



Determination of Consciousness and Awareness of the Public in Lefka about the Cyprus Mining Corporation (CMC)

Şerife Gündüz, Can Erbulut, Behcet Öznacar & Mert Baştaş
Near East University, North Cyprus

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Supporting the increase of environmental consciousness with environmental education is always important in order to make healthy recommendations specific to the countries. Aim of this study is to determine the awareness and consciousness of the local community against the environmental pollution caused by the CMC mine by survey technique. 123 participants took part in this research on a voluntary basis. From 1913, the copper mine mineral ore industry in Karavostasi, Lefka was carried out by a Cypriot mining company, Cyprus Mining Corporation (CMC). After it was terminated in 1974 and all the wastes during the operation process were left alone, forming a death valley. In Karavostasi, there are ore wastes, chemical wastes, scraps from the termination of the factory, recumbent between the sea and mine operation and mineral stratum which increase the environmental problems every passing day and polluting Eastern Mediterranean specifically and all of the Mediterranean in general causing an increase in pollution and threatening biological life. Wastes poured into the sea without any supervision during CMC operation caused the region and the beach to be polluted significantly. The answers participants have given to the questions in the survey has shown that the environmental pollution caused by CMC where they live, is the most important environmental problem. Second most important environmental problem was found as water and sea pollution.

Keywords: heavy metals, CMC, environmental education, environmental consciousness, environmental awareness

INTRODUCTION

History of the copper mine operation located at Lefka area, near the Karavostasi Port in Turkish Republic of Northern Cyprus, dates back to 5000 years ago from today (Altınbaş, Erdem, Oktay, 1999).

Contemporal operation of the mineral stratum located near Karavostasi area, approximately 40 km west of the capital of Turkish Republic of Northern Cyprus,

Correspondence: Mert Baştaş,
Department of Educational Administration, Faculty of Educational Science,s Final
International European University, Northern Cyprus, Via Mersin 10, Turkey.
E-mail: mertbastas@yahoo.com
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Nicosia, accelerated with the mineral researches of Charles Gunther and American Phillip Wiseman on the year 1913 (Lavendar, 1962; Bear, 1963). CMC (Cyprus Mining Corporation) was established on 1916 and processed mines until 1974. In the early years of establishment, the company processed the copper mineral in Skouriotissa and started to extract copper ore (Cohen, 2002). As the result of continuing mineral researches, underground mine located in Mavrovouni has started to be operated in 1926. CMC operation covers approximately 1566 decares to the southeast of Karavostasi. The CMC operation is located at 300 m above the sea level and Lefka, the largest settlement near the area, is located at 200 m above the sea level. It can be said that the land is mostly used for agriculture except for city centres (Cohen, 2002). Minerals mined there were being transferred to Karavostasi Port by newly built railroad, to be transported over the seas. CMC constructed the first factory to separate ore dust by floating in Karavostasi in 1930 (Wilson and Ingram, 1959).

Around the 1930s, copper sales around the world markets and therewith, CMC started focusing on gold and silver. A cyanide factory was constructed to process mined gold. Gold and silver production and export continued until 1942 and the cyanide factory was shortly after Second World War. By the end of 1930s, CMC had found a new market for pure pyrite (FeS_2) and this sulphur rich mineral which was produced by floating technique, started to be exported as from the year 1930. A new factory with a production capacity of 200,000 tons per month was also constructed in the area (Cohen, 2002).

Around 1941, mine operations in Skouriotissa were halted due to technical difficulties and focused more on Mavrovouni area. Excavations in Skouriotissa were resumed in 1962. Acid-wash and sulfuric acid-production factories started operating in Karavostasi. These factories were used to produce pure sulfuric acid from pyrite and use the acid to wash the flattened copper compounds by floating technique (Cohen, 2002).

Because of the politic course of events in 1974, CMC shut down the factory in Karavostasi and left the island leaving all the structures, waste pools and all other residue, cheek by jowl with the environment. An Italian company named Komatex came into the area, processed some of the waste pools and began producing pyrite in 1981. Karavostasi Port was damaged badly by a ship crash in 1985, the sea became polluted and the Italian company shut down the operation. According to a report, a Turkish company named Turuva Ltd., came and sold the previously produced 10000 tons of pyrite to Akdeniz Gübre Companies in 1988 (Kurusakız and Uğur, 1999).

