

This is a summary translation of the news item wired by Xpress newsagency on January 10, 2000 outlining the results of a follow up report by Middle Eastern Technical University (METU) researcher Dr Aysel Altimtay about the environmental catastrophe in Lefke. This report followed up that of Ege University experts.

The reports were funded by the Lefke Environment and Promotion Association to quantify the extent of contamination in the region. This came after many initiatives by the association to raise awareness of this issue and after a variety of newspaper reports.

Dr Aysel Altimtay is a professor of environmental engineering in Middle Eastern Technical University (METU) in Ankara, Turkey. The main point of her report is that any products of farming specially those plants whose leaves are eaten are a very serious poisoning threat to the public. The farming mentioned here uses the water containing heavy metals including traces of cyanide because of the leaks from the waste from the region. Considering other environmental problems in the region due to the Cyprus Mining Company (CMC) waste the report calls the region a “Death Valley”.

Cyprus Mining Company (CMC) left behind poisonous waste which is leaking into Lefke water damn. Farming using the water from the damn and other water resources in the waste areas is poisoning people because there is no serious action by the north Cyprus authorities to stop this practice or to contain the waste.

Both reports contained serious warnings that the water from the water damn should absolutely not be used for farming or other purposes. However, farming using not only that water but also using water from the wells right next to thirty thousand (30.000) tonnes of cyanide containing waste continues.

According to the experts, a minimum of 500million US dollars is necessary to contain the waste. However, the amount reserved for “waste cleaning” in TRNC 2001 budget is only 5 billion TL (about \$7200 with January 2001 exchange rate).

Once questioned by press the producers revealed that several representatives from the Ministry of Agriculture visited a couple of producers and “advised” them not to produce “plants whose leaves are eaten” using the water from the damn. This is a very “interesting” approach by the authorities who are scared of the reactions by the producers. They are only giving “advice” to the producer without any serious enforcement or any warnings to the consumers. The well-being of the consumers obviously comes after that of the producers!

The situation around the damn requires no special study to reveal the frightening extend of the poisonous content of the water. The damn which is in a

valley surrounded completely by heaps of waste (rather large hills) is separated from the waste region by a earthen wall which is in a totally useless condition. The wall has not been maintained for the last three decades or so and is leaking into the damn. The water body which is supposed to be a resource for natural life has contaminated the surroundings to the extend that it is impossible to find a single wild plant there. The birds must be smarter than the human beings who insist on farming using this water that there is not a single bird drinking the water in a water hungry place like Cyprus!

We can now take a look at the extracts from the report to quantify the extent of contamination in the region.

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We investigated eight plant samples taken by TRNC National Laboratory for their October, 28, 1999 report from Gemikonagi Mining Processing Units at various dates. Furthermore, we took three samples from outside the CMC units in areas where we believe there was no metallic contamination. The analysis results are shown in Tables 1,2,3. It is clear from these results that the heavy metals contained in these plants can be passed to the humans who consume these plants directly or indirectly by consuming meat or dairy products of animals feeding off these plants.”

THE SITUATION OF THE DESERTED MINNING AREAS AND THEIR EFFECTS ON THE ENVIRONMENT

The minning area in Karadagh region contains open area and underground minning and Maden Deresi region contains undeground minning facilities.

The minerals like pirit, calcopirit, galena etc (translation of scientific names necessary) that exist densely in these regions would react with rain water and atmospheric oxygen to produce acidic byproducts. The water contaminated by these minerals flows through the surface to water collection areas (e.g dams, wells) or mixes directly into the underground water.

GEMIKONAGI DAMN AND ITS POLLUTION

Gemikonagi damn that is in the region fed by the stream known as “Mine Stream” (Maden Deresi) on the mine waste containment (istihsal?) plate was built in 1994 for providing irrigation water for farmers. The water containment capacity of Gemikonagi damn is around 4 milyon m³ with an irrigation region of 130 hectares. The hills surrounding the damn mainly consist of mine waste. It also feeds two main water wells. These wells were originally built to provide drinking water to the town of Lefke however due to acidic water drainage they are now being used for agricultural irrigation.

During this period we took 17 water samples from the streams fed by Trodos Offiyolit Complex and water ponds rich of minerals. The analysis results are given in Table 5.

We should stress the sample number 11 from the water pond in Mine Stream (Maden Deresi) region. This sample was taken from the water pond which is only 8-10m away from the water filled reserve of the damn. It contains 408.0 ppm iron (Fe) and 59.50 ppm copper (Cu) with a pH of 2.42. It is clear that it should not be used as drinking water or for agricultural irrigation.

