153) from Roşia Montană area, depending on the presence of heavy metals

Chemical element	Class of values			
	normal	Up to the limit of alert threshold (AT)	High, between the limit of alert threshold (AT) and intervention threshold (IT)	Above the limit of intervention threshold (IT)
Cd		97	1	2
Co		34	53	13
Cr	50	50	-	-
Cu	64	36	-	-
Mn	80	17	3	-
Ni	-	83	17	-
Pb	-	84	16	-
Zn	52	48	-	-

Percentage repartition depending on the charge / pollution degree with heavy metals of soils (Horizon A) from Roşia Montană area.

	Cd	Co	Cr	Cu	Ni	Pb	Zn
Loading degree: low			38.5			5.1	
average		5.1	56.4	46.1	7.7	51.3	25.6
high	2.6	10.3	5.1	43.8	15.4	33.3	51.3
very high	7.7		-		15.4	7.7	1.8
Pollution degree : low	76.9	66.7	-	2.6	53.8	2.6	10.3
average	12.8	17.9	-	-	7.7	-	-

Analyzing the data, it is evident that important percentages from all assayed samples (77% for Cd, 67% for Co and 54% for Ni) belong to a low polluting domain. In the case of other chemical elements Cr, Cu, Pb and Zn, most of samples belong to the domain ranging from low to high loading.

The conclusion resulted from the aforementioned information is that the soil cover is to a low extent geologically polluted with Cd, Co and Ni. To a great extent the soil has a level of loading with heavy metals equivalent to the pedo-geochemical background of the region, that means a larger quantity of heavy metals in this region than in an agricultural plane or hilly area where the parental material has a much lower content of heavy metals (subchapter 4.1.1 "Heavy Metals Polution" page 27 volume 13 EIA). At the same time, it is going to be difficult to acquire a certification for the products secured within this area, as being organic products.

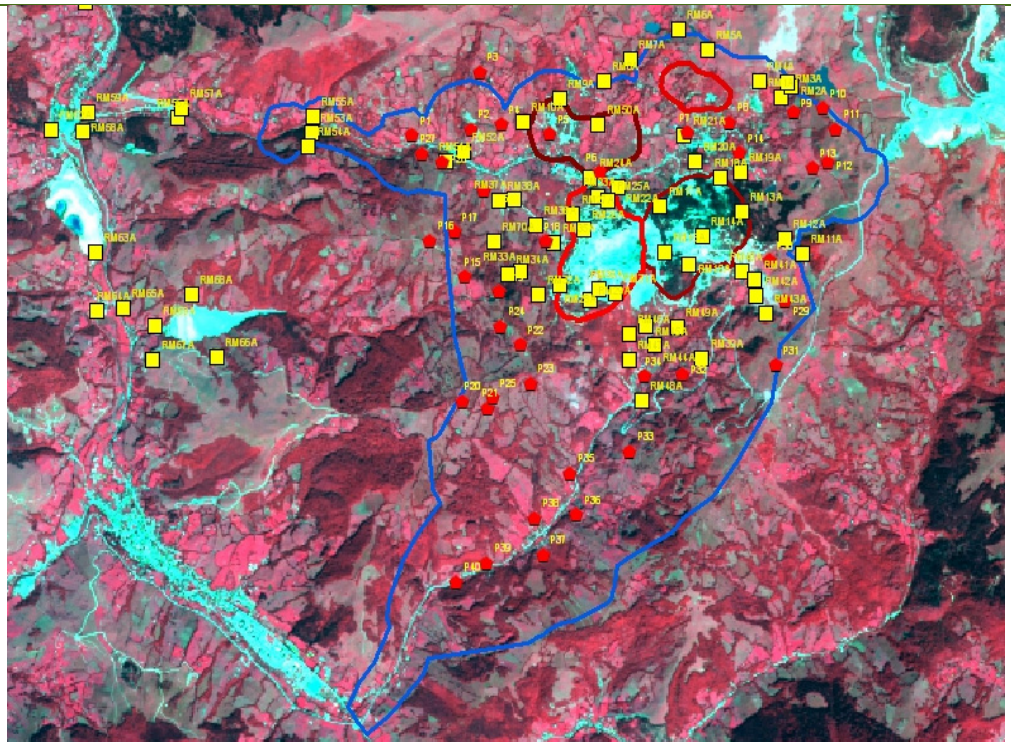
The analytic data of the content of heavy metals from the gold and silver ores bearing rocks indicate values slightly higher as compared to the Clark (concentration of an element in rock or mineral proportional with its content in earth crust). Thus, the values of the enrichment coefficient, which represents the ratio between the average value of the analytical data and the Clarck's value, points out that the analyzed rocks contain 3.4 times more Cd than the Clark's value, 1.75 times more Hg, 2.8 times more Pb and 1.64 times more Zn.