Pyrite production stopped after the drop in rates. Even though the reports compiled by official institutions anticipated the leftover facilities to be “preserved”, they were salvaged and sold as scrap. Because of the senseless disassembly process, facility drainage and wasteway systems were damaged, and wastes stored in the area caused heavy metal pollution in the sea and environment which resulted in a serious threat to the ecosystem (Port ISBI, 2008).

State of the literature

- The purpose of this study is to determine the awareness and consciousness of the local community against the environmental pollution caused by the CMC mine.
- In the region where the study is carried out, there are ore wastes, chemical wastes, scraps from the termination of the factory, recumbent between the sea and mine operation which increase the environmental problems every passing day and polluting Eastern Mediterranean
- There has not been any research carried out in the region of Lefka about CMC until now. This is the first research to be published on this subject for the aforementioned region.

Contribution of this paper to the literature

- According to the research, participants have specified the pollution caused by CMC as the most important environment problem in the area.
- Local community has shown their indifference by eating the fish around the region without any concern even though they knew about the water, soil, CMC and heavy metal pollution's effects on their health.
- This study points out the level of awareness and consciousness of the people in Lefka region about CMC. It is taught that this study will also provide an insight for civic ecology studies in the future.

CMC area, left without any intervention for a long time, was declared a Free Zone after it was conjoined with TRNC Ministry of Economics, Free Port and Regional Administration by the amendment law no: 37/2002 which was prepared to let private sector into TRNC Free Port and Zones, dated 28.05.2002. CMC area and 100 decare of empty field in Famagusta Free Port and Zone was leased to Doba Investments company for 49 years after the auction organised by the Region Administration, in March 2003 (Port ISBI, 2008).

Port ISBI Cyprus Free Zone Marine & Logistic Services Ltd. became the leaseholder – operator, instead of Doba Investment Ltd. which was mentioned as the leaseholder – operator in the prime contract, by a supplemental contract to resolve the disagreements emerged in the prime contract between Doba Investment Ltd. and the board of directors on 26.6.2003 with mutual covenant of Port ISBI Cyprus Free Zone Marine & Logistic Services Ltd. by the S(K-11) 1591-2007 numbered T.R.N.C. Council of Ministers’ Decision dated 22.08.2007 (Port-ISBI Tadil Sözleşmesi, 2007).

METHOD

Research design

The research was designed according to relational screening model which is one of the quantitative methods. In relational screening model aims to determine existence and/or degree of a covariance between two or more variables (Karasar, 2009). These kinds of research can provide an opinion about a cause effect relationship to the researchers but it can never be interpreted as a cause effect relationship. Corelation researches are important research types which discloses relations between variables, specifies the degrees of these relations and provides clues required to do higer-up research about these relationships (Büyüköztürk and others, 2008).

Population and sample / research group

Population for the research is the community of Lefka living in the Cyprus Mining Corporation (CMC) zone between 2014 and 2015. The sample for the research is the 123 people selected randomly and took part in the research on a voluntary basis (See Table 1).

Data collection tool and/or techniques

Survey was used as the data collection tool in this research. Before the used data collection tool was developed, literature about the subject (thesis, papers, reports, books, scientific research, etc.) were surveyed to form the fundamental structure and achieve the research purpose; thus forming the conceptual structure and main frame of the data collection tool.

Data analysis

Every answered given to the questions by the participants in this research were

Table 1. Demographic properties of participants in the survey

	GENDER			EDUCATION				Total
	Man	Woman	Total	Primary	Secondary	Uni.	M.S.	
Primary	6	6	50	15	19	12	21	50
Secondary	34	34	73	26	19	19	12	73
University	62	62	50	14	9	25	21	50
Master’s Degree	21	21	73	5	5	6	21	73
Total	123	123	123	71	59	70	35	123

analysed by quantitative method. Data acquired from the survey results were analysed in computer environment by using SPSS 15. Whether consciousness and awareness status to environment problems caused by CMC of the participants varies by gender were determined by unrelated t-test, whether it varies by education status was determined by ANOVA, Scheffe Test and Post Hoc test. Furthermore, frequencies and percentages were used to determine the environment education sufficiency of the local community.

