

“ARMON” Women Environmental Law Centre Uzbekistan

Identification of pesticide hotspots in Sirdarinsky region, Uzbekistan

The aim of the research study – to assess technical quality of OPs burial sites in Syrdaryinskaya oblast.

Project objectives - to assess risks associated with health and environmental impacts of OPs burial sites.

A brief summary of protect results

- Environmental monitoring works were conducted to identify sources of environmental risks causing major adverse health impacts in Syrdaryinskaya oblast.
- Environmental risks were assessed and ranked.
- Several working meetings and a seminar were held in Sardoba township and in Tashkent with participation of representatives of local communities and initiative groups of Syrdaryinskaya oblast.
- A focus group was formed.
- Working relations were established with governmental bodies, Sanitary and Epidemiological Services, the Ministry of Public Health and local communities.
- The range of most pressing problems in the oblast was found to incorporate - quality drinking water supply and application of POPs in agriculture, inc. application of obsolete pesticides stolen from OPs burial sites.
- Technical quality of Mirzaabadskiy OPs burial site was assessed and locations of former agricultural aviation airstrips were identified.
- A preliminary technical quality assessment was made for OPs burial sites in Syrdaryinskaya oblast.
- The underlying legislative framework of POPs management was reviewed.

INTRODUCTION

Geographic location of the pilot area - the pilot area is located in Golodnaya Steppe, at the distance of 150 km to the West from Tashkent, at the left bank of Syr Darya River - the second largest rives of the Central Asia (see Fig. 1) Chirchik River is the largest tributary of Syr Darya River at the territory of Uzbekistan. Gulistan is the administrative centre of the oblast, the oblast also includes several large townships such as Bakht, Shirin and **Yangier**. Shirin was constructed by Japanese PoWs in 1940, where Farkhad Hydropower Plant was constructed later (in 1945 - 1956).

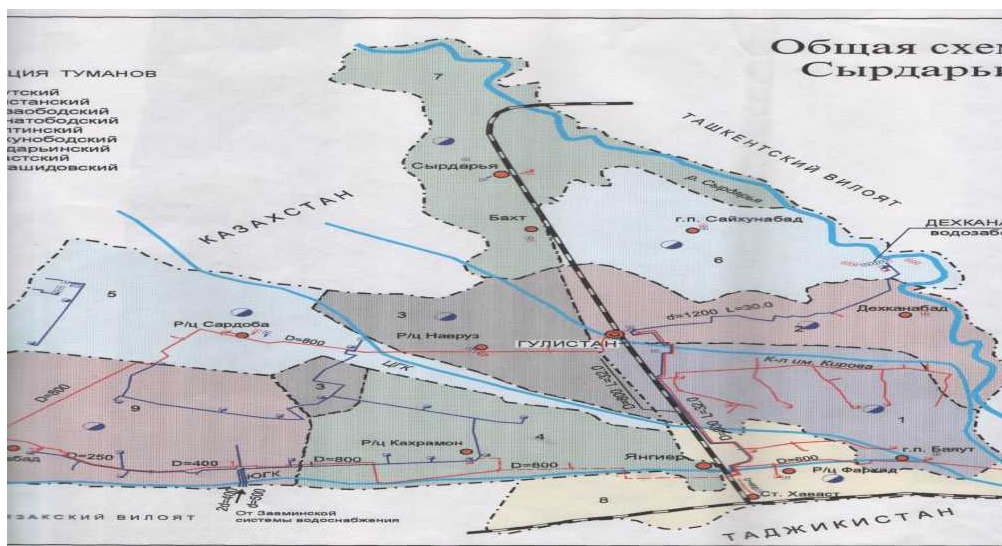


Fig 1. Syrdaryinskaya oblast of Uzbekistan

Syrdaryinskaya oblast includes 9 districts: Alkaltynskiy, Bayautskiy, Mekhnatabadskiy, Mirzaabadskiy, Saykhunabadskiy, Syrdaryinskiy, Shafar Rashidovskiy and Khavaskiy.

Geographic location - 40°42'50" NL 68°41'36" EL / 40.713889° NL 68.693333° EL ^(G)

The oblast borders Kazakhstan (North-west) and Tajikistan (East).

