Laboratory alternatives
for small countries
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two examples of outsourcing
pesticide surveys

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CIPAC/FAO/WHO Meetings 2015
Athens, Greece

Why this topic ….

- many requests for establishing pesticide and other laboratories in developing countries over past 35 years

- not all were justified, and not all activities have really been successful

Why this topic ….

- Numerous challenges related to the establishment of laboratories in developing countries
- Questions about their proper operation and sustainability
- Questions about their economic justification

Challenges
in Establishing Laboratories
in Developing Countries

Murphey‘s Law
or
Pitfalls & lessons learned

Why should we have alternatives?

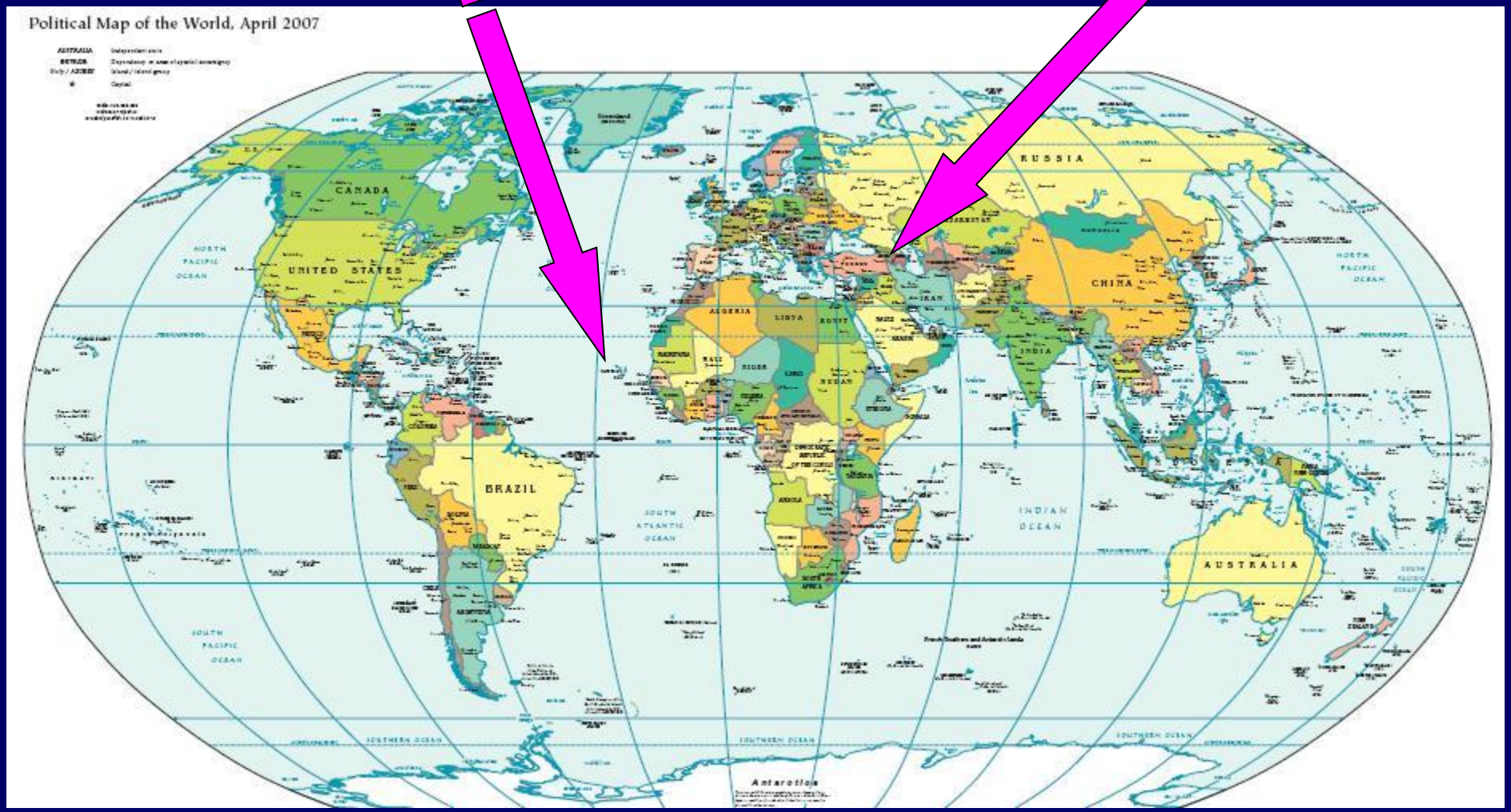
- Establishing laboratories is a long term effort (… several years)
- Needs specialized design and construction expertise (… more tech than architec)
- Expensive to build, run and maintain (budget usually not sufficient)
- Requires highly qualified and motivated staff (not readily available)

What could be alternatives?

