



Zentrum für Entwicklungsforschung  
Center for Development Research  
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# GLOBAL ENVIRONMENTAL CHANGE & WATER-RELATED DISEASES

## IMPROVING RISK ASSESSMENT STRATEGIES FOR PUBLIC HEALTH CARE IN UZBEKISTAN

### Highlights from a collaborative workshop

Tashkent, Uzbekistan  
May 2-6, 2011



## ABOUT THE WORKSHOP

The workshop on “Global environmental change and water-related diseases – Improving risk assessment strategies for public health care in Uzbekistan” was an initiative of the Center for Development Research (ZEF), University of Bonn, in the context of its research on Environment and Health. The workshop was organized in collaboration with the World Health Organization (WHO Country Office Uzbekistan) and the Ministry of Health of the Republic of Uzbekistan and aimed at establishing a science-based, capacity-building collaborative program between European and Uzbekistan researchers. About 40 European and Uzbekistan experts representing a range of organiza-

tions and disciplines in the fields of public health, water resources management, and risk assessment attended the workshop.

The organizers gratefully acknowledge the support of the Volkswagen Foundation which generously assisted this under its program “Between Europe and the Orient – A focus on research and higher education in/on Central Asia and the Caucasus”. We hope that this workshop will generate knowledge for new thinking and concrete actions for public health care in developing and transition countries like Uzbekistan.

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## INTRODUCTION

Since the break-up of the Former Soviet Union in 1991, the Central Asian Countries (CACs) - Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan – have been facing the challenges of economic, political, environmental and regional change as well as security issues. These processes have led to an excessive use of natural resources in these countries, especially surface and groundwater resources. The pressure to rely on their own resources has forced the CACs, especially the downstream countries of the Amu Darya River, Uzbekistan, Kazakhstan and Turkmenistan, to re-evaluate their priorities and strategies regarding water use and management.

According to the Global International Water Assessment (GIWA), the quality of water resources has become of international concern as it directly affects human health<sup>1</sup>. In Central Asia for instance, more than one-third of the population does not have access to good quality drinking water and less than 30 percent of the population in rural areas are served by piped water networks<sup>2</sup>. In Uzbekistan, about five million people do not have access to safe drinking water, and only about half of the population has access to sewage treatment facilities<sup>3</sup>. Additionally, the drinking water is often pumped from groundwater and has increased salt concentrations due to poor irrigation and drainage networks. Governments in CACs have a declared objective to ensure safe drinking water for their respective populations, but widespread provision is hampered by the high costs of operating and maintaining irrigation and drinking water networks. Consequently, poor drinking water supply increases water-related diseases in the region<sup>4</sup>. The European Union recognizes that water management, including management of trans-boundary waters, is a highly relevant environmental concern in Central Asia and conducive to fostering regional security and stability in the region<sup>5</sup>. If not addressed in time, this could derail the 2015 Millennium Development Goals regarding clean drinking water and good sanitation facilities. The European region has been witnessing growing health

*“Provision of safe drinking water to the population under conditions of the shortage of fresh water reserves and intensive pollution of water resources due to strong anthropogenic influence are the main concerns of the present that mobilize the world community to solve such problems”.*

**Prof. Assameddin Kamilov, Deputy Minister of Health, Republic of Uzbekistan**

insecurity in recent decades. The re-occurrence of malaria, the spread of *visceral Leishmaniasis* due to migration from Africa, fear of the spread of Rift-Valley fever to the Middle-East, and the recent *E-coli* outbreak are forcing European scientists to learn and seek solutions beyond their borders.

There is therefore a growing interest in what is happening in Central Asian countries. However, there is growing awareness to move away from the unified regional focus in Central Asia<sup>6</sup> to country-specific issues with regional cooperation and integration as a long term goal<sup>7</sup>. The proposed collaboration will ensure that European and Uzbek researchers have the necessary skills to link high-level knowledge with practical ways of collectively addressing the emerging regional and global problems.



1 Severkiy, V I., 2004. Water-related problems of Central Asia: Some Results of the Global International Water Assessment program (GIWA). *Ambio*, Vol. 33, No. 1-2. Pg. 52-62.  
 2 OECD, 2005. Environmental Management in Eastern Europe, Caucasus and Central Asia. Organisation for Economic Co-operation and Development, Paris. Pg. 39.  
 3 Dilorom, Kh. Fayzieva and Susanne Herbst. 2007. Water and Health in Uzbekistan. *Water & Risk*, WHOCC Newsletter No.11, July 2007. Pg. 1-5.  
 4 Herbst, S. 2008. Risk factor analysis of Diarrhoeal diseases in the Aral Sea region (Khorezm, Uzbekistan), *International Journal of Environmental Health Research*, Vol. 18, No. 5, Pg. 305-321.  
 5 Hodgson, S. 2010. Strategic water resources in Central Asia: In search of a new international legal order. EU-Central Asia Monitoring (EUCAM) Policy Brief, No. 14. Pg 1.

6 Many of the trans-boundary programs have failed to generate consensus for collective action in the region, especially to address water.  
 7 International Crisis Group, (2006) Central Asia: What Role for the European Union? *Asia Report No. 113*. 10 April, International Crisis Group Working to Prevent Worldwide, Brussels. <http://www.crisisgroup.org/en/regions/asia/central-asia/113-central-asia-what-role-for-the-european-union.aspx> accessed October 2010.

## GUIDING PRINCIPLES FOR A COLLABORATIVE INITIATIVE

In an effort to initiate such a collaboration, a Volkswagen Foundation-funded workshop was organized on 'Global environmental change and water-related diseases: improving risk assessment strategies for public health care in Uzbekistan' in Tashkent from May 2-6, 2011 (Annexure 1). More than 40 European and Uzbek experts (Annexure 2) representing a wide range of organizations and disciplines in the fields of public health, water resources management and risk management participated in this workshop. One of the core aims of the collaboration partners was to engage in a long-term commitment to the research capacity building of partner countries. The workshop offered a forum for joint reflection on the issues of global environmental change and water-related diseases, on ways to improve risk assessment strategies for public health care in Uzbekistan, and for highlighting growing health insecurity in Europe. Each partner came with different perceptions and expectations for a collaborative initiative. The workshop offered a unique opportunity for partners not only to meet and learn about the health situation in Uzbekistan, but also to build trust by complementing their perceptions and expectations. This was done by using a combination of conventional presentations and group discussions.