The field research started from the procedure of applying to local authorities for permission to visit chemicals burial sites.

Average life expectancy for women - Residents of Syrdaryinskaya oblast reaches 67 years, while life expectancy for men reaches 61 years (much lower than the national averages).



Photo by D. Zainutdinova - Sardoba - water wells drilled in the Soviet period are the only source of residential drinking water supply.

Access to information – There is an information vacuum, no information is available on either chemical security nor affairs in the country in general. Frequent blackouts reduce opportunities to use radio or TV information channels. However, it is necessary to note that local mass media outlets do not air anything worth a serious attention except music. Administrative centres lack outlets for selling newspapers or magazines.

Preliminary environmental monitoring results

Monitoring works allowed identification of problems of environmental, social and economic nature. Let us focus on environmental ones. In particular, in the course of seminars, the following sources of environmental risks were identified jointly with members of local communities. Three most pressing environmental problems were identified to include:

- secondary salination, waterlogging and excessive humidity of soils due to poorly managed irrigation works;
- quality of residential drinking water supply; and
- contamination of water and soils by persistent organic pollutants.

OPs-related issues

From the Soviet period, Syrdaryinskaya oblast was a major cotton-producing region. Since the 1960s, numerous water intakes and drainage systems were constructed there to use water from Syr Darya River

for irrigation of cotton fields. Local residents literally fought the deadly battle for cotton. In September, every year, cotton fields were sprayed by defoliant. In the past, butiphos, chloprophos and other pesticides were sprayed from the air, while now agriculture aviation is applied only by some separate farms and - as local residents said - defoliants are now predominantly sprayed manually.

Cotton harvesters (mainly women and adolescent students) start work at the fields only a day after application of defoliants.



Photo by D. Zainutdinova. Women and children start working at cotton fields after spraying of defoliants

In Septembers, the incidence of hepatitis and acute intestine disorders sharply increase; however officials do not stop the application of chemical defoliants at cotton fields.

Photo at page 5





Photo by D. Zainutdinova. Deteriorated drainage collectors in Sarbadinskiy district of Syrdaryinskaya oblast

According to the Ministry of Agriculture and Water Management of Uzbekistan, more than **240 kg of nitrogen, 109 kg of phosphorus and 69 kg of potassium in fertilisers** were applied per **1 hectare of cotton fields** (1). In 1967 - 1987, application of fertilisers at irrigated lands of Syrdaryinskaya oblast reached **315 - 435 kg/hectare**, or 20 times over the standard. The range of applied pesticides included 50 - 75 organochlorine and organophosphorous chemicals, including aldrin, endrin, heptachlor, dieldrin, toxaphene and DDT. Archive materials suggest that in late 1980s, in Syrdaryinskaya oblast of Uzbekistan, pesticide loads reached 54 kg of active ingredients per hectare (compared to the republic average of 10 kg/ha) without accounting for copper and sulphur-based pesticide preparations.



Photo by D. Zainutdinova. Sardobinskiy district. F.Khojaeva. The territory of the former OPs storage facility of the agricultural aviation airfield.

OPs management situation

According to official information of relevant local bodies, all pesticide burial sites in the territory of Syrdaryinskaya oblast have been already cleaned and rehabilitated, while OPs from these sites and OPs-contaminated soils were collected and buried. Our field research works sought to **ascertain** whether these official statements are true. **The field research** allowed us to ascertain the following facts:

- In the territory of Syrdaryinskaya oblast, Mirzaabadskiy underground chemicals burial is located. The burial site contains overall 270 tons of chemicals in an area of 5 hectares. According to