- General HR capacity building for inspections and monitoring
- Outsourcing of specific tasks to specialized labs
- Establishing regional laboratories through cooperation agreements

*** two examples of outsourcing ***

pesticide surveys



Geography of Armenia

2,9 mio

29743 km²

former part of USSR

Pesticides
>> 5.000 tons/yr during Soviet times

Less than 10% nowadays

Obsolete pesticides – a declared emergency situation

03/2010

What had happened ?

Obsolete pesticide storage

accumulation since the 1960`s

Nubarashen landfill site
used mid 1970´s

~ 10 km SE Yerevan

- mountain slope
- erosion & earthquakes
- dormant for more than 30 years
- illegally mined in 2010
- environmental disaster
- surface washout

➢500 tons

Obsolete Pesticides

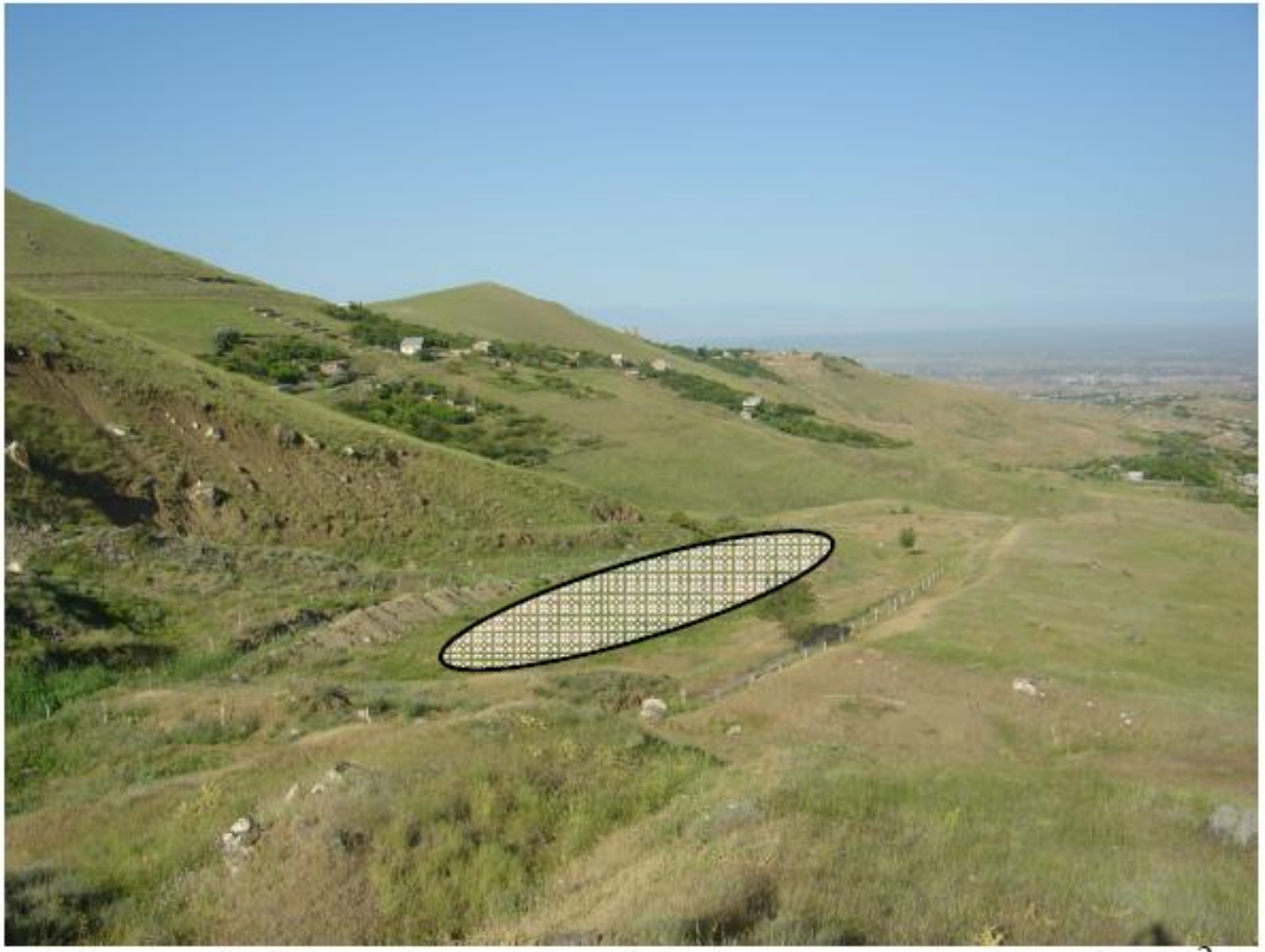


Figure 1: Situation at burial site recorded in 2008.[3]