In waste rocks, the average values of the contents of heavy metals are lower for Cd, Pb and Zn and higher for Co as compared to the values of the same chemical elements from the ore bearing rocks. As a result, the enrichment factors will be: 2.08 (Cd), 1.81 (Pb), 1.40 (Zn) and 0.78 (Co).

The migration of these chemical elements from rocks into soil occurred at the same time with the alteration phenomenon of the rocks and formation of the soil horizons under the influence of the pedo-genetic factors. Due to the higher mobility of some heavy metals (Cd) or due to the affinity of some other metals for the organic component of the soil (Co, Ni), in soil a certain concentration of these chemical elements has been produced, as presented above, so that in average, their contents are higher than in rocks. Therefore, the average grade for Cd is 1.1 mg/kg, for Co is 28 mg/kg and for Ni is 44 mg/kg. If we report the average grade of these chemical elements from soil to the average grade from both rock categories (ore bearing and waste rocks) we will find out that the soil is richer in Cd 3.1 times, in Co 2.3 times and in Ni 1.8 times. The other chemical elements (Cr, Cu, Mn, Pb and Zn) **have been concentrated in soil in a less extent**, so that rocks are richer 1.3 times in Cr, 2.9 times in Mn, 1.1 times in Pb and 1.2 times in Zn.

Taking into account the abundance of these chemical elements in ore bearing rocks as well as in the waster rocks, and by taking into account the technology proposed for the project. There is a reduced chance that soil from areas that are not stripped will be polluted at an elevated level during the development of the construction and operational stages, in such a way that the emergency and response limits will be reached.

However, based on a certain analysis, one cannot state that Roşia Montană area is not suitable for extensive and intensive development of the organic agriculture. The overloading of soils with heavy metals (actually natural loading) cannot lead to an organic certification of the products obtained from these lands. The testing procedure for the products secured through the cultivation of the Roşia Montană lands will indicate a high content of heavy metals. It is normal that a part of the heavy metals naturally existing in Roşia Montană soils to be found again in plants.



The location of the soil profiles sampled from the impact area of the Roşia Montană project and from surrounding areas which have been sampled in order to be assayed.

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	425
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Bucuresti, 21.08.2006
RMGC internal unique code	MMGA_0917
Proposal	The bedrock that underlies the soil shows high levels of heavy metals and the company declared that, once the project ends, organic agriculture will be possible. The question is :how will this be possible, will the bedrock be completely replaced? Will the bedrock with high levels of heavy metals be completely excavated and replaced with new, unpolluted rock?
Solution	It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable. The current base-line conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities and mainly consists of 18 spoil piles and old tailings pond facilities. . They however do support a subsistence level of agriculture based primarily on producing hay (60 % of the industrial area PUZ 1,646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods. The organic farming is not possible in these areas even now due to the past mining activities and the landscape configuration. As a part of the Soil baseline study the experts (ICPA - the soil research institute) team has been evaluated the suitability of the land for different crops (please see the Chapter 4, Section 4.4 Soil, subsection Soils (Land) Suitability for Various Crops) and the conclusions of the assessment are that the suitability for pasture is good for hay meadows is above the average but for crops like potatoes the suitability is very low. After the closure of RMGC's mine, 584 hectares of the former industrial PUZ will be environmentally suitable for agricultural uses. Areas that do not contain extractive or other wastes from the mining project (or from previous mining activities in the area) and, therefore, are clear of all heavy metals and other hazardous substances, may be used for agricultural purposes like pasture and hay meadows. The chapter "Soil pollution" from EIA is based on the results obtained from the analysis of soil samples: 153 samples from undisturbed profile and 70 samples collected from antropic affected areas. A map with the sampling areas is annexed to this document. Thus, it is evident that the soil samples were collected also from the perimeter of the future open pits. The chemical analyses carried out on the 153 samples of soil included 21 indicators: **water pH**, NaF pH, $CaCO_3$, SB, SH, T, V, content of organic matter, total nitrogen, heavy metals (Fe, Mn, Cd, Cu, Cr, Co, Pb, Zn), content of mobile forms of phosphorus, potassium, aluminum. A total of 1521 chemical analyses were performed. The laboratory analyses of the 70 soil samples from several areas affected by mining works have determined 17 chemical elements deemed relevant for analyzed activity (Mo, Cu, Ba, Ni, Mn, Zn, Pb, Co, Cd, Ag, Se, As, Sb, Sn, Be, V). In the case of soil fertility evaluation, the following parameters have been determined: humidity, pH, N – nitrate, ratio C/N, mobile phosphorus and mobile potassium.