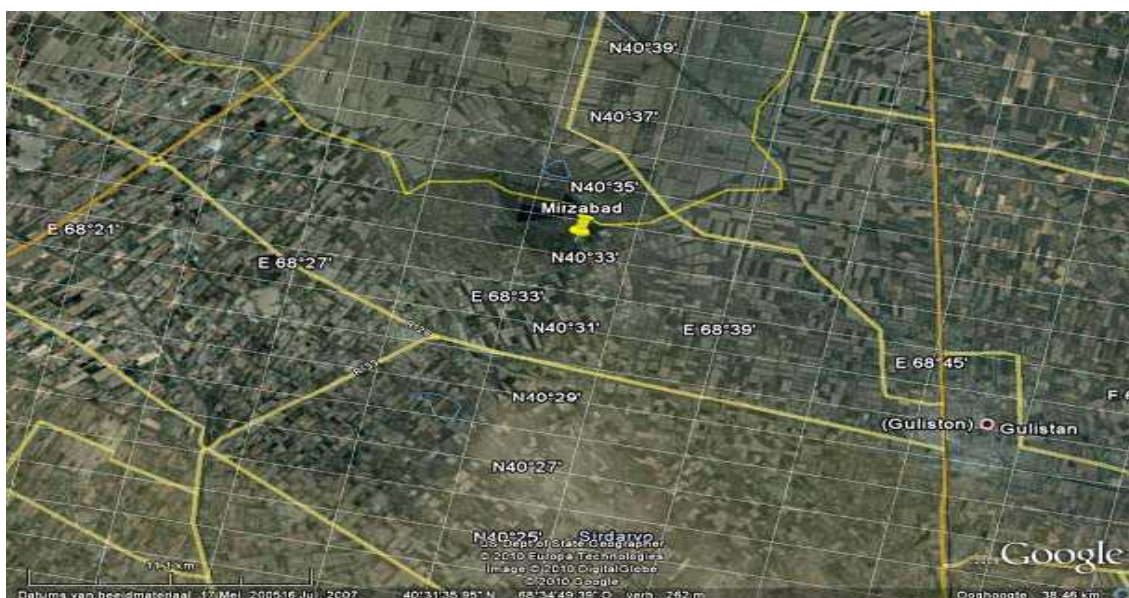
official data, the site contains **methylmercaptophos, benzophosphate, and BI-58**. However, archive materials suggest that the burial site contains some quantities of zineb, pentathuram, kelthane, fazolon, granosane, sodium propionate, succinic acid, DDT, copper chloride, copper trichlorophelolate, omight, SK-9, arasan, amine salt, kataran, uzphen, dentrboceline, pretazine, phosphamide, ustiks, uzphen, SUMI-8, basta, and prometrine.

- Mirzaabadskiy toxic chemicals burial site was opened in 1968. According to Uzkimircsonat, the last batch of chemicals was buried there in 1986.
- Chemicals storage facilities were identified in Sardobinskiy, Syrdaryinskiy, Pakhtaabadskiy, Mirzaabadskiy, Gulistanskiy, Yangierskiy, Gulistanskiy, Yangierskiy and Khavaskiy districts of Syrdaryinskaya oblast.
- In Syrdaryinskaya oblast, pesticides are applied at cotton fields both from the air and from the ground.
- Earlier, the list of applied agricultural chemicals reached more than 50 brands, but now pesticides are applied more rarely. However, as local residents admit, now magnesium chlorate and OPs are intensively applied as defoliants at cotton fields.
- Mass media outlets regularly promote application of magnesium chlorate as a safe alternative to DDT, butiphos and HCCH.
- On sites of former agricultural aviation airstrips, 7 pesticide storage facilities were identified with residual quantities of pesticides.
- Areas of former agricultural aviation airstrips are used now as fields for cultivation of cotton, wheat, vegetables, melons and watermelons.
- Soils contain residual amounts of DDT, HCCH at levels in tens times higher than applicable MACs. To make these lands acceptable for application, the upper level of soil should be removed to the depth of 2 m.

Chemical characterization

Our monitoring works in Syrdaryinskaya oblast allowed us to assess the technical quality of **Mirzaabadskiy OPs burial site** and sites of OPs storage facilities at former agricultural aviation airstrips.

Mirzaabadskiy chemicals burial site (No. 40.34) was opened in 1968 and covers an area of 5 hectares. According to Uzkimircsonat, the burial site contains 270 tons of chemicals and the last batch of chemicals was buried there in 1986. Chemicals are buried under ground. The site is located at the distance of 35 km from Mirzabad station, at Golostepenskiy plateau (a proluvial slope plain). The nearest human settlement - Alkatyn - is located at the distance of 5 km from the site. According to Uzbek Hydrogeology Facility, the groundwater level in monitoring well # 34 increased from 14.7 m in 1958 to 1.6 m in 2010.