Hot topic

Obsolete pesticides exposed at a landfill site

(Kevin Helps)

May 2010

Obsolete pesticides exposed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Damages drainage

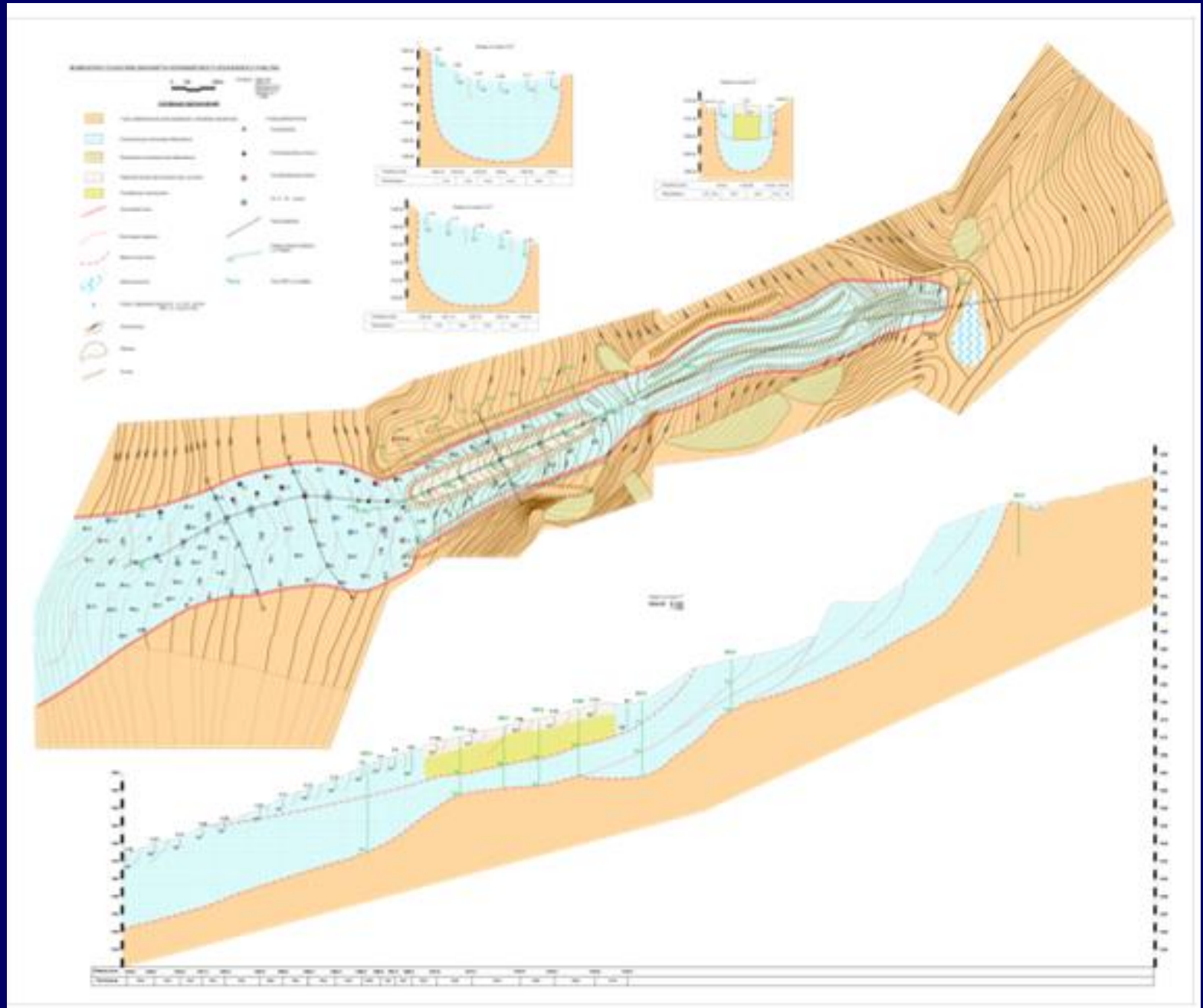


Figure 2: Geological formation and burial location.