The conclusions presented in Chapter 4.4 "Soil" have been drawn reviewing the following documents:
"Environment balance sheet - level II and report regarding the environment balance sheet – level II for CNCAF Minvest SA Deva – AGRARO, 2003"
"Study regarding the ratio acid – base for Roşia Montană area – Knight Piesold Limited, July 2001"
"Baseline study concerning the soil impact evaluation – ICPA, 2003"

Percentage repartition of the soil samples (n=153) from Roşia Montană area, depending on the presence of heavy metals

Chemical element	Class of values			
	normal	Up to the limit of alert threshold (AT)	High, between the limit of alert threshold (AT) and intervention threshold (IT)	Above the limit of intervention threshold (IT)
Cd		97	1	2
Co		34	53	13
Cr	50	50	-	-
Cu	64	36	-	-
Mn	80	17	3	-
Ni	-	83	17	-
Pb	-	84	16	-
Zn	52	48	-	-

Percentage repartition depending on the charge/pollution degree with heavy metals of soils (Horizon A) from Roşia Montană area

	Cd	Co	Cr	Cu	Ni	Pb	Zn
Loading degree: low			38.5			5.1	
medium		5.1	56.4	46.1	7.7	51.3	25.6
high	2.6	10.3	5.1	43.8	15.4	33.3	51.3
very high	7.7		-		15.4	7.7	1.8
Pollution degree : low	76.9	66.7	-	2.6	53.8	2.6	10.3
medium	12.8	17.9	-	-	7.7	-	-

Analyzing the data, it is evident that important percentages from all analyzed samples (77% for Cd, 67% for Co and 54% for Ni) belong to a low polluting domain, while for the other chemical elements (Cr, Cu, Pb and Zn) the most of samples belong to the domain of low to high loading.

The conclusion resulted from those presented is that the soil cover is to a low extent geologically polluted with Cd, Co and Ni. To a great extent the soil has a level of loading with heavy metals equivalent to the pedo-geochemical background of the region, that means a higher quantity of heavy metals in this region than in a agricultural plane or hilly area where the parental material has a content by far lower of heavy metals [1].

For this reason, EU will not certify the products obtained in this area, on these soils, as being organic products.

The analytic data of the content of heavy metals from the rocks bearing gold and silver mineralization indicate values slightly higher as compared to the Clark's domain (concentration of an element in rock or mineral proportional with its content in earth crust). Thus, the values of the enrichment coefficient, which represents the ratio between the average value of the analytical data and the Clarck's value, points out that the analyzed rocks contain 3.4 times more Cd than the Clark's value, 1.75 times more Hg, 2.8 times more Pb and 1.64 times more Zn.