Syrdaryinskaya oblast of Uzbekistan - Mirzaabadskiy OPs burial site is marked by the yellow marker

Technical quality

The field survey of **Mirzaabadskiy OPs burial site** allowed to reveal that the site fence is damaged, the area is not guarded and excavated concrete enclosure structures lay at the site near trenches where obsolete pesticides were buried earlier. The pesticides were mostly stolen. It is dangerous to come near the trenches, as soils are unstable there. Due to rising groundwater levels, pesticides packaging is seriously affected by corrosion. According to local residents, at high winds, a strong smell of pesticides is felt at long distances from the site, and some cases of self-ignition of OPs were observed there.

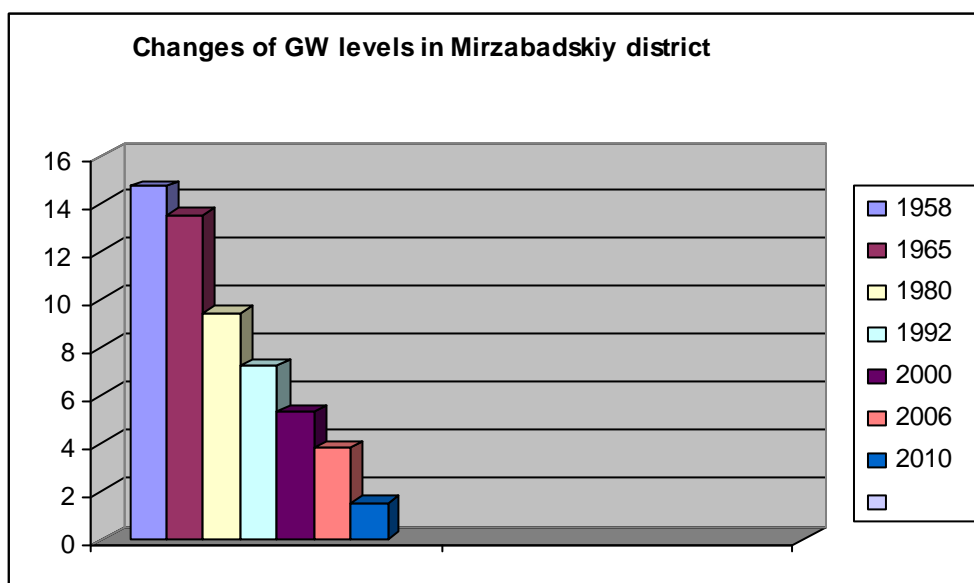


Photo by D. Zainutdinova. Akaltynskiy district, Mirzaabadskiy OPs burial site is not fenced and pesticides are excavated

Local residents themselves unearth the site to get pesticide containers and use them for household purposes and in cultivation of melons, watermelons, cotton and wheat. Empty containers are used to prepare feedstuffs for sheep and cattle.

Mirzaabadskiy OPs burial site is opened up, some chemicals were stolen, while the rest are being dispersed by winds, rain and solar radiation. Levels of DDT and its metabolites in soils at distances over 1 km from the site exceed MACs in 20 - 23 times.

Inadequate water management practices in the oblast resulted in rising groundwater levels. As the chart below shows, groundwater levels rose from 14.7 m in 1958 to 1.6 m in 2010. As a result, pesticide containers are under the impact of high moisture levels, at high daytime temperatures (45 - 50°C) toxic fumes intensively release - shepherds said that under impacts of these fumes, cows and sheep stiffen.



Due to prevailing winds in the area, the highest contamination zone extends to Gulistan. Assessments of soil DDT and HCCH contamination levels were made by comparative analysis of soil MACs (**Uzbek Sanitary Rules and Norms # 0191 – 05**), set as 0.5 g/t for DDT and 0.1 g/t for HCCH.

Risks posed by OPs storage facilities

According to monitoring data of the Uzbek State Committee for Environment, **Mirzaabadskiy** OPs burial site does not pose any real health or environmental risks, as all OPs-related problems were "successfully" resolved.