AGRICULTURAL POLLUTION DUE TO THE DAMN

We conclude from analysis results that since Gemikonagi Damn was activated for agricultural irrigation it has created a great deal of pollution due to the heavy metals from the mine waste. Our analysis of the soil in the irrigation areas of the damn shows that substances such as copper (Cu), iron (Fe), manganese (Mn), zinc (Zn) that plants intake are above the critical levels in the soil (see Table 6.). If we consider the heavy metal accumulation in plants whose leaves are eaten the dangers become alarming.

The report done under the coordination of Dr Umit Erdem approximates that there are around 8 million tonnes of waste effecting a 500 km² area. The same report also notes that investigating the vegetation cover of the region strikingly shows an extraordinary density of Acacia Cyanophylla (Cyprus Accasia) in the CMC facilities. As seen by their names, these plants like high levels of *cyanide* intake and are attracted to those regions.

The analysis results given in Table 8. indicate a substantial acid leakage into the sea water. Unfortunately, these numbers are way above the acceptable norms for environmental health. One should also note here that the conductivity of the sea-water is very high due to the high salt content.

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GENERAL IMPRESSIONS

Gemikonagi CMC waste is above everything a legal problem. It is very important to take the issue to international legal bodies. It endangers Eastern Mediterranean countries like Cyprus, Turkey, Israel, Egypt, Lebanon, Greece and Italy and also Mid-Mediterranean countries. Investigations carried before the mentioned studies showed that accumulation of heavy metals such as arsenic and barium is a serious problem in Eastern Mediterranean. Extensive risk analysis is absolutely necessary prior to any agriculture, water usage, animal grazing and even for human visiting.

The studies show that the pollution are is much larger than the stated amount of around 2000 donums (1 donum=?), if we consider all the pollution effects. We have to consider the long-term effects seriously. In reality, there is an enormous amount of contamination region ongoing in the region that we could call “Death Valley”.

This environmental catastrophe should be considered as a global problem not limited to Cyprus. In the named region, many indigenous life-forms including the shore eco-system has been exterminated.

According to Dr H. G. Barth, the rehabilitation of a catastrophe of these dimensions in Germany would start with a budget of 500 million US dollars. If left uncontrolled in the open, the polluters in the region would cause extraordinary damage. It is very clear that the water dam was built on the most improper location. At least an area of 100 km² is under extreme region considering water, soil, underground and surface pollution.

Another point that escapes attention is the vegetation cover that accumulates these heavy metals and is not sold as agricultural products. In these regions, domestic animal grazing continues endangering human health. Table 6. clearly indicates the pollution of the soil.

Note: The tables below are translated, therefore, the technical terms used may not be very accurate.

Table 1 : Analysis Results

Sample Location	Sample	Sample amount (gr)	Al (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Mn (mg/kg)
Plant samples from CMC Gemikonagi Mining facilities	^a ifa otu 1	2.5770	195.03	15.50	63.72		39.43
	^a ifa otu 2	2.7391	185.28	16.53	75.32		38.92
	Pire otu 1	2.3499	207.41	3.24	77.28		27.55
	Pire otu 2	2.3497	213.01	10.42	58.60		32.14
	Gabbar 1	3.3694	48.79	0.79	7.13	70.04	
	Gabbar 2	3.5786	43.59	0.65	7.37	60.58	28.11
	Ayrelli 1	2.3219	44.02	1.02	3.34		8.66
	Ayrelli 2	2.2342	43.13	0.86	3.90		9.38
	Akasya 1	2.3048	115.80	1.25	11.34	96.93	43.65
	Akasya 2	2.3749	89.39	1.20	11.26	96.68	43.24
	Ayrýk otu1	2.0807	149.71	2.11	6.07	164.51	63.44
	Ayrýk otu2	2.1228	204.02	3.26	46.17	164.83	42.91
	Kuzu otu 1	2.0349	234.56	6.51	5.32	163.74	69.14

Kuzu otu 2	2.0045	391.47	2.87	9.14	226.29	69.99
Çatýrez 1	2.0403	64.11	1.33	0.42	52.10	12.86
Çatýrez 2	2.0178	63.14	2.25	17.55	180.74	17.44

Plant samples from areas considered uncontaminated, "clean"	^a ifa otu 1	2.3119	618.11	32.05	7.43	0.33	14.78
	^a ifa otu 2	2.3905	648.82	22.40	10.57	0.26	9.54
	Pire otu 1	1.9515	67.38	1.04	3.99	176.33	7.35
	Pire otu 2	2.4124	121.99	1.37	4.39	102.84	7.68
	Gabbar 1	2.3339	82.95	0.89	5.49	82.99	11.48
	Gabbar 2	2.7112	70.49	0.66	4.74	77.42	9.93

(Source: TRNC National Laboratory report on October 28, 1999 Halil Çađnan, Head of Radiation and Environmental Analysis Section..)