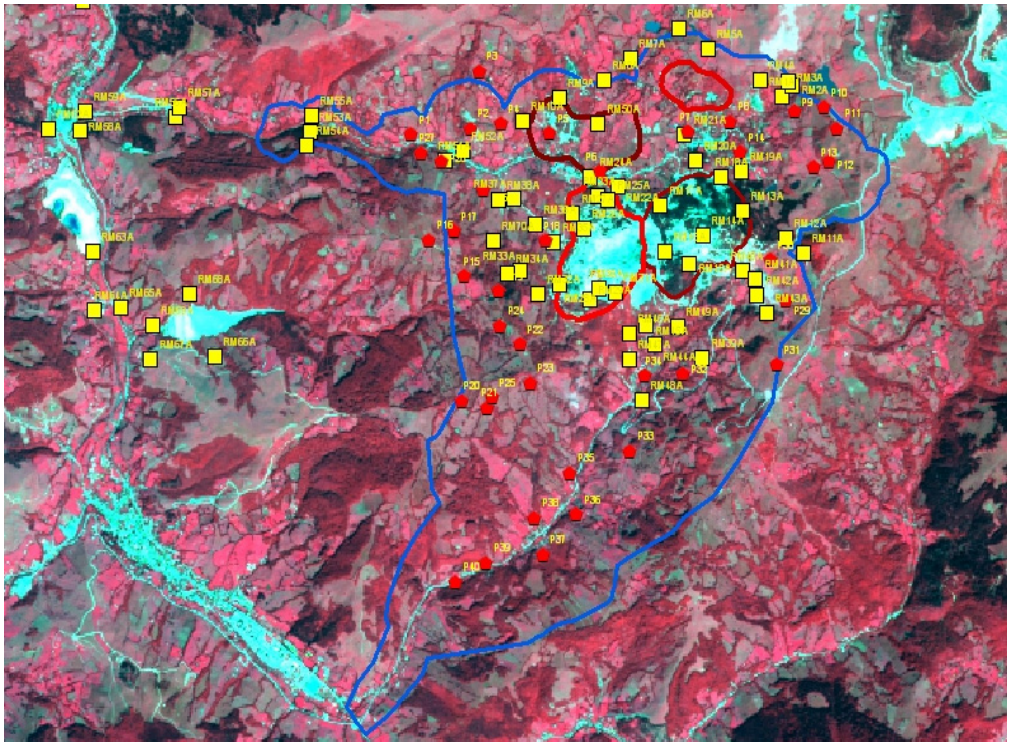
In waste rocks, the average values of the contents of heavy metals are lower for Cd, Pb and Zn and higher for Co as compared to the values of the same chemical elements from the rocks bearing mineralization. As a result, the enrichment factors will be: 2.08 (Cd), 1.81 (Pb), 1.40 (Zn) and 0.78 (Co).

The migration of these chemical elements from rocks into soil occurred together with the alteration phenomenon of the rocks and formation of the soil horizons under the influence of the pedo-genetic factors. Due to the higher mobility of some heavy metals (Cd) or due to the affinity of other metals for the organic component of the soil (Co, Ni), in soil a certain concentration of these chemical elements has been produced, so that in average, their contents are higher than in rocks. Thus, the average grade for Cd is 1.1 mg/kg, for Co is 28 mg/kg and for Ni is 44 mg/kg. If we report the average grade of these chemical elements from soil to the average grade from both rock categories (bearing mineralization and waste) we find that the soil is richer in Cd 3.1 times, in Co 2.3 times and in Ni 1.8 times. The other chemical elements (Cr, Cu, Mn, Pb and Zn) have been concentrated in soil in a less extent, so that rocks are richer 1.3 times in Cr, 2.9 times in Mn, 1.1 times in Pb and 1.2 times in Zn.

Having in regard the abundance of these chemical elements in the rocks bearing mineralization and waste rocks as well as the foreseen technology there is a little probability that the soil from the areas remaining un-stripped to be highly polluted during the construction and operation activities, so that to reach alert or intervention thresholds.

Based on this analysis, it is evident that Roşia Montană area is not a suitable land for the extensive and intensive development of the organic agriculture. The loading beyond normal limit of soils with heavy metals (natural loading otherwise) cannot lead to an organic certification of the products obtained from these lands. The testing of the products obtained through the cultivation of the Roşia Montană lands would indicate a content of heavy metals higher than the average necessary for their certification. It is normal that a part from the heavy metals existing in a natural way in Roşia Montană soils to be found again in plants.

For all that, a monitoring of the soil quality during the construction and mining works will be necessary.



The placement of the soil profiles from influence area of the Roşia Montană project and from surrounding areas sampled for analyses.

Even if the soils will be rehabilitated, inclusively through the covering of certain areas with rock and soil, nowhere it is stated that in Roşia Montană organic agriculture will be practiced.