I could not understand the reasons why officials conceal information on OPs. After completion of field studies, some storage facilities with obsolete pesticides were identified that were not incorporated into official inventory data, including:

Sardoba storage is located at the site of the former agricultural aviation airstrip in Pakhtaabadskiy district, at the distance of 5 km from Sardoba township.



Photo by D. Zainutdinova. Sardoba, the former pesticide storage at site of the former agricultural aviation airstrip

Bakhmal storage is located at the site of the former agricultural aviation airstrip in Sardobinskiy district, at the distance of 12 km from Bakhmal township.



Photo by D. Zainutdinova. The former storage in Bayautskiy district where some OPs are still present, all containers are damaged by corrosion

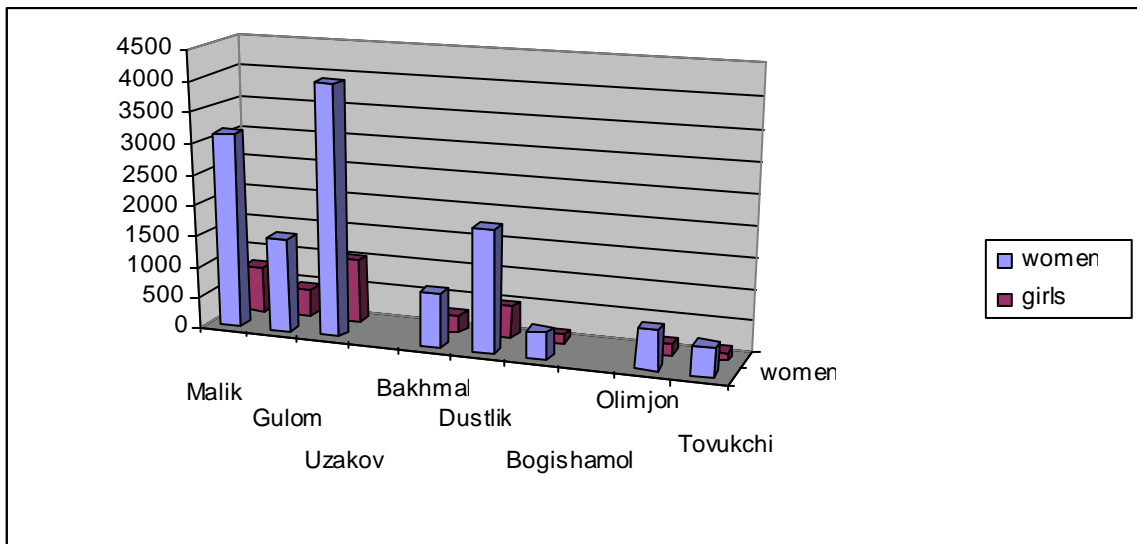
Bayaut storage is located in Bayautskiy district near the border with Tajikistan, at the site of the former agricultural aviation airstrip, at a distance of 7 km from Shirin.

Galaba storage is located in Okaltynskiy district, at the site of the former agricultural aviation airstrip. Now the site is used for cultivation of melons and watermelons that are predominantly sold in Tashkent and in Kazakhstan.