Adaptation of scale and validity-reliability study

Cronbach Alpha value was calculated for the reliability study of the data collection tool. Items that may lower the scale's Cronbach Alpha value were discarded and the final state of the scale was constituted.

With the purpose of ascertaining the content validity, expert opinions were taken, open and understandable language was used and using ambiguous statements were avoided when creating the statements related to dimensions. Items in the scale prepared to determine the construct validity and reliability were decreased to 30 from 35 depending on the analysis results. Cronbach Alpha Reliability Coefficient was found as 0.915. This value is considered sufficient considering the reliability of the scale according to literature (Gall and others, 2003).

RESULTS

In this study, questions about the pollution caused by the CMC mine in Azerbaijan were asked to the local community in order to determine their environmental information degrees. When the answers were inspected, it was found that the right answer percentage of women and men were 59.3 % and 40.7 % respectively (Table 2).

According to Table 2, there is a significant difference between the education status of people who think enough importance is given to environment and who think our country is rich enough to allocate funds to protect nature. This difference is between primary school and secondary, university and master's degree. While people who have been educated only have primary school education thinks that the environment is given enough importance, other education groups does not agree with this school of thought.

As seen on Table 3, the percentage of people had cancer sourced health problems are 40.7% and people did not are 59.3%. Even the percentage of people didn't have any cancer sourced health problems are higher than the people that did, the percentage of people who had this problem are high enough that it cannot be ignored.

When the Table 4 is evaluated, the participants determined that the most important environmental problem in their region was CMC with a percentage of 73.2. Second most

Table 2. Comparison of correct answers by gender to the environmental information questions (ANOVA)

	Primary		Secondary		University		Master's		P
	N	X	N	X	N	N	X	N	
1. Environment in our country is valued enough.	6	2,16	34	4,32	62	4,01	21	4,42	*0,001
2. We are a rich enough country to allocate funds on protecting nature.	6	4,16	34	3,61	62	2,72	21	2,19	*0,001
3. I don't warn someone when he/she is polluting the environment because cleaning the environment is municipality's duty and we pay taxes for it.	6	1,66	34	2,23	62	1,90	21	2,09	0,629
4. I share my knowledge about the environment with my friends.	6	1,66	34	2,14	62	1,75	21	1,76	0,188
5. I prefer ecocredential products even if they are more expensive.	6	2,83	34	2,26	62	2,03	21	1,71	0,092
7. I believe we have enough education to become conscious about the environment pollution.	6	4,00	34	3,26	62	2,61	21	2,14	*0,001

important problem was the water/sea pollution with 27.6%. Third most important problem was both domestic waste and water/sea pollution with 15.4%. Lefka local population seems feel uncomfortable to a large extend with CMC pollution.

Because more than one choice can be marked, total frequency and percentages are above 100% according to Table 5. Most important information source about the CMC for the local community of Lefka are the newspapers with a percentage of 63.4, according to Table 5. Second most important information source are non-governmental organizations with 59.3 percent. Radio/TV, internet and declerations prepared by official sources follow the two information sources before with percentages of 53.7 and 27.6 respectively. Studies done by relevant department was the most inefficient information source.

While 50.4 percent of the people participating in this study attended to scientific studies like seminars, panels, conferences, 42.3 percent of them did not. Even if a 50.4 percent attendance cannot be underestimated, in a region where environment pollution is a big problem, it was anticipated to have more involvement in the matter (See Table 6).

Table 3. Distribution of the sample by cancer sourced health problems in family

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	50	40,7	40,7	40,7
No	73	59,3	59,3	100,0
Total	123	100,0	100,0	100,0

Table 4. Environmental problems had by the participants in their region, distributed by order of importance