The "Guidelines for Research in Partnership with Developing Countries" (also referred to as the "Swiss Guidelines") served as a reference point for the collaborative workshop. The eleven principles are closely linked (Table 1): The first seven refer to details of how to set up and implement a research project in partnership. The remaining points go beyond ordinary research and aim at increasing research capacity and building on achievements. While these principles are easily stated, actually pursuing them remains a challenge for the partners. It was important for partners to wear special glasses (Picture 1) that help them to see the way others perceive the research problem, opening windows of opportunity for collaboration.

*"We use diverse disciplinary lenses to understand and address social problems. It is important that all of us wear special glasses that help us to see the way others see a problem in order to respect and appreciate each other's work for a long-term collaborative project."*

**Saravanan V.S, Senior Researcher, ZEF**



**Table 1**  
**Eleven Guiding Principles of Research Partnership**

1. Decide on the objectives/ issues together
2. Build up mutual trust
3. Share information, develop networks
4. Share responsibility
5. Create transparency
6. Monitor and evaluate the collaboration
7. Disseminate the results
8. Apply the results
9. Share profits equitably
10. Increase research capacity
11. Build on the achievements

Source: The Swiss Guidelines: KFPE 1998. Guidelines for Research in Partnership with Developing Countries- the 11 Principles. Swiss Commission for Research Partnership with Developing Countries, Geneva



**Picture 1**

## OPPORTUNITIES FOR CHANGE

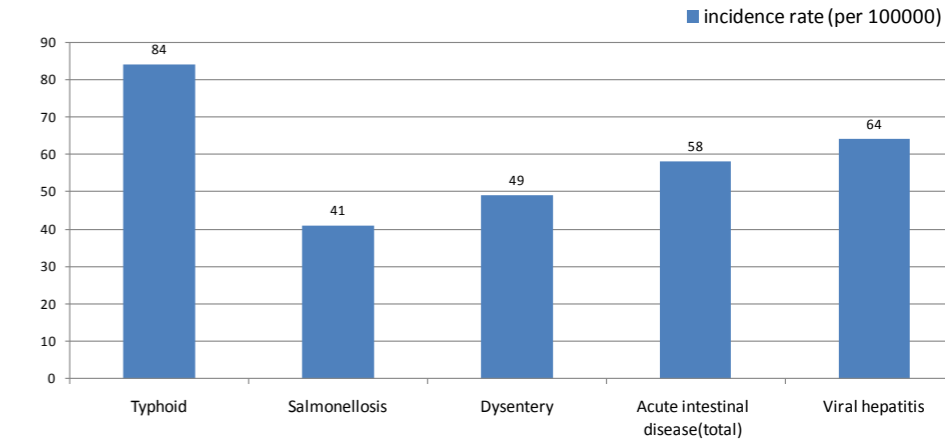
Water-related diseases<sup>1</sup> already pose a major public health challenge in Uzbekistan, but this is becoming even more prominent due to climate change. According to the Ministry of Health of the Republic of Uzbekistan, water-related diseases are the most common type of infectious diseases<sup>2</sup>. Typhoid, viral hepatitis and acute intestinal disease account for more than half of the incidence rates of the various infectious diseases (Fig. 1). The Ministry of Health, Republic of Uzbekistan<sup>3</sup> revealed, that nearly 1.8 million people were suffering from infectious diseases in 1997. Of all these infections, the gastrointestinal diseases accounted for 46.6 percent, viral hepatitis for 29.7 percent and respiratory diseases for 16.9 percent respectively. Between 2003 and 2006, the level of acute intestinal diseases increased from 129.1 per 1000 population to 144.6 per 1000 population. Inadequate sanitation and access to safe drinking water have aggravated the problem. While many provinces reported good access to water supply in urban areas, inadequate drinking water supply is reported in the rural regions of Karakalpakstan, Bukhara, Navoi, and Khorezm. The availability of an effective health infrastructure remains crucial for addressing water-related diseases in the country. The occurrence of typhoid, viral hepatitis and acute intestinal diseases is higher in rural settlements where infrastructure such as roads and hospitals is usually weaker than in urban areas.

Increasing population, intensive agriculture, urbanization and industrialization have led to the deterioration of water quality in the country. Over 28 million people currently live in Uzbekistan (as of April 2011) and the population is expected to reach between 33 to 51 million by 2050. If irrigated farming remains a priority for the Republic of Uzbekistan, water shortage (quantity and quality) will become aggravated, in turn deterring agricultural practices and affecting the drinking water supply for the rural population. Assessments of water supply networks in cities and urban settlements in Uzbekistan indicate that the water supply network deteriorated between 1995 and 2006.

1 Water-related diseases are those that have adverse effects on human health such as death, disability, illness and disorders caused directly or indirectly by the condition of or changes in the quantity or quality of any water.

2 Dilorom, Kh. Fayzieva and Susanne Herbst. 2007. Water and Health in Uzbekistan. Water & Risk, WHOCC Newsletter No.11, July 2007. Pg. 1-5.

3 Dilorom and Herbst, 2007.



**Fig. 1. Infectious diseases incidence rates (per 100,000 inhabitants) in rural settlements of Uzbekistan.**

Source: Olga Mirshina: Presentation at the workshop

## 1. Information gap

Another challenge we face is the growing communication gap between official statistics and the actual spread of diseases in the country. According to the national Ministry of Health, the registered number of acute intestinal and respiratory diseases is decreasing and the country's average is lower than in the other Central Asian republics. The information gap is widened in particular by the complex and dynamic existence of the pathogens. The number of cases of water-related infections increases in hot periods of the year and coincides with high levels of bacterial water pollution triggered by high temperatures, as can be seen in Khorezm. These dynamics of the pathogens provide significant challenges for any precautionary actions and the implementation of effective remedies. Adding to the complexity is the inadequacy of epidemiological data on a household level up to the regional scale, and of the system through which data is usually gathered, stored, processed and interpreted. This hampers the understanding of the health risks from water-related diseases, such as gastrointestinal diseases, Sindhis Fever, Syr-Darya Fever, Tahyna Fever, West Nile Fever, Visceral Leishmaniasis, Leptospirosis and others.

*"Studies in Uzbekistan have indicated a direct correlation between the health status of the population and the available infrastructure."*

**Olga Mirshina, Senior Specialist, Ministry of Health, Republic of Uzbekistan**

## 2. Agricultural sources of pollution

Uzbekistan used to be the second largest producer of cotton during Soviet times. After national independence, the agricultural production system changed from a cotton-monoculture to a cotton-wheat and rice-wheat cropping system, but Uzbekistan remains the 6<sup>th</sup> largest producer of cotton in the world. It is no surprise that over 90% of water pollutants come from agricultural sources as over 90% of drainage water from agriculture is dumped into Uzbekistan's river system. During Soviet times, 15 kg/ha of pesticides were applied to every cotton field in Uzbekistan, and it ranked highest in the world in the use of agricultural pesticides.

