Alleviating the Consequences of an Ecological Catastrophe

Conference on the Aral Sea – Women, Children, Health and Environment 23–24 April, 1998

The five new republics in central Asia, Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan, Tajikistan

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of an Ecological Catastrophe

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Cover: The Aral Sea basin with shrinking lake on satellite image of 2 June 1994, Meteor. From the second RESURS 01 satellite. The two red areas are vegetation on farmlands of Amu Darya delta (bottom) and Syr Darya delta (top). Pale zones of islands and eastern shore are dried lake beds of fine sediments. From *Remote Sensing*, biannual newsletter of the Swedish Space Corporation, Solna, Sweden. © SOVZOND 1994/© SSC SATELLITBILD

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Kerstin Lindahl Kiessling (Editor)

Rädda Barnen
SWEDISH SAVE THE CHILDREN

Swedish UNIFEM committee

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Kerstin Lindahl Kiessling

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The Aral in Crisis

The Aral Sea is one of the most ancient lakes in the world, situated in Central Asia with its very old cultural traditions, the upholder of ancient civilisations with famous, wonderful cities, Samarkand, Bukhara, Khiva. The Aral Sea basin covers an area of 2.2 million km^2 and has a population of about 50 million. Two large rivers, the Amu Darya and the Syr Darya, that drain the basin, run approximately 2,500 km through mountainous countries upstream, then flow through vast desert and steppe areas of the plain countries downstream, before ending in the Aral Sea. Before the Soviet Government decided to become self-sufficient in cotton production the Aral Sea was the world's fourth largest inland sea, with an area of 68000 km^2.

In Central Asia water is a most precious resource, "in every drop of water is a grain of gold," says an Uzbek proverb. The waters of the Aral Sea and the two rivers have been vital to life from time immemorial. Over 90 percent of the water in the two rivers is now used for irrigation, and the sea receives only between 5 or 10 km^3 of water per year, some years a little more, others nothing at all. The Aral Sea is a dying sea.

The Aral Sea environmental disaster is one of the most paramount warnings of our time, demonstrating the consequences of short-sighted attempts by man to exploit nature. The Aral Sea once gave life to flourishing fishing villages, to profitable industry, to tugay forests and limitless reed growth, raw material for manufactured goods. Today it is a fraction of its former grandeur, surrounded by miles and miles of dry, saline sand, contaminated by industrial and agricultural chemical residues that strong winds carry and deposit far away. It is far from certain that the disastrous consequences will be limited to the Aral basin. The people who bear the main brunt of the

encroachment are not those who took the devastating decisions or profited from them.

After the break-down of the Soviet Union, five newly independent states, Kazakhstan, Uzbekistan, Tajikistan, Turkmenistan, and Kyrgyzstan, have to find the means for co-operative management and the allocation of scarce water resources. They must handle the dire consequences on health, economy and employment, in spite of an estimated loss of about 60 percent of state income at the dissolution of the Soviet Union. But rehabilitation is not only a national duty; *the Aral Sea is an international obligation.*

Maintaining the bio-diversity value of the Sea and its wetlands is beyond the capacity of the basin's national Governments, in view of the necessity to balance human needs and bio-diversity goals. For future generations, the degeneration of their natural environment also deprives them of their life support systems. If past salinisation trends continue, a major part of the agricultural land in the river basins will be unfit for irrigated agriculture within a few decades, and the river water will be unacceptable as drinking water. The health, economic, environmental, and social impacts would be incalculable. There is also an in-built potential threat to peace in the trans-boundary water management of the basin. Both in quantity and quality, it is economically and environmentally unsustainable, and Central Asia has to be considered a menacing flash-point.

Already almost 30 percent of irrigated land is severely salinised, so much that crop yields are reduced by 20 to 50 percent. Much of the water from the sea has percolated down to the groundwater, where it has mobilised deep salt reserves and carried them with a rising water-table into the root zone of agricultural lands, thus water-logging the land. When the groundwater levels rise to less than 2 meters below the surface, capillary forces pull it to the surface, where the water evaporates and the salt remains. The exposed former seabed is covered by "solonchak", white alkali soil. The salt contents of the young solonchaks and their wind-borne transfer eastward constitute serious threats to the plants and soils of agricultural areas far away. The Aral Sea was also a barrier against the drying effects of winds and, with the barrier weakened, drying winds and dust-storms are an increasing threat. Public water supplies in the disaster zone are unreliable and unsafe, mainly because of bacteriological contamination. Life expectancy in the disaster zone as a whole is 1.8 years below that of surrounding nations, and in districts near the sea, the difference is 9 years.

The Aral Sea is of global importance, and this must be reflected in our actions. Any statement made must not die away unheard. The five Central Asian states, in co-operation with UN agencies and other organisations, have agreed to initiate far-reaching multifaceted action programmes to address both the ecological and social aspects of the Aral Sea crisis. So there are

bright spots. Replacement of toxic pesticides with biological controls is being tested, and a few persistent agricultural chemicals have been banned in some areas, reflecting a heightened concern. Salt resistant crops are being introduced. Land reforms and other market reforms that can facilitate salt management and reduction in water use and wastage are on the programme. Construction of drainage systems to reduce water-logging and salinisation is underway. This has led to some recovery in the fishing industry, although not in the Sea itself, where conditions are still deteriorating. Uzbekistan and Kazakhstan have made arrangements for providing energy to Kyrgyzstan in exchange for springtime release of irrigation water. Preparations for National Environmental Action Plans, NEAP, have begun. Basinwide, it is thought that a reduction in water use of 5 percent over the last five years has been achieved. There is a growing recognition of the Aral Sea as the "sixth state", with a right to water. There is an increasing concern about delays in concrete action on the ground that may prepare the way for immediate socio-economic impact actions with focus on poverty alleviation as well as technical problems.

The difficulties in implementing the overriding plans are enormous. Things take time. It will take decades to address completely the observed problems. So there is a need to focus not only on long-term strategic issues. Short-term investments are needed to alleviate the most critical problems. Public participation is necessary to find out the expectations of the people in the region, with respect both to the future of the Aral Sea itself and to the changes in present every-day life conditions.

This was the starting point for three Swedish organisations that in 1998 decided to arrange a conference on the Aral Sea, focussing on contributions to the alleviation of the consequences of this environmental catastrophe.

Görel Thurdin, chairperson of Rädda Barnen, the Swedish Save the Children, saw the links between the environment and the prospects of healthy growth for the children. Each new generation should be given a beginning that allows full expression of hidden potentials in every individual. Restrictions emanating from the careless and selfish actions of preceding generations, leading to breakdowns in life support ecosystems, are unacceptable. This is a standpoint expressed by the Secretary General of the Royal Swedish Academy of Sciences, Professor *Erling Norrby. Gia Kjellén*, chairperson of the Swedish UNIFEM Committee and the initiator of the project, pinpointed the fact that vulnerable women and children were left to bear the brunt of hardships in a society with poor health care systems, shortage of safe food, polluted water supplies, unemployment and poverty.

The major objectives of the conference were to increase awareness, in Sweden and in a broader international community, of the dimensions, the causes, and the effects of the Aral Sea catastrophe. But first and foremost it

was to focus on the possibilities for co-operative action that could provide hope for the future. We wanted to concentrate on the relation between health and environment and, in particular, the health of women and children, as well as the equal participation of men and women in the societal development. We believed that the complex situation in the Aral basin had not been adequately approached from this perspective. There was an encouraging response from researchers and practitioners in all relevant disciplines, from active organisations and fieldworkers. Many knowledgeable people living in the basin welcomed the proposition and were instrumental in the composition of the conference programme. They are all listed at the end of this publication, together with the conference programme.

This report contains a scientific part, analysing physical environmental issues, hydrology and ecology. *Anders Rapp* was entrusted with the description of the emergence of the crisis from an environmental perspective. Anders himself is no longer with us – he passed away last December, far too early. We keep him in grateful memory.

Gunilla Björklund studied the hydrological issues, but had to refrain from participating in the conference at the very last minute. We include her contribution in this volume to make it more complete. She is now taking part in the follow-up procedure.

The full articles in this volume are worked-up from manuscripts delivered by the authors. The contributions to the open debate sections have been revised from transcriptions of recorded tapes. The material has been distributed to as many speakers as possible for revision, but comments have not been obtained from everyone. Thus, all possible mistakes and misunderstandings are the sole responsibility of the editor. Utterances that may seem controversial or unusual have not been censured – they are there to awaken debate.

What then are the possibilities for this conference to initiate remedial action to repair the damage caused by decades of misuse? Certainly successful and sustainable change can only come about if people themselves are mobilised to take an active part in the process. It is our hope that the conference and the follow-up work that is now underway will facilitate greater community participation, and raise an international sense of responsibility as well as give new incitement for donors and volunteers in respect to the Aral Sea crisis. Research, advocacy and action are the key words for our approach.

The whole world has to get involved, said Dr *Amanbay Mambetkadirov*, conference participant and Chief district medical practitioner for 30 years in Muynak, situated in the most affected Aral Sea region. *The whole world needs to acknowledge the necessity to tread lightly on the biosphere.* ■

The following mimeographs form the background for this introduction.

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(Compiled after Merrick Tabor)

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Chairperson Rädda Barnen/Swedish Save the Children and International Save the Children Alliance, Deputy Speaker of the Swedish Parliament, Sweden

The UN Convention of the Rights of the Child and Agenda 21

Excellensies, colleagues, dear guests and friends.

Good morning and welcome to the Parliament of Sweden, *Riksdagen.* I thank you all for coming here, as I consider this a most important and maybe a pioneering conference. I especially want to welcome the people from the region concerned, bringing their knowledge to us, making it possible to discuss one of the most serious, perhaps the greatest ever ecological catastrophe in modern time, the Aral Sea. We are also happy to have our European commissioner Anita Gradin here. We have been cooperating on issues related to children before. We have also a number of scientists, representatives for NGOs and important international institutions such as the UN and WHO, MPs etc. I also want to thank Gia Kjellén for taking the initiative to this conference. *Rädda Barnen,* Save the Children in Sweden, and the Royal Swedish Academy of Sciences have invited you to this event together with the Swedish UNIFEM committee.

Here in Parliament, we mostly deal with issues from a sector perspective. Today and tomorrow we will deal with the problems of the Aral Sea in an integrated way. I think it will be the first time an international conference of this kind will try to focus on environment, health, children and women together. Environment and health are too seldom discussed together. Sometimes you feel that we human beings do not belong to the biological system. Still, we do. Therefore, scientific proof of links between health and environment is largely lacking, and statistics are incomplete. But we cannot always wait for scientific evidence, because while we wait many more will die. We have to take political responsibility for the decision-making.

As former Minister, I accompanied our King at the opening ceremony of the Rio Conference. I am very well aware of the principles of the Rio Declaration and the Agenda 21. If the principles of householding of natural resources and the precautionary principle had been in the mind of decision-makers 50 years ago, the Aral catastrophe had never happened. Had there been environmental impact assessments and environmental thinking before decisions, the consequences had been known to the decisionmakers.

If the local people had been asked and had been told the consequences of cotton production and the use of enormous water quantities from the rivers leading to the Aral Sea, they would have wanted another solution in order to safegard their survival and lives. Had they been aware of the influence of chemicals on their health, they would probably have said no. The planning process was not aiming at a sustainable development, and therefore the decision-making had these awful consequences.

All over the world we have developed a sectorial way of dealing with problems. We believe that looking at one thing at a time is most efficient. Our decisions have thus solved one problem and produced another one at the same time. Scientists and experts have all learned to dig deep where they stand, with no connection to the next hole, without cooperation. This conference will give us the opportunity to do otherwise.

Agenda 21 is a formidable document, showing the way to democracy and sustainability. In Agenda 21, children and women have their own chapters and their own roles in sustainable development. Chapter 25 states that the participation of young people in the process of decision-making on environment and development, as well as in the implementation of these programmes, is crucial to make the Agenda 21 a success in a long term perspective.

Children are the most vulnerable, not only to war and violence but also to the pollution of environment. Pollution and health are strongly related, as are health and human settlements.

Agenda 21 also says that governments should take the initiative to shape processes that make it easier to consider issues that affect children, in every political field, and in all strategies for environment and development at local, regional and national level. This would include the distribution of natural resources as well as housing, recreation and the combat of pollution and hazardous materials in both rural and urban areas.

I want to highlight physical planning. It is crucial, because in this process we decide and make priorities between environment protection and exploitation, householding and expenditure, people and machines and techniques, healthy and unhealthy human settlements, long-term and short-term, simplicity and complexity, women's and men's perspectives. It is the

physical planning that decides the structure of society, its water, sewage and energy- and transportation systems. It also decides children's access to playgrounds, green areas and safety. It decides lifestyles and the possibilities to reach a sound and sustainable development, and in this I include social issues.

However, we cannot force people to change their lifestyles. We have to involve them, to give them knowledge and positive examples. People want to live in a sound way, especially children, but we have failed to plan for that. Society is getting increasingly complex. People feel as though they have no possibility to influence, decide or choose. In reality, the physical planning process decides whether you have a democracy or not.

Had the Niger delta in Nigeria been polluted by the oil-industry, if the people had been able to influence the decisions? No. Had there been mines all over Afghanistan, Bosnia, Cambodia and many other countries, if the children had been given a voice in the decision-making? No. If the consequences for children were considered in a democratic process, there would be no wars and no oppression destroying human settlements and the environment of the world. Has anyone asked the children of their opinion and their wishes? NO!

In physical planning, every decisionmaker in every field and at every level should be forced to use a child's perspective and be forced to make environment impact assessments, as well as assessments of the impact on children and youth.

As President of the NGO *Rädda Barnen* and the International Save the Children Alliance, I represent a huge knowledge about children, their needs, their rights and their perspectives. The UN Convention on the Rights of the Child is fundamental to our work. All projects, all initiatives carried out by the organisation, both in Sweden and in other countries, can be tied to articles in the Convention, together with knowledge and experiences. This approach is needed, if the efforts are to have a long-lasting effect. Children do not only have the right to survive, they have the right to live and develop. Our only real mandate is to stand at the side of the child – always – especially the child in a vulnerable position, like all children around the Aral Sea.

Every child has the right to be born to a healthy environment; therefore we must focus on women. A sick mother gives birth to sick children. I saw them in the Bo Landin film from Karakalpakstan, shown on Swedish television earlier this week. It all starts before the baby is born, even before the woman gets pregnant. It starts when the future mother is a small girl.

According to the Convention on the Rights of the Child, the small girl and the small boy have a right to have their basic needs met, they have a right to

influence their own lives, they have a right to health, life and development. Due to the unhealthy environment around the Aral Sea, the children cannot grow or develop normally. So the catastrophe has led to a stage of non-implementation of the Convention.

I think there are two things that will decide peace or war in the future: the environmental situation and the situation of the children.This is about human rights. The right to a good, living environment and to health – the right to your own life and development, in other words – as well as the right to non-violence, to be respected, listened to, involved – the right to democracy.

If I have rights, I have obligations as well. I must care for the environment and economise when using natural resources. I am not allowed to attack anyone, and I must listen to other people and respect their opinions, also should they be different from my own. It is the lack of respect for these fundamental rights and the lack of cooperation and joint responsibility that have led and leads to war. Who suffers the most from our wars? The children! Who are going to inhabit the future and influence it? Our children!

If we agree that all that is good for children is good for all of us, there are two documents, the implementation of which will be decisive for peace in the world – Agenda 21 for sustainable development and the Convention on the Rights of the Child for a sustainable childhood. The link between them is strong. Agenda 21 talks about economising our resources, the Convention on the Right of the Child talks about sharing resources in the best interest of the child. To be able to implement them, you have to produce impact assessments. You have to make priorities from a broad perspective and for sustainability. Both documents deal with democracy and involvement. The Convention on the Rights of the Child takes up the social perspectives.

In principle, every municipality in Sweden has its own Agenda 21. Now, *Rädda Barnen* together with the Globetree and the National board of local authorities tries to get the child perspective included into the Agenda 21 process. We hope that this work will be very successful.

The ecological catastrophe of the Aral Sea affects and upsets people in Sweden seeing the film by Bo Landin. Our children get information about what happens to people around the world. We grown-ups betray the children – both their feelings and their need of knowledge – if we do not show them possiblities to help and to find solutions. We do not prepare the children for the future, nor do we give them hope and confidence in the future, if we fail to act against injustice, war and ecological catastrophes. We have to take the responsibility today for the tomorrow of our children.

During these two days, *Rädda Barnen*, the Academy of Sciences and the Swedish UNIFEM committee want to create an arena for the creativity,

knowledge and common sense needed in the work we must do together, beginning now. The declaration made by this conference will be a framework for the goal we want to reach. Making use of the different aspects presented, an holistic perspective on mankind – not least women and children – must be made to work for sustainability.

My wish is that these two days will contribute to make the problems of women and children of the Aral Sea area visible, once and for all, and allow them to become involved in a process to create better circumstances of life. I know that all of us involved in this conference are deeply committed – so let us create, together, the structures needed to realise our goal. ■

Mairam Akaeva

Chairperson of the MEERIM Foundation, Kyrgyzstan

The Sinister Breath of the Aral Sea

When I received the invitation to take part in this conference, frankly, my thought for a moment was: what can a well off Scandinavian country like Sweden have in common with the Aral Sea, suffocating in an inexorable grove of the Asian desert? However, a striking exit from a poem of a great son of Scandinavia, Henrik Ibsen, came to my mind. It portrays a boy, who rang a small bell during cold winter nights to remind people that the world is not restricted to the privacy of their warm houses. There is an outer world at the other side of the threshold, where some people freeze and starve to death. For us in Kyrgyzstan, this image is associated with Scandinavia and Sweden.

An emerald cup

Now the tragedy of the Aral Sea area, once an emerald cup of Central Asia where my country is located, far from northern Europe, has echoed with pain in your hearts. Once again, it became apparent to me that wherever we live, whatever the distance between us, we all come from one cradle, the cradle of our mother Earth. There is a saying in the Orient that maintains: *water is life.* This is an extremely true notion. People settle down by water, they cultivate gardens and fields and grow bread. With water people associate their present as well as the future of their children, family and country. Water gives them everything.

But if people offend water by senseless action, water could turn into an evil power. Water could destroy everything which it created, and infringe on life itself. The Aral Sea is a sad example of this. The nature took a cruel revenge on people for their senseless attitude towards the Aral Sea and its sources. The Aral Sea turned into a yearning wound of the planet. The sea, with a surface area of 68,000 km², lying in a dry and arid territory, began to shrink. It shrank every day and every hour. According to the research of the Stockholm

Environment Institute in 1992, it will be reduced to 9,000 km² already in the beginning of the 21st century, if urgent measures aimed at rescuing the sea are not taken immediately. Let us compare, 68,000 km² and about 9,000 – and even those could turn into several reservoirs, not linked to each other. A terrifying picture: a man walking along, sinking deep into dust on what was once the bottom of a blue sea that dried out forever. In place of the Aral Sea, a plain of grey, yellow, biting dust. The amount of dust by the houses! The dust covering windows, doors and streets of towns, just recently surrounded by a tender sea. The salty dust, lifted from the bottom of the Aral, is found today even in Canada. Doctors do not recommend women in the region to breastfeed their children. Is this not the greatest misfortune for a mother? It is a bitter fact, but abnormal children born in the region, including those struck by hereditary genetic diseases, are not isolated cases. Children and mothers are dying, but the tragedy is not limited to the region.

Rescue the Aral Sea

The breath of the wind is really sinister. If not properly addressed, it will poison the life, bringing problems not only to the people of Central Asia, but disturbing people on the whole planet as well as future generations. To think that this tragedy could never be replicated in some other corner of our planet is a dangerous and light-minded illusion. Today, various horoscopes, forecasts and predictions are very popular in the world. Many are expecting, with horror, the end of the world, the advent of just another comet with poisonous tail or other misfortunes. In my opinion, however, this is not what we should be afraid of. The evil is not in the depths of the earth, not at the bottom of the helplessly dried up sea, but it is inside us in our minds.

At the 1995 international conference, under the auspices of the UN, on sustainable development in the countries of the Aral Sea basin, the leaders of the five Central Asian countries, including Kyrgyzstan, addressed the world community in the Nukus declaration, with an appeal to rescue the Aral Sea. Noteworthy, the international community immediately responded to the appeal for a battle against this major environmental disaster, and this very conference is one of the examples of that.

The Syr Darya river, which feeds the Aral Sea, originates in the mountains in Kyrgyzstan. It is not by accident that Kyrgyzstan put forward a proposal to the UN, to declare the next year as the international year of mountains. Today we have developed a concept of environmental security and approved a national action plan on environmental protection and hygiene.

The human dimension

However, the problem of the Aral is a multifaceted one, and there are many aspects that require attention. For me personally, what is most important is the humanistic and human dimension of the Aral tragedy. I am sure this issue plays an important role for everyone who cares about the fate of mothers and children in the 21st century. Mainly for this reason and on the initiative of the MEERIM international charity foundation, of which I am the chairperson, a rehabilitation centre, supported exclusively by public sources and social organisations, is being created at the Issyk-Kul lake, where ill children, including those from the Aral Sea, will be treated and their health restored.

Dear colleagues, following the example of Ibsen's little hero, the best cinematographers should make films, the best playwriters and directors should write and stage plays, the star journalists should make reports about the fate of the Aral Sea. The notion of the great English poet John Donne, "do not ask for whom the bell tolls, it tolls for you", should become a reminder for minds, hearts and souls of the society. I believe that this massive and permanent flow of information, say the flow of consciousness, can ensure the flow of water to the Aral Sea and will not allow it to perish, since the ecology of earth and water is the ecology of spirit and soul. ■

Anders Rapp

RSAS, Professsor of Physical Geography, University of Lund, Sweden

The Environmental Disaster

– the Emergence of the Crisis

Desertification as defined by UNEP and UNCED

One of the major environmental problems discussed at the UNCED meeting in Rio in 1992 was the issue of desertification. Agenda 21 defined desertification as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities." UNEP had prepared a comprehensive "World Atlas of Desertification" for the Rio Conference (UNEP,1992). I quote some sentences from the *Preface* to the Atlas, signed by Dr. M. Tolba, at that time Director of UNEP:

> Desertification has for too long been the poor relative of environmental issues. It is mainly experienced in rural areas of the world and in many cases in developing countries. In both cases it has been less visible to politicians and policy makers than problems such as urban air pollution and the disposal of hazardous wastes. Yet, as the world population expands, desertification will become of increasing concern. Measures to combat its advance have until now been hampered by lack of political commitment and lack of funds.

The Aral Sea area is a particularly striking case of land degradation and desertification, and it shows many of the symptoms mentioned in the quotation above. It is a disaster of environmental, socioeconomic, technological and other dimensions. It hurts agriculture, fisheries and water supplies as well as pollutes the air from wind erosion of farmlands and dry lake bottoms. Disposal of hazardous wastes, salinisation of soil and shortage of clean water for irrigation and drinking purposes are other negative effects on vegetation, animals and human health in the Aral Sea area. Most of this complex ecological disaster is the result of a non-adapted and misused irrigation technology, inefficient bureaucracy and lack of communication between politicians, engineers and the local people in this periphery of the former Soviet empire.

Reports on environmental problems in 1976–1989 in the Aral Sea area before Glasnost.

I came to the area twice in the 1970s, as a member of two international scientific conferences on soil and water conservation. The first meeting was in June 1976. It was held in the Samarkand area and arranged by Soviet scientists and the international organisation IFIAS (International Federation of Institutes for Advanced Science). The second meeting was a UNEP meeting in August 1979 at the Institute of Desert Research in Ashkhabad and was led by its director, Professor Babaev. It included paper sessions, discussions and several field trips to the large Kara-Kum canal and new villages, irrigated by water diverted from the Amu Darya via the new canal.

This was before Glasnost, and it was quite evident that our Russian colleagues in soil and water conservation were instructed not to speak about degradation of natural resources in their country. When we asked about their experiences of soil erosion in drylands or of the sinking levels of the Aral Sea, due to diversion of water from the River Amu Darya to the Kara-Kum canal, the answer was either that "We have no such problems in our country", or "There is a temporary sinking level of the Aral Sea, but our water engineers will soon compensate that by the construction of a large diversion canal that will turn one of the Siberian big rivers and cause water to flow southward, thus raising the level of the Aral Sea again." (An overview map shows that the Ob River in southern Siberia is the nearest option as a source of river water for possible diversion southwards).

But at the coffee break after one of the sessions, when the problems connected with the sinking Aral Sea had been mentioned by European colleagues and denied by some of our Russian colleagues, another professor of soil and water conservation came up to some of us, standing in the garden.