Table 2 : Carcinogen Heavy Metals From Leaves, Carcinogen Heavy Metals from Soil

Sample Location (farm) and type	Zn (ppm)	Cr (ppm)	Cd (ppm)	Pb (ppm)	Ni (ppm)	Depth (m)	Zn (ppm)	Cr (ppm)	Cd (ppm)	Pb (ppm)
Azer Baycan						0-10	217.5	11.3	1.17	16.3
Tangerine Leaf	15.0	6.0	0.90	14.5	5.3	10-28	132.5	9.2	1.02	12.5
Altan Öksüz						0-14	92.5	11.5	0.93	45.0
Orange Leaf	10.0	26.0	0.95	16.0	4.9	14-40	92.5	20.3	1.12	23.8
Mehmet Özakdenizli						0-14	87.5	25.9	1.07	22.5

Bean Leaf	27.0	2.0	0.48	22.5	5.3	14-33	80.0	4.5	0.78	11.3
Özdemir Panlýdađ						0-14	67.5	22.3	1.76	27.5
Cabbage Leaf	17.0	4.0	0.55	7.3	3.5	14-32	55.5	2.3	1.85	26.3

Table 3: The health summary of some heavy metals found or expected to be found in Lefke Mine waste ponds

Carcinogen Heavy Metal Type	Amount measured in waste pond* ppm	Permissible amount in waste ppm	Permissible amount in drinking water ppm	Permissible amount in fish ppm	Permissible amount in irrigation water ppm		Chronic dangers on humans if consumed via drinking water or fish
					Sand	Clay	
Cadmium	range:1.0-1.5 mean:1.2	1.0	0.01	0.1	0.05	2	Lung Cancer, Reproductive System cancer, Prostate Cancer, Excretion system cancer, Kidney insufficiency ve Anfizem, Üremi, frequent fractures in bones
Lead	range:11.3-82.8 mean: 34.8	5.0	0.05	0.5	0.2	20	Lung, Stomach-Intestine ve Kidney Cancers, Brain membrane degeneration, Eye, Kidney, Muscle and Joint problems, miscarriages.
Chrome	range:9.5-59.6 mean:32.2	5.0	0.05	0.5	5	20	Ingestive system problems
Zinv	range:43-110 mean:77.8	5.0	5	60	5	10	Cancers of all organs, various dermatological problems, degeneration of bronchial system ve Zatürre.
Arsenic	Not investigated	5.0	0.01	10	1	10	Skin, Lung, Blood ve Lymph Nodes Cancers, Kansýzlyk, Heart Problems, Siroz, Kidney degeneration, birth defects.
Mercury	Not investigated	0.2	0.001	0.05	0.05	0.5	Cancers in lab animals, breathing difficulties, Parkinsons, Akciđer Ödemi, memoery loss, Üremi, bleeding.