UzHydromet (the state water inspection agency) is responsible for monitoring pollution. It monitors more than 45 parameters (salinity, nitrogen, phosphorus, heavy metals, pesticides – HCH, DDT and its metabolites) in all rivers, large canals, water reservoirs and collectors (80 units) across Uzbekistan. The results indicate that the salinization of surface water is 500 mg/L upstream, and over 1 g/L downstream of Amu Darya, where it becomes unfit for drinking. One of the major pollutants that may affect health is nitrogen. The most risky nitrogen component is nitrate, which can cause so-called blue baby syndrome, occurring when the nitrate content of the water amounts to over 100 mg/L.

Currently, 180 types of pesticides are allowed in Uzbekistan. The Cabinet of Ministers issues permits for their use. The most common pesticides are herbicides used for wheat production. Pesticides specified by the Stockholm Convention have been banned by the Uzbek government, including DDT, HCH and others. However, there are residues of these banned pesticides that can still be found in soils and surface water. The pesticide content in soils in Tashkent province is well below the allowable levels and the concentrations are declining annually. Organochloride pesticide concentrations are less than half the permitted levels in Uzbekistan. In recent years, DDT has not been detected in surface waters. In the most downstream provinces of Amu Darya, like Khorezm, the HCH and DDT content is two to three times less than allowed. Besides pollution from agricultural sources, industrial pollution also poses a problem: Heavy metals and phenols in surface water can impact human health. Therefore water pollution should be assessed continuously to identify its causes and potential impact on health.

*“There is increasing pollution from industries, domestic waste, fertilizers, and pesticides that drain into the sewers.”*

*Olga Mirshina, Senior Specialist, Ministry of Health, Republic of Uzbekistan*



## 3. Poor laboratory facilities

However, assessing water pollution is complicated due to inadequate laboratory testing facilities in the country. There are 14 provincial and 260 district-level laboratories for testing pesticides and poisonous chemicals, but they are poorly equipped (Box 1) and use outdated analytical protocols from the 1980s. There is a need to upgrade the equipment of these laboratories while ensuring that the testing standards of ISO 17025 are applied. An assessment of water laboratories in Uzbekistan in 2003 revealed that laboratory staff lacked training in the use of modern equipment to apply international quality standards (Box 1). The laboratory equipment is old, dating back to the 1980s. As a result, the standard requirements for water quality analysis are sometimes not fulfilled. This has resulted in microbiological parameter indicators exceeding the limit, thus risking the occurrence of water-related diseases in the country.

*“There are 14 provincial and 260 district-level laboratories for testing pesticides and poisonous chemicals, which are poorly equipped and use outdated analytical protocols. Currently, the bacteriological laboratories have old facilities and equipment, which are handled by untrained laboratory staff in sampling and testing water quality in order to survey and monitor water-related diseases in the country.”*

*Dilorom Fayzieva, Senior Fellow, Institute of Water Problems, Tashkent*



**Box 1. Assessment of water laboratories in Uzbekistan in 2003/2004**  
(Missions of experts from the Pasteur Institute in Lille, France, supported by the French Embassy in Uzbekistan)

- Personnel of laboratories with basic training and long experience in the same laboratory;
- There is an absolute lack of up-to-date training or information on modern equipment and practices, on international standards and quality assurance requirements;
- Laboratory equipment is usually old, latest acquisitions date from the end of the 1980s;
- Absence of quality control procedures and inappropriate equipment management;
- As a consequence, standard requirements for water analysis are sometimes shortened or not fully completed.

## 4. WHO guidelines

Through its “Water Safety Plan”, the WHO framework for safe drinking water can offer important insights for Uzbekistan to improve its water quality. The framework offers scientific guidelines which can form a basis for developing national drinking water regulations and standards which are appropriate for Uzbekistan’s context. This helps to tailor the comprehensive risk management approach that encompasses all steps in water supply from catchment to consumer. Tailoring effective risk management strategies requires an “EcoHealth” perspective to fully understand the links between water supply, sanitation, health-related behavior, hygiene issues and disease outcomes<sup>4</sup> when developing a national water safety plan<sup>5</sup>(Box. 2).

*“The WHO Guidelines for Drinking Water Quality, 3rd edition shifts emphasis that was largely focused on single-point water quality testing towards integrated risk assessment and risk management. This forms a basis for developing a national drinking water safety plan appropriate for each country’s situation. A water safety plan is a comprehensive risk assessment approach that encompasses all steps in water supply from catchment to consumer.”*

*Jo Nurse, WHO Regional Office for Europe, European Centre for Environment and Health, Rome*

### Recommendations for research capacity building

1. Need to develop a composite index to improve risk assessment strategies to address water-related diseases.
2. Collaboration with the State Center for Epidemiology and Sanitation Surveillance (CESS) for an integrated diseases surveillance system.
3. Need to develop a water safety plan for Uzbekistan’s context that reflects the water safety plan approach of the WHO.
4. Need to assess economic, social and institutional feasibility of existing drinking water quality standards and regulatory framework in Uzbekistan.
5. Inadequate capacity of water quality testing laboratories in Uzbekistan to meet the ISO standard 17025.
6. Lack of information regarding the effects of overuse of contemporary fertilizers and pesticides on human health.

#### Box 2. Three essential components of a water safety plan

1. System assessment to determine whether the drinking-water supply chain (up to the point of consumption) as a whole can deliver water of a quality that meets health-based targets. This also includes the assessment of design criteria for new systems;
2. Identifying control measures in a drinking-water system that will collectively control identified risks and ensure that the health-based targets are met. For each control measure identified, an appropriate means of operational monitoring should be defined that will ensure that any deviation from required performance is detected in a timely manner; and
3. Preparing management plans describing actions to be taken during normal operation or incident conditions and documenting the system assessment (including upgrade and improvement), monitoring and communication plans and supporting programs.

<sup>4</sup> Herbst et al., 2008.

<sup>5</sup> WHO (2008) Guidelines for Drinking Water Quality- Third Edition Incorporating the First and the Second Addenda- Volume 1 – endations. World Health Organization, Geneva. Pg.49

## 5. Improving health data-base management

Uzbekistan lacks adequate information on health-related parameters. Often, information on many socio-demographic parameters collected at a “Rural Doctors’ Point” (which acts as a rural health care center) are aggregated to the regional level, often losing the core information required for the surveillance and management of water-related diseases (see Table 1).