– It is not true what you just heard from my Russian colleague about the Aral Sea, he said. The wind erosion in the area is very severe, and we have seen the indications of that in big dust plumes, showing up in satellite images and experienced in reality for many years (Grigoriev et al. 1976, Orlovskij 1962). It is due to the sinking water level, and drying of the lake-bed. And the technocratic dream to turn south the flow of a Siberian river is only a dream that has been discussed for decades, originally called the Davidov plan. It will not materialise. It is too big a project, too expensive, too complicated, its environmental consequences unknown. But I am not allowed to speak to foreigners about these problems, so forgive me for keeping silent in open discussions on these matters.

After some questions from us, he continued:

– I have to be careful. If I apply for permission, I may be allowed to publish a paper on soil erosion in the Ukraine in English, but this will take time.

But the paper was actually published two years later in a volume on the drylands of the world, edited by the American Professor Troy Pewe in a volume for the USGS. The topic was wind erosion and dust storms over Ukraine's cultivated plains. (Cf. N.K.Shikula, 1969, and A. A. Grigoriev *et al*, 1976).

Reports on the increasing Aral environmental crisis, after Glasnost

After Glasnost and the collapse of the Soviet State, information is freely available. The three Russian scientists and authors of the Aral Sea case in the UNEP Atlas quite frankly describe the reason behind the Aral disaster by the following text: "Today the Amu Darya delta is a densely inhabited, agricultural region producing cotton, rice, grain and vegetables. However, the drive to increase irrigated agricultural production in this area, dating from the 1950s, has been instrumental in turning the Aral Sea region into the largest zone of ecological crisis in the arid part of the USSR"(Milanova et al 1992).

In the "World Map of Desertification", UNEP (1977) also has shown clear risks for desertification and dryland degradation in the area from the Black Sea to the Aral Sea basin. In particular two areas – the surroundings of the city of Baku at the Caspian Sea and the valleys near Afghanistan in the southeast – appear to run very severe risks of dryland degradation. The latter areas are the valleys of the High Mountains of Central Asia, from where much of the flow in the Upper Amu Darya is fed by melting snow and ice in the summer.

The average annual precipitation is about 250 mm in the northern steppe zone, from Volgograd to Lake Balkash. It decreases southwards, to less than 100 mm per year in the two desert areas Kara-Kum and Kyzyl-Kum.

Summing up from *Our Planet* (1992): The amount of water put yearly into the Aral Sea by its two main tributary rivers was 55 km^3 between 1926 and 1960. By the end of the 1980s, the flow from the Amu Darya and Syr Darya rivers had fallen to virtually nothing.

The water from these tributaries began to be diverted for agricultural irrigation in 1956. As a result of the diversion and of destructive irrigation practices over the next 36 years, the sea had been reduced in volume by 70 percent, had its surface area reduced by 54 percent and its salinity increased to 40g per litre, approximately three times its previous salinity. (It was always slightly brackish, but without intervention, in about 15 years, its salinity will be about 100 g per liter, comparable to the Dead Sea in Israel, according to the World Bank; WB report No 17587–117). The shoreline has receded by 80–100 km. Wind erosion of the exposed dry sea bed now removes about 43 million tonnes of salty silt each year. When the eolian silt is deposited by the

wind, it increases the salinity of the soil for hundreds of kilometres and inhibits plant growth.

The irrigation was almost exclusively for massive cotton farms, rice being the only other major crop. With such limited crops, the same fertilisers, pesticides and herbicides were applied, causing significant pollution of the sea from irrigation water run-off. The rise in salinity and chemical levels completely eliminated fish life from the entire Aral Sea, and caused the collapse of the fishing catch, which, prior to 1960, had been about 44 000 tonnes per year.

The Kara-Kum canal runs for about 1,000 km and beyond the capital city of Askhabad in Turkmenistan towards the Caspian Sea with a level drop of about 28. The canal diverts water from the Amu Darya. The leakage and losses by evaporation of water in the Kara-Kum canal and its irrigation system of about 1 million hectares is estimated to be up to 40 percent of the diverted water. Water logging and salinisation result largely from lots of leaking water that forms ponds and lakes in the desert and from which evaporation is high. This, of course, has affected much of the new irrigation. (*Our Planet*, 1992)

Trends of mean annual temperature and mean annual precipitation changes between the mid and late 1900s

What, then, is the trend of air temperature and rainfall? Is there also a climatic effect? The UNEP World Atlas of Desertification has, by comparing data from two different 30-year-climatological periods, been able to show at least some trends. The periods are 1930–1959 and 1960–1989, and the two parameters are mean annual temperature and mean annual precipitation.

The mean annual temperature has increased in Central Asia and the Aral Sea area with 0.5–1°C when the first period is compared to the second. The global mean temperature change between the two periods is only 0.07°C. Central parts of North America also show an increase. But on both sides of the Atlantic Ocean there is a decrease in mean annual temperature, caused by the cooling of the ocean.

There has been far less access to data on precipitation for the periods. This is particularly so for Central Asia and the Aral Sea area. No distinct trend can be demonstrated for this area, due to lack of data. The only region where it is possible to distinguish a clear change is the Sahelian region that has grown considerably dryer.

Fluctuating water levels of the Aral Sea and other lakes in the recent past

A long-term record of fluctuations between wet and dry climatic periods in the Aral Sea basin shown in a water level curve from 1785 to 1990, published by Létolle and Mainguet (1996). It is based on proxy data until 1900 and systematic water level recording from the last 100 years. It shows dry periods in

the 1810s, 1850s and 1870s. But the drastic drop of level in our time is unique. High levels up to about 53 m a s l are characteristic of the 1900s, with minor fluctuations of about 1 m. They compare it to the Caspian Sea curve that shows a rise of about 3 m, up to and above, "normal" in the 1990s.

Dust storms as a sign of aridity and desertification

Wind erosion is one of the main threats that destroy or reduce the productivity of soils in drylands all over the world. Dryland soils need a protecting cover of grass or other dense vegetation to save it from land degradation by water erosion due to heavy rainfall, wind erosion in dry periods, or salinisation by accumulation of salts during conditions of bad drainage and evaporation of water.

Wind erosion or deflation is the blowing away of sand in sandstorms or more fine-grained soils in dust storms. On sandy beaches in all climates you find the effects of wind erosion as sand dunes in a belt parallel to the sandy beach. It shows two characteristics: sand grains are blown a short distance, jumping and rolling on the ground. They form dune ridges near the beaches or close to deflation areas in deserts after a short move of grains up to 2 mm in size. Finer grains, silt and clay particles, and organic material move in dust storms and may reach high up in the air as dust plumes. They form clouds that may darken the sky, reduce visibility, stop air traffic and cause car crashes on the roads because of a dense haze.

The dust clouds move with the wind and can easily reach from one continent to another, from the Sahara to Scandinavia, or from the Aral basin to Turkey or Greece. The bottom layers and the deltas of the shrinking Aral Sea consist of water deposited silt and clays and also of exposed salts. When these beds dry up, they are blown as dust clouds – particularly in spring and early summer – with winds from the north-east. If the weather is clear, the dust plumes show up very clearly in satellite images. The effects on the landscape may also appear as deflation areas or patches, where the topsoil and vegetation is missing or damaged, as dunes or overgrazed patches. Wind erosion control can be achieved by wind breaks of planted trees, shelterbelts of grass and bushes, improved watering and a protecting vegetation cover. The losses of fertile soils from the deltas of the Aral Sea can be observed, monitored and calculated in millions of tonnes of valuable topsoil in each single heavy storm.

Discussion and conclusions

The shrinking Aral Sea is an environmental and socio-economic disaster. The building of the Kara-Kum canal and the diversion of river water from the Amu Darya to irrigate about 1 million hectares of desert land in Turkmenistan, without due consideration of what happened to the people

now living near the destroyed sea-shores, is one important cause of that disaster.

The disaster of desertification grows bigger year by year through wind erosion, salinisation, pollution of air and drinking water as well as increasing health problems. The trend shows increasing water scarcity, and the general cure prescribed by the technocrats to get water from Siberia by turning a river is no practical solution. Planned relocation of the majority of suffering people in Karakalpakia, and massive programmes of improved water management and improved health, sanitation and family planning seem to be some ways out of the ecological disaster. One project discussed during the conference ("Clean water to hospitals and villages in the Aral river basins. A project for rehabilitation of a man-made desert of chemical pollution") to be implemented by NGOs could, to my mind, be an important step towards recovering health status for people. It should be initiated immediately.

As was pointed out, the five Central Asian republics sharing the water of the Aral Basin are still suffering from the mistakes of the Communist time, and have inherited the bureaucratic structure from those days. They are poor, have no or few NGOs offering partnership, are fighting each other for water and survival, and have heard political declarations for 20 years but seen nothing but deterioration. ■

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Hydrology and Ecology of the Aral Sea

The Aral Sea was, until the middle of the 20th century, one of the largest salt lakes in the world, appearing about 10,000 years ago. Only the Caspian Sea, the Great American lakes and lake Victoria in Africa were larger. Salinity in the lake was about 10 g/l, and at the Syr Darya inflow in the north-east and the Amu Darya inflow in the south, it was even lower.

The Aral Sea has always been characterised by low species diversity. Before its present salinisation, 20 species of fishes, 195 species of free-living invertebrates, 12 species of higher plants and 82 species of lower plants (14) were noted, as well as 213 species of parasitic invertebrates. Nevertheless, one of the most essential characters of the Aral Sea ecosystem was the domination of species that had arisen in fresh and salty water bodies.

The first significant biodiversity changes in the Aral Sea ecosystem in the 20th century were connected with acclimatisation activities. From the 1930s to the 1970s, plenty of fish and invertebrates were introduced into the Aral Sea, and many of them became naturalised (13). The next important change was connected with antropogeneous desiccation (14, 13). By the 1980s, the aboriginal fish species had actually disappeared because of salinisation. Only stickle-back and introduced plaice, silverside, baltic herring and some species of gobies survived, and the biodiversity of fish-eating birds was also greatly reduced. The variety of water invertebrates decreased significantly, as did wild animal communities living off the coast.

The main causes of biodiversity changes in modern times have to do with desiccation and salinisation, due to the huge withdrawal of water for irrigation purposes from the Amu Darya and Syr Darya (13, 17). The desiccation of the Aral Sea was accompanied by changes in the local hydrographic net-

work and degradation of environment and underground water, aridisation of climate and sharp reduction of agricultural production volume. All things considered, the economic and cultural value of the sea has been seriously reduced.

In 1989, the Aral Sea was divided into two because of level fall: the northern Small Aral and the southern Large Aral. The salinity of the Small Aral water is lower, its level is rather stable and by 2–3 meters exceeds that of the Large Aral. When a dam was constructed between the two parts in Berg's strait, possibilities to refresh and increase the Small Aral level were created (10). The Large Aral does not have the same favourable perspectives.

Climatic and man-induced fluctuations

Significant palaeo-limnological changes of the Aral Sea during the last 10,000 years have been shown by many researchers (9). During the Holocoene period, rises and recessions of the Aral Sea level were accompanied by significant salinity fluctuations. In prehistoric times, these changes of level and salinity occurred because of natural climatic transformations. During humid climatic phases, the Syr Darya and the Amu Darya were fully flowing and, as a consequence, the water level of the sea was high and salinity low. During dry climatic phases, the rivers lost part of their flow, resulting in a lower level in the sea and increased salinity.

In historical times, however, especially after the Horezm Kingdom, changes of level and salinity were controlled mainly by men and their activities rather than by climate. When countries in the Aral Sea basin developed successfully, areas for irrigated agriculture became, as a rule, very large. Significant water volumes were drawn from both rivers, resulting in a low water level and high salinity in the Aral Sea. When, on the other hand, wars and revolutions troubled the countries of the Aral basin, the rivers once again flowed fully, because water withdrawal was significantly reduced. The sea level rose and water was refreshed (15). This extremely unstable hydrological regime caused very restricted endemic biodiversity in the Aral Sea (8).

It should be emphasised that the adverse conditions eventually resulted in the formation of a very original ecosystem, capable of easy transformation following the salinity of the sea. When the Aral Sea is deep and salinity is low, freshwater and brackishwater fauna and flora dominate, while marine and hyperhaline fauna and flora survive in the shallow salinised gulfs. When the lake becomes shallow and salinity rises, marine and hyperhaline fauna and flora become widespread in the sea. The freshwater fauna and flora then survive in the estuaries and deltas of Amu Darya and Syr Darya, awaiting future favourable conditions. At times when the Aral Sea would be completely dry,

its ecosystem, apparently, is even capable of "running into diapause". This is so because some hydrobionts are able to enter stages of rest (as spores, seeds, latent eggs etc.), allowing them to survive even a complete drying out of the lake for long periods of time (6, 5). This ability is inherent in some organisms at all basic, trophic levels – from producers through consumers, predators included – so we may probably conclude that part of the whole ecosystem of the lake is capable of diapausing.

Different types of ecosystems

Five basic types of ecosystems exist in the lake: *freshwater, oligo-mesohaline, polyhaline, hyperhaline* and *diapause* (4). The freshwater biodiversity is the most diversed. When the freshwater ecosystem transforms into oligo-mesohaline, biodiversity decreases insignificantly. The reduction of the number of species taking place, when the oligo-mesohaline stage transforms into polyhaline, is much more serious and is increasingly so in the hyperhaline stage, before it reaches its least diversity at the stage of ecosystem diapause.

To examplify this in our time: in the middle of the 1970s average salinity exceeded 11–14 g/l, and the freshwater hydrobionts were almost completely extinct. In the middle and end of the 1980s, when average salinity exceeded 22–28 g/l, many brackishwater organisms disappeared. At that time, the transition from the oligo-mesohaline to the polyhaline stage was completed. Today, marine, euryhaline and hyperhaline hydrobionts live in the lake.

In recent years, the environmental crisis of the Aral Sea basin has attracted world-wide interest. International, governmental, and public organisations, as well as different United Nations agencies and the World Bank are trying to understand what initiated the crisis and how to overcome its adverse effects on socio-economic processes and health in the region (17). The purely biological problems are often looked at quite superficially or not considered.

This paper attempts to fill that gap, and it is based on field observations over the past 16 years (1, 2, 3, 4, 5, 6, 7, 8, 10) and on available written information from the last 172 years, beginning with the expedition of Lieutenant A.I. Butakov in 1848–1849 (11, 13, 14, 16, 19, 20, 21, 22).

Acclimatisation activities affect the ecosystem

Even though information on the ecosystem of the Aral Sea is incomplete, it is possible to say, with a high degree of certainty, that environmental changes began to manifest themselves in the mid-20th century. Initially, the changes were caused by wide-scale acclimatisation processes. Beginning in 1927, fish species from the Caspian Sea, the Ural River, the Baltic and Chinese waters were introduced into the Aral Sea. Some survived and were recorded in catches, and some even became important commercially. Baltic herring,

grass and silver carp, goby, friar and pipefish and finally flatfish were caught as a result of the acclimatisation.

But in the process of acclimatisation, parasites were introduced as well, sometimes causing heavy epizootia and mass extinction among new hosts. In addition – beginning in 1954 – benthic and planktonic invertebrates were introduced, together with shrimps from the Caspian Sea and the river Don and worms and clams from the Sea of Azov. Unintentionally, together with these, came the crab. Finally, in the late 1980s, the Mediterranean mussel was introduced, although not successfully, for at that time the hard rocks suitable for mussel settlement were located in the zone of desiccation (the exposed, dried seabed).

Vegetable- and detritus-consuming Copepoda, planktonic invertebrates, were introduced from the Kuban brackish lagoons and from the Taganrog Bay of the Sea of Azov. By 1972, representatives of this species were spread all over the sea and were dominant within the zooplankton. New planktonic larvae of benthos forms were revealed in the zooplankton, as a result of the acclimatisation.

In retrospect, it is important to note that the changes caused by the introduction of fish and invertebrates were both positive and negative. The most adverse effects had to do with fish acclimatisation. The introduction of new representatives of the ichthyofauna and, primarily, such plankton-eating fish species as the Baltic herring, friar and goby fry contributed about tenfold to the reduction of the average biomass of the summer zooplankton, from 150 to 15 mg/m^3.

The introduction of the above-mentioned pathogenic parasites with new fish species had drastically adverse effects. But so did the occasional introduction of small non-commercial fish that propagated very quickly in the lake and significantly affected the nutritional base for commercial fish. Today we know that in spite of the significant increase in species diversity in the ichthyofauna, the population of commercial fish changed only slightly; and the increase of the annual catch was insignificant (13).

The only positive effect of fish acclimatisation has to do with the introduction of flatfish into the Aral Sea. At present (1995), under present polyhaline conditions, it is the only object of exploration for commercial fishery. In 1991, experimental large-scale flatfish fishing yielded 112.2 tonnes. However, it was nearly stopped because of its labour-intensive character. By now, few fishing teams are fishing flounder in the Aral Sea.

The introduction of moving invertebrates resulted in more positive effects. The introduced species have become widespread under the polyhaline conditions. Their high potential salt tolerance and their quick mass

propagation have made them the dominating species, and today they are the main nutritional base for the surviving fish in the Aral Sea.

To summarise: the changes, although some of them had positive effects, were predominantly negative. Unfortunately, all acclimatisation activities failed to take into account scientific recommendations. As a result, new parasites were introduced into the sea, and its ecosystem was affected by the increased food load of zooplankton and zoobenthos. Therefore, epizootia of the Aral spinefish and complete extermination of some planktonic and benthic invertebrates have been observed in the Aral Sea.

Desiccation and salinisation

The environmental changes associated with the acclimatisation were followed by environmental changes related to desiccation and salinisation of the sea. The sea level began to drop and salinity increased already in 1960. However, noticeable signs of their adverse effects were not revealed until in the late 1960s and early 1970s. Fish roe, larvae, and fry were the first to be affected, and somewhat later the processes of ichthyofauna reproduction were disturbed (13). In the shallow-water spawning areas, salinity increased more rapidly than in the open sea and, by 1965–1967, exceeded 11–14 g/l.

According to A.F. Karpevich (13), in the late 1960s, the situation of the fluvial anadromous fish in the spawning areas was aggravated. By then, the area of spawning pools had decreased by 5–8 times, because of sea-level drop. Reduction of spawning areas was also caused by the construction of dams in the lower reaches of the Syr Darya and Amu Darya. The total adverse effect of acclimatisation activities, construction of dams as well as salinisation and sea-level drop resulted in a nearly threefold decrease of annual fish yield, from 44,000 to 17,500 tonnes, in no more than a decade.

It was in 1971, when the average open sea water salinity exceeded 12 g/l, that the first signs of adverse effects on adult fish due to salinity increase became apparent. The growth rate of many species slowed down; the death rate increased and the population number decreased; numerous morphological aberrations and a general “exhaustion” were observed (13).

Already by the mid-1970s, when the average salinity was over 14 g/l, the natural reproduction processes of the majority of species were practically all disturbed.

By the early 1980s, with salinity exceeding 18–20 g/l, the Aral Sea lost its fishery importance, and organised fishing ceased.

By the mid-1980s, all commercial fish in the Aral Sea, except the flatfish, were gone. Some old fish specimens were found in the deltas of the Syr Darya and Amu Darya, but 20 indigenous fish species and 15 introduced

species were lost. Among the most valuable of the extinct fish species were the Aral spineback, Aral salmon, bream and roach.

Presently, only five fish species, instead of 40, are found in the Aral Sea, four of them introduced (flatfish, Baltic herring, friar, monkey goby) and one indigenous (stickleback).

Effects on zooplankton

The invertebrates, both planktonic and benthic, were affected somewhat later than the fish by the salinity increase and sea-level drop. The first signs of adverse effects on zooplankton dates back to 1971, when the average salinity became more than 12 g/l.

Practically all coarse representatives of the zooplankton disappeared, and fine forms, particularly *Rotifera*, became prevalent. Since 1973, the indigenous *Arctodiaptomus salinus* has not been observed in the Aral Sea, nor *Moina mongolica* since 1975. They disappeared quickly, partly because they had to compete for the food supply with the introduced *Calanipeda aquaedulcis*, partly – and mainly – because they were consumed by the new plankton-consuming fish species.

By the mid-1970s, when the average salinity exceeded 14 g/l, practically all fresh-water and most brackish-water planktonic organisms were lost. Euryhaline species of zooplankton survived and reached their mass development. Some other zooplanktonic organisms were sometimes observed in separate parts of the sea. They included three species of *Rotifera* and one of *Copepoda* (11).

Between the mid-1970s and the early 1980s, the total number of extinct species of zooplankton approximated 20. However, beginning in 1969 and in spite of the species reduction, the average summer biomass of zooplankton gradually increased from 22 mg/m^3 to 123 mg/m^3 in 1981. This increase may be explained by the successful acclimatisation of the *Calanipeda aquaedulcis* and by the reduction of plankton-eating fish.

By the mid-1980s, when the average salinity exceeded 22–23 g/l, signs of a new crisis in the zooplankton became apparent. The number of rotifers sharply decreased, and by the early 1990s, only 11 out of 56 plankton species remained. 10 of the surviving 11 were rare.

Effects on zoobenthos

The changes in benthic communities have been roughly similar to those in plankton. The first signs of adverse effects of salinisation on the benthos of the Aral Sea dates back to 1966–1967, when larvae of *Trichoptera* disappeared from the Sea, and areas shrinked occupied by brackish-water molluscs *Dreissena* and *Hypanis*. Simultaneously aboriginal euryhaline and acclima-

tised marine invertebrates started to occupy new Sea regions and to form dense settlements. *Oligochaete* and some insect larvae were the first to become extinct. (13). In 1970s only brackish-water and eurihaline species could endure salinity above 12–14 g/L. Among them were indigenous species of gastropod and introduced species of clam, polychaete, shrimp and crab.

Out of 159 species of benthic inhabitants, specified in the Atlas of Invertebrates of the Aral Sea (12), only about 50 species were still to be found in the mid-1970s. Today, we can not give accurate numbers; only representatives of the macrozoobenthos have been regularly recorded, so information of smaller benthic organisms is scanty and incomplete. In the 1970s, a constant increase of total macrozoobenthic abundance and biomass was observed. By 1980, total biomass had increased to 196 g/m^2, 8.5 times more than the average annual value during the quasi-stable period.

By the mid-1980s, when the average water salinity was more than 22–24 g/l, the zoobenthos also showed signs of a new crisis. A further decrease in benthic species diversity and some stabilisation of abundance occurred. Many brackish-water species were lost, and only eurihaline invertebrates coming from the Mediterranean-Atlantic Basin or continental brackish-water bodies in arid zone survived. By that time, only 15 species of benthic dwellers remained in the Aral Sea. Zoobenthic biomass reached 207 g/m^2, stabilised, and then begun to decrease gradually.

In 1989, investigations of the open waters of the Aral Sea showed that the total biomass of the zoobenthos in the Large Aral Sea was 108 g/m^2, and in the Small Aral Sea 247 g/m^2. In benthic communities, only two species of bivalves, gastropods of genus *Caspiohydrobia*, one species of polychaeta, shrimps, ostracods and crabs were present. Insect larvae were extremely rare. In the 1990s, when salinity of the Large Sea exceeded 30 g/l, the insect larvae were not recorded in zoobenthos.

Effects on phytoplankton

Unfortunately, the impacts of salinisation and reduced water level on the phytoplankton and phytobenthos were not studied during the period of man-induced desiccation of the Aral Sea. Therefore, we may only postulate an intense substitution of fresh- and brackish-water plants to sea water and hyperhaline plants. The change in the balance of biogenic components must have had a great impact on the plants. Thus, the phytoplankton and phytobenthos were, evidently, affected by the impact of salinisation, water level drop, acclimatisation activities and changes in the balance of biogenic components.

By the mid-1970s, when the average salinity was above 14 g/l, the biomass and number of phytoplankton had decreased threefold, and diatoms domi-

nated more than before. Lacking direct observation data, we may still assume that the majority of fresh- and slightly brackish-water plankton algae were lost, and that euryhaline species of phytoplankton reached their mass development. By 1985, many species of blue-green and green algae had disappeared from the phytoplankton composition. Ecologically, the phytoplankton of the Aral Sea became more homogeneous, mainly composed of diatomaceous and dinophytic species of algae typical for brackish and sea water (18).

It is difficult to specify how much species diversity in phytoplankton was reduced as a result of salinisation and water level drop. Different authors give different numbers, and the initial number of species remains unknown. The average summer biomass of phytoplankton prior to desiccation can be given with more accuracy. In the mid-1960s, the summer months values varied from 0.5 to 2.6 g/m^3.

In the late 1980s, with salinity exceeding 28 g/l, there was relative stability of phytoplankton. In the beginning of the 1990s, the average summer biomass of phytoplankton varied from 0.22 to 6.83 g/m^3.

Effects on phytobenthos

The phytobenthos was, evidently, more affected by the water level drop than by the increased salinity. When the shallow-water areas and the branched deltas of the Syr Darya and the Amu Darya rapidly dried up and disappeared in the late 1970s, there was widespread loss of flowering plants. The famous reedfields (*Phragmites australis*) of the Aral Sea were most affected. In no more than 10–15 years, they became completely extinct.