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1	01/12/94	Yeşilyrmak stream	6.96	823	95	92	*	262	16	122	30	27	5.60	-	*	*	*	*
2	01/12/94	Drinking water well	7.15	492	40	72	*	196	3	32	45	27	0.30	-	*	0.05	*	0.08
3	01/12/94	Maden stream	7.36	458	30	62	*	190	3	29	40	24	0.40	-	*	*	*	*
4	01/12/94	Lefke stream	7.90	497	30	70	*	202	10	29	40	32	0.90	-	0.04	*	*	0.01
5	01/12/94	Gemikonađ ýdamn	6.60	712	45	284	*	74	3	29	65	48	0.70	-	0.73	0.32	*	0.06
6	01/12/94	“ “	6.60	722	45	274	*	78	3	32	65	44	0.70	-	0.79	0.31	0.05	0.16
7	01/12/94	“ “	6.38	722	45	290	*	72	3	32	65	46	0.70	-	0.96	0.37	*	0.10
8	01/12/94	“ “	6.52	713	45	280	*	78	3	46	65	46	0.80	-	0.61	0.30	*	0.15
9	01/12/94	Dipsavak yandan	4.68	880	45	424	*	10	3	32	70	66	0.70	-	3.43	1.02	0.02	2.04
10	01/12/94	Dipsavak Kanaldan	6.44	780	45	320	*	66	2	34	80	43	1.10	-	0.75	0.34	*	0.18
11	01/12/94	Maden stream	2.42	3950	55	3700	*	*	15	8	200	830	0.30	-	50.90	6.60	0.23	408.0
12	01/12/94	Lefke stream, canal end	7.60	500	30	62	*	208	17	27	30	39	0.90	-	0.07	0.03	*	0.03
13	01/12/94	Çamlyk stream	8.08	765	50	80	*	404	26	41	37	78	1.50	-	*	0.05	*	*
14	01/12/94	Çakyl stream	8.18	865	60	55	*	328	15	45	57	45	1.10	-	*	0.04	*	*
15	01/12/94	Dođancy stream	7.85	660	35	230	*	134	13	32	60	45	0.08	-	*	0.02	*	*
16	01/12/94	Derivation canal end	8.20	700	45	70	*	348	17	39	37	63	1.20	-	*	*	*	*
17	01/12/94	Güzelyurt stream	7.87	425	25	55	*	154	13	20	45	18	1.10	-	*	*	*	*

Table 6: Lefke Region, Element Traces(ppm)

Sample No	Plant G.	Soil.G.	Fe	Cu	Zn	Mn
37	4	17	5.3	20.0	4.5	3.0
38	4	17	9.0	25.0	5.8	5.2
39	4	17	17.5	89.0	21.1	4.9
40	4	17	8.6	45.0	7.6	5.8
41	4	17	11.8	36.0	9.7	2.6
42	4	17	8.0	53.0	9.8	6.4
43	4	17	8.8	31.0	9.7	2.4
44	4	17	9.8	35.0	26.4	2.6
45	6	17	6.7	20.0	4.5	0.7
46	4	17	4.3	11.0	8.1	0.7
48	6	17	7.6	15.0	5.0	2.2
49	4	1	8.3	14.0	25.3	1.9
50	7	1	2.2	6.0	22.1	0.7
51	1	1	5.0	9.0	11.9	2.0
52	1	1	7.0	12.0	10.1	1.9
53	1	1	3.3	13.0	5.3	1.6
54	1	1	5.5	12.0	13.8	0.9
55	1	1	12.5	22.0	6.9	1.5
64	4	17	6.8	16.0	6.0	1.0
65	1	1	9.7	19.0	9.4	2.1
66	1	1	16.4	26.0	8.0	5.0
67	1	1	13.0	38.0	11.9	1.1
68	4	17	2.4	12.0	2.1	1.2
69	4	17	6.4	19.0	2.2	1.2
70	4	17	5.6	12.0	2.4	1.5
71	4	17	4.7	9.0	3.3	1.5
72	4	17	6.0	17.0	2.0	2.5
Ort.	4	2	7.86	23.5	9.44	2.37

(4=citrus, 6=vegetable, 7=banana, 1=grains)

Table 7: Samples from Waste ponds

Sample No	1.Pond	2.Pond	5. Pond	6. Pond
pH	1.69	2.42	2.79	2.51
Total water soluble salt(%)	1.90	1.45	0.83	0.98
Sand(%)	17.44	25.44	21.44	29.44
Mil(%)	45.64	67.64	47.64	63.64
Killi(%)	36.92	6.92	30.92	6.92
Bünye	Milli Killi tyn	Milli tyn	Killi tyn	Milli tyn
Organic Substances(%)	3.93	2.06	1.15	3.45
S(%)	16.82	7.95	4.85	7.09

Zn ppm	63	94	110	43
Cu ppm	280.50	1102.87	936.75	369.75
Fe(%)	9.067	4.89	3.87	14.77
Mn ppm	74.75	209	594	50.5
Cd ppm	1.15	1.10	1.00	1.50
Co ppm	99.12	50.75	22.87	68.62
Pb ppm	82.75	13.50	11.25	31.50
Cr ppm	9.50	59.62	39.75	19.87
Mo ppm	177.87	20.00	18.00	295.50

Table 8: Water Samples

	PH	Conductivity (mho/cm)	Copper (mg/Litre)
Canal 1	2.0	7.5×10^{-3}	121
Canal 2	2.0	8.75×10^{-3}	141
Sea	2.2	5.56×10^{-3}	10.4
Damn	6.5	1.345×10^{-3}	<0.2