The survey sheets or register records maintained at the Rural Doctors’ Points were designed many decades ago, and have not been revised to assess impacts of global environmental change. Revising and updating these questionnaires and registers is of utmost importance for the effective surveillance of water-related diseases. If spatially mapped and supplemented, they can support the identification of possible environmental sources of infections and outbreaks and can help to develop understanding. GIS offers an effective tool to show the spatial distribution of water-related health data. This helps the efficient storage, management, analysis and display of large water-related health data sets on mapping intestinal diseases. However, the application of GIS is not without problems: insufficient data on microbiological quality, registration of diseases, and insufficient inter-agency cooperation create difficulties for epidemiological assessment. Often the staff involved in collecting and maintaining this information are not adequately trained and updated about international standards. This is coupled with a lack of facilities and equipment.

*“Data collected through the regular monitoring system of patient registration is rarely analyzed due to paucity of trained human resources.”*

*Sanat B Shaumarov, Director, Scientific Research Institute of Sanitation, Hygiene and Occupational Diseases, Ministry of Health, Uzbekistan*

	samples	TMC >100	%	Coliindex >3	%	Colititer <333	%
1991	366	70	19.1	208	56.8	207	56.6
1992	212	34	16.0	139	65.6	139	65.6
1993	221	53	24.0	175	79.2	175	79.2
1994	133	4	3.0	97	72.9	98	73.7
1995	167	13	7.8	96	57.5	96	57.5
1996	163	14	8.6	99	60.7	99	60.7
1997	147	20	13.6	70	47.6	70	47.6
1998	121	26	21.5	49	40.5	50	41.3
1999	204	126	61.8	173	84.8	170	83.3
2000	79	29	36.7	63	79.7	63	79.7
2001	82	40	48.8	59	72.0	57	69.5
<b>total</b>	<b>1895</b>	<b>429</b>	<b>22.6</b>	<b>1228</b>	<b>64.8</b>	<b>1224</b>	<b>64.6</b>

**Table 1. Microbial drinking water quality report sheet of routine statistics in CESS**

*“Identifying the limitation of the existing data sets with an intention to fill in and strengthen the questionnaires according to international standards will help in collecting comprehensive health-related information.”*

*Larisa Tetyuhina, Scientific Research Institute on Hygiene and Sanitation, Tashkent*

## Recommendations

1. Need to apply GIS tools for epidemiological studies to assess risk from water-related diseases (WRD).
2. Need for more appropriate geo-reference data on water-related diseases
3. Need to build scenarios/ models on the future occurrences of water-related diseases taking global environmental change into account.

## HEALTH GOVERNANCE

The health care system of Uzbekistan has undergone changes since the breakup of the Soviet Union and independence in 1991: Uzbekistan has initiated a number of laws and decrees to move away from centralized regulation towards a mixture of a public-private system<sup>1</sup>. Currently there are more than 20 laws (decrees and resolutions of the President and Cabinet of Ministers) focusing on improving public health (Box. 3). Sanitary and epidemiological services take the lead in preventing infectious and specific non-infectious diseases. The basic document that drives other legislation is the Law on State Sanitary Control (1992).

These reforms have made noticeable progress in terms of compliance with regard to drinking water supply and sanitation. In spite of the progress achieved in the last two decades, various barriers remain, however; one of them is the complex institutional structure. For instance, many agencies have institutional responsibilities for environmental policy and statistics and these diverse and multiple responsibilities often compete with each other. Currently, a national strategy for water supply and sanitation is under consideration by the parliament for approval. Though the precise content of the strategy is unknown, it is said to offer good insights for restructuring drinking water supply and sanitation in the country.

The use of health care facilities among the population in rural areas increased by almost 20 percent between 2004 and 2008. Through its health reform program “ZDARV plus”, the government of Uzbekistan has implemented



### Box 3. Legislative documents on Public Health

- Law on State Sanitary Control
- Law on Public Health
- Law on Water and Water Use
- Law on Quality and Safety of Food Products
- Law on Radiation Safety
- Law on Certification of Products and Services
- Law on Technical Regulation
- Law on Prevention of Iodine-Deficiency Related Diseases
- Law on Protection of Consumer Rights, etc.

Source: Shoumarov, S B, Presentation at the Workshop

health reforms at national and provincial levels, which led to a shift from the Soviet multi-tiered system to a two-tiered Uzbek system. Over 90 percent of rural health facilities have gradually been upgraded and better equipped through the donor-funded projects Health 1 (1998-2005) and Health 2 (2005-2010).

According to a survey of donor-funded projects, two-thirds of the Uzbek population reported improvements in the quality of health care, such as the availability of medicine and improved access to better trained doctors and paramedical staff. Some challenges still facing the public health care system of Uzbekistan are the low budgetary allocation, limited and outdated equipment and medicines, outdated facilities - especially in rural areas - regional disparity in the quality of health services, lack of staff (for example almost 300 rural doctors' points lack physicians) and limited coverage of the state-guaranteed benefits package (Box. 4). Budgetary allocations for each health facility are based on the number of personnel, as well as on the size of and the services offered by the facility, causing inefficiencies and disincentives for improving health care.

*“There is hardly any study on the cost-effectiveness of the public health care system that can offer insights to improve public health care in Uzbekistan.”*

Faisal Abbas, Post-Doctoral Fellow, ZEF

The nexus between poverty and health is ever increasing. The growing middle class in Uzbekistan exhibits increasing trends towards fast-food consumption, rising levels of obesity, chronic diseases and communicable diseases. This trend also needs attention to provide better and cost-effective ways to improve public health and social welfare. However, health risks are still twice as high for poorer households in Uzbekistan than for wealthier ones. The poor have restricted access to high quality public health care due to the lack of own financial resources. The poor either erode their savings or borrow money from others for health care purposes, often leaving them more vulnerable to both economic and health risks.

*“The Asian Development Bank has prepared a National Water Supply and Sanitation Strategy under their technical assistance program, which is under consideration with the national Parliament for approval. Though the content of the strategy is unknown, the strategy is said to offer good insights for restructuring drinking water supply and sanitation in the country and also for future research capacity-building projects.”*

Nargiza Talipova, Asian Development Bank, Tashkent

### Box 4. Challenges of public health care in Uzbekistan

1. Cost effectiveness of primary health care in Uzbekistan.
2. Effectiveness of health insurance system in Uzbekistan.
3. More than 50% of the population aged 65 or above die of heart attack, probably due to the sedentary lifestyle of the middle-aged population of Uzbekistan, but the underlying reasons have not been investigated. It might be due to the high rate of heart diseases and lack of developed cardiac surgery or modern invasive cardiology for the middle-aged population.