Obsolete pesticides – a declared emergency situation

03/2010

- Request by Government for assistance
- OSCE and FAO independent missions
- Investigation of the site & situation

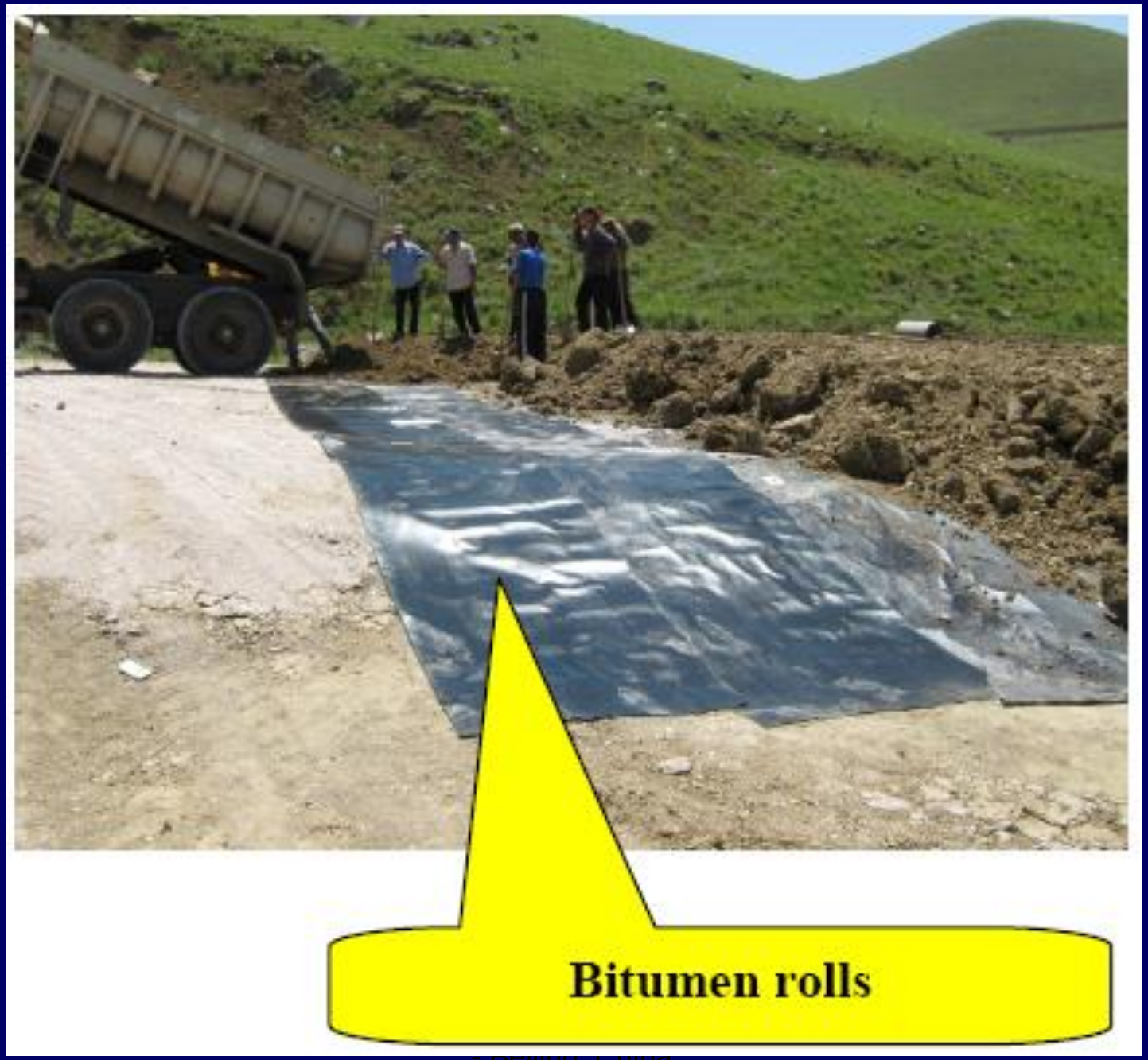
- Elaboration of emergency programme

A 10-step emergency programme

- Securing the site
- Diverting surface water
- Covering with multi-barrier containment system
- Installation of new surface drainage
- Planting of a grass / vegetation
- Develop sampling plan for contamination survey
- Bore hole monitoring points for water
- Non-invasing geophysical survey
- Consolidation of data
- Long term strategy for stabilisation or remediation

(K. Helps/FAO)

A temporary solution


Bitumen rolls

GCP/ARM/003/GRE

Support for pesticide quality control and residue monitoring in Armenia

2009 to 2015

2 million USD

How could we help ?