By the mid-1980s, only one species of flowering plants (*Zostera noltei*) was still widespread in the sea. But the drying up of large seabed areas also caused the loss of many species of algae, particularly charohytes. The water milfoil and Vaucheria, most sensitive to salinisation, were the first to disappear. Presently, only 7 species are found, including two species of higher aquatic plants, three species of green filamentous algae and two species of green microphytic algae.

Studies to trace the dynamics of change of the phytobenthos biomass, linked to increased salinity and drop of sea level, were never carried out. Prior to the human-induced desiccation, the total weight of bottom plants was a little more than 0.5 kg/m^2. The share of phytobenthos in the total biomass reached 90 percent (13). The high degree of water transparency and the small average depth lay behind the fact that the bulk of organic matter was created not by phytoplankton but by phytobenthos. This made the water ecosystem quite different from other aquatic ecosystems. Today, values of phytobenthos biomass are available only for one northern bay and vary from

0.5 to 3.7 kg/m^2. Nevertheless, we may certainly assume that in the present (1995) Aral Sea, the average summer biomass of the phytobenthos has decreased manyfold.

Trophic development

Although data from continuous observations of varied trophic conditions in the Aral Sea are not available, we shall try to describe, in brief, its possible dynamics.

Most likely, between the early 1960s and the mid-1970s, the trophic condition of the Aral Sea began to change from oligotrophic to mesotrophic as a result of the increased input of mineral fertilisers from irrigation fields around the sea. When, in the late 1970s and early 1980s, the water flow from the Amu Darya and the Syr Darya practically ceased because of intense irrigation farming in the region, the input of biogenic elements drastically decreased, and the water body soon became oligotrophic.

At this time the trophic status of the Aral Sea was, evidently, at a minimum if we consider the entire observation period during the 20th century. This came about not only as a result of reduced input of biogenes with river flows but also because of restructuring in the phytocommunity. As mentioned above, many species of fresh-water and brackish-water plants disappeared, salt water and hyperhaline forms coming as their substitutes. Extremely high water transparency (15–20 m according to Secchi's disk) provided the indirect evidence of a high degree of Aral Sea oligotrophic status.

As the river flow slightly increased in the late 1980s, biogenes input increased as well. However, the number of dust storms in the area around the lake increased, transporting more biogenes. In 1995, the town of Aralsk had 110 days with dust storms and very strong wind. Thus the eolian factor has become rather significant. And again, the sea showed a tendency towards transformation from an oligotrophic to a mesotrophic condition. This tendency was particularly strong in the northern water area. For further information about the trophic condition, see Karpevich (13).

Division of the Aral Sea

Yet another phenomenon has greatly affected the ecosystem of the Aral Sea. In 1989–90, the sea was divided into two independent lakes, formed as a result of the drop in sea level: the Small Aral in the north and the Large Aral in the south. From this time on, increased salinity and decreased sea level have been observed only in the Large Aral. The Small Aral has shown a rise and stabilisation of water level as well as decreased salinity. Evaporation from the Small Aral has been less than the total input of Syr Darya water, precipitation and groundwater.

The rising water level in the Small Aral resulted in water flow to the Large Aral. The hydraulic gradient of the channel between them increased and caused a turbulent flow. In spring 1992, the flow amounted to 100 m^3/sec. The channel was dammed at Berg's Strait in the summer of 1992 to keep the water in the Small Aral. This cofferdam existed about one year, only to be partially destroyed by the 1993 spring flood.

However, during the dam's short period of existence, the water level in the Small Aral increased by more than 1 m and partially filled up previously dried-up areas, such as the gently sloping depression of the Large Sary-Chaganak Bay. The elimination of the flow prevented disintegration of the Small Aral and had other positive effects as well (7).

After the cofferdam failure, the flow rate from the Small Aral was still less than it had been before the dam construction. This reduction was probably due to several facts: 1) sand dunes – barkhans – of 2–3 m, caused by intense sand drifting, strengthened the southern side of the cofferdam and hampered the flow to the Large Aral; 2) the water area of the Small Aral near the cofferdam was extremely shallow; 3) as a result of wave action, numerous shoals were formed parallel to the cofferdam, thereby strengthening its northern side; and 4) even in its partially collapsed state, the cofferdam hindered (and still hinders) the former high volume of water flow.

In 1993 it was this partially collapsed barrier that contributed to the rise of the water level by more than 1 m and its stabilisation in 1994–95 at the elevation of +40 m or even +41 m, according to the absolute scale. Today, the Small Aral level is at least 2–3 m higher than that of the Large Aral.

Different prospects for the lakes

Thus, the destinies of the two lakes are different. Due to the flows into the Small Aral, its salinity will decrease from year to year. Its level will be stable or drop very slowly as a result of the water discharge through the existing, partially collapsed cofferdam. Would the dam be reconstructed or a new dam built, the Small Aral level may rise. As for the Large Aral, its salinity will increase and its level drop.

Because of different hydrological conditions, it is likely that future creeping environmental changes in these two water bodies will also be different. The negative trends of the Large Aral will remain, and its ecosystem will turn into the ecosystem typical of hyperhaline water bodies in arid zones. The development of the Small Aral ecosystem will go on and reverse negative trends until it represents an ecosystem typical for slightly saline lakes. Theoretically, we may even assume that in case of a stable flow from the Syr Darya of 5–7 km^3/year, complete desalinisation of the Small Aral will be possible within a few decades.

However, when mentioning possible positive trends in the development of the Small Aral, it should be noted, with regret, that the sea will continue to accumulate considerable amounts of chemical pollutants, carried by the Syr Darya. It would be desirable to minimise the use of chemical fertilisers, pesticides, herbicides, and defoliants on irrigated areas adjoining the Aral Sea. A reduction of pollutants would allow for a more rapid and effective conservation and subsequent rehabilitation of the Small Aral.

Critical periods of the Aral Sea

In our time, the Aral has gone through three critical periods. The peak of the first crisis was observed in the mid-1960s and was associated with acclimatisation activities. The second crisis came in the mid-1970s, when average water salinity was more than 11–14 g/l and when aquatic organisms of fresh-water origin were lost. The third critical period was observed in the middle and late 1980s, when average water salinity exceeded 22–28 g/l. During those years, many aquatic organisms of brackish water origin were lost.

Its fourth critical period may well begin in the near future.

The beginning of the fourth period will be noticeable, when water salinity is more than 36–42 g/l. The peak of this crisis will be at a salinity level of 50–55 g/l. At such a level, the existing Aral flora and fauna of marine origin will not survive, but single forms of hyperhaline invertebrates, algae, and bacteria will remain. It should be emphasised that the fourth critical period concerns the ecosystem of the Large Aral.

In assessing the ecosystem, it is reasonable to suppose that, because of its history, the biota has gained the capacity to adapt to and withstand periods of salinisation and water level drop as well as periods of desalinisation and water level rise. During salinisation, fresh-water aquatic organisms endure an unfavourable period in deltaic water bodies and branches of the rivers entering the Aral Sea. During desalinisation, brackish-water, sea water and hyperhaline inhabitants find rescue in shallow-water salinised bays – *kultuks*.

But there are factors making the present (20th century) changes different from similar changes earlier on: consequences of large-scale acclimatisation activities, heavy chemical pollution and very high rates of water withdrawal from the Syr Darya and the Amu Darya for irrigation purposes.

Future scenarios

Discussing the future of Aral Sea biodiversity, we must remember the five types of ecosystems that may develop, depending on the amount of water coming into the lake. Theoretically, the following further development scenarios are possible:

1. If lots of water (more than 100 km^3 per year) would come into the Aral Sea, its level would rise, the Small and Large Aral would again be united, and with further rise of level, water would stream into the Sarykamysh lake and on into the Caspian Sea. Would this happen, the Aral Sea would be completely refreshed and, due to migration of hydrobionts, would have a very high biodiversity, comparable to those of the Amu Darya and Syr Darya basins. During a freshwater stage, the ecosystem of the lake would have maximum biodiversity. According to palaeolimnological data, such a situation was observed in the sea some 3,000 years ago.
2. With a slightly smaller inflow into the Aral Sea (60–70 km^3 per year), its level gradually would return to the values it had at the end of the 1950s, and its salinity would be 11–14 g/l. It would have freshwater and brackishwater fauna and flora. The ecosystem would exist at an oligo-mesohaline stage, with slightly lowered biodiversity, as was observed from the middle of the 19th to the middle of the 20th centuries.
3. If some 20–30 km^3 per year flowed into the Aral Sea, a reunion of the Small and the Large Aral Seas would come about. A new balance between inflow and evaporation would be established, salinity would at first decrease, and the ecosystem would exist at the polyhaline stage. Its biodiversity would be comparable to the present one. However, after quite some time it would inevitably pass into a hyperhaline stage with very low biodiversity. According to palaeolimnological data, a similar situation was observed in the Aral Sea in the Middle Ages, some 450–500 years ago.
4. If the present volume of water inflow would continue, the lake would also continue to exist as two separate water bodies. The Large Aral would go on drying up, becoming increasingly salinised, and the present polyhaline phase would shortly be replaced by the hyperhaline phase. If the Small Aral would be maintained and a dam constructed in Berg's strait, initially the sea would be refreshed and reach a salinity of about 20 g/l. But gradually salinity would increase, because the sea would be terminal. Under those conditions, the ecosystem of the Small Aral would exist at the polyhaline stage.

   However, if the dam would not be constructed, a small stream would flow into the Large Aral, the level would be stable and a gradual refreshening of the Small Aral down to the oligo-mesohaline phase would be observed. This would take very long, however. According to palaeolimnological data, a the similar situation was

observed some 9,000 years ago and also possibly some 1,600 years ago, but then the terminal lake of Syr Darya (Small Aral) was very small.

5. If less water than today would flow into the Aral Sea, the discharge from the Small Aral into the Large Aral would soon enough be terminated. The ecosystem of the Small Aral would quickly transform from a polyhaline to a hyperhaline type. As for the ecosystem of the Large Aral, it would very quickly transform into a hyperhaline type. Its eastern part would dry up completely, and the ecosystem would diapause. According to palaeolimnological data, during regressions similar complete desiccation has quite often been observed in the eastern part of the Large Aral and in the western part of the Small Aral.

So, many things are not new in the present situation of the Aral Sea. But because of the new factors, fast environmental changes and very heavy chemical contamination of its basin, the present antropogeneous desiccation is extremely dangerous. If the drying up rates would slow down and chemical pollution ceased, the Aral Sea would stand a reasonable chance of rehabilitation, as soon as the needed amount of water would be discharged into it. But, if special urgent measures to conserve and rehabilitate will not be carried out in the near future, the chances that the Aral Sea will be revived are very low. ■

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The Aral Sea

– Water Resources, Use and Misuse

The story of the Aral Sea is a story of an ecological catastrophe caused by unsustainable use of water resources.

Natural background

The Aral Sea is one of the most ancient lakes of our planet. It was the fourth largest inland water body on earth with an original area of 68 320 km^2 (including 2 230 km^2 of islands) and a volume of about 1 066 km^3. The maximal depth was 69 meters, most of the sea was less than 30 meters deep (UNEP 1992).

The Aral Sea is located in a depression in the Turanian plain. *Geologically* it consists of a Mesozoic-Cenozoic sedimentary platform-cover layer on top of a folded basement of pre-Paleozoic to Paleozoic age. Part of the mountains framing the basin, such as the Tian Shan, are of considerable age, while the Pamir region is still geologically active. The tectonic structure of the total drainage basin is very complicated, something that affects surface as well as groundwater localisation and flow.

The mountains with peaks reaching 6000–7000 metres above sea level, including their piedmont areas, the slopes, only take up about 20 percent of the basin. The rest consists of plains, to a large extent deserts, mainly the Kyzyl-Kum and the Kara-Kum deserts.

The *climate* was even before the depletion of the sea continental, even though the water body at that time did modify the cold winters and hot summers. The southern parts have a more subtropical climate. On the plains the annual precipitation is 90–120 mm, in the piedmont areas it is 400–500 mm/year, while on the western slopes of Tien Shan the precipitation reach-

es more than 2,000 mm/year. The high rate of evaporation results in low run-off in the downstream parts of the rivers even under natural conditions.

Data on the *groundwater discharge* for the area are very uncertain, partly depending on how the Sea region is defined. The UNEP diagnostic study gives 0.07–0.3 km^3/ year for discharge directly to the Aral Sea and 14 km^3/year for the Aral Sea region (UNEP 1992), while FAO has estimated the groundwater inflow to the sea at 5–6 km^3/year (FAO 1997). All these data are referring to groundwater connected hydrologically with the surface water, thus being renewable groundwater. There do also exist considerable groundwater resources in aquifers not directly in contact with surface water, thus at least partly non-renewable. This groundwater can be both freshwater and salt water, depending on originating type of bedrock. The localisation is determined by the geology.

Until 1960, the water surface of the Aral Sea did not fluctuate more than ca 3 meters, at around 50–53 m a s l. In the *hydrological balance* for the Sea, the high rate of evaporation from the water surface of 58–65 km^3/year, equal to 90 cm water layer, and the loss by infiltration and separation in lagoons of 1–2 km^3/year was balanced by a discharge by the rivers Amu Darya and Syr Darya to the Aral Sea by 52–56 km^3/year, a ground water discharge of 0.07–5 km^3/year, and a very small precipitation of 5–8 km^3/year or about 150 mm/year (UNEP 1992, Klötzli 1994, FAO 1997).

The total drainage basin of the Aral Sea is 1.9 million km^2, of which 28 percent is in South-Kazakhstan, 24 percent in Turkmenistan, 23 percent in Uzbekistan, including Karakalpakstan, 12 percent in North Afganistan, 7 percent in Tajikistan and 6 percent in the Kyrgyz Republic (FAO 1997). The water reaching the Aral Sea before 1960 originated with 4 percent from South Kazakhstan, 1 percent from Turkmenistan, 9 percent from Uzbekistan, 6 percent from North Afganistan, 55 percent from Tajikistan and 25 percent from the Kyrgyz Republic according to calculations by FAO in 1997. This shows that the downstream countries are mainly confined to exogenous water, water originating outside the country.

The Aral Sea is a closed drainage system. Several smaller rivers are running in the basin without reaching the Aral Sea. Only the Amu Darya and Syr Darya rivers are discharging in the Sea. As both rivers have their sources, including tributaries, in the high mountains with snow and ice, the run-off showed natural variations during the year. The maximal natural water discharge was in July–August and the minimal during December–March, when the water supply is almost entirely ground water. This was particularly so for the Amu Darya, the basin of which is the largest and has the highest water-bearing capacity of the region.

The maximum run-off from the two rivers amounted to about 120 km^3/year, 2/3 of that by the Amu Darya and 1/3 by the Syr Darya, and was measured before the rivers entered the desert plains. Even before 1960, there was important natural variations between different years. About half of the total run-off is lost naturally through infiltration and evaporation. Until the end of the 1950s, this resulted in about 50–60 km^3 annually reaching the Aral Sea (UNEP 1992, UNDP 1995).

Due to the high rate of evaporation, the water was saline even before the depletion of the lake began, with a mineral content of ca 10 g/l, mainly consisting of nitrates, silicate, sulphate and chlorine, transported by the evaporating water from the deeper layers. From 1960, the rapidly increasing irrigation has resulted in a tripling of the mineral concentration to ca 30 g/l, thus making the water disastrous for fish, bird and other organisms, and of course as drinking water. Together with increased overuse of fertilisers and pesticides and untreated wastes this has resulted in highly polluted water, containing phenols, nitrogen compounds, DDT, organic matter and sulphates up to 10 times the maximum permissible concentration (Klötzli 1994).

History of water demand – human influence

Already several hundred years BC, irrigation farming was developed in the area, particularly in the tributaries to the Amu Darya and Syr Darya. The irrigation at that time developed from once-a-year lagoon irrigation to regulating floods by damming smaller streams and subsequently larger ones. In the first century AD, the areas around some posts of the Silk Road developed hydrotechnical knowledge. In the 12th and 13th centuries the area around Samarkand, being the metropolis of the emirate, was irrigated and made a "flourishing oasis"(UNEP 1992). Most of this ancient irrigation took place in areas boarding the rivers or close to oases and in areas with a higher amount of precipitation and less evaporation than the areas where irrigation schemes have been developed during this century.

In 1919, Lenin decreed that the Soviet Union should become independent of cotton import. Central Asia – having a large labour surplus, long hot growing seasons, fertile though thin soils, and what was regarded as adequate supply of water – was seen the ideal part of the country for cotton production (UNDP 1995, Klötzli 1994). It was to concentrate on cotton and move away from food production. The Soviet Union later became the second largest cotton producer of the world, more than 90 percent of its cotton production coming from the Aral Sea region.

But it was not until in the end of World War II that the production grew to demand more than a sustainable amount of water and soil resources, something that became evident around 1960. An increasing number of irrigation

canals and inter-basin diversion canals were built. In the 1950s, the Kara-Kum canal was constructed. The canal diverts water from the Amu Darya, just downstream the boarder between Afghanistan and Turkmenistan, with a maximum flow of 320 m^3/sec over 840 kilometers to the vast Kara-Kum desert. Between 1965 and 1986, irrigation fields expanded at an annual rate of 2.3 percent or from 5.6 to 7.6 million hectares, 4.3 million hectars being located in the Amu Darya basin and 3.3 in the Syr Darya basin (Raskin et al. 1992). Water uses doubled during the same period (Klötzli 1994).

The main reason for this, of course, is that the irrigation systems are inefficient. In the upper watersheds of the basin, it is estimated that only 30–40 percent of the water withdrawn from the rivers for irrigation actually reaches the crops! As a result, by 1991 almost all river water was being diverted for agriculture, yet little of it actually reached the plants. Thousands of kilometers of irrigation canals (including the Kara-Kum canal) transporting water over sandy soils were built without any linings, and many irrigation schemes were designed without adequate drainage. Some of the schemes with drainage directed the run-off into depressions in the desert, thus creating new small shallow lakes with rapid evaporation. This resulted in hundreds of drainage lakes in the desert, filled with salty run-off. (GEF 1997)

Table 1. Hydrologic parameters of the Aral Sea from 1960 to 1989. (From Kotlyakov 1991. Source: D.B. Oreshkin, "Aral skaya Katastrofa" (The Aral Catastrophe) Nauka o Zemle , no 2(1990):42)

Year	Sea level (m a s l)	Sea area (thousand square kms)	Sea volume (cubic kms)	Mineral content (grams/ per liter)	Total river run-off into sea (cubic kms)
1960	53.3	67.9	1 090	10.0	40
1965	52.5	63.9	1 030	10.5	31
1970	51.6	60.4	970	11.1	33
1975	49.4	57.2	840	13.7	11
1980	46.2	52.4	670	16.5	0
1985	42.0	44.4	470	23.5	0
1989	39.0	37.0	340	28.0	5

By the end of 1989, the Aral Sea had receded into two separate parts, the southern Large Aral, with an area of about 33.5 thousand km^2, a volume of 310 km^3 and a mean salinity of 3.0 percent, and the northern Small Aral, approximately 3 thousand km^2, with a volume of 20 km^3 and a salinity vary-

ing between 1.8 and 3.5 percent, the lesser salinity at the river mouth of Syr Darya.

Much of the water loss in the irrigation canals percolated through the soil down to the groundwater. There it mobilised salt from deeper parts of the soil, salt which the rising groundwater carried to the root zones resulting in water logging. As these areas are seldom washed out, the land becomes saline and eventually sterile and thus unproductive. Where it is washed out into the rivers, these become salty and polluted. About 60 million tonnes of salt are added annually to the rivers. The result is that the midstream and downstream parts of the rivers now has a salinity of 0.9–1.1 g/l. The area of salinised lands, where the crop yield is reduced by 20–50 percent, is almost 30 percent of irrigated land (GEF 1997).

The less productive conditions of the soils have led to an overuse of fertilisers, herbicides and pesticides. Even at early stages in the production, huge quantities were used to supplement nutrient content and combat diseases that had acquired immunity due to monoculture practices. This has successively increased. Central Asian cotton fields in 1995 received as much as 54 kilograms of pesticides, such as DDT and lindane and other types of dioxines, and 424 kilograms of fertilisers per hectare, about 6–10 times the normal dose of pesticides for the former Soviet Union states according to a study by UNDP (1995). After the independence of the republics, the figures have gone down but are still very high by international standards. Added to that are adverse effects of heavy metals used in mining and metallurgic industry. This, of course, has led to heavily polluted water, unfit for any type of human consumption, both in the river systems and in the shrinking Aral Sea. Soils have become polluted and inproductive. Several serious diseases, frequently occurring, such as hepatitis, typhoid, throat cancer and birth defects, are presumably linked to the bad water quality.

The desertified and unproductive areas including parts of what was former Aral Sea beds, some 36,000 km^2, are now exposed to winds. Approximately 75 million tonnes of toxic salt and dust are blown away annually from the area, which is covered by a white alkali soil (UNDP 1995). Naturally, the dust is a threat to ecosystems. More then 500 kg salt and sand per hectare fall each year on the Amu Darya delta. Some of the dust is transported much longer and has been found in the river Ganges and on the Himalayan mountains.

The water situation after the Soviet era

In the Soviet legal system, water resources were an exclusive state property and therefore provided as a free good. The state could also decide on quotas between its different republics. The charges were only for the development

and maintenance of water supply schemes and not for the amount of water consumed. This considerably reduced water use efficiency (Klötzli, 1994). This legal system was accountable for the water policies of the Soviet Union, policies that were driven by water supply rather than by demand, and where even the "turning around" of Siberian rivers was seriously considered.

After 1990, when the republics declared sovereignty, they also affirmed their rights to control land, water and other natural resources within their territories. They did, for the time being, keep the quotas of what became shared water resources between the new states, although the management systems were completely changed. Klötzli (1994) describes how the policies of the new Central Asian countries influence the water use and thus the future of the river systems and of the Aral Sea.

The Syr Darya water resources

The Syr Darya leaves Kyrgyzstan, the upper riparian country in the eastern Fergana Valley, passes the Uzbekian part of the vally, then shortly – but importantly – it crosses the Tajikistan part of the valley before again pouring into Uzbekistan. After having crossed what is called the Hunger Steppe, the river runs into Kazakhstan. The Fergana Valley is densely populated and ethnically very mixed, something that complicates the upstream-downstream situation.

Already during the Soviet era, big reservoirs were constructed for the mountain countries, such as the Toktogul reservoir in Kyrgyzstan and the Kayrakum reservoir in Tajikistan. Kyrgyzstan, the most upstream country and the one in control of the sources of the river, faces serious economic problems, mainly due to shortage of energy supply from Russia and the neighbouring countries. It therefore wants to make maximum profit of its abundant water resources.

Needs for maximum energy production often do not correspond to the needs for irrigation use. In the summertime, when the water would be needed for irrigation, it is stored upstream to be released during winter, when the energy demand is at its highest. Uzbekistan, being the downstream country to Kyrgyzstan, upstream but also downstream to Tajikistan, has possibility for cheaper energy production with its own fossil fuels but needs water for irrigation. This means that Uzbekistan is heavily dependent on Kyrgyzstan to release enough water from the Toktogul reservoir at the right time, and on Tajikistan to do so from the Kayrakum reservoir. The political situation is also complicated by territorial claims of Uzbekistan on parts of Tajikistan, where a large part of the inhabitants are Uzbeks.

Kazakhstan, the most downstream country, has claims on the upper riparians, due to reduced quantity but also to the quality of the water.

In 1998, some agreements were reached between the upstream and the downstream countries concerning the use of upstream reservoirs for energy production and irrigation purposes, but still much needs to be done.

The Amu Darya water resources

For the Amu Darya river, Tajikistan is the upper riparian. It then flows through Turkmenistan to enter Uzbekistan, where its delta is built up in Karakalpakstan. The river Zeravshan also runs in the Amu Darya river basin, shared between Tajikistan and Uzbekistan but running dry before it reaches the Amu Darya.

Tajikistan being in charge of hydrotechnical installations, mainly reservoirs in the upstream parts, would have exploited the hydropower resources to a larger extent had it not been for its internal civil war. Still, the situation between Tajikistan and the downstream countries is contentious.

In the Turkmenistan and the Uzbekistan parts of the river system, several diversions and recorded and unrecorded canals are built for irrigation. On the border between Turkmenistan and Uzbekistan, there is the Tuyamuyun reservoir under exclusive control of the latter. As it is in the middle of the desert, it causes enormous loss of water by evaporation, as do the open irrigation canal system. Sometimes the irrigation schemes are also linked to inter-basin transfer systems. The largest and most contentious one is the Kara-Kum canal (directly running on loose sand!), now diverting more than 12 km^3 annually from the Amu Darya in Turkmenistan, substantially exceeding the established quotas.

As the rate of population growth is high in the area, water and land is partly used to feed the growing population – on top of keeping up the cotton production. This increases the demands on the scarce water resources; new areas are exploited for irrigation and the political tensions become even more pronounced.