*“The poor either erode their savings or borrow money from others for health, often leaving them more vulnerable to economic and health risks.”*

Mehmood Ul Hassan, Senior Researcher, ZEF

## Opportunities for strengthening health governance

1. Need to examine the economic aspects of public health care in Uzbekistan.
2. Need to study the disparity and distribution of diseases (regional, gender and age-specific).
3. Need to devise approaches to identify vulnerable groups for water-related diseases, and under what conditions.
4. Need to strengthen the public health care system in the field of human well-being, especially for the poor and vulnerable.
5. Need for an institutional analysis of the health care system in Uzbekistan, and its interfaces with the Ministry of Agriculture and Water Resources, urban and rural municipalities, donor-funded health programs.
6. Need to explore the economic feasibility of existing drinking water quality and water pollution standards.



<sup>1</sup> WHO, 2010.

## HEALTH EDUCATION AND RESEARCH

Though there are institutional structures in place such as the Department of Health Research within the Center for Epidemiological and Sanitation Statistics (CESS), the main health-related research undertaken in Uzbekistan remains limited to the assessment of drinking water quality. There is a sharp contrast between the hygiene training carried out by the MoH and donor-sponsored projects. The MoH carries out its training through patron nurses posted in villages, who explain the importance of personal and food hygiene to the population in general and young mothers in particular. The training strategy used by the International Secretariat for Water (ISW) in a project located in the Fergana Valley uses a cascade training system for training health and education professionals. The project is reported to be having a high impact in terms of sanitation awareness. A comparison of the efficacy of these two types of training strategies has yet to be undertaken.

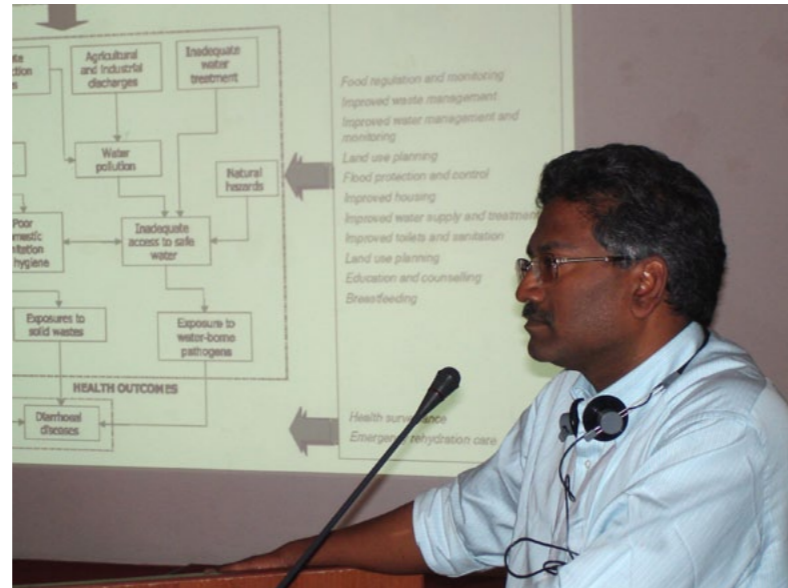
*“The comparison of the efficacy of hygiene-based training conducted by MoH and international agencies and cascade training undertaken by the International Secretariat for Water (ISW) has yet to be undertaken.”*

**Feruz Madelieva,**  
*International Secretariat for Water*

The Cabinet of Ministers has introduced a number of legal instruments that identify the need for fundamental, applied and innovative research (projects) on water-related issues. This legislation points out the need for developing new methodologies for ecological and environmental norms for potential water-related risks to public health, and for strengthening the national monitoring system.

Although data is regularly collected from water sources, it still needs regular and rigorous analysis and interpretation. There is an urgent need to prepare a new cadre of researchers and experts in water and health issues for this purpose.

According to the WHO, the majority of populations in most developing countries regularly use and rely on traditional medicine for their everyday health care needs. However, the policy and regulatory settings supporting this health reality are still at the early stage of development in many countries. The WHO published its first “Traditional Medicines Strategy 2002-2005” in 2002 regarding the contribution to and integration of traditional medi-



cine into national health care systems. This report argues for the development of evidence-based approaches to traditional and complementary medicine in order to be able to integrate it into the existing systems of biomedical knowledge-based health care systems. It is therefore important to assess the status of bio-medical knowledge and its ability to address water-related diseases as well as the extent to which traditional medical knowledge addresses water-related diseases in Uzbekistan.

The proposal that is to be developed as an outcome of the workshop will aim to improve health research capacity by drawing on diverse knowledge bases for an effective water safety plan. This could be achieved through an understanding of the capability of the existing water supply system, identification of potential sources of contami-

*“Presidential decrees, laws, and resolutions of the Cabinet of Ministers require programs that offer fundamental and applied innovation in these legislations. Research can contribute by developing new methodologies for ecological and environmental norms for potential water-related risks to public health, and strengthening the national monitoring system.”*

**Sanat B Shaumarov, Director,**  
*Scientific Research Institute of Sanitation, Hygiene and Occupational Diseases, Ministry of Health of Uzbekistan*

nation, implementation of a system for the monitoring and surveillance of water quality, and actions to ensure the supply of safe water for public health care. One of the single most important prerequisites for the future of Central Asian countries like Uzbekistan is to provide training for experts in a broad range of disciplines relevant to environmental health: epidemiologists, toxicologist, geographers, physicians, engineers, hygienists, ecologists and medical anthropologists. Such multidisciplinary teams can improve the chances of a sustainable future for public and environmental health in the country.

*“For Uzbekistan, there is absolutely no documented knowledge on the status of traditional medicine and its practice, though the term of tabib (herbal healer) is widely used and understood by the population.”*

**Anna-Katharina Hornidge,**  
*Senior Researcher, ZEF*



### Opportunities for education and research:

1. Lack of adequately trained researchers for risk assessments of water-related diseases.
2. Inadequate knowledge of the role and status of traditional vis-à-vis biomedical approaches to addressing water-related diseases.
3. Inadequate capacity and knowledge about appropriate approaches to training staff for the creation of public health care awareness.
4. Inadequate capacity of water quality testing laboratories in Uzbekistan to meet the ISO standard 17025.
5. Lack of information regarding the effects of overuse of contemporary fertilizers and pesticides on human health.