References:
[1] Sub-chapter 4.1.1 "*Polluting with heavy metals*" – p.27. Vol.13 EIA

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	428
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Bucuresti, 21.08.2006
RMGC internal unique code	MMGA_0923
Proposal	The following comments and questions are to be answered:The impact study says that agriculture is not possible for the moment, but that it will become possible after the project ends. It will be even possible to develop organic agriculture. How is it possible to develop organic farming on a cyanide lake? What does organic farming involve? Using as much cyanide as possible for plant growing?
Solution	During mine operation, agriculture will not be permitted within RMGC's 1,646 hectare industrial PUZ which we will be using for mining activities. In this area, which notably already contains poorly managed open pits and waste disposal facilities from previous mining activities, no other type of development can take place until the operation is concluded and the impacts have been remediated. Setting aside sections of land for particular economic or residential uses is not uncommon. In the case of Roşia Montană, the establishment of an industrial zone and a surrounding buffer zone is necessary to ensure that impacts (i.e. noise, air, or physical hazards) from the operation do not affect anyone or anything outside the designated monoindustrial area. Areas that do not contain extractive or other wastes from the mining project (or from previous mining activities in the area) and, therefore, are clear of all heavy metals and other hazardous substances, may be used for agricultural purposes. The organic farming is not possible in these areas even now due to the natural soil enrichment in heavy metals.. As a part of the Soil baseline study the experts (ICPA - the soil research institute) team has been evaluated the suitability of the land for different crops (please see the Chapter 4, Section 4.4 Soil, subsection Soils (Land) Suitability for Various Crops) and the conclusions of the assessment are that the suitability for pasture is good for hay meadows is above the average but for crops like potatoes the suitability is very low. The mining operation will not create a "cyanide lake." Throughout the mine's operation, cyanide content in the tailings management facility (TMF) will comply with European standards (EU Mine Waste Directive 2006/21/EC). After mine closure, agriculture might once again be possible if local community will request in certain areas because of RMGC's Mine Closure and Rehabilitation Management Plan (Plan J in the EIA). The plan sets out a series of measures to ensure that the mine leaves as small an imprint as possible on Roşia Montană's landscape. These measures are as follows: • Covering and vegetating the waste dumps as far as they are not backfilled into the open pits; • Backfilling the open pits, except Cetate pit, which will be flooded to form a lake; • Covering and vegetating the tailings pond and its dam areas; • Dismantling of disused production facilities and revegetation of the cleaned-up areas; • Water treatment by semi-passive systems (with conventional treatment systems as backup) until all effluents have reached the discharge standards and need no further treatment; • Maintenance of the vegetation, erosion control, and monitoring of the entire site until it has been demonstrated by RMGC that all remediation targets have been sustainably reached. The mine's rehabilitation will meet or exceed the standards set by the EU Mine Waste Directive, which dictates that RMGC must "restore the land to a satisfactory state, with particular regard to soil quality, wild life, natural habitats, freshwater systems, landscape, and appropriate beneficial uses." According to our Mine Closure and Rehabilitation Plan, agriculture is not the preferred land use for the reclaimed tailings management facility (TMF) or other waste facilities (e.g., waste rock heaps). Rather, technical experts and, in some cases, regulatory authorities recommend alternative uses (such as a golf

	course, hiking trails, or other recreational areas). Agricultural activity on the tailings pond cover may disturb the engineered cover layers and compromise their functionality, and farming on waste repositories may be outlawed in Romanian legislation. At the end of project life time the local community will be involve in the final decision for further land destination, as a stakeholder during the public consultation stage of a final Mine Closure Plan.