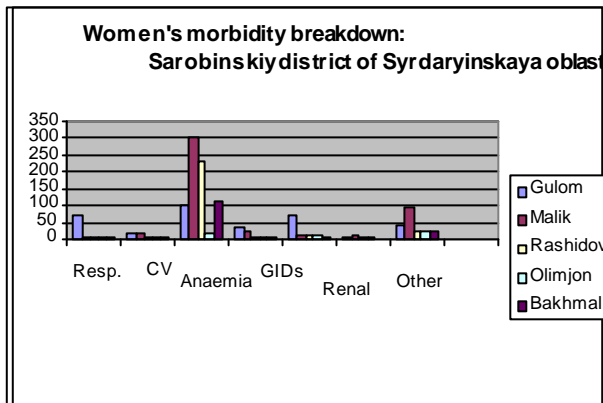
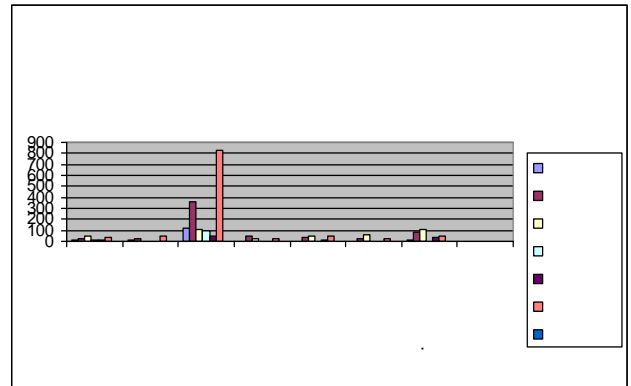
Nobody usually guards sites of former agricultural aviation airstrips where toxic chemicals were stored earlier. Makeshift concrete constructions that do not meet chemical security requirements were generally used as pesticide storage facilities at these sites. Now, the majority of former agricultural aviation pesticide storages (containing residual amounts of OPs) pose a major health threat as they do not meet even basic requirements of material safety datasheets.

Environmental and Health Consequences

A preliminary assessment of health impacts of the environmental contamination there was made at the base of morbidity data (inc. morbidity time series) for **women of reproductive age and children under 14** in Syrdaryinskaya oblast from 1995 to 2005. See below information on **numbers** of women of reproductive age and girls under 14 in the following human settlements: G. Gulom, T. Malik, Rashidov, Olimjon, Bakhmal, Dustlik, Uzakov, Kushchinor, Tovukchi, Bashigamol and TMT of Syrdaryinskaya oblast:



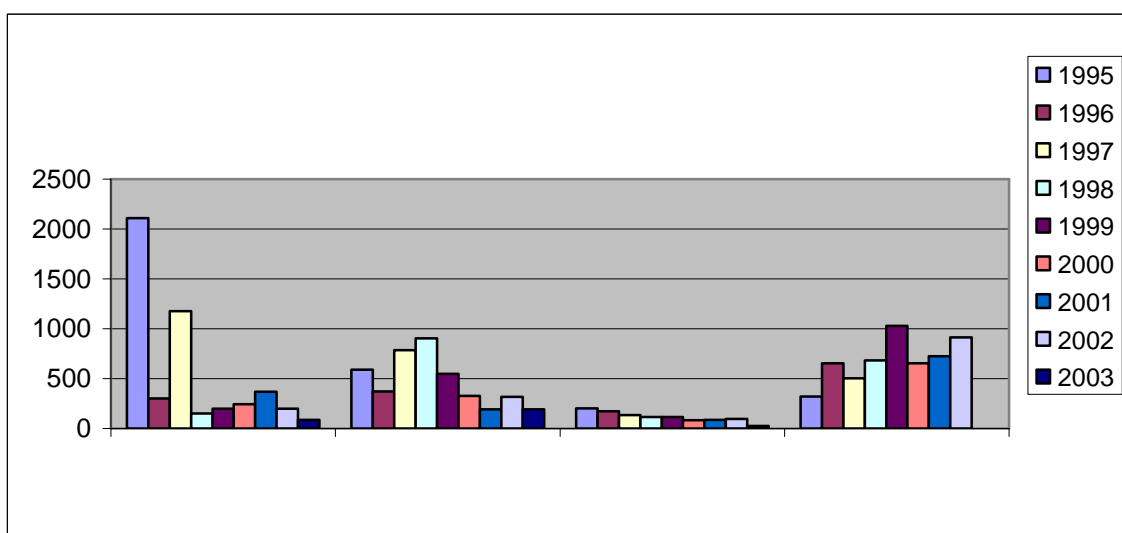
Number of women of reproductive age



We attempted to conduct mapping of the morbidity data to identify the most heavily affected locations. Let us look at Table 1.