*“A comprehensive risk assessment of water supply and sanitation can help in reflecting on the WHO Guidelines for Drinking Water Quality III, and also help reflect on the national strategy for drinking water and sanitation in Uzbekistan prepared by the Asian Development Bank.”*

**Michel Louis Marie Tailhades,**  
*WHO- Country Office Uzbekistan, Tashkent*

## Hands-on knowledge: Visit to a rural doctors point

The workshop participants paid a visit to a Rural Doctors' Point (RDP) located in a village about 30 km away from Tashkent. The RDP was established in 2005 at a cost of 55,217 Euros<sup>1</sup> and provides basic health care facilities to approximately 9600 inhabitants living in a radius of five kilometers. The RDP has a laboratory with modern equipment donated by the Japanese government, capable of carrying out 18 types of blood tests. On average 20-25 tests are performed every day.

The staff consists of six physicians and specialists and 18 nurses and paramedics. On average, 75 patients visit the facility per day and most of them are treated immediately. On average only up to three patients per day are referred to secondary or tertiary health care systems. The RDP provides free services and basic medicine. Common ailments in the area are colds, blood pressure disorders, respiratory diseases, gastro-intestinal diseases, endocrine-related problems and hepatitis A. Endocrine-related problems and hepatitis are declining, however. The RDP is also responsible for vaccinations.

The RDP maintains a separate register for each patient

with details of household address, number of family members, age and health history. However, the data which are upscaled are an aggregation, ignoring the demographic and other location specific details of the households.

The gastro-intestinal diseases in the area are mainly caused by the consumption of unwashed or poorly washed fruit and vegetables (30%), exposure to contaminated water, especially when swimming, (30%) and consumption of poor quality food (15%). The hardness of the water is the main cause of kidney related problems.



<sup>1</sup> The exchange rate of 1 Euro = 2300 Uzbek Soums.

ductive approach). The workshop offered a forum for the partners to adapt these two approaches to defining their objectives and activities for a research capacity-building initiative for public health care in Uzbekistan. These approaches were expected to be within the overall themes of 'risk assessment', 'global environmental change' and 'water-related diseases'. This helps in pursuing those core activities that are considered important.

Given the number of participants attending, the partners were divided into three groups, with each group discussing two topics. Thus, partners could collectively 'think

within their box' (to identify activities that will facilitate improved risk management strategies and the tools required to make this happen), and to 'think outside the box' (to identify the inputs and outputs from and for other group discussion topics). This was a challenging combination of tasks, as partners from different disciplines and backgrounds often feel that their disciplinary approach can solve most of the problems. It required the partners to be more pragmatic in their approach and to understand the local context more clearly. A number of activities were identified for risk assessment strategies in Uzbekistan based on the intensive group discussions.

## Group discussion topics

### Group 1

Developing Composite Index (mainly from Panel 1) (Health impact assessment, pesticide impact on health) GIS-based epidemiological mapping (from Panel 2)

### Group 2

Socio-economic assessment (mainly from Panel 3) Institutional mapping and analysis (from Panels 3 & 4)

### Group 3

Public Health Research – (mainly from Panel 1) (Priority local PH research issues – water safety plan – feasibility of water quality and regulation) Health database management system

## Summary of activities from the preliminary group discussion

### Group 1

1. To map the water quality (toxicology and microbiological content from secondary information) via GIS methods for the case study province.
2. To map the incidence of water-borne diseases from both secondary and primary information.
3. To test for associations between water quality and incidence of water-related diseases (via statistical modeling, structural equation modeling, geospatial modeling, other methods).
4. To define possible vulnerable populations based on scenarios projected from the increase or decrease in water-related diseases.

### Group 2

1. Analyze health care access mechanisms for WRDs considering SES, regional, gender and age differentiation.
2. Understand local health care knowledge and practices relating to WRD
3. Understand dynamics of health care system reform in WRD
4. Understand agricultural transformation and its effects on WRD
5. Evaluate emerging peri-urban agricultural change and the social vulnerability it produces
6. Comparative analysis of existing hygiene education and awareness approaches
7. Assess socio-economic and nutritional impacts of WRD
8. Analytical interpretation of donor-sponsored health programs.

### Group 3

1. Review the existing questionnaires at the Rural Doctors' Points, keeping in mind the need to upscale the data to the Province level without aggregating them.
2. Identify the limitation of the existing data sets with an intention to fill the gaps in collecting information and monitoring the water-related diseases.
3. Identify possible sources of infections or environment for potential outbreaks using a combination of GIS-remote sensing and field checks in the Province.
4. Suggest ways to reorganize the data set, keeping in mind the surveillance of the diseases and assessment of potential outbreak (which requires training existing staff in multidisciplinary skills). Create awareness of the Water Safety Plans (prepared by WHO), and enhance the existing water safety plans in Uzbekistan.
5. Suggest ways to regulate water quality regulations.
6. Review of public health literature on the current trends in water quality regulation and analytical methods for risk assessment.
7. Geographic mapping of the sources of infection from the border territories
8. Participation in the planning of Safe Public Water Supply.
9. Capacity building for the laboratory of the Research Institute of Sanitation, Hygiene, and Professional Diseases and training their staff.

## THINKING WITHIN AND OUTSIDE THE BOX: CHALLENGES OF INTERDISCIPLINARY COLLABORATION

The collaborative initiative proposed by the workshop brings together an interdisciplinary team that offers insights for improved risk assessment strategies for public health care in Uzbekistan, and at the same time draws implications for Europe to prepare itself for growing health insecurity. This interdisciplinary group will help to capture and assess the different factors influencing water-related diseases in the region, and to enable and develop an interdisciplinary research capacity-building program. However, coordinating partners from diverse disciplines, professions and cultural backgrounds also poses a number of challenges: On the one hand, they have to think within

their own box, and at the same time they have to integrate with others outside their box. Two main challenges were identified by the partners: (i) Diverse approaches among disciplines; and (ii) Moving from disciplinary to interdisciplinary research.

In a multi-disciplinary collaborative initiative like this, some disciplines (such as economics and natural sciences) are often expected to develop a detailed work plan on the basis of objectives and hypotheses (deductive approach), whereas some of the social sciences (such as sociology and anthropology) usually develop objectives and hypotheses based on the context of the research (in-



## TOWARDS A FRAMEWORK FOR HEALTH RESEARCH CAPACITY BUILDING

The second major challenge was to achieve consensus on the inter-linkage between disciplinary and interdisciplinary topics for the project. There were various approaches ranging from linear to non-linear, disciplinary versus interdisciplinary, or a combination of disciplinary and interdisciplinary approaches. At the end of the fourth day, a democratic approach was adopted to allow interested participants to present a framework that could bring together disciplinary and interdisciplinary topics.