Co-operation for water future

Each of the five ex-Soviet basin states has acknowledged the need to adopt a sustainable development strategy as a prerequisite for the water future in the Aral Sea basin. They do, however, respond differently to the challenge. A programme for a sustainable future would include different parameters, such as incentives for water conservation and sustainable agriculture and rehabilitation of inefficient and deteriorating infrastructure. Measures must be taken at national level but within the framework of regional co-operation. An Interstate Commission for Water Coordination, ICWC, with legal power, was created in 1992 as a result of the first interstate agreement. Later agreements led to the set-up of finance institutions and commissions for sustain-

able development of the region. A meeting in February 1997, to discuss streamlining of the different organisations, resulted in a new International Fund for the Aral Sea, IFAS. IFAS is a high-level body with the authority to make legal decisions on sustainable development of the Aral Sea basin. It also has the financial responsibility for implementing such projects in the area. IFAS is also the implementing agency for International Assistance programmes in the area.

What kind of water future is possible – and how?

It has been estimated that at least 73 km^3/ year of water would have to be discharged into the Aral Sea for at least 20 years in order to recover the 1960 water level. The riparian countries do not consider this a realistic alternative.

Other more feasible options for the future of the Aral Sea have according to FAO (1997) been envisaged by different parties:

- A total inflow to the Aral Sea of about 35 km^3/year would stabilise the sea level at the 1990 level, which is 38 m a s l, and secure an active delta. It would, however, not end the environmental degradation and desertification of the exposed seabeds.
- A restoration of the Small Aral to the same level would require an inflow in that part of at least 6-8 km^3 for the next five years. Due to the construction of a dam between the lakes, it would be feasible to refresh and increase the level of the Small Aral.
- The restoration of wetlands in the Amu Darya delta and the conservation of the Large Aral would require an inflow of 11–25 km^3/year, with at least 5–11 km^3 of freshwater.

To achieve this goal, major efforts must be made to reduce losses in rivers and canals, notably by lining of the canals and by increased effectiveness of the distribution. Irrigation must not be expanded, and more efficient irrigation methods must be introduced in existing irrigation areas. The non-used fraction of the water diverted into irrigation schemes must be returned directly to the Aral Sea. There would also be a need to change agriculture policies in a more sustainable direction than what was originally introduced during the Soviet era. Otherwise, any possibility to reach any kind of successful outcome in the Aral Sea Basin programme is most unlikely. The implementation of the programme would involve substantial financial resources, and the over-all economic situation is very difficult in these countries. Thus, external financial assistance is needed.

The water quality problems are rapidly growing. More efficient methods are needed to reduce the use of herbicides, pesticides and fertilisers, thus increasing the water quality.

For an effective implementation of these measures, it is important for the countries to apply policies that give priority to sustainable development in the whole area. Measures to reduce water use in the countries would benefit from the application of a "water regarded as an economic good"- approach. With water given its proper value in all its uses, non-sustainable use of resources would be reduced.

An application of the "Polluter-pays"- principle and a polluter's tax would presumable reduce the use of polluting substances and thus reduce the adverse tendency of the quality.

Co-operation between the riparian states is necessary to reach any of these goals. However, the existing institutional co-operation framework only comprises the countries of the former Soviet Union. Afghanistan, another riparian, covering 12 percent of the Aral Sea basin (FAO 1997) will presumable be a more important water user, once stability increases in the area and would therefore need to be included in the co-operation. To reach sustainable development in the Aral Sea area, all parties concerned must participate in the efforts. ■

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Reasons Behind the Catastrophe

Historic, Ethnic and Cultural Development in the Aral Sea Region

The Aral Sea catastrophe cannot be explained solely in terms of planning decisions and technical systems. There are clearly historical, ethnic and cultural aspects to the situation. And regardless of how the catastrophe is explained, solutions cannot ignore these historical, ethnic and cultural issues. It is not possible in this context to provide a comprehensive account of these different aspects of the situation. The intention is rather to present some of the considerations which have to be taken into account in dealing with this catastrophe.

History and current practices

History, in a very general sense, is important in various ways. One concerns the notion of "what happened" in order to understand the background and causes of the current crisis. However, there are other important aspects of history. One involves the extent to which certain historical situations still persist and are perpetuated through current practices. Yet another is the way in which history is interpreted and is used in the construction of contemporary understandings, not least of all in terms of national, ethnic, linguistic and religious identities as well as political and socio-economic factors, which also effect the way in which these problems are dealt with.

One aspect of the historical development of this area, not merely the immediate area around the Aral Sea, but the entire territory of Central Asia, is commonly perceived in relation to the unique topology. It is often considered to be one of the most topologically unique areas in the world, with extremely high mountain ranges, deep valleys and plains.

A particular type of settlement pattern developed on the basis of different rather limited socio-economic groups forming in different parts of the area –

nomadic herders in some of the high mountains, settlements of a particular type in the high valleys, other settlements on the plains, desert nomads. These different types of socio-economic groups were for a long time relatively independent of each other.

Of particular importance in this area has been access to water, both in terms of where people settle, but also in terms of the types of organisations – political and social – which developed. There is evidence that certain specific connections exist between the availability of water and the type of socio-political organisations that arise in different parts of the world. Situations in which water is more plentiful seem to be more conducive to the development of more decentralised types of structures. Situations in which water is more scarce seem to be more conducive to the development of more centralised types of structures in order to deal with problems of water management, which is crucial to survival. This relationship can be seen to a significant extent in the history of Central Asia, and it is of importance in viewing traditional political and social structures in Central Asia and for understanding the role of this type of structure historically and as it exists today.

These historical patterns have also contributed to a variant of regionalism that is also quite prevalent. This can be seen as, at least in part, a result of the historical pattern of local groups maintaining a significant degree of independence from each other economically and socially, though interacting through trade relations. These local identities are still today extremely strong. Even during the Soviet period, certain aspects of the Soviet system actually encouraged the development of this type of local identity. It was partly a rather elaborate federal structure with different types of autonomous republics and regions, but also the utilisation of some of these traditional structures integrated into some Soviet structures. This was particularly the case in the sphere of agriculture. It has been argued that certain patterns of collectivisation in agriculture fit more closely certain types of traditional, agricultural patterns in Central Asia than more individually owned agricultural systems found in many other parts of the world.

Identity construction

Up until the Soviet period, there seems to have been a form of general Central Asian identity – associated with Turkistan, the greater territory of Central Asia. This was also tied to Islam in which local folk traditions and customs were mixed with Islamic practices. During the Soviet period, Central Asia went through a rapid and intensive process of modernisation. Separate administrative areas were created, which eventually received status as Soviet republics.

A primary motivation behind these seems to have been a perceived fear on the part of the Soviet Union for a re-emergence of pan-Turkism, an idea that Turkey might once again try to build up an empire including Central Asia

based on Turkish language identity. It seems to be in order to prevent this by creating separate identities, rather than basing republics on strong pre-existing identities, that this development came about. Through the republics, a type of nationalist programme was conducted, not dissimilar to the types of nationalist programmes that were seen in Western Europe some years earlier.

The republics developed separate political institutions, somewhat different histories based on notions of specific ethnicities tied to the different republics and languages and language policy, through attempts to standardise certain languages and create stronger identities based on these particular languages. This type of development was relatively successful. At the end of the Soviet period, the five republics became independent and, with the exception of some minor orientations, have accepted the idea of separate states and separate peoples.

It is important to keep in mind that these states have never previously been independent nation-states. With the exception of very limited movements advocating a greater Central Asian state, the notion of five separate states with strong national identities is clearly established. The process of identity construction along with nation-building has been of major concern in the Central Asian republics since independence. This is a very important feature to keep in mind in relation to some of the conditions that are seen as vital to the solution of problems in the Aral Sea region.

One aspect of this has to do with developments in the direction of democratisation. Very often the notion of some type of national identity, particularly the term nationalism, is seen in rather negative terms, and certainly this often tends to lead to – and even has led to in Central Asia – ethnic conflict. However, at the same time it is often an important element in the establishment of a democratic system. One of the basic notions in very philosophical terms behind democracy is the notion of rule by the people, whatever form it takes. A precondition seems to be that people in a particular system, within certain borders, have a feeling that they belong to one and the same people.

Without this very strong feeling of being one people, it is much easier to perceive the political order and majority decisions in terms of the oppression of certain groups by others. With this intensified feeling of separate peoples and, not least of all, of separate states, it becomes increasingly difficult to view specific issues in terms of common problems and common solutions. This is very much the case in relation to the Aral Sea catastrophe, in which the different republics view these problems from the perspective of more specific interests of their states and peoples.

Single and independent economies

In addition to developing ideas of individual nation-states, individual political systems, there is an idea of developing separate economies. It is impor-

tant to recognise that the economic background of the Aral Sea crisis, the mismanagement, the result of the virgin land scheme in Kazakhstan, irrigation in terms specifically of wheat, the mono-culture development in Uzbekistan with cotton, occurred in the context of a larger and more integrated economy.

But with independence the economy of Uzbekistan became a mono-economy. Previously, it was more of a specialised region within the greater economic system. This is not to defend the economic decisions leading to the development of the agricultural sector in Uzbekistan, but rather to point out some of the complications entailed in the present situation. Being perceived and considered as part of a larger economic system opens the possibility for notions of a broader restructuring of the economy, redistribution of tasks, changes in production, etc. Being perceived and considered more as a single and independent economy, which is highly dependent on one type of production, leads to rather different problems and perhaps more limited alternatives.

It is, perhaps, not so much a lack of understanding of the basic problems in the Aral Sea region, as a difficulty in seeing alternatives. This is also something that greatly affects political developments and the potential for political solutions. As has been pointed out previously at this conference, a solution to this problem will necessitate the co-operation of all of the Central Asian states. The Aral Sea, even if only located within two of these states, is dependent on all of them in terms of water. But these states are now political and economic competitors in a way they were not previously. The pursuit of specific political policies and economic restructuring are increasingly considered in relation to the relative advantages and disadvantages as compared with the other Central Asian states.

Many of the issues have moved to the realm of international relations. The damming issues, for example, illustrate this. It is one thing to dam a river or lake within a particular state, where there is a conception of a single political system with one nation having control over it and making the relevant decisions. It is quite another thing to dam a river or a lake, when the consequences of such actions affect water on its way across an international border to another country.

Lacking gender perspective

A key focus of the present conference is on the consequences of the Aral Sea crisis on women and children. It has been quite apparent that the situation for women and children is particularly difficult. However, more conventional accounts of the crisis and of the historical and contemporary background as well as proposals for alleviating the consequences of this ecological cata-

strophe most often neglect aspects of the situation which are related to gender relations. Historical, political, social and economic descriptions of the situation are based on general descriptions of these "societies", "nations", "ethnic groups", "cultures" etc. Distinctions are not commonly made within these collectives, and in particular not distinctions based on gender relations. This is problematic with regard to social, political and economic solutions, but even with regard to technical solutions.

Historical conditions and developments are very often described in terms of major continuities and changes and on the basis of the history of the "states", "societies", "nations", "ethnic groups", "cultures". However, these continuities and changes have had varying relevance for men and for women. The Soviet period and the independence of the Central Asian states have also had varying relevance for men and for women. This is seen at all levels of society, from decision-making institutions at the highest level of the political systems to conditions within households.

Although the transformations that have occurred and are occurring are described in general terms, a type of independence, a possibility of deciding over your own conditions, is very much concentrated to particular groups in society. Some of the traditional structures that existed have actually been intensified and incorporated into some of the transformations.

The traditional role of women in agriculture, for example, has been included in some of these new economic structures. One of the advantages and one of the difficulties in finding alternatives to the type of production that exists now, is that there are clear economic advantages at least in the short term, for preserving this type of production. Partly it is difficult to see alternatives, partly the types of products that are produced can be produced at relatively low cost, thus making it possible to market them. Cotton production, for example, is quite labour intensive, which makes it possible to avoid a high degree of unemployment. All of this creates a situation in which it becomes very difficult to change.

The role of women, both in the household and in agriculture, contributes to this "advantageous" situation. A type of hidden subsidy to the production can be seen in the unpaid labour of women in traditional social relationships. This is reinforced in a system, where it is very difficult to change gender relations without causing economic consequences that would effect the national economy. This again is a type of problem that has to be more consciously dealt with, if solutions to the Aral Sea catastrophe are to be found while at the same time moving in the direction of democratisation and empowerment of women.

An important consequence of not integrating a gender perspective into the search for solutions is the implicit assumption that existing gender rela-

tions must be the unquestioned point of departure for the types of technical solutions that are sought. This most often leads, either intentionally or unintentionally, to maintaining or even reinforcing of the existing relations. In some cases, one may be searching ways of solving certain technical problems without "disrupting" society. This approach, regardless of its intent or level of awareness, is conservative in its social, political and economic manifestations. *The integration of a gender perspective in the natural science and technical approaches to the problem of the Aral Sea is crucial.*

Proper understanding

One final aspect that should be mentioned is the way in which these problems are actually studied. An important aspect of any solution involves research conducted into various problems. The research methods themselves have various biases, and particularly gender biases, one aspect of which is a way of looking at society and not recognising gender relations and the different situations of men and women in different societies.

Other relatively well known problems include the construction of official statistics, which often hide very important aspects of relationships by basing the statistics on families. There are also phenomena that are not reported at all and which, therefore, do not find their way into the statistics. However, this methodological concern can be traced down to the level of specific techniques.

From a natural science point of view, from the point of view of an hydrologist, it is not particularly important to establish an intimate relationship with the water that you are studying. That is, there is an idea that the natural rules governing the behaviour of water can be studied without this type of interaction. In studying social, political, economic, cultural and gender relations, however, it is important to study this in a way that you can build up a much more intimate relationship with the people that you are studying in order to get a proper understanding of the situation.

This is perhaps particularly the case in the situation that exists in Central Asia, with over one hundred different ethnic groups, a long tradition, even within the same ethnic groups, of separate settlements with distinct patterns. Without a proper understanding of the local conditions, it becomes extremely difficult to understand the problems and to see the possibilities for change in attitudes and change in behaviour. This again necessitates a different type of methodological approach than what is conventionally used in the social sciences, which is commonly based very much on a natural science point of view of the appropriate way to study society. ■

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Community Participation

The Importance of Civil Society

I am very happy to be here today and address this important conference on "The Aral Sea – Women, Children, Health and Environment". I am particularly pleased to talk about a theme very close to my heart: community participation and the importance of civil society.

All my public life I have been active in women's and popular movements at both local, national and international level. I know by my own experience the power for change and development that can be released when people are mobilised and get involved.

The ecological catastrophe taking place in the Aral Sea basin is alarming, the hidden reality even worse. In terms of its ecological, economic and social consequences, the Aral Sea is, according to the United Nations Environment Programme, one of the most staggering disasters of the twentieth century. A rapid and sustainable change is needed, if we are to address these serious environmental, social and health problems.

To succeed, great efforts and the involvment of all members of society is required. Well co-ordinated and targeted initiatives from the governments in the region are vital and must be supported. However, successful and sustainable change will only come about if the people themselves are mobilised and take an active part in the process. I am therefore convinced that one of the crucial factors in alleviating this environmental catastrophe will be to support and facilitate greater community participation. This can only be done by a multitude of actions to strengthen democracy and facilitate participation at all levels, national, regional and local.

Another factor, which will play a crucial role, is the development of non-governmental organisations, so called NGOs. Such organisations have

proven to be important components of the support system that society needs in order to combat various manifestations of deprivation, may it be social or environmental. Policy development, and well-targeted measures, has come to depend on guidance that only the local community and voluntary organisations can provide. This is also true for the European Union. More and more of European policy-making and implementation is done in close co-operation with local communities and NGOs. The European Commission is at the moment looking at several ways of how to further develop this co-operation. NGOs are important, because they are very often the first ones to call for assistance to people. And, too often, the only port of call.

Finally, to mobilise, and support people in getting involved in alleviating this environmental crisis is fundamental for the *general development of democracy* in these countries. I have seen several examples where people's engagement in substantive issues has had a strong mobilising effect on their general awareness, and prepared them for forming opinions on wider political issues. This would be particularly important in these Newly Independent States, engaged in a transition process towards a well-functioning democracy. Supporting and facilitating community participation is therefore not only essential in alleviating the environmental catastrophe in the Aral Sea region, but also in contributing to a well-functioning democracy in this part of the world.

To support the development of an active civil society is not an easy task, especially not in countries which have experienced a long period of totalitarian communist rule. The five Central Asian states – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan – have practically no experience with "democracy" or, indeed, with "civil society", in the Western sense of the word. Except for Uzbekistan, the nomadic tribes of what are today Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, were never organised into any kind of "statehood" before Russian colonisation. An important negative legacy of the communist period was the widespread suppression of individual and independent collective local initiative. The communist heritage has left behind a society, in which non-state initiatives are rare and where there is a widespread mutual distrust in society, and towards the state and its policies. People do not dare to discuss or debate problems, even less to form a critical political opinion, sometimes not even within the family. This has prevented the development of public debate and of a civil dialogue.

Only since 1991 have the first steps been taken in Central Asia to overcome the habits of this institutionalised repression. Since then there are however some positive signs that a new type of independent organisations are developing in the Aral Sea region. This is primarily taking place in the politically more open republics of Kazakhstan and Kyrgyzstan. These organi-

sations seek to mobilise the energy of the people most immediately affected by the specific environmental problems. A key manifestation of this process was the formation and actions of the "Nevada-Semipalatinsk Movement". This popular movement was formed to work for the closure of the nuclear test range in northeastern Kazakhstan, but also for measures to deal with its environmental and health consequences. Another good example is the creation of Water Users' Associations between farming units. The objective was to better co-ordinate the sharing of irrigation water, and to assume responsibility for the maintenance of the related infrastructure. Such indigenous developments are vital and must be supported. Their energy, commitment and constituencies need to be engaged as key partners in the rebuilding process.

A major hindrance for these new participatory tendencies to develop further is, however, the weak civil dialogue in society. To be successful, civil dialogue must be based on an open dialogue in society, which effectively communicates the views of the citizens, especially those most vulnerable and disadvantaged. An important factor is popular access to information and the existence of free and independent media. The situation today is far from satisfactory. There is a huge demand for information at the local level, which needs to be satisfied. In order to mobilise people and facilitate their participation, this situation must be improved.

Another important factor is to support the establishment of a network between local communities and voluntary organisations in the region, as well as with NGOs in other parts of the world. Such a network could be a powerful instrument in increasing both regional and international awareness of the ecological and social problems. It could also be a forum for mutual support and exchange of experience.

To increase community participation, structures for communication and constructive debate also need to develop between the governments, and the voluntary sector. This would also assure co-ordination of their efforts.

An area where improvements are needed is the legal framework regulating the establishment of voluntary organisations. The procedures for registration are today very complicated and seem to have a negative effect on the establishment of new NGOs. An even bigger hindrance for the development and influence of non-governmental organisations are the very small economic resources available. The situation is further complicated by the fact that local authorities are still biased, when allocating available funds.

Finally I would like to underline that in order to assure the participation of civil society in the rebuilding process, greater efforts are also needed to address the general problem of social exclusion. We know that social exclusion very often goes hand in hand with a more general exclusion from public

participation. If active measures are not taken, we run the risk that the great expectations which arose in the Aral Sea region after independence quickly turn into disillusionment and disengagement.

Integrating women and children in the rebuilding process

Let me now turn to the situation of women and children in this region and how women are integrated in the rebuilding process. If we are going to succeed in alleviating the environmental and social catastrophe around the Aral Sea, women must play a key part in this process. I am convinced that a gender perspective and gender analysis will be very useful and show ways to solutions. Especially at the local level, women are decisive in addressing social problems and choosing a consumer behaviour which favours sustainable development. However, the potential of women is often neglected in national or regional development plans, or in rebuilding processes such as the one taking place in Central Asia. Even though women in this region are generally well educated and often represent the majority of the work force, they are only to a very small extent engaged in public activity and political life. The general status of women has been further undermined by the deterioration of social and economic conditions.

To give an example, in Karakalpakstan, an autonomous region of Uzbekistan, which has been worst affected by the Aral Sea disaster, unemployment amongst women is over 50 percent. The situation is critical, as women traditionally are the main providers for their families. To well target our support to women, we must have reliable statistics and objective information. An *observatory on the development of women's situation* in the region, supported by the local and international community, would be useful. Such an observatory would raise the general public awareness of the situation of women and the existing severe gender inequalities.

I also would like to underline the necessity of involving children and young people, both in the development and the implementation of strategies to alleviate the crises. We have already seen in Eastern and Central Europe how young people in the difficult social and economic situation still prevailing have turned into drugs and organised crime. Young people need to be provided with an alternative vision for the future and be able to play an active part in it. They need to participate in their own right and be given meaningful tasks in making their contribution to the rebuilding process.

The role of the European Union

What, then, is the European Union doing to support the necessary development? We believe that the most effective kind of support to a sustainable rebuilding of the region is not the provision of modern environmental tech-

nology (which on its own would only give temporary benefits). What is needed is assistance to *catalyse local action* through expanded information about long-term policy options, and to enhance institutional capacity to analyse and implement those options. We need innovative approaches, which respond to the real needs on the ground. I have seen several examples in the European Commission of how projects with relatively small sums of money, well targeted, can produce hugely beneficial effects. They have mobilised local communities and enabled them to tackle problems such as social exclusion and long-term unemployment.

Of course, some large-scale funding is also needed to improve physical infrastructure (such as irrigation networks and water delivery systems). But the region's experience to date indicates that sustainable development is not only – in fact, not even primarily – about money. It is about changing objectives, policies and institutions. And about striking off on a new development path, not about piecemeal improvements to the old one. The European Community has already contributed to these efforts through various programmes funded by its Tacis (Technical Assistance to the Commonwealth of Independent States) budget. Let me give you some examples:

- First and foremost there is the "Water resources management and agricultural production" program (WARMAP). This will give a financial support to the Aral Sea region of 7.9 million ECU over five years.
- Second, the EU also gives support to the evolving National Environmental Action Plans (NEAPs). Here a project has just been launched to support the identification and preparation of environmental investment projects. The project has a budget of 2.7 million ECU.
- Third, a project has been launched to raise environmental public awareness and to develop environmental media. This project covers the entire area of the former Soviet Union and has a budget of 5.4 million ECU over three years.

The Tacis inter-state programme is also planning to support the establishment of a new Regional Environment Centre (REC) for Central Asia. This centre is likely to be located in Kazakhstan.

To conclude, a strategy to promote sustainable development has to involve all members of society. The responses need to be multi-dimensional and well co-ordinated, bringing together the many partners who have to be involved at all levels. In this way, a strong civil dialogue becomes itself an instrument in helping to achieve social inclusion in the region. Financial support as well as partnerships and links to popular movements and NGOs from outside are

crucial. It is, however, important to assure that the course of development is driven from the inside and from the bottom up.

This is the only way to assure sustainable civil mobilisation and community participation, as well as well targeted actions to meet the specific needs of the region. I hope that this conference can be the platform from which a strategy and a longer-term co-operation among the various actors in this region can develop. ■

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Quality of Life and Economic Development

It is both a privilege and a challenge to be here as an economist. The programme tells me I am the only economist here; at least I am the only one brave enough to acknowledge it. What can an economist do in 15–20 minutes? I feel a little modest. What is the contribution of economics to a disaster of this scale? I do not really know. But, I will say a few words about what I could call modern theories of economic development. It is really entirely up to you, especially to you people from the countries that are concerned, to discuss whether these issues are relevant in your countries or not.

Economic development a tool

I am here substituting for a representative of the World Bank, who could not attend, so his theme of speech, *Quality of life and economic development*, was handed over to me. I am not a philosopher, so when it comes to the quality of life, I am an amateur. But to me as an economist, human development is the goal. Economic growth and economic development can only be tools. Economic growth can be a good or a bad way of reaching it. There is economic growth that is excellent for human development, and there are other kinds that are very bad for it. We have jobless growth; we have growth that destroys the environment; we have growth that creates huge inequalities, civil strife, lack of social cohesion, and so on. That kind of growth is bad.

But poor countries need economic growth, of course. I see human development as an enlargement of human choice. To an economist, that is the ultimate objective, I think. However, some of us sometimes forget that and talk about growth as if that in itself were the objective.

The UNDP talks about sustainable human development. Sustainable could be interpreted in an ecological context, but it also represents thoughts about the future. We must pay as much attention to future generations as to those alive today. But I think we could also discuss sustainability in social and economic terms. Development that does not pay attention to the least privileged is not socially sustainable. We must keep this in mind. So, sustainable human development has human beings in the centre. Of course, it is pro-equity, pro-women, pro-children, pro-nature and pro-jobs.

Modern theories of economic development

It is very presumptuous to try to summarise modern theories of economic development in a few minutes, but I would like to indicate a few trends that are visible if not to all so at least to many economists. Some of those trends might be relevant in this context.