	Air Pollution		Domestic Waste		Industrial Waste		Noise Pollution		Water/Sea Pollution		No Environmental Problems		CMC		Other	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1.	8	6,5	11	8,9			3	2,4	4	3,3	3	2,4	90	73,2	4	3,3
2.	23	18,7	16	13,0	10	8,1	4	3,3	34	27,6			7	5,7	2	1,6
3.	12	9,8	19	15,4	16	13,0	14	11,4	19	15,4			4	3,3	2	1,6
4.	12	9,8	19	15,4	17	13,8	9	7,3	8	6,5			1	.8	2	1,6
5.	15	12,2	9	7,3	4	3,3	11	8,9	10	8,1			2	1,6	3	2,4
6.	5	4,1	3	2,4	7	5,7	16	13,0	8	6,5	2	1,6	1	.8	4	3,3
7.	2	1,6					3	2,4			2	1,6			13	10,6
8.															2	1,6
Total	77	62,6	77	62,6	54	43,9	60	48,8	83	67,5	7	5,7	106	86,2	32	26,0

Table 5. Information references of participants about CMC

	Frequency	Percent (%)
Newspapers	78	63,4
Radio/Television	66	53,7
Declarations prepared by official sources	34	27,6
Studies done by the relevant department	16	13,0
Non-governmental organisations	73	59,3
Internet	34	27,6
	Total Freq: 301	Total % :244,6

Table 6. Distribution of the sample by attending scientific studies like seminars, panels, conferences

	Frequency	Percent	Valid Percent	Cumulative Percent
Completely Agree	28	22,8	22,8	22,8
Agree	34	27,6	27,6	50,4
Undecided	9	7,3	7,3	57,7
Disagree	44	35,8	35,8	93,5
Completely Disagree	8	6,5	6,5	100,0
Total	123	100,0	100,0	100,0

Table 7. Distribution of the sample by the knowledge about the harmful effects of heavy metals on health

	Frequency	Percent	Valid Percent	Cumulative Percent
Completely Agree	64	52,0	52,0	52,0
Agree	34	27,6	27,6	79,7
Undecided	13	10,6	10,6	90,2
Disagree	5	4,1	4,1	94,3
Completely Disagree	7	5,7	5,7	100,0
Total	123	100,0	100,0	100,0

Table 8. Distribution of the sample by the discomfort felt by the CMC sourced pollution in Lefka region

	Frequency	Percent	Valid Percent	Cumulative Percent
Totally Agree	67	54,5	54,5	54,5
Agree	25	20,3	20,3	74,8
Undecided	5	4,1	4,1	78,9
Disagree	9	7,3	7,3	86,2
Totally Disagree	17	13,8	13,8	100,0
Total	123	100,0	100,0	100,0

Table 9. Distribution of the sample by preference of ecocredential products even if its more expensive

	Frequency	Percent	Valid Percent	Cumulative Percent
Definitely Agree	43	35,0	35,0	35,0
Agree	45	36,6	36,6	71,5
Undecided	23	18,7	18,7	90,2
Disagree	6	4,9	4,9	95,1
Definitely Disagree	6	4,9	4,9	100,0
Total	123	100,0	100,0	100,0

According to Table 7, 79.7 percent of the participants stated that they know the harmful effects of heavy metals on health.

74.8 percent of the participants are in discomfort by the pollution caused by CMC according to Table 8. This percentage is very high. It is thought that the studies being done to resolve the discomfort of the community should be accelerated.

71.6 percent of the participants have stated that they prefer ecocredential products even if it is more expensive according to Table 9. Still on the subject of environment, every person of the community has an individual responsibility for nature. This is why the sum of people who are undecided and who are preferring money over environment being 28.4 percent gave rise to thought about the importance given to the nature.

A statistically significant difference was found between participants who believe they have taken enough education about the environment and their education status according to Table 10. According to the Scheffe test, this significant difference is between participants who have primary school and master's degree education, and between participants who have secondary school and master's degree education. Participants who have a master's degree believe that they have enough education about environment

Table 10. Distribution of people believing that they have taken enough education about the environment by the education status

	Primary		Secondary		University		Master's		P
	N	—X	N	—X	N	—X	N	—X	
I attend to scientific studies like seminars, panels, conferences.	6	2,33	34	2,94	62	2,87	21	2,23	0,176
I attend to the works of voluntary organisations about the environment.	6	1,66	34	2,91	62	2,98	21	2,28	0,06
Environmental problems draw my interest.	6	1,16	34	1,94	62	1,16	21	1,52	0,075
I believe I have taken enough education to become more conscious about the environmental pollution.	6	4,00	34	3,26	62	2,61	21	2,14	*0,001
We have conversations about the environment in our family.	6	2,00	34	2,20	62	2,11	21	1,95	0,849