- Local laboratories not suitable
- Project lab still in planning phase

- Outsourcing as the only solution
  - Identification of suitable laboratories
  - Bidding procedure
  - Evaluation of bids and signing of contract

Sampling Plan

(June 2010)

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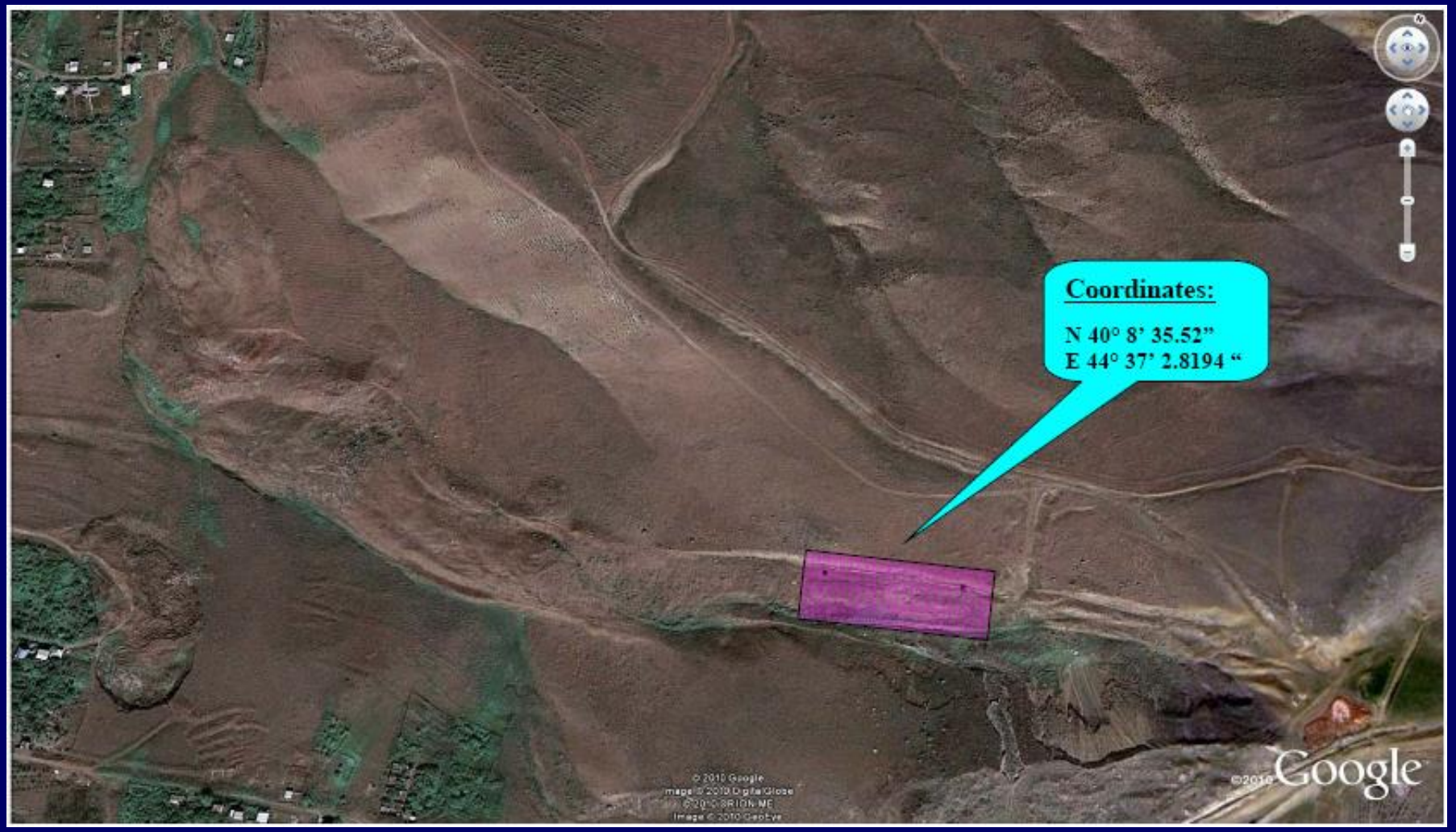
Annex: Proposed sampling locations