One such trend is the trend away from "hardware" to "software" factors. Hardware is basically factors such as natural resources, physical capital formation, machinery equipment, etc. When I started to study economy many years ago, there was a lot of discussion about investment rates, using gross capital formation, and the whole profession seemed obsessed with the role of physical capital formation and natural resources. This was, to an extreme extent, the case in the former Soviet Union. The Stalinist symbol of a huge factory with a lot of smoke was really a symbol of the development of productive factors, the key to growth in the old Marxist tradition. It also implied an exploitation, not to say a violation, of nature. Nature was there to satisfy short-term objectives and economic growth.

Today, the emphasis on hardware – natural capital, natural resources and technology – is becoming a little obsolete. I will not enter a theoretical discussion about this, but empirical evidence from the last two decades or so clearly demonstrates that for example natural resources are not the key to economic development. Many countries in the world could be classified as rich countries with poor people, among them many of the former Soviet republics. They are extremely rich in natural resources, but people are poor. Africa and Latin America have many countries rich in natural resources but with a poor population. The benefits of exploited natural resources have tended to accrue to a small privileged elite, rather than to the people.

On the other hand, there are poor countries with rich people. Japan is one example, always considered very poor when it comes to natural resources. Hong Kong and Singapore, that today have higher per capita income than Sweden, are extremely poor in natural resources. It never occurred to people in Hong Kong that irrigation and pesticides were the road to economic development. Their success has nothing to do with

exploitation of natural resources. In a way, it was probably to the benefit of these countries that they had no copper mines, sugar or cotton plantations. They had one asset: people. They invested in people, letting them develop their potential. People's skills and experience were the key to success. National resources and physical capital formation came afterwards – but it began with investment in the people.

Investments in people

Today, much statistical and theoretical evidence shows very clearly that investments in people are the best road to economic growth. I am not saying that we should invest in people only because it is good for the economic development. People's possibility to use their potential and creativity is an end in itself. Likewise, it is good economics to invest in children, but a happy childhood is an end in itself and does not need the justification of an economic cost-benefit analysis. So, people are the key to development, not least women.

Many statistically very convincing studies demonstrate clearly that the investment in its girls probably is the best investment a country can make. Numerous countries discriminate against girls in their educational systems, their labour market, etc. This is clearly bad for human development but also for the narrow objective of economic growth. The economist who is not a feminist – that is, who does not believe in gender equality – is a very bad economist. You have to fight for equality and the abolishment of discrimination based on class, gender, ethnicity or whatever, not only because it is good in itself but because *it is good economics to combat all forms of discrimination*.

When we talk about software, we include people, people's skills and creativity. During the next century, with globalisation and the information society, people will come to play a much more important role than copper mines. Already, people's ideas, knowledge and creativity are the key not only to human development but to economic growth in a rather narrow sense as well.

Institutional capital

Other factors have also come to the foreground in the economic analysis of growth and development. One such factor is the role of institutions. Over and over again it has been shown that the major bottleneck, when it comes to development, is not machinery or engineers, but rather institutions, in a broad sense. This is so in many countries, not only in those undergoing a transition from state planning to market economy.

Good institutions, in this context, means that which is related to good governance, democracy, freedom for mass media to criticise the power-hold-

ers, as well as a decent legal framework to be trusted: non-corrupt and honest public officials, statistical central offices and other institutions that are absolutely essential to economic development. My experience from countries undergoing a transition is that the institutional capital, to use that expression, is very poorly developed in many of them. A very important factor that could contribute to the acceleration of economic growth and development is the strengthening of democratic institutions.

Social capital

Finally, let us turn to the role of social capital. Basically, social capital is an expression of trust between people. A society rich in social capital is a society, where people trust each other, respect others, respect business agreements, trust the legal framework and the courts. Although difficult to define, a country with weak social capital is easily recognisable

My point is that social capital is extremely important. Not only is it more pleasant to live in a society rich in social capital – where your kids play around without being afraid, where business agreement can be trusted, etc. – but it is also good economics. Social capital is productive, in that it makes other forms of capital more productive. Since social capital is so closely linked to the norms of interaction in civil society, it makes places of human encounter – such as teachers' and parents' associations, business associations, sports clubs, NGOs, etc. – quite essential.

If you can meet and talk freely, this increases the level of trust in society – and trust is important for economic growth. Any decent and efficient society needs to stand on three pillars: the state with its public sector, the market and civil society. Whenever the balance between the three pillars is upset, you have a problem. In many countries undergoing the transition from state planning to market economy, civil society has been suppressed in the past and has not been allowed to develop efficiently today.

In the past, the state in your countries was obviously far too powerful. It tried to control everything. Now, in certain countries undergoing transition, you will see the market taking over. The state almost disappears, and many good things disappear along with it. The market takes over much of the public sector's responsibilities, and that as well is a situation where civil society and social capital may suffer. So – if you forgive my saying so, considering how little I do know about your countries – I have the impression that civil society and social capital need most of your attention in the future. Perhaps, on the road from an all-encompassing state control to a free market, civil society is suffering. Extremely successful countries seem very often to be based on the co-operation between the state, the market and civil society.

A vibrant civil society

We already said that economic growth is a good but not sufficient condition for human development. It may not even be a necessary condition. You can achieve much with a rather low per capita income. Let me use Kerala in India as an example.

Kerala has, according to several indicators, achieved tremendous success. The average life expectancy for a Kerala girl today is 74 years, 20 years more than in Uttar Pradesh with the same per capita income. Almost all girls go to school and learn to read and write. Infant mortality is 13 per 1,000 births, far better than many countries with higher per capita income. In terms of quite a few human indicators, they have achieved tremendous success – and now economic growth, in the conventional sense, is also accelerating.

Why is this so? It is due to the co-operation between a progressive government, with committed officials and a low level of corruption, and a vibrant civil society, where peoples' organisations assume their part of the responsibility. Kerala is an example of how it is possible to achieve fantastic results, even with a rather low level of income per capita, if the balance between state, market and civil society is right.

I have no advice to give, and I have very little knowledge about the disaster in the Aral Sea region. However, some of the experiences of other countries, not least concerning the need for balance between state, market and civil society as well as between different forms of capital, might be interesting to discuss when searching solutions to the extremely difficult problems. ■

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The Aral Sea Crisis: Health Consequences for Women

First of all I would like to express my thanks to the organisers of this conference for giving me the opportunity to be here. Thousands of women in Karakalpakstan are waiting for concrete change and improvement in their situation. So I wish our conference real success.

During the past 30 years, the Aral Sea area (the Priaralye) has been polluted by pesticides, herbicides and heavy metals, owing to prolonged and excessive use of chemicals in agriculture as well as the dumping of drainage waters from agricultural areas, factories and plants. This problem is severe in Karakalpakstan, because the republic is situated in the lower reaches of the river where toxic substances have accumulated. As a result water, soil, air and products of the entire region have been severely contaminated.

The Aral Sea is the only sea in the world that has literally been destroyed by human hand. The destruction is the result of Soviet policies and activities in Central Asia, in particular the use of large land areas for cotton growing and the mindless diversion and waste of water from the rivers feeding the Aral Sea, without thought given to the interest of the people living along the river.

The region surrounding the Aral Sea is called Prearalia, or Priaralye, and comprises the entire republic of Karakalpakstan (located within Uzbekistan), as well as sections of Kazakhstan, Turkmenistan and additional parts of Uzbekistan, Khorezm and Bukhara. Prearalia is inhabited by about 3.5 million people, thereof 1.5 million in Karakalpakstan.

Karakalpakstan lies in the delta area, where the Amu Darya river enters the Aral Sea. The main ecological problem in this region is massive chemical

pollution (pesticides, chemical nutrients, industrial pollution, etc). As a result, all natural resources – water, air, soil, food – are heavily polluted.

One of the main problems is water. Mineralisation of water has increased during the last 45 years. Only 46.8 percent of the population in Karakalpakstan is provided with piped water, and 65 percent of this piped water does not comply with drinking water standards. The water is very hard (14–20 mg-ekv/l), and there are high concentrations of chemical nutrients and pesticides, including DDT and lindane. As is well-known, pesticides and heavy metals have mutagenic, teratogenic, embryotoxic and other effects on the human body.

Health

Due to the severe pollution of all natural resources in Karakalpakstan, it is believed that its entire population has been exposed to dangerous chemicals for a long time. The health situation in Karakalpakstan is deteriorating with the worsening ecological situation. Over the past 15 years, we have observed an increase in the rates of anemia, kidney and liver diseases, allergies, cancer, tuberculosis, birth defects and reproductive pathologies. The incidence of liver cancer has increased 5 times in Muynak, the town closest to the Aral Sea, over the last 10 years. Anemia in pregnant women has increased from 17–20 percent in 1982 to 99 percent in the period of 1992–95. Kidney diseases have increased 20 times, birth defects 6–7 times, and average life expectancy has gone down from 64 years in 1989 to 56 in 1996.

In the years 1982–1995, I investigated about 5,000 women of reproductive age in Karakalpakstan. Pregnancy outcome, blood system, immune and endocrine system, feto-placental system and heavy metals in the blood and placenta were studied. My research has shown a high incidence of disease among different groups of women, beginning with teenagers. The main reproductive pathologies (miscarriage, bleeding, birth defects, severe anaemia) were more significant in Muynak (the most polluted area) than in Nukus. The shocking conclusion is that presently, practically no baby in Karakalpakstan is born healthy.

Anaemia, the rate of which is the highest in the world, has become a real regional problem.

87 percent of the young women, 92–99 percent of the pregnant women and 92 percent of the newborn babies are anemic in Karakalpakstan. About 10 years ago, women with Hb 70 g/l were considered extreme cases; now we see pregnant women with Hb 20–30 g/l. What kind of life can their children expect?

Some investigations indicate that environmental factors may play an ethiological role in the formation of anaemia in this region. High levels of Mn, Cr and Cd were discovered in the blood of women together with lower levels of Fe, Zn, Cu and Se. Competition between these metals could induce malabsorbtion of iron. However, drinking water in Karakalpakstan is considered having higher levels of iron than the water in Tashkent, Bishkek and Moscow. On the other hand, Mn, Cr and Cd are toxic and could affect different systems.

Available research results together suggest that negative environmental factors (high mineralisation of water, imbalance of minerals, iodine deficiency or pesticides) could be one main reason for ill-health among women in the Aral Sea region. Medical and social factors may be concurrent reasons for the high level of reproductive pathologies.

It is worth noting that many illnesses are not recorded, due to the poor diagnostic system in the republic. Genetic, endocrinological and toxicological research is not performed at all locally, due to lack of qualified personnel and suitable laboratories. So we don't even see the whole picture.

All these terrible data form the life of the Karakalpaks, since 98 percent of the inhabitants live in this polluted area. We may well be witnessing the death of a nation as a result of human mistakes. It is, in fact, a form of genocide, and the situation is indeed alarming. During no more than 30 years, i.e. less than the lifespan of one generation, a dramatic change for the worse has taken place. Just remember that the Aral Sea used to be the fourth largest lake in the world! People of my age feel it very strongly:

- 25 years ago, I used to go swimming in the Aral Sea. Now it has become a white desert.
- the Amu Darya river used to be 1,000 metres wide. Now it is merely a canal, 30 metres wide.
- 30 years ago, we used to suffer from Amu-Darya floods. Now we do not even have enough toxic water for irrigation.

And the problems are far from being solved. During the last ten years, discussions about the Aral Sea problem have been frequent. Many conferences have set down recommendations and promises that were never implemented. Much money has been spent, but concrete positive changes for people in the region have not been achieved. The situation now needs urgent global attention.

Recommendations to the conference

Women priority in health work

Women's and children's health care programmes should be given highest priority by international agencies, supplying technical support to local hospitals and setting up diagnostic centres.

Environmental health priority

The Aral Sea problem shows the need to create an international programme that can provide independent expertise for monitoring environment and health. It is important to engage environmental health experts and ear-mark funds for research and action.

Fresh water priority

Each district in Karakalpakstan should be provided with clean water. Each year Karakalpakstan receives less water, a situation reflected in the economical and social status of the republic, creating doubts about the future and sustainability of the region. The UN must address the problems of people living downstreams with more energy.

Priority to women's NGOs

In countries with a history of authoritarian rule, NGOs are often the only organisations trusted by the community. NGOs, especially where women's participation is strong, can motivate and mobilise communities to understand how their activities affect their health and/or are harmful in other ways, and also show them how this can be changed. This is especially important in ecological disaster areas. Local NGOs should have the right to participate in and be supported by international agencies.

Aral Sea Watch Committee

The Aral Sea is continuing to dry out. According to some experts, it may well disappear in 20–25 years. It is now 10–15 years after the discussion about the Aral Sea began, and there are still no positive changes to be seen, although a lot of money has been spent. This only proves the necessity of creating an International Independent Committee for the monitoring and assessing of international programmes on the Aral Sea – The Aral Sea Watch International (ASWI). This committee should consist of local and international experts as well as NGO representatives. ■

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Child Health in the Aral Sea Region of Kazakhstan

People living around the Aral Sea, who are aware of the ecological catastrophe caused by the rapidly diminishing surface area of the sea, the increasing salination and the exposition of barren, sterile land of former sea bottom, speak about the "dry tears" of the Aral Sea. When storms sweep around the sea, the air is filled with dust containing salt, heavy metals and pesticides. It has been calculated that 140–150 million tonnes of salty dust annually is transported into the atmosphere. People living in the area are exposed to various toxic compounds when breathing contaminated air, and salt and pesticides destroy steel mills and various technical equipments.

The ecological catastrophe in the Aral Sea area is followed by deteriorating health in the inhabitants, and children have been particularly affected. Health surveys have shown that rates of perinatal mortality, low birth-weight and pre-term birth are increasing as is the incidence of congenital malformations. In addition, the rate of miscarriages is increasing. Among children, the prevalence of long-standing diseases such as chronic bronchitis with bronchectasies, atrophical gastritis, urolithiasis, secondary immune deficiencies and anaemia is increasing. Many children are stunted with retarded puberty. The increased prevalence of tuberculosis in the old population and in children causes much concern. In epidemiological studies it has been found that 83 percent of the children have abnormal skin pigmentations or alopacia. The incidence of congenital heart disease is much higher than in West-European countries. The frequency of malignant disease is increasing among children and adults.

The deterioration of health among people living in the Aral Sea region has caused much concern and is generally considered to have a multi-facto-

rial background. One obvious factor is the impoverishment of the people resulting in poor nutrition and sanitation. An increasing part of the people cannot afford to buy drugs and proper clothing. The previous health care system has partly broken down, and people do not have access to medical emergency treatment. In addition, people are exposed to various toxic chemicals, such as the pesticides DDTs, HCHs, and PCBs, and to heavy metals like lead and cadmium. Soil and drinking water may contain high concentrations of nitrates and nitrites. The way by which the population is exposed is generally considered to be from the air, from drinking water and from various food products.

Due to the concern about the health of the children in those regions in the Republic of Kazakhstan, where the ecological conditions are unfavourable, the National Children's Rehabilitation Centre (URPAK) has been founded in Almaty. The aim of this non-governmental, non-profit centre is to provide medical care and to perform medical research particularly regarding the rehabilitation of children with poor health due to adverse environmental factors. During the last five years, 4,000 children with suspected "environmental disease" have been admitted to the URPAK centre from the Aral Sea region. In this paper, the clinical features and work-up of the children, who have been admitted to the centre, will be reviewed.

Methods and material

All children admitted to URPAK have an ordinary physical and laboratory examination. When relevant, immunological, cytological, and microbiological studies are performed. In some cases the concentrations of pesticides in blood lipids and of heavy metals in erythrocytes and hair have been analysed.

In the clinical examination, it has been found that various organs are affected as shown in *Table 1*. It is quite obvious that many of the children have serious diseases and that many of them need efficient medical treatment. It should particularly be noted that the frequency of gastrointestinal, lower respiratory tract and urinary tract diseases is very high and that almost 100 percent had iron deficiency anaemia. It also has to be noted that congenital heart disease was diagnosed in 1/3 of the patients and tuberculosis in almost 40 percent of them.

As has already been reported, the concentration of such pesticides as DDTs, PCBs and HCHs was very high in some of the patients (Jensen et al. 1997). According to our hypothesis, the high concentrations of e.g. DDTs and PCBs in the blood lipids are of etiological importance for the pathology of many of the patients. An inverse relation between the Body Mass Index (BMI) and the concentrations of DDTs and PCBs in the blood lipids has been demonstrated (Mazhitova et al. 1998).

The clinical significance of the fact that the concentration of lead in the erythrocytes is found to be 2.5 times higher than in a control material, and that of cadmium twice as high as in a control material remains unknown and has to be further elucidated.

Table 1. Disease Panorama of Children Admitted to URPAK from the Aral Sea Region

Abnormality or Disease	Percent affected
Body weight below 2 SD for age	53
Height below 2 SD for age	42
Retarded age for puberty	46
Congenital malformations (all types)	60
Congenital heart disease	33
Tuberculosis	38
Skin disease including pigmentation	83
Ear, nose and throat disease	90
Lower respiratory disease	68
Gastrointestinal disease	94
Cardiomyopathies	14
Urinary tract disease	84
Iron deficiency anaemia	96

Discussion

In the Aral Sea region, child health has deteriorated rapidly due to multi-factorial reasons such as poverty, collapsing health care system and exposure to toxic chemicals such as pesticides and heavy metals.

To protect children living in the Aral Sea region from increasing health risks, immediate and efficient measures are necessary. The whole population in the region should have access to fresh drinking water, which is not contaminated by micro-organisms or toxic compounds. Although human milk may be contaminated with toxic compounds such as PCBs, DDTs and dioxins, breast-feeding should be promoted. However, measures have to be taken to ensure that the food for lactating women is free from toxic compounds. It may also be advisable to analyse the concentration of pesticides in breast milk in some areas to avoid that too much of such compounds are transferred to breast-fed infants. All children should be guaranteed food that meets the requirements of macro- and micro-nutrients. All children with gas-

trointestinal parasites have to be properly treated. Primary medical care has to be organised in such a way that all families are educated about child rearing and nutrition. All children should be provided with a proper vaccination programme, including BCG, and their physical and mental development should be regularly checked. They should also be examined for the presence of "ecological diseases". Particular attention should be paid to the prevention of chronic diseases in the respiratory, gastrointestinal and urinary tract. All programmes have to be based on scientific grounds and should be evaluated by scientific means.

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Health Problems of Women and Children and the Aral Sea Crisis

WHO/EURO role and activities for the promotion of inter-sectoral action for health and environment in the Central Asian Republics and the Aral Sea Basin

The World Health Organisation appreciates the commitment of the Swedish and the international society, the NGOs and all donor states to assist and support the Central Asian Republics (CAR) in their attempt to solve the problems of women, children, health and environment in the Aral Sea basin. WHO has contributed and will continue to contribute to these joint efforts, and I am pleased to confirm our firm commitment to continue to launch actions that will lead to an improved environment and better health for women and children in the region.

From declarations to actions

Over the past seven years, many countries of the WHO European Region, particularly those of the former USSR, have experienced revolutionary change. By and large, this has been a quiet revolution, although it has drastically changed the lives of many people living in the newly independent states. The past few years have been a period of excitement, of finding new identities, and of facing the challenges of socio-economic and cultural reform. For many people, however, these changes have also meant hardship, poverty, unemployment and ill health.

The development of market economies, while providing undreamed-of-opportunities for individuals and communities, has been accompanied by rapid deterioration in environmental health. All data show that the public health sector was the first victim of the economic crisis. In certain areas, as that of the Central Asian Republics and the Aral Sea Basin, this deterioration went so far that the sector is now on the verge of total collapse, which may

have disastrous consequences not only for those countries but for the stability of the entire Region.

However, this time of crisis should be seen as an opportunity to implement changes and to plan and act for a better future. It is the right time to transform into reality the ideas and declarations of recent conferences in different areas of health and human wellbeing, such as those on health policy, health care reforms, environmental health, primary health care, etc.

Major problems

Inequalities between health conditions in different parts of our region are becoming more pronounced. The greatest extent of deterioration in many parameters during the last few years is shown in the newly independent states of the former Soviet Union, particularly in the CAR. These problems are particularly serious in the area of the Aral Sea basin.

The problems are reflected in the resurgence of diseases thought to have been eliminated, and in the rise of the number of deaths from preventable and treatable illnesses, made more acute by the shortage of essential drugs, vaccines, medical equipment and other basic commodities.

Health problems of women and children

The health of women and children has deteriorated rapidly. The maternal and child mortality and morbidity are higher in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan than in any other European country. Perinatal complications are responsible for 30 percent of infant deaths. Infants experience upper respiratory tract infections, diarrhoeal diseases and vaccine-preventable diseases such as tuberculosis. There are also nutritional deficiencies. In many areas exclusive breastfeeding is still a marginal practice. In Kazakhstan, only 12 percent of infants aged 0–3 months are exclusively breastfed. Diarrhoea, acute respiratory infections, including flu and pneumonia, are responsible for over 40 percent of the mortality of children under five.

Maternal mortality ranges between 63 and 135 per 1,000 live births. Lack of contraceptives forces women to resort to abortion as a means of fertility control. Unsafe abortion is a common cause of mortality and morbidity, but is only one of the many basic medical interventions that still often lead to complications due to poor sanitary conditions and lack of antibiotics. Many pregnant women are malnourished. Anaemia is one of their most acute problems, and iodine deficiency and chronic malnutrition are very common in the region, while the lack of laboratory testing equipment makes full analysis of blood impossible. Several countries also report chronic malnutrition in children.

The Environment in the Aral Sea Basin

A recently held conference of the Interstate Fund for Saving the Aral Sea (FSA) in October 1997, revealed several striking facts, from the health point of view:

- the inflow of water into the Aral Sea from the Region's principal rivers, the Amu Darya and the Syr Darya, has almost stopped;
- since the beginning of the 20th century, the regional population has increased sevenfold to more than 50 million;
- irrigated land has grown twofold to 7.5–7.7 million hectares;
- shortages of drinking water supply and the poor sanitation have led to deterioration of human health;
- the deep economic depression in the areas close to the Aral Sea affect all 5 million people living there. The most pressing problems are in the territories of Kazakhstan, Turkmenistan and Uzbekistan.

Against the background of these facts, WHO/EURO wishes to underline the following aspects of the crisis:

- Chemical pollution, while a vital element for the whole picture, has in some quarters perhaps been given too much emphasis at the expense of other environmental health issues.
- In many parts of the region, more widespread adverse effects on health are caused by microbiological rather than chemical contaminants. The dramatic upsurge of, for example, cholera and tuberculosis is closely linked with environmental health conditions.

Currently more than 40 percent of the population (60 percent in rural areas) obtains water from decentralised (individual or communal) sources. These sources include canals, rivers and dug wells; however, no official information is available regarding the quantity of these water points or the quality of the water provided. Another problem is the irregularity of water supply. Environmental pollution caused by pesticides and heavy metals has been widely attributed as the main cause of deteriorating health in the Aral Sea area. However, *no actual environmental or drinking water quality data exist* to confirm this view. Moreover, some studies suggest that environmental sources of toxicity are secondary to other factors such as mineralisation. Local agencies have limited capacity to measure the concentration of either pesticides or heavy metals.

Sanitation represents a major problem across the region, especially when combined with inadequate water supply in certain areas. Poor sanitation facilities and practice in schools represent a major threat to children's health. Sewerage systems exist only in some cities. In Nukus, for example, it

covers only 20 percent of the population. The rural population uses primitive pit latrines. These are also used in the majority of the schools and health facilities in the region. Many latrines are situated in high water table areas, thus contributing to the groundwater pollution. In real terms, 90–95 percent of the population uses primitive pit latrines.

The main effects of current agricultural practices, especially cotton and rice cultivation, on irrigated fields are soil erosion, salinisation, contamination of ground and surface water as well as water-logging. This has had the following detrimental effects:

- decline in the fertility of the agricultural production,
- decrease in the amount and quality of water for drinking and other domestic purposes,
- rising ground water tables which has adversely affected the sanitary conditions of pit latrines.

The IFAS Conference reported that due to the efforts of the five CAR to date, US$ 2 billion from external resources have been invested in improving the quality of environment, health and living conditions in the coastal regions. But despite these efforts and investments, the situation continues to deteriorate and the crisis is accelerating. WHO's greatest concern is that the population in the region, particularly children, do not get safe water and that there is no safe sanitation provided. Water without adequate sewage means no real progress. Adequate sanitation is the entry point to water management in the collaborative way. We simply do not believe that the five countries could not provide the 3 billion m^3 of water needed for their populations.

Health Care and Environmental Health Systems

It is possible to link the negative health conditions to the basic failures of Soviet systems for prevention and control of environmental health hazards. In particular, the main tools that decision-makers needed for environmental health management were inappropriate or non-existent: The regulatory instruments were not properly developed to be effectively enforced. The enforcement system, although overstaffed, was ineffective and powerless. The equipment was either poor or lacking; the methods and methodologies used were out-of-date. The education and training of professionals was inflexible and traditionally conservative; and the economic instruments for protection of environmental health hazards were virtually non-existent. There is an urgent need for reforming, strengthening and upgrading the whole range of environmental health policy instruments in the five CAR.