**The first framework** was presented by Peter P. Mollinga. The framework proposed that risk assessment should be involved in examining patterns and mechanisms that contribute to an Integrated Risk Assessment. This assessment would make two contributions, one to the policy-making world and the other to health database management. The project management task would coordinate the overall project, while research capacity building would be cross-cutting, involving all topics. The framework claims to have an interdisciplinary perspective from the beginning to the end. However, in practice it is difficult to work from an interdisciplinary perspective from the very beginning, given that each partner tends to work within his or her disciplinary lines and then aims to offer inputs for an interdisciplinary perspective. This also raised the issues of authorship and property rights to knowledge or output, as well as complications in work routines and accountability, as various partner institutions have diverse administrative routines and working principles.

**The second framework** was presented by V.S. Saravanan, who brought together the disciplinary perspectives (or work within individual disciplines) to be integrated within the Integrated Risk Assessment topic. Under this framework, the Project Management team is expected to develop indicators for risk assessment together with risk managers. Working closely with the risk managers, the program aims to facilitate between the partners and the risk managers. The idea is to reach an output that comes closer to the application of the results in order to generate the sustainability of risk assessment strategies for public health in Uzbekistan.

**The third framework** presented by Thomas Jänisch adopts a linear approach towards developing integrated risk assessment strategies with capacity building/data base management as the output. The framework proposes that once the research has been done by 'experts', the findings could be implemented by the development agencies. This framework was questioned for its inability to capture the non-linear aspects for sustaining the national health system.

Jörg Szarzynski proposed an integrated, water-related environment and health information system based on UN-SPIDER's experience of tsunami warning in Asia. The approach was expected to contribute to integrated risk and vulnerability information for risk assessment. This framework is innovative and could represent a future intervention after addressing the drawbacks of the existing health information systems in Uzbekistan and reviewing existing practices for disaster management in developed countries like the United States, Australia and Europe. It also requires a review of approaches by ZEF and other international agencies.

While the frameworks offered different insights on how to approach the research capacity-building program, they shared the commonality of the topics. However, they differed on the inter-linkage of the topics and also on interacting with the risk managers for an effective research capacity-building program. Following rigorous debates and discussions on the strengths and weaknesses of each of the frameworks presented by the participants, a convergence of views emerged that the contents (research and capacity-building themes) were almost identical in all the three frameworks offered, and the differences were merely 'organizational'; for example, about how to organize the flow of contributions into an integrated assessment. The participants agreed to aim for a 'hybrid' framework; an attempt has been made in Figure 2.

Based on the issues identified, the workshop classified the themes for the project as: (i) Epidemiology and mapping of water-related diseases; (ii) Socio-economics of disease burden; (iii) Institutional analysis of public health care; (iv) Integrated risk assessment; (v) Health data base management; (vi) Public health research; and (vii) Capacity building for public health research. Themes (i), (ii) and (iii) are disciplinary themes that will be integrated in theme (iv) through integrated risk management. These four themes will contribute towards restructuring health data-base management and enhancing public health research in Uzbekistan, and will also offer insights for preparing health research in Europe.

### 1. Disciplinary themes

(i) **Epidemiology and mapping of water-related diseases:** Aims to develop an integrated database on water-related diseases, apply GIS and remote sensing techniques for mapping spatial distribution and vulnerable regions, and carry out (statistical) analysis of the relation-

ship between human health and water-related diseases.  
 (ii) **Socio-economics of disease burden:** Aims to comprehensively assess and identify the socio-economic determinants influencing water-related diseases.  
 (iii) **Institutional analysis of public health care:** Aims at a comprehensive assessment of the institutional

### 2. Interdisciplinary theme

(iv) **Integrated risk assessment:** Aims to take a systemic perspective to draw together the disciplinary findings to help develop integrated risk assessment at various levels. It will provide insights into the relative importance of key factors influencing disease risk and the effects of societal responses to this risk.

### 3. Output themes

(v) **Health data base management:** Aims to revise the current health information reporting system for effective surveillance and monitoring of water-related diseases.  
 (vi) **Public health policy support:** Will draw findings from various other themes to enhance health data base management, generate an appropriate institutional strategy for safe water, and promote an efficient policy-making system.

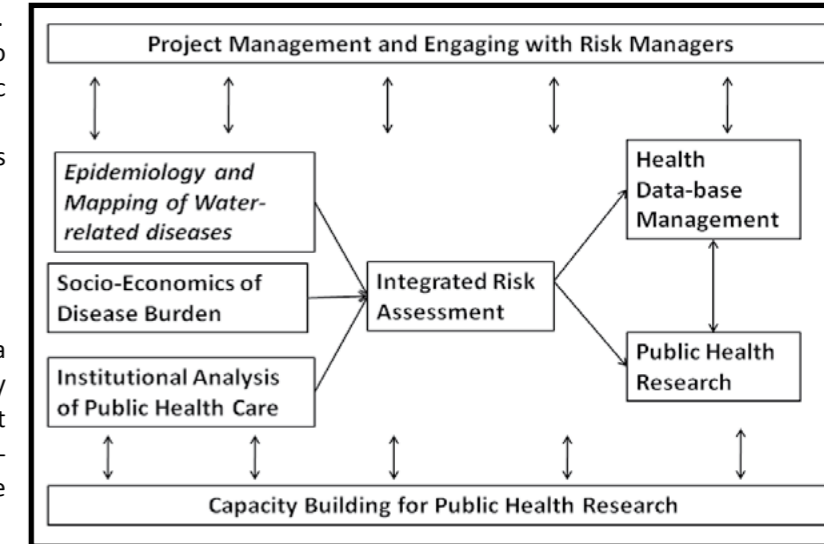


Fig. 2. Framework for health research capacity building

(vii) **Capacity building for public health research:** Aims to identify and equip a cadre of health-related professionals from Uzbekistan's health and research systems who are interested in learning advanced analytical skills in carrying out health risk assessments. These disciplinary and interdisciplinary themes will be facilitated under the overall coordination of the Project Management team. The Project Management team will also actively interact with risk managers from Europe and Uzbekistan to frame the disciplinary and interdisciplinary themes for improving the risk assessment strategies.