Table 11. Distribution of participants who think that environment is given enough important and that our country is rich enough to allocate funds to protect nature by their education status

	Primary		Secondary		University		Master's		P
	N	—X	N	—X	N	N	—X	N	
Environment is given enough importance in our country.	6	2,16	34	4,32	62	4,01	21	4,42	*0,001
We are a rich enough country to allocate funds to protect nature.	6	4,16	34	3,61	62	2,72	21	2,19	*0,001
I don't warn someone when he/she is polluting the environment because cleaning the environment is municipality's duty and we pay taxes for it.	6	1,66	34	2,23	62	1,90	21	2,09	0,629
I share my knowledge about the environment with my friends.	6	1,66	34	2,14	62	1,75	21	1,76	0,188
I prefer ecocredential products even if they are more expensive.	6	2,83	34	2,26	62	2,03	21	1,71	0,092

and participants who have primary school education stated that the education they have about the environment is not enough.

There is a statistically significant difference between participants who think that the environment is given enough importance in our country and participants who think that our country is rich enough to allocate funds to protect nature according to Table 11. According to Scheffe test, this difference is between the participants who have primary school education and participants who have secondary school, university and master's degree education. While participants who have primary school education think that enough importance is given to the environment, other education groups do not agree with this school of thought.

DISCUSSION AND CONCLUSION

Results and suggestions acquired from this study are explained below based upon the results of the research. According to the research, percentage of participants who have cancer originated health problems in their families are high. Since cancer originated health problems are multi-factorial diseases, it should not be thought that Cyprus Mining Corporation (CMC) is the only reason for them.

Surveys filled by participants have specified the pollution caused by CMC the most important environment problem. Second most important problem was found as water and sea pollution. When it is thought that the water and sea pollution is also an environmental problem caused by CMC, it can be realized how big an environment problem CMC has caused. Local community discussing the CMC issue between them, affecting their lives and them living together with the CMC in the region has caused discomfort.

Local community has obtained the most information about the CMC on the newspapers. Non-government organisations, radio/television was also effective during this period. Related department, Lefka Municipality and Lefka European University (LEU) were insufficient with the studies and declarations they made and are criticized by the community. This situation also caused the community to lose trust in the ministry, municipality and LEU. Lack of interest from these institutions and the works of non-government organisations has increased the faith and trust in the civilian community.

Even though Lefka community explicitly mentioned their complaints about the environment, they haven't shown the required sensitivity to studies like seminars, panels, conferences and to deeds like environmental activities and voluntary works. It was also found out in the research that the community was uninvolved in these kind of activities and studies because they did not believe that they could change anything by themselves, which was a result of community finding the precautions taken by the state insufficient.

Local community has shown their indifference by eating the fish around the region without any concern even though they knew about the water, soil, CMC and heavy metal pollution's effects on their health.

It was found that there is a statistical difference between gender and environmental problems being talked in family. Statistically, men are talking about this issue partially more than women. There also was a statistically significant difference between gender and idea of environment being given enough importance in our country. Statistically, men think that the environment is given enough importance partially more than women.

There also was a statistically significant difference between gender and using ecocredential products. On this issue, women are more conscious than men. Men were found more pessimistic than women in the research, about the pollution being completely cleansed with precautions the state is taking.

Between the education status and the belief of having enough education to be conscious about the environmental pollution, there was also a statistically significant difference. Participants with a primary school education do not believe that they have enough education to be conscious about the environment. Participants with a master's degree believe that they are conscious enough about the environmental awareness. Evaluating these results, it can be seen that the environmental awareness and education are in a linear relationship and how important education is.

There is a statistically significant difference between the education status of participants who believe that the environment in our country is given enough importance and participants who believe that our country is rich enough to allocate funds for the protection of nature. The difference was found between the participants who have primary school education and participants who have secondary, university and master's degree level of education. Participants who have primary school education think that the environment is being given enough importance whereas the other education groups does not agree with this school of thought.

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