The working conditions of medical personnel are very difficult, and the health care reforms are still in the early stage of implementation. The knowledge and skills of health care staff urgently need improving: maternal, neonatal, paediatric care is often too invasive and practices are often too theoretically oriented. The health facilities are suffering from lack of basic equipment, drugs and contraceptives.

Improving the potential of nurses and midwives in the Aral Sea area is crucial. Until now, like in many of the Central Asian countries, nurses and midwives have only been used as assistants to a physician. They must now be trained to serve local communities in an independent way. Taking the public health agenda forward is integral to the profession; working with the local community (community development) supporting them, seeking information on their behalf and assisting them to lead change; ensuring that women have access to ante-natal care and post-natal care is a key role for nurses and midwives. Families also need advice on child rearing, child development, including the uptake of immunisation and knowledge about proper nutrition.

Solution – investment in prevention is cheaper than cure

Certainly, one of the main causes of the identified environment and health problems was the inappropriate investment strategies that neglected basic principles of sustainable development and protection of the environment. The environment and health sectors were not involved in the development of investment strategies of different economic sectors at the central, regional and local levels. Unfortunately, the situation has changed very little, and this meeting should indeed focus its attention on this simple, but often ignored, fact. As long as the health and the environment sectors are perceived as being here only to "cure" the problems, there is no way to achieve the objectives of sustainable development. These two sectors must be integrated as equal partners in development of investment strategies at all levels – international, national, regional and local.

WHO's basic Health for All Principles

WHO's work in the region is based on the regional policy for health for all, with its 38 targets, which offers the best way to meet present health challenges. The policy's enduring value lies in its comprehensive approach to health, its firm fundamental principles, and the flexibility of their application. This means that the WHO Regional Office for Europe pursues a wide variety of goals in all areas relevant to health – including lifestyles, the environment and health services – with any combination of methods and part-

ners that suits the circumstances. The principles of Health for All should harmonise these efforts.

The Health for All policy and its seven principles guide all our activities. *Equity* in health is the first principle in every sense. Dedication to this goal has led the Regional Office to address the most serious health problems and the most vulnerable groups and countries. In particular, work with the CCEE and NIS, to narrow the health divide, comprises two thirds of the activities. This work constitutes the EUROHEALTH programme. Closely allied to equity is the second principle, *ethics*. This is the basis of WHO's work to improve the quality of health services. The next two principles emphasise *primary health care, health promotion and disease prevention*. Work here ranges from reducing substance use and promoting health in schools to improving maternal and infant health and promoting family planning in the CAR. The last, closely linked principles are *participation* in decision-making by everyone concerned and *inter-sectoral and international co-operation*.

Health for All expresses WHO's recognition that health concerns everybody and that co-operation maximises the effectiveness of all the partners in the task. In this area, WHO makes special efforts to build the capacities of different groups of professionals, including nutritionists, school staff and environmental health managers. It has formed powerful alliances within the health sector, as well, which help to ensure the sustainability of WHO programmes.

The Regional office constantly widens its network of international partners, which brings invaluable information, expertise and technical advice on public health. WHO has turned partnership from goal to a reality, resting on a solid and growing foundation of successful shared work.

WHO/EURO's activities

With these principles in mind, WHO/EURO is implementing special programmes and projects in support to all countries in transition, as well as some very specific for the CAR region and for the Aral Sea area. The most important ones, which are directly linked to the subject of this conference and to the problems of women's and children's health and the environment, are:

- EUROHEALTH Programme (General framework for assistance)
- NEHAP Programme
- CARAK Project
- CARNET Programme
- CARINFONET Programme
- MUYNAK Project

I would specifically focus on some of them which, in our view, would most positively influence the state of the environment and of health of the whole population in the region, women and children benefiting to greatest extent.

CARAK Project

To respond to the enormous health needs of the populations of the CAR, the health ministries concerned and WHO/EURO launched the CARAK project in 1995. Its major aim is to reduce infant and maternal morbidity and mortality by strengthening health services and to promote family planning. The main components are:

1. Maternal and child health care, the objective of which it is to reinforce the preventive health care/ health promotion skills and practices in reproductive health as well as obstetric care, family planning, nutrition during pregnancy and lactation, breastfeeding, neonatal care, midwifery management and nursing care (inpatient and outpatient). It should reduce the use of abortion as the main method of fertility regulation and increase the use of modern contraceptives.
2. Integrated management of childhood illness, the objective of which it is to promote the prevention of diarrhoeal diseases, acute respiratory infections, malaria, measles and malnutrition, and to maximise correct case management in children under five through the adoption of integrated management of childhood illness.
3. Essential equipment and supplies, the objective of which it is to promote capacity-building in the management and maintenance of the basic medical equipment and drug supplies for maternal and child health services and to provide standardised procedures and treatment through the use of appropriate technology.
4. Coping with emergencies, the objective of which it is to provide humanitarian assistance in emergency situations.

The strategies to achieve the aim are the provision of training and local capacity building, the revision of national policies, the promotion of interdisciplinary and holistic approach and the development of inter-country networking among health services at different levels. Instead of working at national level, the project concentrates on pilot districts, working directly with health professionals in facilities with fewer resources and less access to international standards of care. The project has focused on adoption of cost-effective clinical practices and non-medical interventions that have already been shown to improve maternal and child health in other countries.

MUYNAK Project

Muynak is situated in the Republic of Karakalpakstan, 270 km north of Nukus, the capital of the Republic. The area has a total population of 25,000 and is one of the worst hit by the Aral Sea disaster. The former seaside town of Muynak with a thriving fishing industry is now 100 km from the seashore that is inaccessible. The population of the town has dwindled from 45,000 to 13,000. The fish-canning factory is under-functioning with imported fish. Agriculture cannot flourish because of the salinity of the water and soil. In summer the climate is hot and dry and winters are cold. Water supply and quality have become severe problems. Living conditions like this has a tremendous impact on the health status of the population.

In brief, the situation can be summarised as follows: The health problems are mainly due to poverty and general social and economic deprivation. The health care system is based on inpatient treatment (hospital) and staff training is dominated by specialisation. Basic living conditions like the level of sanitation are severely affected by shortage of water and poor quality water facilitates the transmission of waterborne diseases. This results in high numbers of

- anaemia/poor nutritional status (vitamin A deficiency)
- respiratory tract infections , especially among children
- tuberculosis
- diarrhoeal disease
- STD/kidney disease

as well as a number of other conditions. And again, there are vulnerable groups that are suffering most, like children and their mothers, the very poor, the elderly, the unemployed /unpaid employed and others.

WHO /EURO launched a project where support towards developing PHC in the area of Muynak is the main focus. The project is financed by The Norwegian Government and focuses on the following important components:

- to support health reforms towards strengthening of the general practice /family medicine approach in the Republic of Karakalpakstan.
- to train nurses and physicians in targeted areas of importance like TB, ARI, diarrhoea, etc. including supply of equipment for these tasks at PHC level
- to supply rural health posts and hospital outpatient department with necessary equipment for providing PHC
- to establish radio-communication between rural health posts and local referral district hospital in Muynak town

- to translate WHO training material into local language
- to support local health promotion centre with equipment and material
- to provide community based health education through local government and different community organisations
- to improve the water situation
- to promote co-operation with local medical school and nursing school on the issue of PHC
- to promote co-operation with other UN organisations and NGOs in the area on the issue of PHC
- to make experiences in the project available to others

NEHAP Programme

In the follow-up to the Second European Conference on Environment and Health in Helsinki, June 1994, when the Environmental Health Action Plan for Europe was adopted as a set of practical actions to be carried out at national and international levels – with the partnership of not only the environment and health sectors but all relevant economic sectors and the public as well – all states, including the CAR, either developed or are developing their National Environmental Health Action Plans (NEHAPs), and some are even entering the implementation stage. Amongst all, NEHAPs are based on the following main principles:

- investment in prevention is cheaper than cure
- the "round table" (integrated) approach of collaborative efforts and actions is the best possible one. This means that all responsible sectors should be involved to resolve environmental health problems at all possible levels – local, regional, national and international. This means partnership in action. The "round table" mechanism should only be used to decide where external resources are needed
- application of well-planned national and inter-country policies, strategies and action plans is the only way for a long-term solution of the existing huge problems

Kazakhstan, Kyrgyzstan and Uzbekistan already developed their NEHAPs, and they will be endorsed by the Governments not later than July 98. Tajikistan and Turkmenistan will be ready by the end of 1998. Implementation of these plans in all five CAR is seen by countries, and should be perceived by donors, as the proper cost-effective mechanism of achieving collaboration and remedying the problems based on human health criteria. This comprehensive national plan is an integral part of the

overall country development programme, and a starting point in defining the countries' investment strategies and priority projects.

The implementation of these national plans (NEHAPs) at all levels are expected to achieve the long-term objectives of remedying existing environmental health problems, and reversing negative trends in the status of health. Particular attention should be given to health problems linked to the environment. For the implementation of their NEHAPs , the CAR will need donor support, as well as the mobilisation of available domestic resources, both human and financial.

The implementation of a NEHAP is primarily a local and a national action. Because of the common problems, the five CAR have also agreed to implement concerted actions at the regional level, as indicated in the Issyk-Kul Resolution adopted by the First CAR Ministerial Conference on Environment and Health, June 1996. The five CAR decided to design, adopt and implement:

- a common policy on the issues of water management, drinking water supply, transboundary contamination of water, implementation of unified monitoring and control of quality and safety of drinking water, organisation of a uniform reporting system;
- local environmental health action plans (LEHAPs), applying the subsidiary principle, particularly in the regions adjacent to the two rivers and the Aral Sea basin;
- common environmental health strategies for the economic sectors. With regard to solving environmental health problems in the Aral Sea Basin, the involvement of the agriculture and water management sectors is of the highest importance. Basic changes in agriculture policies and strategies are needed and the introduction of completely new irrigation technologies should be discussed as previously mentioned;
- collaborative actions to build up the capacities needed in the region and to reform, strengthen and make effective and efficient the environment protection and environmental health protection systems in each of the five CAR. To implement these actions countries will also need the technical and financial support of the international funding institutions and donors. WHO is not a financial institution. But WHO will provide technical expertise and guidance;
- policies and strategies to increase public awareness to improve public information, and to ensure the involvement of the public in the decision-making process for environment and health.

Conclusions

The way forward is working in partnership, to reverse the negative trends, to build up an effective system for the prevention and control of environmental health hazards, and to improve the health of populations, particularly women and children. All this will require large-scale investments of existing knowledge and financial resources. In all cases, however, one particular challenge does not require more money – or technology, or research – and yet it is crucial for our efforts! That is the need to create far better co-operation and co-ordination of the work and potential of international organisations and governments.

In conclusion, I would like to convey one message only. During this time of crisis, we should not give up hope. On the contrary, we should strengthen our resources for a brighter future so that our children may live in an improved environment. We should have courage and determination to fight for action with regard to the environmental health challenges mentioned and to all other. And above all, we should recognise that the limited resources available to countries, international organisations and funding agencies must be organised in a new spirit and within a new framework for joint action.

Finally, we would call on international organisations, international funding institutions and donors to:

- support the development and implementation of NEHAP in each of the five CAR;
- co-organise, together with the Interstate Council of the Republics of Kazakhstan, Kyrgyzstan and Uzbekistan and WHO/EURO, the Second CAR Conference on Implementing NEHAPs, which is to adopt and launch a collaborative programme of concerted actions, and to support its implementation at all possible levels, local, regional, national and inter-country. ■

Galiya Khasanova

UN Gender in Development Bureau Director

Empowerment of Women in the Rebuilding Process

Women and contemporary society

The population of the Republic of Kazakhstan is 15.8 million, including 8.1 (51.3 percent) million women. In the mid-1990s, 62 percent of the total number of citizens with specialised and secondary or post-secondary education were women, constituting a colossal resource for national development. The women comprise more than half of the population in employment; the share of women studying or working is high; the share of women with a post-secondary education is higher than that of men; a feminisation of science and engineering is under way.

In addition, 2/3 of the women are employed in materials industries, including light and food industries, which are almost entirely dependent on women's labour. In the service sector, women also make up most of the workforce: more than 80 percent of doctors, 90 percent of junior medical personnel, 75 percent of teachers, 75 percent of credit and state insurance and 66 percent of cultural activities. However, one of the characteristic trends in the republic is the clear under-representation of women in the middle and upper levels of management and administrative structures in all spheres.

Every second man (48 percent) with a post-secondary and specialised secondary education is in management, whereas the corresponding percentage of women is only 7 percent. Even in sectors where women make up the overwhelming majority of employees (light industry, food and others) few are found in management positions. There are significantly fewer women postgraduates (35 percent) and PhDs (17 percent), and at higher levels there are few women in the hierarchical management structure.

The worsening economic and social conditions complicate the situation further. Achieving genuine equality between sexes is not among the Government priorities. The figures provide an example: the number of women in Parliament is about 12 percent. Although women comprise the overwhelming majority in state administrative bodies, they rarely reach the level where governmental decisions are made. At present, there is only one female minister.

Increasing unemployment also has a bearing on women. Women's share in the total number of workers laid off is approximately 68 percent. A significant number of them is female with post-secondary and/or high school education, with more than 10 years of work experience. Economic and social hardship has had a drastic impact on the demographic situation in

Number of women, working for enterprises and offices in different areas of economics 01.01.97 in Kzyl-Orda oblast

	Objectives	number	%
1	Total	55,972	41.2
2	Industry's enterprises	6,275	37.4
3	Agriculture	5,369	17.1
4	Forestry	47	13.9
5	Transport	2,894	18.6
6	Communications	1,594	57.0
7	Construction	877	13.5
8	Trade	2,367	71.7
9	Food industry	557	81.4
10	Supply and sale	273	22.0
11	Storing up	211	32.1
12	Counting systems	194	84.3
13	Geology, geodesy, earth exploration	162	15.4
14	Others in material industries	130	20.1
15	Housing and Communal Economy	590	20.8
16	Health, sport, social security	13,552	77.5
17	Education	16,603	68.5
18	Science	191	28.9
19	Financing, crediting and insurance	551	63.3
20	Local government	1,528	29.6

Kazakhstan, with a sharp decline in birth rate and a high level of mortality. For the last five years, the birth rate declined from 21 in 1991 to 15.4 per thousand in 1996. A negative population growth was registered in three regions of Kazakhstan. A general frustration in the society caused by economic difficulties does not promote stability in families, especially among young parents, for a proper family planning. A worsening of reproductive indicators is occurring simultaneously with the deterioration in women's and children's health. For instance, while the country health index for Kazakhstan is 30 percent, it is 20 percent and lower in several remote regions. The highest morbidity is registered among women living in ecologically devastated regions of the country. The low health index for women is accompanied by a high level of health complications during pregnancy and labour: 60 percent of all deliveries have complications.

The Centre of Mother and Child Health Protection has prepared the National Programme on Women's Reproductive Health Security in Kazakhstan. The main tasks are mother and child health protection, safe motherhood and safe abortions, generally available family planning as well as medical and genetic councelling, prevention and treatment of infertility, prevention and treatment of specific infections. In Kzyl-0rda, there is an alarming rate of health problems among women during pregnancy: anemia 51 percent, kidney diseases 10 percent, gastro-intestinal disorders 18 percent, mental disorders 9.8 percent, stomatological pathologies (caries) 40.5 percent, stomatological pathologies (paradontosis) 64 percent.

State Policy on women in Kazakhstan

The Council on Family, Women and Demographic Policy, under the office of the President of Kazakhstan, was established in 1995 as the national mechanism to represent women's issues within the Government structure. The biggest achievement of this agency was the formulation of the State Policy on Improving the Status of Women in Kazakhstan, signed by President Nursultan Nazarbaev in March 1997. The Council has the highest legal status among women's organisations, but it remains a formal consulting entity in the government, without any implementing or monitoring powers. Though it has divisions in the oblasts of the country, it does not perform any systematic activities on improving the situation of women.

One of the major causes of the current situation on gender issues, is the fact that Kazakhstan has not signed or ratified the Convention on the Elimination of All Forms of Discrimination Against Women and other relevant international instruments. Kazakhstan officially participated in the Fourth World Conference on Women in Beijing in 1995. The delegation consisted of senior officials, including the First Lady Ms. Nazarbaeva, and

representatives of women's NGOs. The Kazakhstani delegation adhered to the Beijing Declaration and Platform for Action and made commitments for their implementation. However, the Government does not treat the gender issues as a priority in the process of economic transition and development. Kazakhstan has not developed the National Action Plan on Improving the Status of Women due to absence of financial resources for elaborating and implementing the reforms to promote women in society. At present, Kazakhstan has made commitments on the implementation of the Convention on the Rights of the Child, which it signed in 1993.

At present, development of small and medium enterprises is in the focus of Government policies. Ms. Nina Kayupova, Chair of the Council on Family, Women and Demographic Policy under the President, says that, in addition to providing women with professional skills, we must widen their participation in small and medium enterprises. Following the recommendations of the Council, the President declared that women will be encouraged to apply for small loans ($400). This amount may seem insufficient for individuals to start a private business. However, it is expected that the families receiving the money will be able to create small firms to provide services, on the basis of collective ownership.

After completing an assessment of women's employment status in the labour market, we elaborated recommendations to introduce amendments in the national legislation in order to meet the international legal standards on equal opportunities for women in the labour market. The recommendations also concern the issuing of new legislative acts to encourage employers to hire women with families, and to provide protective mechanisms for non-competitive women's resources in the labour market, such as disabled women with many children, and other vulnerable groups.

Women's NGOs in Kazakhstan

There are about 30 officially registered women's non-governmental groups in Kazakhstan. All of them are actively dealing with the social and political problems emerging in the economy of transition. All women's NGOs have common objectives:

- advocacy of women's human rights
- promotion of equal rights and opportunities
- strengthening of the political, economic and social role of women in the development of the country.

There is an overall tendency among NGOs to be neutral to Government policies and programmes, and generally to the activities of the Government agencies. The main reason behind this policy is the fact that the Government

has given low priority to gender issues in formulating the national strategies for the period of transition. Nevertheless, women's NGOs recognise the necessity of co-operation with the Government, since the major social and economic issues of women's concern require its active role.

Some data on women in Kzyl-Orda oblast

	Number	%
1. Number of women working for enterprises and organisations:		
• total	135,743	100
including:		
• women	55,972	41.2
– workers	26,334	
– office-workers	29,638	
including:		
– managers	1,733	
– specialists	24,771	
2. Number of students of universities in 1997–1998, total	9,466	100
• including women	4,975	52.6
3. Number of students in colleges in 1997–1998, total	4,809	100
• including women	2,686	55.8
4. Children born in 1996 (on mother's ages):		100
• before 20 years		7.9
• 20–24		37.9
• 25–29		27.3
• 30–34		16.7
• 35–39		8.4
• 40–44		1.6
• 45–49		0.2
5. Number of children, born by married women	12,866	
• urban women	7,083	
• rural women	5,783	
6. Number of unemployed women 01.01.97,	6,154	
including women living in rural areas	1,024	
7. Population in working age (in total number of population)		53.1
8. Women in working age (in total number of women)		50.8
9. Rate of employed population to total number of population in working age		40.7
10. Rate of employed women to total number of population in working age		37.2
11. Rate of employed women to total number of employed population		43.8

There are several factors that contribute to inadequate co-operation of women's NGOs with the Government:

- insufficient development of civil society leads to low public activity of women and distrust on the part of the women in the Government's willingness to introduce constructive changes in their status
- absence of public and state awareness of gender inequalities
- undeveloped mechanisms of co-operation between Government agencies and NGOs.

United Nations Gender in Development (GID) Bureau activities for the empowerment of women in Kazakhstan

The UN office in Kazakhstan has as one of its primary objectives to establish strong mechanisms for co-operation between the Government and NGOs. The UN GID Bureau has set up several strategies for implementing this objective. The GID Bureau conducts joint training courses, workshops, seminars and conferences for representatives of NGOs and Government. The Bureau is actively assisting women's NGOs on project development and formulation and required resource mobilisation. The GID Bureau is also working with mass media to increase public awareness of gender issues and give a wide coverage of its activities, objectives and future plans.

Report on the status of women in Kazakhstan, 1997

The lack of gender disaggregated statistics, the absence of a single comprehensive information source on women, a low level of gender awareness in society and few women's groups in the region – all this was part of the problem that faced the UN Gender in Development Bureau at the opening of the office in December 1996. The Bureau decided to lead the process of facilitating information gathering, co-ordination and dissemination on gender issues in Kazakhstan. Following the model of the Platform for Action, the GID Bureau came up with the initiative to publish articles on the status of women in the 12 priority areas formulated at the Beijing Conference. This initiative was supported by the International Mercy Corps Country Office in Kazakhstan, which became the leading financial partner, and the NGO «Feminist League», which executed the project. Notwithstanding the absence of a Gender research Centre in Kazakhstan, the GID Bureau was able to identify a group of experts in social and economic sectors, who participated in the elaboration of the report. The experts had valuable experience in dealing with women's issues and, moreover, they had access to reliable information and statistics dispersed among various government institutions.

All these factors contributed greatly to the quality of the report. It is worth mentioning that the report is the result of joint action between representatives of Government and non-governmental organisations, who equally demonstrated enthusiasm and commitment to the concept of the project. The Report targets a wide range of readers, from decision-makers in the legislative and executive branches of Government to NGOs, local administrators, the donor community and international organisations. It is specially designed as an assessment tool for developing programmes for women. In general, making the report was a valuable experience for the UN GID Bureau, which is now ready to share it with all interested partners.

Raising gender awareness in society

The UN GID Bureau organises workshops on women's political leadership, women's rights, violence against women and other gender-related issues, for the representatives of governmental agencies and NGOs. For instance, at the Sub-Regional Women's Summer Camp participants took part in intensive courses on gender issues. The Camp has achieved significant results, such as a Resolution on the policy planning issues and priorities for the women's movement in Kazakhstan and a Letter to the President on the crucial necessity for Kazakhstan to join the major international conventions of the UN on women's rights.

In October 1997, 30 members of Parliament, representatives of NGOs and mass media gathered in the House of Parliament to attend the seminar on Equal Opportunities Legislation and Mechanisms of its Implementation.

Its objectives were:

- to introduce to parliamentarians the experience of Sweden in establishing a national machinery to implement state legislation on equal opportunities;
- to increase awareness of decision-makers on gender issues in Kazakhstan;
- to prepare the ground for the elaboration of gender sensitive legislation on equal opportunities;
- to inform decision-makers of the activities and priorities of the UN GID Bureau.

Implementation of Beijing resolutions in Kazakhstan

The UN GID Bureau is working with the national machinery on women's issues, which in Kazakhstan is embodied in the Council on Family, Women and Demographic Policy, to foster the process of implementing the Beijing resolutions, stated in the Platform for Action. The UN GID Bureau and

Women NGOs jointly identified the major priority for 1997, which was the elaboration of the draft of the National Action Plan – a comprehensive national policy on the improvement of women's status in the period of transition in all spheres of public and economic life.

This became the purpose of the National Conference "Beijing: two years later", convened by the UN GID Bureau on 21–22 October 1997 in Almaty. The most active NGOs in various fields and decision-makers from legislative and executive branches of power participated in the conference. The objective of the first day was to assess the already existing implementation concepts in accordance with the demands formulated in Beijing, to identify priority areas for action in Kazakhstan and to develop strategies for all actors.

On the following day the working groups developed a framework for action, identified concrete problems, targets and time-tables for each priority area. The final document of the conference was the draft of the National Action Plan on the improvement of the status of women in Kazakhstan. The conference was organised with a minimum of financial input, considering the scope of objectives and large scale participation of various actors. Assistance provided by the Swedish International Development Agency permitted participation of a Swedish expert on gender issues, who provoked an intensive exchange of experience at the conference. And finally, the conference set a positive precedent for further collaboration of government agencies and civil society representatives.

GID Bureau plans for 1998:

Legislation review from a gender point of view. It is suggested that the National Team of Experts should write a report in two parts: 1) a review of the laws and codes to determine what is gender friendly and what is discriminatory; 2) recommendations for adoption and lobbying of new gender laws (in support of women's business, or revision of election laws and appointment laws to allow for quota, for example). The report should be used for lobbying gender laws in Parliament. The first results are expected by the first week of June 1998, when UNDP and OSCE are co-sponsoring a Regional Conference on Gender Legislation in Uzbekistan.

Gender disaggregated statistics. A team of national experts should write a paper on 1) what kinds of statistics are available by gender and 2) what kinds should be developed and why, in order to convince the State Committees on Statistics and the Planning agencies to disaggregate data in the up-coming censuses.