	Human settlements	Numbers of women	Resp. diseases	CV and hemopoietic diseases	Anaemia	Gastric-intestine diseases	Renal failure	Endocrine disorders	Other
	Gulom	1534	73	16	97 (6.7%)	35	71	9	41
	Malik	3161	8	17	302 (9.6%)	22	13	14	92
	Rashidov	3038	10	6	232 (7.6%)	6	12	5	24
	Olimjon	658	6	3	17 (2.6%)	5	12	6	19
	Bakhmal	884	6	7	108 (12.2%)	5	9	2	20
	Dustlik	1970	7	11	115 (5.8%)	3	5	3	17
	Uzakov	4067	28	30	360 (8.6%)	4	34	30	87
	Kushchinor	3460	54	2	119 (3.4%)	3	52	63	109
	Tovukchi	464	8		98 (21.2%)	6	6		5
	Bogshishamol	428	14		47 (11%)	6	9		35
	TMT	3532	35	52	830 (23.5%)	30	51	19	49

In 10 recent years, the following diseases were found to rise in Syrdaryinskaya oblast: chronic bronchitis, acute pesticide poisonings, toxic hepatitis, silicosis, cochlear neuritis (diminished hearing), brucellosis, allergic dermatitis and other diseases of skin and hypodermic tissues, gastric-intestine and endocrine disorders, blood circulation and hemopoietic diseases.



Health impacts of the environmental pollution are obvious; however, one should not rule out sharply falling living standards, nutrition quality and inadequate drinking water supply as well.



Photo of D. Zainutdinova. Let's catch some fish. Sardobinskiy district of Syrdaryinskaya oblast

The below table shows morbidity data for women of reproductive age of Sardobinskiy district (located in close proximity to Mirzaabadskiy burial site).

	Years										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Anaemia	4370	4930	5218	4620	5017	4568	4855	4394	4144	4347	3968
Cardiovascular diseases	868	861	836	738	855	657	678	754	784	674	539
Urogenital disease	560	518	619	583	524	554	520	558	607	640	508
Gastric-intestine disease	373	427	498	471	566	470	512	549	583	632	383
Respiratory diseases	72	30	143	197	253	214	245	337	263	212	225
Endocrine diseases	104	108	56	252	81	158	179	225	157	132	145
Nervous system disorders	483	616	616	872	692	779	743	788	839	861	936
Other											

Site Responsibility

The state system of emergency response and prevention operates under control of the Cabinet of Ministers of Uzbekistan. Responsible bodies in charge of chemical security include:

- The State Committee of Uzbekistan for Environment
- The Ministry of Public Health
- The Ministry of Emergency Response
- The Ministry of Interior
- "Uzkimiesanoiat" State Facility
- Local authorities

As one can see, there are numerous authorised bodies in charge but actually nobody is responsible for OPs management.

Obstacles

In real life situations, any attempts to protect environmental citizens' rights in connection with OPs health impacts encounter the following obstacles:

- State organisations refuse to provide the necessary environmental information on management of OPs burial sites to ordinary citizens
- Authorised bodies do not inform residents on the health and environmental impacts of chemicals under pretext of its confidential nature
- No proactive measures are taken to ensure chemical security

Theoretically, one may get some information on pesticide burial sites, but "the secrecy virus" actually is just a cover for officials who seek to get a profit by selling pesticides for combating rats, mice, mosquitoes, etc. As a result, they conceal information on the number of pesticide burials in the country and deny the fact that pesticides (defoliants) are still applied at cotton fields.

Plans for clean-up

It is necessary:

- to conduct monitoring, inventories and certification of Mirzaabadskiy burial site and all former pesticide storages;
- to estimate actual amounts of OPs;
- to strengthen control over application of chemicals;
- to identify which pesticide preparations are produced domestically and which are imported; and
- to conduct an assessment of technical quality of OPs burials at the territory of Syrdaryinskaya oblast and identify measures necessary to ensure chemical security.

Project Outcomes:

The research studies allowed us to identify major failures in the management of OPs and OPs storages at former agricultural aviation airstrips that are widely spread in all districts of Syrdaryinskaya oblast. The OPs storages identified and the OPs burial site under control of "Uzkimiesanoiat" State Facility give us reasons to conclude that the currently applied chemical security measures are not sufficient. I believe that the following measures should be taken in a longer term:

- To develop a draft Law on Environmental Control, stipulating sanctions for non-compliance in the sphere of chemical security;
- To ascertain the precise number of pesticide burials and storages in the oblast, as we were not able to cover the whole territory of the oblast in the course of the project implementation;

- To assess and rank their technical quality;
- To develop feasibility studies for remediation of the most hazardous sites (according to specific local conditions, hazardous substances should be eliminated on-site, in order to avoid repackaging, transportation and temporary storage costs); and
- On-site liquidation of OPs on sites under remediation works and/or in burials would allow the elimination of waste and recultivation of soils in parallel.