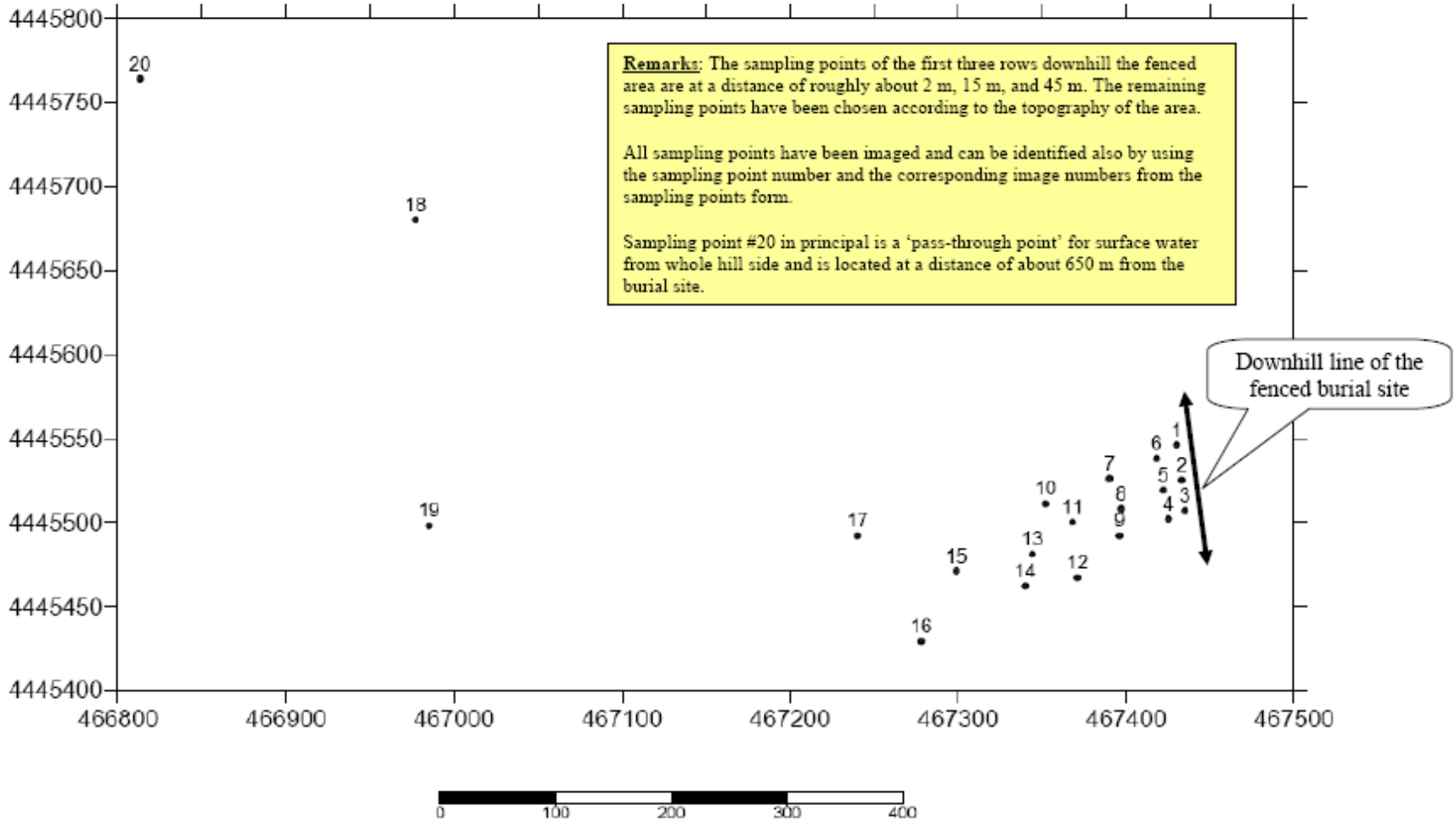
The analytical survey



The analytical survey

GCP/ARM/003/GRE

Actual sampling points *(as determined by coordinates)*



The analytical survey

GCP/ARM/003/GRE: Identification of sampling points/Նմուշառման կետերի նույնականացում

Project reference:՝ Ծրագրի կոդը՝ TCP/ARM/3301
(Nubarashen environment)/(Նուբարաշենին հարող տարածք)