Gender studies. This project aims to 1) co-ordinate gender research in Kazakhstan, and 2) develop curriculum for teaching gender studies. The Centre will establish contacts with Universities and Pedagogical Institutions in Central Asia in order to disseminate the curriculum.

Further elaboration and implementation of the *National Action Plan*: technical support of the Working Group on NAP development.

UNDP Project: "Status and Economic Advancement of Women in Kazakhstan"

In the sphere of economic advancement of women, the UNDP has developed and commenced the implementation of a project on *Micro-lending for small and medium scale women's enterprises* in ecologically disfavoured regions in rural Kazakhstan. Two least developed regions of the country with vast environmental degradation have been chosen as the target objects for implementing the project. The UN volunteers are actively involved in the work of the Centres of Business Support to provide consultation on obtaining the required funds and their allocation.

As it is stated in the Memorandum of Mutual Understanding, adopted by the participants of a Kzyl-Orda meeting in 1997, the challenges to the region were identified as: adequate clean water-supply, improvement of health standards and provision of employment opportunities.

A special fund for economic and social development was established in the region, in order to generate employment opportunities and launch micro-lending schemes for the development of small and medium enterprises. A UNDP funded project targeted at this region will promote women's employment by providing interest-free loans for development of small-scale enterprises. To ensure successful implementation of the project, two UNDP Support Centres were established in Kzyl-Orda, Aralsk, and Kazalinsk in close co-operation with local women NGOs and the recently founded Centre for Economic Development. Experts in micro-lending organise training courses for women and provide consultation service on the elaboration of business plans. The business plans are to be submitted to the Appraisal Committee, which will assess their feasibility and approve them for the next stage of lending, upon fulfilment of all requirements. Actual delivery of loans is envisaged for the period of April–May 1998. ■

Ekrem Birerdinc

CARK area representative, UNICEF, Pakistan

The Social Side of the Aral Sea Crisis

The social side of the crisis is my main subject but I will also challenge the forum on issues that were omitted by earlier speakers.

The Aral Sea is not the mother of all problems. Let us make that very clear. There are lots of problems in Central Asia, there are lots of problems in Russia. And there is an Aral Sea problem. We have to place our facts right if we want to be effective as international communities, as UN representatives, as governments etc. And we also have to put our facts together correctly. It is true that the Aral Sea is dying. There are problems of salinity, chemicals, sand that is going up in the sky, etc. We have to acknowledge that. But let us talk about facts that have to be dealt with scientifically, technically and so on.

The problems around the Aral Sea are not any worse in terms of social or economic disaster than in other regions of these countries. We heard about Karakalpakstan that is part of Uzbekistan. There are other provinces, facing difficulties in terms of social and economic conditions. And believe me, there are provinces in the Central Asian countries that are worse off than the ones around the Aral Sea.

I want to challenge the economists. In any decent country, you will have big problems if you cut the national revenue by 60 percent. Imagine what would happen if you cut the Swedish state income by 60 percent just overnight. You will most certainly get enormous problems. And that is what happened to the Central Asian republics, when they became independent states, because earlier 60 percent of their income came from Moscow. All of a sudden they were told that they were free, independent, with no government and no more money! How do you cope with such a situation?

This happened around the Aral Sea too. Earlier governors around the Aral Sea obtained supplements for this, supplements for that, and – of course – their salaries. So all of a sudden, as in many other provinces, they did not receive their salaries. This is simply what happened. Schools that had obtained teaching materials and all other equipment did not obtain supplies any more. All of a sudden it stopped. It is that simple.

So, the Aral Sea is not the mother of all problems. When I visited the area I saw schools without supplies, without windows – they cannot be repaired – without school books, paper, pencils in the hands of the children. This is not so because of the Aral Sea problem. The teachers leave their profession. In Kazakhstan, 1,000 teachers left. They left also the Aral Sea region – but this in itself has nothing to do with the shrinking of the Aral Sea. These are economic problems.

We have been talking about different matters this morning: pollution, health and so on. Pollution problems are everywhere. Tajikistan has the biggest aluminium plant that is polluting the whole country – but also the south of Uzbekistan. It creates disease, a disease that eats up the bones. And the children are all yellow. There is pollution for you. If you want to fly tomorrow to Almaty, you have to pass through thick smoke. And you will fly through the same smoke to Tashkent. There is pollution for you. We also talked about anaemia. It is truly a problem at the Aral Sea, but it is also a problem in Tashkent, in Kyrgyzstan, in Osh, in Russia. I think we need to be clear in our minds as to what we say and why we are saying it. So, again, the Aral Sea is not the mother of all problems.

There are problems with breastfeeding. The babies become blue as the sky and then they die, because the mothers accumulate nitrate from the water and from food, and that nitrate prevents the haemoglobin to bind oxygen. The babies become blue because they lack oxygen and they die. Despite that, UNICEF and everybody else advice continuation of breast feeding because it is still the best and only alternative. Some activities have improved the situation, and last year we saw only three cases of this disease.

I wish there were also people from Turkmenistan here – it is also affected by the shrinking of the Aral Sea. Some parts are terribly affected by the salinisation.

How do we decide where to go, and how do we make the right decisions to help? The Aral Sea is a reality, the problems it creates are real. They have to be dealt with. But they have to be dealt with *on the basis of scientific knowledge and on the basis of technical proofs* and not on an attitude of alarm. We follow the criteria of UNICEF, on the basis of infant mortality rate, which is very low here compared to developing countries. We should look more to the prob-

lems of hygiene, to public health problems and so on rather than on very minute problems of heavy metals etc. Let us get our proportions right.

The service functions are important in every country. I never saw a village without a health centre, a school, a hospital. The services are there, but they are breaking down. So we need to help them regain their strength. We have to help the teachers, the nurses, the doctors make the services function properly, because they are vital for any social set-up. The main problem and what makes the service stations break down and the personnel leave is the economic situation.

So we should give more attention to *what people really need*. The international organisations should co-operate better to give efficient help. We should work together and agree on what is necessary, do it consequently and avoid overlapping or duplication of each other. ■

Marie Kranendonk, the women's network Women in Europe for a Common Future, asked from the floor:

I want to challenge the last speaker, Mr. Birerdinc, on his data. I have data from research done for the World Bank by a Japanese development organisation. In a research report published in 1996, they say that the infant mortality rate in some areas around the Aral Sea, in Uzbekistan, is 100 deaths per 1,000 live births. According to a very recent report from UNDP (1995), the infant mortality rates in Karakalpakstan average 34.8 per 1,000 deliveries. This is the highest infant mortality rate in Uzbekistan, where the average is 30 per 1,000 deliveries , and is even higher than the formal USSR rate with an average of 25 per 1,000 deliveries. Sometimes we must be very critical when looking at figures, and I object to your giving the impression that the figures and the data given today by many experts and researchers from their research in the Aral Sea area and in Karakalpakstan were not scientifically sound. I do not share that feeling.

Mr Birerdinc:

I am sorry if I gave the impression that scientific research results presented here were no good. I did not say that and did not even intend to. But we maintain that infant mortality rates given by UNICEF are infant mortality rates calculated on the basis of how infant mortality rates are calculated in the UN. So these are the figures that we use. WHO, and especially the governments, do not do the specific, necessary calculations that are needed to be in accordance with the international standard, when they give infant mortality rates.

Professor Rolf Zetterström:

According to my experience, there is no reason to believe that all figures about infant mortality rates in governmental sources are particularly accurate. Having worked with infant mortality rates in Sweden as well as in some African countries, I know that you can get figures varying between 20 to 100 per 1,000, depending on what people you ask. From what I have heard about Kazakhstan, instead of 36 plus 3, 4 or 5 decimals, it is more likely about 80 per 1,000.

Moderators' Summing Up

Barbro Westerholm

Commissioner Gradin, Dr. Ataniyazova and Professor Mazhitova have given us data on the declining health of women and children. I do not think we should get stuck in discussions about exact percentages. The data they showed were real whistle-blowers; we have to do something and we have to do it quickly and at the same time with more of a long-term perspective. The short-term action is actually to protect food and water. Medicines can do a lot, but it is really clean water and safe food that we should head for.

With regard to more long-term action, I think Anita Gradin, in her paper, showed us the way: building on society, building on women. Towards the end she mentioned a very crucial group, that is young people, teenagers. They must be given the feeling that it is worth fighting for the land where they grew up, so that they do not go in for drugs or the like. Those groups are really the essential resources, as I interpret her presentation.

We have to build on experiences from other countries that have faced similar problems. Creating networks of women, establishing NGOs, has been successful for example in countries south of the Sahara. I remember one colleague from the National Board on Health and Welfare who went to Kenya, helping to build a network of women to get clean water and safe waste disposal. These networks of women were quite successful.

We must get rid of any obstacles that might stand in the way for these networks and the new NGOs. Democracy is the basis of successful work. However, democratic decision-making takes time, and people need training if not used to it. Sida has put a lot of money into projects in South Africa, where politically interested women have learnt about democratic ways in

order to achieve their goals. There are many other examples showing that people's involvement, networks, free dialogue, free press really work. It is also a good thing if you have the experience of success. It is always important to feel that you are a little bit better off than you were yesterday or the year before. Here, of course, the necessary collection of data comes in, even if the quality may not always be the best.

Anita Gradin also underlined that much money is not always what you need. If you target your money, make your priorities and find the key people, who are really filled with enthusiasm, then you can accomplish a lot. It is worthwhile to stop and think before rushing into projects, so as to reach your goal with the targeted money.

Margareta Israelsson

Let me begin at the end. This situation holds not only the problem with the shrinking Aral Sea, but also problems in connection with changes after the transformation of the Soviet Union into many different states. The UNICEF representative focussed on that issue. Taking that into account, it is even more important to consider the construction of democratic organisations as well as local and regional authorities.

The representative from WHO mentioned that many of the problems are due to old structures and working methods that are in great need of updating. We can all agree about this. Naturally, there is also the need of economical resources. Dr de Vylder also talked about making investments in mankind, good investments at that. I would like to stress what he said about social capital. That people trust other people is very important, especially young people's trust in democracy. This is probably one important part in the reconstruction of this area.

This afternoon gave us information about the very difficult situation for women and children, and the high rate of unemployment that burdens the economy. Fish factories actually have to import fish to be able to continue, to employ people and to save their economy.

One thing to remember is the perpetual problem with statistics. It is always difficult to discuss figures in a way that makes everyone feel confident. Nevertheless, the figures presented to us are not "good" figures in the sense of "representing good life conditions". The work that lies ahead of us is changing these bad figures into good.

Bo Landin

Information is part of my life, part of everybody's life. We need to get information and need to send information of various kinds. I do not see information from statistics as an answer, but rather as a question. Sometimes we treat

statistics as if it were an answer, even though it is not. There is a lot of information and a lot of statistics available. I have worked for many years in various parts of the former Soviet Union, and I know there is plenty of numbers. But what did statistics say? Looking at the reality behind, statistics were not always telling the truth.

What we really need here is a compilation of statistics from different areas, specified, differentiated. If we talk about "health problems for the population", we ask only one question and receive one answer. We have to ask: what is the situation for women, for men, for children of various ages, for people living in different areas?

We must be more specific. One outcome of a meeting like this should be an *emphasis on the need for research*. We need more epidemiological information, information about the relation between health and environment, ecological information, technical information. Research into those areas should be performed in a multi-disciplinary way. Many things reported here today and otherwise are from specific sectors. It does not cross over from one sector to the other. The ecologists do not speak to the medical doctors, the dam-builders do not speak to the ecologists. This is when we end up with problems at the end of the day, and that is why I think we must ask for a multi-disciplinary approach to these issues.

Information should of course be freely available to everybody working in these countries, and it should flow freely between countries and people working with these issues. How do we get information and how are we allowed to disseminate it? Obviously, that is again an issue of democracy. No environmental problems will be solved – and there are thousands of examples from around the world of this – unless everybody involved has access to information and is free to speak about it.

Preparing for this conference, I looked for information about the Aral Sea on the Internet. There were 23,000 hits on the words "the Aral Sea". I began looking at them. Naturally, I could not read all the 23,000, but it shows what a fantastic source of information the www is.

However, most of what I found was very old information and absolutely useless. That is a tragedy, when the www really is a tool for everyone today, by which to get access to or leave information. As long as you can find a telephone line, you can get that information. You can break barriers that existed before, blocking information. We must make sure that information from this meeting is published in one way or the other on the web, to get facts and opinions updated. I hope that the international organisations here present will be able to open up their own web sites and link them to this material. Publishing this material in book-form costs a lot of money. Through the Internet, we can reach many who are not here, so we just have to use it.

The need for information and the right to disseminate that information is crucial. Let us agree on that and not argue over facts, over and over again.

Many people have asked me about videos and the film presented on the Swedish Television earlier this week. Gia Kjellén and I have decided to distribute the film that we made for the Swedish Television through a Television Trust for the Environment in London. They have available a huge amount of environmental documentary films and educational films, produced all over the world. There is Aral Sea material and other important films that are handed out, free of charge, to NGOs in countries like yours and similarly offered to the television stations in your nations. You should contact TVE (Television Trust for the Environment):

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Discussions

Moderator: Bo Kjellén

Panel Discussion

Presentation of projects in the Aral Sea region,
relating to women, children and the environment

Central Asia Executive Committee of the International Fund for Saving the Aral Sea – IFAS:
Tuylegan Sarsembekov, Ministry of Agriculture, Akmola, Kazakhstan

The World Health Organisation – WHO
Jaqueline Sims, Technical Officer, WHO, Geneva
Gunter Klein, M.D., Director, WHO, Copenhagen

United Nations Development Program – UNDP:
Andriy Demydenko, PhD, Project manager, Tashkent, Uzbekistan
Zharas Takenov, Sustainable Development Adviser, Almaty, Kazakhstan

United Nations Children's Fund – UNICEF:
Pierre Ferry, Kazakhstan Country office, Almaty, Kazakhstan

Swedish International Development Agency – Sida
Maria Israelsson, Area Manager, Sida, Stockholm, Sweden

International Federation of Red Cross and Red Crescent Societies – IFRC
Eric Michèl-Sellier, Regional Relief Co-ordinator for Central Asia, Almaty, Kazakhstan

The Karakalpak Centre for Reproductive Health and Environment – "Perzent"
Oral Atanyazova, Director, Nukus, Uzbekistan

General Discussion

Panel Summing up

Project Presentation by Invited Organisations

Mr Tuylegan Sarsembekov, IFAS

IFAS is an interstate organisation, established in order to fund a joint regional environmental and research programme. The five Aral Sea states are now committed to carry through a rehabilitation programme aimed at improving the environmental situation in the areas affected by the disaster, as well as to solve regional socio-economic problems and to save the Aral Sea, focussing on water resource management.

These five states, in co-operation with United Nations Agencies and other organisations, have agreed to initiate a far-reaching multi-faceted action programme to address both ecological and social aspects of the Aral Sea crisis. A number of international organisations have analysed the problems facing the region and brought to the attention of donors the extent of the Aral Sea crisis and the measures needed to ameliorate it.

The concrete action of the Aral Sea programme, accepted by the five states in Nukus in 1995, has the following broad objectives:

- to stabilise and manage the environment of the Aral Sea basin better,
- to rehabilitate the disaster zone surrounding the Aral Sea,
- the improved management of the region's critical water resources, also connected with
- concrete action for the improvement of the health of the people living in this region.

Special importance is attached to clean water, sanitation and health security, high quality supply of clean drinking water for the population of the whole of Central Asia and improvement of sanitation.

Drinking water of poor quality is a source of high morbidity in the coastal area. These problems have been solved with the help of the following projects, which include providing the region with clean drinking water, improving sanitation, expanding the system of ground water use, securing water treatment and distribution, sanitary education of population.

The Aral Sea programme is an organic process of change with the ultimate aim of sustainable management of the environment. This process will require preparations on a broad scale among a host of national and interregional institutions. UNDP, the World Bank and other organisations have prepared programmes for priority projects that require support from additional donors. Andriy Demydenko will talk about these programmes.

Finally, assistance should be aimed primarily at supporting, stimulating and creating conditions for participatory approach towards improving the

life of the people in this area and establishing a framework for halting and then reversing the crisis.

Ms Jacqueline Sims, WHO

Following the Fourth World Conference on Women in Beijing, 1995, the UN system reached the agreement to adopt gender mainstreaming throughout all its policies and programmes that will have certain implications for our future work. A formal decision to this effect was taken at the UN Economic and Social Council session in July, 1997. Since then, the Secretary-General has contacted all branches of the UN, including Executive Heads of the Specialised Agencies, requesting them to proceed with gender mainstreaming measures, and report regularly on progress.

A number of UN bodies (for example UNDP) have already taken action in this direction, and have committed staff and resources to gender mainstreaming initiatives. WHO has now decided to formulate a policy on gender mainstreaming, which after full consultation with Regional and Country offices will be presented for adoption at the World Health Assembly next year.

Similarly, a decision has now been taken within the Programme on Environmental Health to prepare a policy framework on gender, health and environment issues, in order to mainstream a gender perspective throughout all health and environment work undertaken by WHO. It is hoped that this new focus will assist us to support the work of Member States, create and strengthen partnerships with the NGO community, and other research and development stakeholders, in addressing the gender implications of health aspects of environmental change and degradation. Funding is currently being sought for this purpose, and we hope that this will permit us, in collaboration with our colleagues from the European Regional Office, to establish activities in the Aral Sea area.

Dr Gunter Klein, WHO

In close collaboration with the headquarters of WHO in Geneva, the regional office is pursuing several processes which are strongly supporting the idea of this meeting. It is a combination of top-down and bottom-up processes. In the Aral Sea basin up to now, we failed in creating a supporting top-down policy mechanism, but it is on the way. I understand very well that people may be fed up with planning, but the major component of this planning is that it has an end. The plans have been finalised, and we are now going for the implementation to give the whole thing structure. We will engage not only Prime Ministers and, as today, first ladies, Ministers of Health and Environment but the agriculture and economic sectors in a proper way and

challenge them with the idea that it is good to earn money by creating health, instead of spending money by treating disease. This is the economic perspective. And we are well aware that it makes no sense trying to do this in Washington, Geneva or Copenhagen. It has to be done together with the people in the country, with the organisations in the country and on the basis of willingness of the people to collaborate with each other.

Dr Andriy Demydenko, UNDP

As my college Mr Sarsembekov has mentioned, there are several initiatives taken by the five countries in order to address the Aral Sea issues. Among these is the creation of several regional institutions. Two of them merged a year ago, but in the beginning they launched the Aral Sea Basin programmes with the support of particularly UNDP. The Nukus Declaration, signed in 1995, and the Almaty Declaration, signed by five presidents in February 1997, signify very important commitments to international action and regional co-operation. It is also a commitment to establish regional institutions to deal with these issues. You should take into account the importance of these commitments, considering that all these states became independent as late as in 1991.

The UNDP system of the region consists of some activities at regional level. First of all, support to the development of a Convention on sustainable development of the Aral Sea region, which has been requested by the five presidents. There is also the Regional Aral Sea Basin Capacity Development project. I am the manager of this project, as well as of several local and national projects that will be described by my college, Mr Takenov. The objective of the Aral Sea Basin Capacity Development project is to strengthen the executive committee of IFAS in its implementation and further development of the Aral Sea Basin project, and to develop practical methodologies and support of institutional arrangements to apply the concept of sustainable development to the region. The public participation component will be mainstreamed above the objective. Here I see some possible involvement of Swedish NGOs, because this component is not yet very well supported by the external community. This is so especially in the area of public participation in decision-making, totally absent in the region today and really in need of support.

Mr Zharas Takenov, UNDP

We have two initial projects, one in Kazakhstan and one in Uzbekistan. The project in Kazakhstan started in 1994 and concentrates on addressing human needs at a very local level. We began a negotiation process with the local community and questioned them as to what they wanted, what kind of

projects we could do. In order to do this, we organised three project support centres in the disaster area. We equipped them with office facilities, we provided transportation for them and we placed UN volunteers from different countries (the Netherlands, Turkey, India, Australia, Hungary, Germany, the Philippines) at the centres. Each volunteer spent about one year working closely with local people. They assisted them in preparation of projects, in preparing business plans, and they built capacity. Our project, Sea Shore Rehabilitation, has a slogan: "Help the people of Aral to help themselves". It means that people find projects by themselves and bring ideas to our project support centres, and our volunteers assist them to find funding. Today we have submitted project applications in three major areas: job creating activities, health and environment as well as sustainable development. In total, we have worked out project plans for 2.5 million dollars and for the moment we have already financed projects for almost half a million dollars. When people are preparing projects, we assist them in finding money. But even with us managing the funding, it is still a learning process.

Mr Pierre Ferry, UNICEF

Our project ASPERA was established in 1995 upon the request of the governments of three countries, Kazakhstan, Uzbekistan and Turkmenistan. It is a project taking into account the particularity of each area and each country. ASPERA aims at responding to the basic and immediate needs of women and children in the area. The implementation is carried out by the local authorities and is closely monitored by UNICEF. Briefly, the projects consist of about 1,300 health care facilities, including drugs and medical equipment. We are also working on nutrition and education; since 1995 about 200 schools have received supplies. We started a project in Turkmenistan as well as an information management system. In the field of sanitation, twelve institutions received laboratories in 1995. We have also provided washing basins and clean water containers.

Ms Maria Israelsson, Sida

I am representing a funding organisation. We do not implement any projects ourselves, but we finance co-operation between a local partner and, usually, a Swedish partner in carrying out projects. We do not have any programme assistance in Central or Eastern Europe, but we rely on receiving requests and proposals from the local governments and organisations. The support to Central and Eastern Europe, in which we include Central Asia, so far has been concentrated to countries close to Sweden, the Baltics, Northwest Russia, Poland and Ukraine, whereas activities in other countries have been limited. What we have done in the Aral Sea area has been within the frame-

work of the Aral Sea Basin programme, of which we have heard earlier, and it has been of a technical character with regard to dam safety. We have had no social projects so far, and we very much welcome the opportunity of being a sponsor of this conference, hoping that good proposals on social projects that we could fund will come out of it.

The conference is very well timed, as from this year we have received increased opportunities of working in these other non-prioritised countries, like in the Aral Sea region, and also a little more flexibility for the use of Sida funding in this region. The concentration of projects in Central and Eastern Europe has been based on transfer of Swedish know-how. That will still be a component in the future, but we are a little more flexible as to what we could fund. In connection with this conference, we will ear-mark initially 3 million Swedish crowns. There may be more money allocated, depending on whether we get proposals that we feel appropriate to fund. What are we looking for in the projects? As I said earlier, Swedish transfer of know-how and definitely a development component, a long-term initiative, with strong local commitment and local participation, and we very much welcome the interest shown by Swedish NGOs . We very much look forward, with excitement, to see what comes out of this conference.

Mr Bo Kjellén, moderator

Thank you very much, I find it very important that Sida is prepared to support projects in the Aral Sea area. Perhaps we should explain the notion of "non-prioritised countries". It is an old tradition in Swedish development co-operation policy to have quite a clear-cut prioritisation of programme countries, to develop co-operation with them, originally mainly poor countries in Africa. But I think it is fair to say, as you indicated, that in recent years there have been increased possibilities for countries outside this group.

Mr Eric Michèl-Sellier, IFRC

The international federation of the Red Cross and Red Crescent Societies has two objectives in the region, i.e. assisting the most vulnerable and assisting the five Red Crescent societies, so that they can gradually take over this crucial role. After five years of commitment in Tajikistan and Kyrgyzstan, in response to the worsening situation, the international Red Cross decided to investigate the living conditions of the population, especially the most vulnerable. I personally conducted a field trip in February and March in the Aral Sea region. I would say that, even comparing with Tajikistan, a region deeply affected by a devastating conflict, I do not recall having seen such a desperate situation anywhere in Central Asia. The Aral Sea Basin must be one of the worst places in Central Asia to stay and live in.

As a direct consequence of the reports sent to us by the local Red Crescent persons working in the area, and the different field trips undertaken by delegates and Red Cross staff, we decided to organise a conference on the assistance to the most vulnerable, affected by the ecological and economical disaster. The conference took place in Tashkent on March 27–28, with NGOs, WHO, UNDP, UNHCR, UNICEF, MSF and USAID participating. The International Red Cross and the represented societies are firmly convinced that in order to optimise the impact of future relief operations and training programmes in the Aral Sea region, we need a very strong collaboration with all the organisations, which work in the area. On March 27th, the Red Crescent Aral Sea committee was created, with representatives of the three Red Crescent societies of Kazakhstan, Uzbekistan and Turkmenistan. This committee, in collaboration with the International Red Cross, designed the first regional assistance programme for the Aral Sea. The programme is divided into three components:

- a supplementary nutritious food basket to 7,000 children in orphanage institutes for handicapped children or isolated schools and kindergartens,
- family assistance to 6,000 families with single parents or no income, and
- four public canteens in the area, one in Kazakhstan, one in Turkmenistan and two in Uzbekistan.