I believe that it is not appropriate to transport OPs to some centralised storages for elimination, as in the course of transportation operations, pesticides might be spilled or blown away by winds. Besides that, their on-site elimination in burials would be much cheaper and safer.

Potential and hidden risks associated with residual pesticide contamination of soils at former pesticide burial sites may be reduced in the medium term by bio- and phyto-remediation. Prior to application of these methods, it is rather important to minimise consequences of wind erosion of surface soil layers at OPs burial sites. First, consolidation of new (upper) soil layers would prevent further wind-induced spread of OPs. Bio- and phyto-remediation methods are effective only at consolidated soils. Higher organic contents in soils and irrigation of upper layers of soil would minimise consequences of wind erosion and enhance effectiveness of bio- and phyto-remediation.

Activity conducted

In order to assess public awareness in the sphere of chemical security, two seminars were conducted - in Sardoba township (April 2010) and in Tashkent (August 6 - 7).

The seminars allowed us to collect valuable information on the interrelations between governmental bodies, businessmen and farmers. In particular, the seminars demonstrated:

- Low legal and environmental awareness by the country's residents;
- Low public consolidation due to the information vacuum and strong social inequality (income differentiation); and
- Legal nihilism and growing social contradictions.

In the course of these seminars, participants referred to numerous social, economic and environmental problems. However, according to the seminar participants, the most pressing ones include:

- Low public awareness of chemical security matters;
- Low recourse capacity of local communities;
- Low potential sanctions for officials who fail to comply with the due laws and regulations, including in particular the ones pertaining to ensuring chemical security and maintaining due technical quality of Mirzaabadskiy burial site;
- Lack of the rule of law; and
- **Governmental bodies fail to ensure safe residential drinking water supply, notwithstanding major loans for water supply purposes provided by ADB, the World Bank, the Islamic Bank, etc.**

Impacts

Participants of the seminars developed the following project proposals:

- **"Clean Water" project** to address water supply problems of Kushchinor township with 3460 inhabitants.
- **"Mirzachyl" project** to implement works for assessment of real technical quality of Mirzaabadskiy burial site, including drilling a monitoring well to check groundwater levels and to estimate levels of pesticides in groundwater.
- **"Energy for all" project** to design and assemble a wind-and-solar generating unit, as due to frequent blackouts in local villages their residents face serious problems in cooking and drinking water treatment.

- To conduct trainings on matters of adverse health and environmental impacts of OPs for representatives of local communities and NGOs, in addition to officials of relevant governmental bodies.
- To develop a series of methodological manuals for dissemination among rural residents who directly deal with pesticide preparations.
- To train trainers - representatives of NGOs - for further public awareness-raising on basics of chemical security and methods of protection of environmental rights.

Outputs .

Publishing information materials on health and environmental impacts of OPs in 8th and 12th issues of "Environmental Security and Public Initiatives" newsletter (the newsletter is published with support of OSCE Project Coordinator in Uzbekistan).

Conclusions

- **It is necessary to conduct bacteriological and chemical quality analysis of water and check whether water quality meets applicable state standards.**
- **Local residents consume drinking water with salinity of 3.0 to 5.0 g/l or 46.12%;**
- **In locations of OPs burial sites and former agricultural aviation airstrips of Syrdaryinskaya oblast, levels of DDT metabolites vary from 2 to 25 MACs (3.2 - 7.5 MACs for DDE).**
- **While there is a trend of decreasing levels of contamination by organochlorine pesticides (by 5 - 30%), absolute measured levels of pollutants still remain high.**
- **Monitoring results suggest that maximum levels of organochlorine pesticides at sites of former agricultural aviation airstrips in the oblast vary – at average- from 1.5 to 29 MAC's.**