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	428
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	Bucuresti, 21.08.2006
RMGC internal unique code	MMGA_0924

Proposal	Why is it not possible to develop agricultural activities now, but it will be possible after the mining project ends?
Solution	The RMGC mine impacts only 4 of Roşia Montană's 16 sub-comuna. Consequently, the vast majority of Roşia Montană's land will still be available for agriculture throughout the construction, operation, and closure of the mine. The organic farming is not possible in these areas even now due to the past mining activities and the landscape configuration. As a part of the Soil baseline study the experts (ICPA - the soil research institute) team has evaluated the suitability of the land for different crops (please see the Chapter 4, Section 4.4 Soil, subsection Soils (Land) Suitability for Various Crops) and the conclusions of the assessment are that the suitability for pasture is good for hay meadows is above the average but for crops like potatoes the suitability is very low. That said, RMGC has obtained a 1,646 hectare industrial PUZ which we will use for mining activities. In this area, which notably already contains poorly managed open pits and waste disposal facilities from previous mining activities, no other type of development can take place until the operation is concluded and the impacts have been remediated. Setting aside sections of land for particular economic or residential uses is not uncommon. In the case of Roşia Montană, the establishment of an industrial zone and a surrounding buffer zone is necessary to ensure that impacts (i.e. noise, air, or physical hazards) from the operation do not affect anyone or anything outside the designated monoindustrial area. After mine closure and the completion of RMGC's Mine Closure and Rehabilitation Plan (Plan J in the EIA), areas that do not contain extractive or other wastes from the mining project (or from previous mining activities in the area) and, therefore, are clear of all heavy metals and other hazardous substances, may be used for agricultural purposes (pasture and hay meadows). In total, 584 hectares of the former industrial PUZ will be environmentally suitable for agricultural uses. Please see Chapter 4.4. (Impacts on Soil) in our EIA for the specific areas. According to our Mine Closure and Rehabilitation Plan, agriculture is not the preferred land use for the reclaimed tailings management facility (TMF) or other waste facilities (e.g., waste rock heaps). Rather, technical experts and, in some cases, regulatory authorities recommend alternative uses (such as a golf course, hiking trails, or other recreational areas). Agricultural activity on the tailings pond cover may disturb the engineered cover layers and compromise their functionality, and farming on waste repositories may be outlawed in Romanian legislation. With the exception of the reclaimed TMF and the former waste facilities (which, as previously mentioned, cannot be farmed), the land is free to be rezoned in whatever way the community chooses. In accordance with Urbanism Law no 350 and the Mine Closure Manual, a new PUZ will be issued after mine closure and rehabilitation. The new PUZ will establish the new uses of the land, which may include agriculture-related development. All relevant stakeholders (i.e. local authorities, local communities, business communities, and NGOs) will participate in the decision.

Domain	SOIL
MMDD's item no. for the question which includes the observation identified by the RMGC internal code	1356, 1357
MMDD's identification no. for the question which includes the observation identified by the RMGC internal code	No. 110300/24.08.2006, No. 110302/24.08.2006
RMGC internal unique code	MMGA_1177

Proposal	What will be the economic losses caused by the fact that land use will bring irreversible alteration to the land?
Solution	It is important to keep in mind that only 25 percent of the land surface of the Roşia Montană community is required for the Roşia Montană Project – and that portion represents a small part of the arable land in the area. In fact, 1% of the overall area is arable. The current conditions at Roşia Montană as high-lighted in the base line reports in the EIA show that current soil conditions over most of the project impacted area are poor and in many areas polluted from historical mining activities which mainly consists of 18 spoil piles and old tailings pond facilities. They however do support a subsistence level of agriculture based primarily on producing hay (60 % of the industrial area PUZ 1,646 ha) to feed live-stock and a small amount of vegetable production. This level of agricultural however as shown in the socio-economic base line studies is only sufficient to provide a subsistence level of existence to the residents. Either pastoral agriculture has be conducted on a larger scale, meaning the displacement of most people in order for a select few to reach a sustainable levels of agricultural productivity or residents need to obtain outside work and sources of income to sustain their livelihoods. Areas that do not contain extractive or other wastes from the previous mining activities in the area and, are clear of all heavy metals and other hazardous substances, may be used for agricultural purposes. As a part of the Soil baseline study the experts (ICPA - the research soil institute) team has been evaluated the suitability of the land for different crops (please see the Chapter 4, Section 4.4 Soil, subsection Soils (Land) Suitability for Various Crops) and the conclusions of the assessment are that the suitability for pasture is good for hay meadows is above the average but for crops like potatoes the suitability is very low. The economic calculation for agriculture land loose may be done simply by two methods. The first is the calculation method of the Academy of Agricultural and Forestry Sciences (ASAS) which takes into account the number of reliability points of the land multiplied by number of hectares to which that note is applied, multiplied by the quantity (kg) for wheat (that means how many kg of wheat could be obtained from a class of similar quality – for example class V) and multiplied by the wheat price. Finally, the result is multiplied by the number of years when the respective surface will be taken out from agricultural circuit, in our case about 25 – 30 years. I put 30 years taking into account the monitoring period after the mine closure. As a simple exercise, I propose to consider that all soils which will be affected by project are of class I of quality, 30 t / ha of wheat can be obtained (that is exaggeratedly much), the affected surface is of 1,000 ha, the wheat price is USD 5 / kg and the taken out period from the agricultural circuit is 30 years. Therefore, the economic value would be 30,000 x 1,000 x 5 x 30 = $1.2 billion. This calculation is very far from true because all these values are utopian. The real value is by far smaller, because these lands are below the class I of quality for wheat. In fact, the real quality class is VI and in the best case only 1,000 kg / ha of wheat could be obtained, and wheat price is between $1 and $3 (as you know very well) and thus the economic value might be about $100 million in the best situation. The following paragraphs present conclusions regarding the suitability of the lands for various agricultural