## OUTLOOK

A number of gaps in research and action remain to be filled. As already mentioned, researchers face the task of collecting much more evidence on the links between global environmental change factors and human health, and on how they can be effectively exploited to improve human well-being in Uzbekistan and help Europe prepare for the growing threat of water-related diseases. But it is also important not to feel paralyzed when faced with a lack of evidence, especially in a country like Uzbekistan. A lot can already be done, for instance on the level

of health research capacity building, to process existing information, revise monitoring and surveillance mechanisms, strengthen existing health information systems, develop integrated models for improved risk assessment strategies in Uzbekistan, and help prepare Europe to address growing health insecurity. Finally, any solutions designed for water-related health issues will have to function in the context of a rising global population, growing incomes and changing consumption patterns.

## ANNEXURE I

**“Global Environmental Change and Water-related Diseases: Improving Risk Management Strategies for Public Health Care in Uzbekistan”  
Hotel Shodlik Palace, Tashkent, 2-6 May 2011**

May 2 <sup>nd</sup> , 2011		
Time	Title	Speaker
0900-0910	Welcome address	<i>Michel Louis Marie TAILHADES</i> , WHO Country Representative, Uzbekistan
0910-0930	Opening address	(Deputy) Minister for Health, Republic of Uzbekistan
0930-1000	Welcome note and introduction to the workshop Agenda for a Water and Health Program in Central Asia	V.S.SARAVANAN, ZEF, University of Bonn
1000-1030	Coffee Break	
Panel 1: Water and health nexus (Chair: Michel Louis Marie TAILHADES, Discussant: Mavjuda BABAMURADOVA)		
1030-1100	Global environmental change and (epidemiology of) water-related (infectious) diseases: Challenges in Central Asia	<i>Thomas JÄNISCH</i> , Section Clinical Tropical Medicine, University Hospital, Heidelberg
1100-1130	Water and hygiene in Uzbekistan: An overview	<i>Olga MIRSHINA</i> , Department of Public Hygiene, Ministry of Health, Uzbekistan
1130-1200	Microbiological safety of drinking water in Uzbekistan	<i>Dilorom FAYZIEVA</i> , Institute of Water Problems (IWP), Tashkent
1200-1230	WHO activities on water, sanitation and health	<i>Jo NURSE</i> , European Centre for Environment and Health, Rome
1230-1330	Discussion	
1330-1430	Lunch	
Panel 2: Research-based tools for improving health governance (Chair: Thomas JÄNISCH, Discussants: Mehmood UL HASSAN and Dilorom FAYZIEVA)		
1430-1500	Earth observation and GIS based risk analysis and modelling in support of managing water-related health risk in Central Asia	<i>Jörg SZARZYNSKI</i> , The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), Bonn/German Aerospace Center
1500-1530	Application of GIS for water and health aspects in Uzbekistan	<i>Feruza ALIMOVA</i> , Tashkent Institute of Irrigation and Melioration
1530-1600	Development of space-based platform for communication purposes, process Support and information dissemination to manage water-related health risk in Central Asia	<i>Jörg SZARZYNSKI</i> , The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), Bonn/German Aerospace Center
1600-1640	Discussion	
1800-	Workshop Dinner	

May 03, 2011		
Panel 3: Health governance in Uzbekistan (Chair: John LAMERS, Discussants: Olga MIRSHINA and Anna-Katharina HORNIDGE)		
0930-1000	Economics of public health in Uzbekistan	<i>Faisal ABBAS</i> , ZEF, University of Bonn and <i>Inna RUDENKO</i> , Khorezm Rural Advisory Support Service, Urgench
1000-1030	Health governance-wellbeing and access to health facilities in Uzbekistan	<i>Mehmood UL HASSAN</i> , <i>Nargiza NIZAMEDINKHODJAYEVA</i> , ZEF, University of Bonn and <i>Peter P. MOLLINGA</i> , SOAS, London
1030-1100	Water pollutants of agricultural origin and potential health hazards in Uzbekistan	<i>Bakhriddin NISHONOV</i> , Hydrometeorological Research Institute, Tashkent, Uzbekistan
1030-1100		
1100-1130	Institutional arrangements for sanitation and hygiene in Uzbekistan	<i>Saniat SHAUMAROV</i> , Institute of Hygiene, Sanitation and Occupational Diseases, Tashkent, Uzbekistan
1130-1230	Discussion	
1230-1330	Lunch	
Panel 4: Health education and research in Uzbekistan (Chair: Mehmood UL HASSAN, Discussants: Inna RUDENKO and Tal'at NABIYEV, Department of Research Coordination, Ministry of Health, Uzbekistan)		
1330-1400	Collaborative training program on water and hygiene in the Fergana Valley	<i>Feruza MADALIYEVA</i> , and <i>Oliver NORMAND</i> , Regional Rural Water Supply and Sanitation Project, International Secretariat of Water (ISW), Uzbekistan
1400-1430	Development of drinking water safety concept in Uzbekistan	<i>Islam USMANOV</i> , Institute of Water Problems, Tashkent
1430-1500	Coffee break	
1530-1600	Traditional vs bio-medical knowledge in health care: Implications for health care in Uzbekistan	<i>Anna-Katharina HORNIDGE</i> , and <i>Solvay GERKE</i> , ZEF, University of Bonn
1600-1630	Food-web and water quality in water bodies Khorezm, Uzbekistan	<i>Laurel SAITO</i> , <i>Margaret SHANAFIELD</i> , University of Nevada, USA, and <i>John LAMERS</i> , ZEF, University of Bonn, <i>Bakhriddin NISHONOV</i> , <i>Dilorom FAYZIEVA</i> , IWP, Tashkent
May 04, 2011: Field visit		

## ANNEXURE II

May 05, 2011		
<b>Panel 5: Potential collaborative research activities (Coordinators: V. S. SARAVANAN, Mehmood UL HASSAN, Michel Louis Marie TAILHADES, Mavjuda BABAMURADOVA and Dilorom FAYZIEVA)</b>		
0900-1030	Presentation of issues and proposed research activities by chairpersons of each panel and discussions	
1030-1100	Coffee break	
1100-1230	Presentations and discussions continued	
1230-1330	Lunch	
1330-1500	1. Group work under the following themes:  (i) Assessment of health knowledge;  (ii) Epidemiological research for water-related diseases, and  (iii) Education and research capacity building for improving risk assessment strategies	
1500-1530	Coffee break	
1530-1700	Presentation of the group work	
May 06, 2011		
0900-1330	Identification of goal & objectives, and work packages:  Tasks for proposal preparation with case studies in Andijan, Namangan and Fergana Provinces of the Republic of Uzbekistan.	
1330- 1430	Lunch	
1430-1630	Closing remarks	

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