Point-N /Նմուշառման կետի N	X Coordinates North /Կոորդինատները - Հս	Y Coordinates East /Կոորդինատները - Արլ	H Altitude (in m) /Բարձրությունը (մ)	Accuracy (in m) /Ճշգրտությունը (մ)		Image N° /Լուսանկար N°/	Remarks/Դիտումներ	OCL	TRI	HM	CN	SC
1	0467 430	44 45 546	1364	+/- 4		12-13						
2	0467 433	44 45 525	1366	+/- 3		14-15						
3	0467 435	44 45 507	1362	+/- 4		16-17						
4	0467 425	44 45 502	1361	+/- 4		18-20						
5	0467 422	44 45 519	1366	+/- 4		21-22						
6	0467 418	44 45 538	1364	+/- 6		23-24						
7	0467 390	44 45 526	1361	+/- 4		25-26						
8	0467 397	44 45 508	1363	+/- 4		27-28						
9	0467 396	44 45 492	1362	+/- 5		29-30						
10	0467 352	44 45 511	1357	+/- 5		35-36						
11	0467 368	44 45 500	1359	+/- 5		33-34						
12	0467 371	44 45 467	1358	+/- 5		31-32						
13	0467 344	44 45 481	1353	+/- 5		37-38						
14	0467 340	44 45 462	1354	+/- 5		39-40						
15	0467 299	44 45 471	1354	+/- 5		41-42						
16	0467 278	44 45 429	1342	+/- 4		43-44						
17	0467 240	44 45 492	1343	+/- 5		45-46						
18	0466 977	44 45 680	1286	+/- 4		47-48						
19	0466 985	44 45 498	1306	+/- 4		49-50						
20	0466 813	44 45 764	1260	+/- 3		51-52						
21												
22	Points # 1-20 taken on 11 AUG 2010 (KZ)			Coordinates based on UTN/WSG 84								
23												

GCP/ARM/003/GRE:

Soil Sampling Form & Chain of Custody Documentation

Receiving lab:

Project reference: TCP/ARM/3301
(Nubarashen environment)
Courier service: LUFTHANSA CARGO
Waybill Number: 020-1759 4850

Ser.N°	Sample Identification	Container #	S.-Date	Time	Point N°	Taken by	Remarks	OCL	TRI	HM	CN	SC
1		1	13.08.2010		20	V.P.		1	1	1	1	1
2		2	13.08.2010		20				1	1	1	1
3		3	13.08.2010		20			1	1	1	1	1
4		4	13.08.2010		18			1		1		
5		5	13.08.2010		18			1		1		
6		6	13.08.2010		18			1		1		
7		7	13.08.2010		19			1	1	1		1
8		8	13.08.2010		19			1	1	1		
9		9	13.08.2010		19			1	1	1		
10												
11												

Container #	S.-Date	Time	Point N°	Taken by	Remarks	OCL	TRI	HM	CN	SC
61	24.08.2010		R1	KZ (SS_{10})	left hill side	1		1	1	
62	24.08.2010		R2	KZ (SS_{10})	right hill side	1		1	1	
63	24.08.2010		R3	VP (SS_{10})	below Datscha area			1	1	1
64	24.08.2010		R4	KZ (SS_{10})	area above the ridge (ENE)		1	1	1	1
65	03.09.2010		R5	KZ (SS_{10})	area above the ridge (E)	1				
66	03.09.2010		Z1	VP	Datscha area (egg)			1		1
67	03.09.2010		Z2	VA (SS_{10})	road in front of burial site	1		1		
68	03.09.2010		Z3	VA	Mushakan (egg)			1		1
69	03.09.2010		Z3	VA	Mushakan (cheese)			1		1
						OCL	TRI	HM	CN	SC
					Total:	60	20	60	30	15
					Max:	60	20	60	30	20
					organochlorines	X				
					triazines		X			
SS_{10}	Surface Sample to max 10 cm depth				heavy metals			X		
					cyanides				X	
Note: some scans are retained for later checks					semi-volatile organic compound scan					X

The analytical survey

The analytical survey

The analytical survey

What did we analyze ...

- 67 composite samples (soil, incl. 4 food samples)
- 3 different depths (0-50 cm / 50-100 cm / 100-200 cm)
- background samples from reference points
  - organochlorines
  - heavy metals
  - cyanides
  - triazines
  - wider scans for some randomely selected samples