crops and fruit growing [1]:

- *"For pastures* – The lands are suitable on only 157.56 ha (9.58%). These lands are situated within Roşia Montană area and on the right interfluve of the Corna valley;
    - The class IV is dominant with 314.60 ha (19.12%). These surfaces are situated preponderantly in the northern part of the perimeter;
    - Classes V and VI of suitability totalizing 751.38 ha (45.61%) are dominant within site. These lands are situated both on Corna valley and west and north of Cârnic – Cetate area;
    - The remaining lands are of low suitability (classes VII – X), totalize a surface of 298.19 ha (18.12%) and are encountered all over the site.
- *For hayfields* – The lands are classified in classes V – VIII of suitability, have a surface of 1,213.84 ha (73.71%) and are scattered all over the site.
    - Classes V – VIII are prevalent south of Cârnic – Cetate area and in the north-western part of the territory, while the class VII is encountered west and north of Cârnic – Cetate area;
    - Classes III and IV with a surface of 166.91 ha (10.15%) are preponderantly encountered to the north of territory and on the right interfluve of the Corna valley;
    - The lands from classes IX and X with a surface of 140.98 ha (8.57%) are frequently scattered in the northern part of the investigated perimeter.
- *For potatoes* – The lands are of very low suitability. Classes IX and X occupy a surface of 1,183.11 ha (71.85%). The other lands are classified within the classes VI - VIII of suitability, have a surface of 338.62 ha (20.58%) and are situated north of Roşia Montană area and on Corna valley's interfluves.
- *For apple tree* – The lands from the classes IX and X of suitability are dominant, having a surface of 1,083.74 ha (63.07%). Classes VI – VIII of suitability occupy about the third part of the territory with a surface of 482.99 ha (29.36%). The lands from these classes are scattered on the whole investigated territory"

Given the natural conditions (climate, relief, geology, soils) of the area, the categories of prevalent use of the lands are represented by natural meadows (pastures, hayfields) and forests. There are also the mining sites with depones, waste rock dumps and rock falls accumulated on versants or at their lower part.

In these circumstances, the land and soil management has involved the use of the natural resources for domestic purposes. The landowners use their lands and soils for grazing, breeding, hayfields, green and fodder hay [2].

We made the above utopian calculation in order to demonstrate that even in the case of this utopia (from economic point of view) it is preferable to have industry (mining industry) instead of agriculture, because only the Romanian State's benefit is $2.8 billion that means twice compared to utopian economic evaluation. Having the suitability notes from environment report you may perform as much calculations as you like depending on desired culture.

The second calculation formula would be the market value of one hectare from area. If the market value were $10,000 / ha (utopian price) we would have a value of $100 million.

What we have wanted to demonstrate with these two utopian examples is the fact that the land's value is very small as compared to the economic benefits provided by RMGC project.

References:

[1] Sub-chapter 3.3 "*Soils Suitability for Various Crops*" – p. 23, Vol. 13 EIA
[2] Sub-chapter 3.3 "*Types of Soil Management*" – p. 24, Vol. 13 EIA