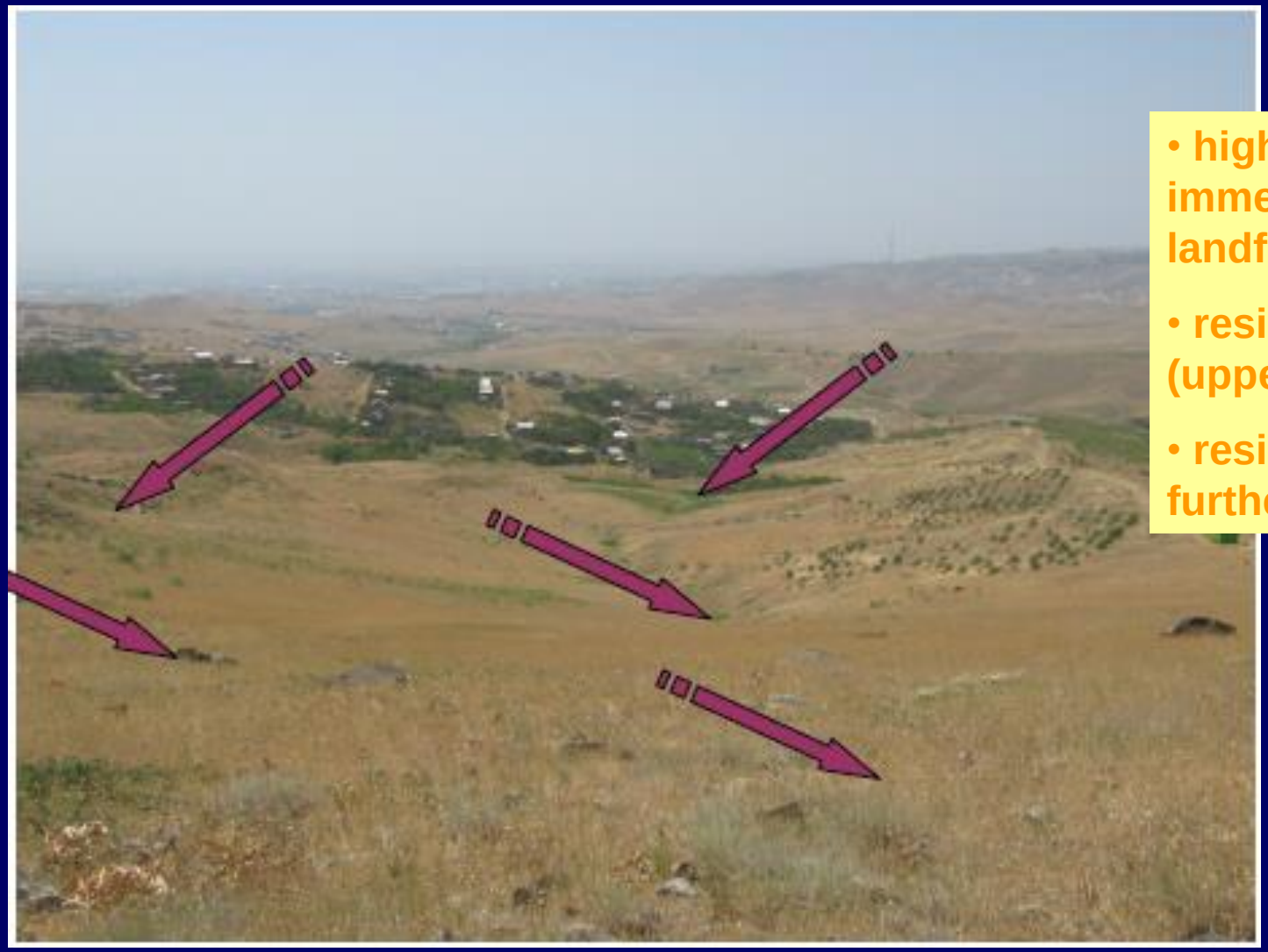
The results

- **Arsenic: up to 33 ppm**
- **CN: < 1 ppm**
- **OCL:** DDT up to 340 ppm
  HCH up to 66 ppm
  PCP up to 390 ppm
  SIM up to 100 ppm
- **Scans:** series of unidentified aliphatic hydrocarbons

The interpretation & conclusions ...

Point of highest residues

The preliminary conclusions ...



- highest residues immediately after the landfill site
- residues in the first (upper) layer
- residues negligible further downhill

The costs

- manpower appr. 2.5 P/M
- time for sampling 5 days
- time for analytical work 3 weeks
- analytical costs appr. 10.000 USD
- total time frame 4 months

The excercise was …

- quick
- cost effective
- using state-of-the-art technology
- reliable results (ISO 17025)
- incl. HR capacity building component

Before you decide …

to build a laboratory

- **What is your objective ?**
- **Can you assure sustainability for a lab ?**
- **Is outsourcing a suitable alternative ?**
- **What is more economic for you ?**

Think about it …. !

PART (2)

Think about it ….

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