The strength of this programme is that it will be directly operated by the Red Crescent societies in the area. In addition to this food assistance programme, the national societies decided to create social rules in order to regulate their efforts towards the most common diseases, like tuberculosis, hepatitis and diarrhoea. The three Red Crescent societies of Turkmenistan, Uzbekistan, and Kazakhstan are still running a visiting nurses programme in the area. The population is aware that this is a traditional Red Cross and Red Crescent task, and the implementation of these social rules will therefore be welcomed by the population. In conclusion, following the intention expressed during the last Tashkent conference, there will be a strong collaboration with all local and national authorities and local and international organisations.

Several million dollars are poured into Aral Sea programmes. The International Red Cross and Red Crescent societies have not seen any improvement in the life of the most vulnerable living in the area. They are usually excluded from this golden rain. The child, living in an orphanage, has not been given more bread during this period. And unfortunately, conditions are deteriorating day by day. We have been equally shocked and horrified to see that in some parts of the Aral Sea area, people are still living in

the age of starvation, which is not acceptable today. I will recall the words of a five-year-old child living in an orphanage: "Do not abandon us, come back with something to eat!".

Dr Oral Atanyazova, Centre "Perzent"

The main principle of the Centre Perzent is to do a few concrete things every day. We are an organisation of implementation, concerned with women's and children's health in our area. We have many activities, and I would like to talk about some. We have a women's and children's health protection programme, in which we co-operate with many organisations, with the local ministry of health, with international organisations, such as Women in Europe for a Common Future, with its US counterpart as well as with the Academy of Sciences of Uzbekistan. Under this programme we make use of the knowledge of physicians, nurses and the community, on linkages between health and environment, and provide practical assistance in health programmes in the area. We have begun a training programme and have now trained 20 physicians on the linkage between health and environment. These will train 10 women in each area. We opened help desks in five villages to give people information and practical assistance. The programme is supported by NEHAP and international counterparts.

This year we began a programme called Healthy Food for Children in Chimbay, supported by the EU. In this programme, we developed a demonstration farm in Chimbay to provide the kindergarten and children's hospital with food. We will provide education for the parents on health, nutrition and environment, and they will also be active in farming. We are also involved in a scientific programme in Washington, on developing environment health educators, and also with New York University and the University of Groningen, Holland. Together with UNFPA, we work for implementation of a Platform for action after Beijing and the UN conference in Cairo. So we have experience of working with local authorities, local NGOs and international UN foundations.

I think we have developed some good activities and programmes in collaboration with Sweden during these days. I have got some concrete ideas of how we could go on. For instance, we can focus our attention on one hospital in a specific district and help it to develop. Such a programme would reach about 300,000 people. We could develop diagnostic and medical possibilities that are now very poor. I also have an idea about developing an international expert programme with Swedish scientists, for monitoring the environment and health. We even began discussing that yesterday. I look forward to follow-up activities after this conference, and I would recommend a round-table discussion soon, to discuss how this could best be achieved.

General Discussion

Compiled by the Editor

The Aral Sea problems are manifold, something that was naturally reflected in the general discussion. The local access to potable water was the main, immediate interest for most of the social and medical workers present. But the fateful question of what will happen to the Aral Sea in a longer perspective was also discussed intensely. Research needs, the dream of salvation by Siberian rivers, pricing of water, the cotton and rice production were on the agenda. Also Mr Birerdinc's question as to why we wanted to support the Aral Sea region, prior to other destitute regions, was once again on the agenda. The health and environmental situation, however, had obviously been treated satisfactorily by the speakers and the panel participants earlier. More interest seemed to focus on the possibilities that the five states might co-operate – being after all the vital question for Aral's existence or non-existence – and the participation of NGOs in the build-up of a healthier society.

Water management

Anders Rapp opened the discussion with a comparison between the Aral basin and East Africa, where he worked as a Sida adviser for three years in the 70s. Swedish NGOs could play a particular role in this big Aral Sea complex. There have been many Swedish projects in arid and semi-arid parts of the world before, focussing on clean water supply to rural villages, such as the 10-year programme in Tanzania. We have know-how and people who are specialists on water resource problems, many at the University of Linköping, KTH and Sida itself.

Professor Rapp suggested a priority project that should read as follows: clean water to hospitals and villages in the Aral River Basin. This would be one important project for rehabilitation in a man-made desert, where chemical pollution has destroyed water and air. To begin with we have to concentrate on the quality of the drinking water. It can be done. But it is also important to manage high quality irrigation water, because at present people are using filthy water for irrigation, speeding up the process of salinisation both on the surface and from the groundwater. So from an environmental aspect, this is crucial.

Malin Falkenmark stressed that the Aral Sea problem is an extremely complex issue. It is in fact a number of issues. One is what to grow: cotton or food crops? Another is how to minimise the use of water in cultivation, that is the issue of water pricing. Another issue is how to avoid chemical pollution of

the water running down the rivers. And finally, how do we protect the population from the consequences of the combination of these different issues? From an interdisciplinary perspective, the whole field has a tremendous generality in the context of development in low-income, food-insecure countries in the dry-climate tropics and subtropics.

Two questions have to be distinguished. How much water flows into the Aral Sea and how much pollution is introduced into that water? Considering the first one, we run into a principle human dilemma that must be addressed in the coming decades, i.e. the fact that crop production is a huge consumer of water. 3,000 m^3 of water per ton grain is what goes back to the atmosphere in a dry climate. This means that food or other growth production consumes 100 times more water than the drinking water needed, and thus 100 times more water goes back to the atmosphere as part of the plant production process instead of going back to the river. So, the more crops we grow, the more we deplete the river.

The principle water management question is how to balance the water needs for food production or other biomass production that sends huge flows of water back to the atmosphere, and how much has to remain in the river. This is a fundamental question for the future of the dry lands in the world, places where we also have very rapid population growth and escalating food supply needs. So at the end of the day, the issue is what is *avoidable* of this reduction of flow to the Aral Sea, causing all the problems, and what is *unavoidable* and a consequence of the production upstream.

This is an essential perspective and a good description of the characteristics of the problem. One aspect on the avoidable water reduction was emphasised particularly by Anders Rapp and Gunilla Björklund in their articles. They pointed out that not only agriculture and water-demanding crops but pure *wasteful* use of water diminishes the water flow to the Aral Sea, a completely useless and even detrimental process. Unscrupulous technology used for the channel construction and insufficient irrigation management upstream are responsible for maybe half of the water loss or more by increased infiltration and evaporation. What can be done to prevent this waste?

A worrying aspect is that more and more people will be suffering from water stress in this sense in the years to come. Traditionally, in places where water is scarce, people tend to be more centralised, and there is more co-operation at higher levels than when you have lots of water. This means that the future will bring a need for still more co-operation between people, countries and governments sharing water resources. Either we will see the shared water resources and problems related to them leading to a downgoing spiral with an increasing number of conflicts and – ultimately – war, as

in the middle East. Or we will see an up-going spiral of co-operation – something we all hope will happen in Central Asia and the Aral Sea basin. However, there are obvious problems when trying to achieve the necessary changes in production. First, we must make irrigation more efficient. Second, we must abandon the use of chemicals. And third, we must restructure agricultural production at large.

The Siberian dream

Some participants pointed out that a belief still exists in Central Asia, at least upstream the Amu Darya and along the Kara-Kum Canal, that the problems could be solved by turning a Siberian river towards the Aral Sea. Dr Klein and many with him made it absolutely clear that *this idea is dead*. It only means more evaporation, more salt on the land, more destroyed land. This conference should make this perfectly clear: *it is not about getting more water from outside, but about getting the proper management of available resources*.

Dr Demydenko pointed out that many in society at large still think that the solution of the problem is to be found outside their region. Somebody, somewhere withholds the water and simply does not like to provide people downstream with an additional amount. At the highest political level, things are slowly changing. It is not until during the last year that it has been possible at all to talk about a decrease in water usage.

Co-operation between regions

The closer to the Aral Sea, the more people realised that their problems had to be solved on a basis of co-operation between regions around the Syr Darya and the Amu Darya. This was the impression of one participant who had travelled by car along the two rivers to meet local politicians and local specialists on water and health. People upstream did not really calculate with people living downstream concerning water.

The issue of relationships between the countries concerned and the way they are involved in co-operation is very relevant. When the Nukus declaration was signed in 1995, the president of Turkmenistan was not present, but he signed it later on.

Lately, things have begun to happen. The Issyk-Kul Declaration and the Almaty Declaration, signed a year ago, are hopeful signs. And recently, there was a meeting to discuss the implementation of the Almaty Declaration. Five Central Asian Ministers of Environment met in Almaty, where they took steps towards the preparation of a co-ordinated common environmental and ecological safety programme. Information about this will soon be available.

Swedish participation in the Aral development?

The discussion moved on to the more concrete and earthy elements that were raised by Anders Rapp in the beginning of the session. It was necessary for the persons responsible for the follow-up procedure of this conference to obtain a clearer picture of how the participants judged the relevancy of Swedish efforts. What kind of projects should Swedish NGOs get involved in (hopefully supported by Sida and/or the EU, by the Tacis programme, mentioned by commissioner Gradin)?

One question in particular is linked to the participatory approach: does the money reach those who really need it? How can people see the change? *If we are only making resolutions and conventions and agreements, etc., but nothing is changed for ordinary people, we have failed.*

Co-operation at the grassroot level between Swedish and local NGOs

Against that background the moderator welcomed further comments on exactly how the participants see the ways in which Swedish NGOs could contribute, at grassroot level.

However, NGOs is not an altogether familiar concept in Central Asia. Mr Takenov pointed out that NGOs did not exist in the former Soviet countries, especially not in these remote areas. In 1994, there was a big meeting of donors to the Aral Sea Basin programme in Paris. Two NGOs from each country in the region were invited, but it proved very difficult to find true NGOs.

When NGO volunteers began working in the region, there was a long process of training and explaining what an NGO is and how people can organise themselves. Now, there are several NGOs in the region, but in regions with project support centres there are only UN volunteers. If NGOs from Sweden are going to work in the region, it is important to use previous experience. Some NGOs could take care of twin project support centres in regions that UNDP does not cover, since they cover only two regions very close to the Aral Sea.

This was a useful reminder about the dimensions of the problems that the conference has to tackle. It was also very encouraging remarks. If Swedish NGOs are interested in working in the Aral Sea region, it would be possible to find co-operative partners. The moderator pointed out that this should be interpreted as a welcome from the governments as well to activities of this kind at the local level. Sweden has a long tradition of various NGOs and different types of organisations and interested parties. The co-operative movement also played an important role as an NGO, both within agriculture and to introduce consumer co-operatives. But this is a totally new world opening up to the countries that we are discussing, and we must recognise all the dif-

ficulties while using all opportunities and all possibilities to make real progress.

Dr Demydenko said that the problem is to provide for participation in decision-making, especially at the political level, i.e. at central level in state and region. It is regional tradition to provide some space for decision-making, but someone coming from a country, where for example protest demonstrations on ethical questions are not uncommon, trying to use such an approach would probably not be very successful. Since these countries have now had some exposure to the external world, you might sometimes find room for public participation. UNDP can give some support even at the highest level, but it is very hard to find people who are interested or capable of taking part in the decision-making. Regional NGOs are mostly not willing or capable to participate in the decision-making at national or regional level. There are many reasons to this. First of all, the level of decision-making is still hidden. There is no transparency. Secondly, there is no such tradition. This is indeed an area where Swedish support could be provided to the region.

Cultural and historical factors, which are very important for the social situation in these countries, must be held in greatest respect. We have to realise that the situation and the traditions are different and show great respect for the situation in the place where we are operating. But it is quite clear that there is a need for change, since some of these habits have a negative effect on political decision-making. More transparency with regard to decisions, more possibilities of operating are needed. So, to stimulate the kind of grassroot participation that we have in Sweden may be a fruitful approach. People in a community, coming together to solve a common problem, has no political implications; they just need to co-operate. If this kind of co-operation procedures with NGOs were established, maybe that would create a basis for broader change in society as a whole.

The democratic process takes time

Things take time – we know from Swedish experience that it takes time to develop democratic procedures down to grassroot level. Perhaps the democratic process is an issue where Swedish NGOs could be useful, said Ms Thurdin: "I think Sweden often has helped in starting such processes. We have great experience in dealing with democratic processes, to get people into the process. We have worked with it a lot in our own country as well."

NGOs could support getting the right information to the right place and convincing local people to accept principles that in the long run will be sustainable. It is not a good idea to provide villages with water supply equipment that makes one litre of water cost 3 dollars, when you with a well-organised sub-regional or community approach can provide 10 m^3 for the same money.

Water management knowledge exists, and we have to bring it to the decision-makers. Dr Klein asserted that we do not need additional research to solve the problems that are on the table now, and he emphasised that food production, safe water supply and sanitation in an overall water management approach is the key to success.

Cultural diversity

Consideration of local traditions may not be all that easy. Ethnic and cultural backgrounds are not identical for all people in Central Asia, and different national identities have been a major concern, which was elucidated in Merrick Tabor's talk. Jaqueline Sims asked Mr Tabor for suggestions as to how the social and gender aspects might be addressed at the local level. What would the partnerships be, what sort of local capability is there on the ground to start looking into this, should we begin by sending an anthropologist into the area?

It is very important to observe the atmosphere at different levels. Sometimes there is a tremendous emphasis on what happens at the top of the political system, for example the idea of including more women in high decision-making positions, which of course is extremely important in itself. But it does not very often lead to immediate changes for women in their everyday situation, particularly in the agricultural sector. Mr Tabor found it very important to perform local studies, initiate local projects.

One must remember that a lot of this national identity building is done centrally. It is quite common in all systems to try to build up a new national feeling, to try to revive ideas about traditional structures and to use them as a basis for the construction of a new nationality. This is particularly so in a situation where there is a feeling that one's own people has been oppressed and the culture has been oppressed. It is important both to deal with how people experience their traditions and culture, in their lives, at the local level, and to create an awareness of how central political ambitions can influence them through this process of constructed nation building.

The situation is not specific for Central Asia. It is a common problem, when you have separate national identities and you feel that your interests as a people are different from those of the people across the border. This makes it much more difficult to find common solutions. There are of course a lot of co-operative arrangements between Central Asian states, but the basic notion of separate nations with separate economic and political interests is problematic.

The five countries again – space for Swedish contributions?

Dr Demydenko came back to the issue of regional co-operation: it is true that Turkmenistan was absent to begin with but signed the Nukus Declaration later on. However, in Almaty, for example, all five presidents were present. Only one regional co-operative organisation, where all five states take place, exists and that is the one concerning the Aral Sea. There is also an economic organisation in the region, where only four countries co-operate to create some common economic space. Turkmenistan has declared itself a neutral state and does not participate in any regional co-operation, except the Aral Sea co-operation, where it is a full member. Turkmenistan, as a member of IFAS and the water commission, has participated in decisions on water problems in the Aral Basin region.

In 1995, in Issyk-Kul, ministers of all the five Central Asian republics came together, Ministers of Health, Environment, Health and Medical Industry, Utilisation of Natural Resources. All the five countries signed the Issyk-Kul resolution, by which they committed themselves to develop a policy approach, which is already directed towards improving what is still difficult, that is communication bottom-up and top-down. This is the key issue, where Swedish experience on how to overcome the discrepancies between different policy levels could be useful.

Is more research needed?

Ms Thurdin was one of them who asked for more research. She asked specifically for research linking environment and health in the region. Whenever disasters caused by chemicals are revealed, it is said that we have not enough scientific proof, not enough statistics and not enough data to connect health and environment. Thus, no immediate action is possible. Knowledge that allows us to know exactly what to do, when chemical pollution of soil and water occurs, is vital and necessary information. This kind of disasters has been with us for a long time now. We need relevant data, so we can act immediately. Is such research going on?

Claes Ramel emphasised that monitoring of health and environmental problems in the area must be done in order to identify what kind of pollution we are dealing with. The Royal Swedish Academy of Sciences supports a small-scale research project, with Professor Zetterström and Professor Jensen, that has already begun. Hopefully, they will also look into possible hereditary effects of pollution by use of modern DNA techniques at the Wallenberg Laboratory at Stockholm University with Professor Ulf Rannug.

Monitoring of key organisms is a specific and central part of environmental mapping, in which Sweden has much experience. Hopefully, researchers at the Museum of Natural History, who are experienced in this field, will

begin a project in the Aral Sea region. One project on reptiles and amphibians is already under way. They are very suitable key species to monitor the problems of pollution in areas like the Aral Sea basin. The project is carried out at the University of Göteborg by Dr Claes Andrén.

Dr Klein was of a somewhat different opinion. One has to separate the really helpful from the merely interesting, the urgent from the important, he said. He went on: "I have a broad scientific background, and I know that research is important. However, I clearly state here that WHO would not support any idea of carrying out long or medium term database survey studies or other projects of that kind, with respect to the urgent needs. No doubt we need research, but we know that children are dying from diarrhoea, and we know there is a way to deal with it. Water supply for villages is a good approach. We know that mothers are suffering from anaemia. Look at that region and its agriculture, on the basis of 60 billion km^3 of water. It is not used to provide the people there with food. Why not? There must be a change in policy, not just by resolutions but by implementation.

Dr Aladin reminded the participants about the fact that there already is much data collected by various organisations, the UNEP, the National Science Foundation, various other academies. Now *the existing data should be assembled to be of practical use.* That would bring a new understanding of the situation and be of direct help to children and families in this area. The Rural Academy of Russia exploited this area for one and a half century. There was a period when different Russian Academies were eager to study the Aral region. A network of researchers interested in these questions should take on the task to incorporate this material with the international literature on the Internet.

Damming the Aral Sea?

The Aral Sea is no longer one single lake, it has been divided into the Large Aral and the Small Aral. Experiments have been carried out with dam-building between the two parts to prevent water from being lost between the Small and the Large Aral. There are different opinions about the meaningfulness of this project. Maybe what speaks in favour of it is that people could see that something was being done. Mr Aladin declared his total agreement with the statement that we have already talked about the Aral Sea for about ten years and now must put forward a message about the urgency of the task. Some things have changed already, but we need to change more. The dam between the north and the south Aral Sea could be improved. If our community of scientists, politicians, medical doctors, would support funding, a lot of people in Kazakhstan, those who are living directly around the small Aral Sea, would get better life conditions. There are different opinions on how much

money is needed to improve the dam, but it is certainly so that if we strengthen the position of the investments with our voice, there would be very good results only in Kazakhstan. It is partial rehabilitation and just a first step, but I think we need this kind of urgent message.

Mr. Ferry commented that the Aral Sea illustrates perfectly the problems left by the Soviet Union, including the environmental defects, for unfortunately it is not unique. Just 200 kilometres from the Aral Sea is Baikonur, where you have left over rockets from the space station. In Kazakhstan, there is the disastrous Semipalatinsk. The Caspian Sea is a disaster as well.

But the dam between the two parts of the Aral Sea is no simple thing. Syr Darya, the river going through Kazakhstan, still reaches the Aral Sea in the Little Aral, still giving some water to the Aral Sea. The Amu Darya in Uzbekistan on the other hand does not reach the Aral any more. *The dam is a very good solution, but only in Kazakhstan, because building it would kill the Uzbekh Aral Sea.* That is no good collaboration, Mr Ferry ended.

Men, women and children – the gender aspect

All information about the health and social situation around the Aral Sea indicates that the main burden of the environmental deterioration has fallen upon women and children. Still, society is built of men and women, and women and men have to solve the problems together. *This gender related aspect* has to be kept in mind all the time.

Carolyn Hannan-Andersson widened the perspective, by saying that it is important to link closely the discussions of gender equality and environment instead of always keeping them separate.

The discussion of water as an economic good is a good example. The principle of water resource management is very complex. There is a need to understand that if we put a price on water, i.e. if we give a market value to water, we run the risk of increasing or creating inequality. Therefore, we need to have a social cultural perspective indeed, when talking about water as an economic good. We need to have a gender perspective. We need to make sure that we identify all uses of water and that we identify all users. We must make sure that we understand the power relations that exist at community and household level, so that we know who will actually make decisions about what the most productive use of water is. Linking these two discussions is very important in relation to all the principles of water resource management.

Ms Andersson's questions related to the topic of the Panel as stated in the conference programme: description of projects in the area related to women and children. There is sometimes a tendency to presume automatically that all health projects, all water projects, benefit women and men equally. It is

important to stop a while and consider that projects and activities should give the possibility to both women and men to influence the development, to be involved actively and to benefit from it equally. This does not happen automatically.

WHO outlined very briefly what they are trying to do to make sure that they bring both women and men in. But what are other agencies doing to try to ensure that women and men influence what is happening, that they are involved in the projects actively and that they also benefit from it, whether we are talking about water, income-generating activities or health or whatever?

Pricing of water, which is of course extremely important in all the international discussions, should also be considered in this perspective. The moderator brought up how in many poor countries water is available in the cities, subsidised for the middle class that has piped water, whereas the poor have to pay much more for their water. They must fetch it at some well, controlled by somebody, or buy it from a water vendor that charges high prices. It is an essential problem and it also must be seen in a gender perspective, since women are usually responsible for handling the drinking water.

Pricing of water

According to the textbook a free commodity will not be treated with thrift. As long as air, or water, is seen as a free good, it has no value. Therefore, pricing of water must be brought up. It is one of the most common subjects of contention in the international water debate, being one of the most difficult and most important on the agenda.

Irrigation water is provided free of charge to the farmers and other units. According to Mr Klein, Kyrgyzstan is the only country in the region where, formally that is, water pricing has been introduced. But no one is paying the price, because they have no money. In some other countries, leaders say that it is impossible to even think of pricing water. Water is a gift, and you could not charge people for a gift, the gift of God or maybe the chief authority of the country.

This mirrors a very difficult discussion at the global level. We might end up in a situation where people are used to not paying for irrigation water. But users that need water in towns for drinking or hospitals and so on would have to pay. That, obviously, would be an impossible situation for rational management of water resources. That includes seeing what the water resources are and economising it. It may well be the main problem of water, that it is seen as a free good. People become used to very uneconomic applications, and if there are limits to the quantities of water, then it is up for grabs.

Dr Klein was not sure pricing would improve conditions. It is also a question of fairness. When you charge people, you have to give them something,

i.e. clean water. Maybe it is time to come back to the issue of pricing water in 20 years. But we need a strong policy to highlight that misuse of water for irrigation purposes devastates the resources and destroys the country and, therefore, should come to an end.

Mr Michél-Sellier pointed out that the gift of water is not the same for everybody. When travelling in Turkmenistan, he had met people from a sovchos or a kolchos who had been without water for more than two years, most likely because people in Uzbekistan forgot to open the gates of the water channels. The vital thing is for real co-operation to begin – and then we could talk about the real problems someday, he stated. In Kazakhstan, water pricing issues are much linked to the privatisation process that has in fact only taken place on paper. Privatisation was declared, but in reality the former sovchoses and kolchoses did not like the responsibility. The reason for this was the lack of a good credit system and no clear property rights. Not even the process of privatisation was well established.

Mr Sarsembekov pointed out that Aral Sea problems connected to different aspects of water use differ in different areas and with economic differences. Water resources play many important roles in the economy and influence the interaction between countries. There are many separate issues. All countries interact in water using problems. Earlier an interstate water commission existed that designed forms for water distribution and water usage between the countries. After this commission, IFAS was established, now playing an important role as a regulatory body.

Of course, the main aim of this commission is to economise water resources, regulate regional distribution and supply water to agriculture and as drinking water and, finally, to save the Aral Sea. When we talk about additional water resources, we think about rational use of water resources in our own region, Mr Sarsembekov said, because Siberian rivers are so much further away and require huge investments. It is not realistic in the present economic situation

The overriding problem – health

Water supply problems in a region are, of course, closely connected to and a cause of health problems. Dr Klein stated that the major killers in this region are infectious diseases, mainly diarrhoea through food-born and water-related infections. The majority of early death infectious diseases affect the respiratory tract. There are also external causes, mainly injuries and accidents and failures to organise the daily life. This is the overall picture for the whole of Europe (the five Central Asian states included). For Central Asia, these components are higher for the first six months of life. Take the figures for

causes of death times 5 or 10, and you have the morbidity – not just the mortality – and the bad starting conditions of these children.

But this is not the only reason why we focus on people at the Aral Sea before others, Dr Aladin said, referring to an earlier question by Mr Birerdinc. We must choose poor people from the Aral Sea first, because they live in a dangerous environment. And to be poor in a dangerous environment is very difficult. We need to choose the Aral Sea, not because of poverty, but because of chemical contamination of this area and because of the terrible shortage of drinking water. This is not just a question of poverty.

Irrigation purposes

The reason water scarcity is so debilitating is, of course, the heavy cultivation of cotton and rice, two very water-demanding crops. Gunilla Petrisson took up the broader implications for the future, if this production pattern were to go on unhindered. Many realise that there have to be changes. But changing agriculture policies is difficult enough in Europe and certainly not easier in Central Asia. Nevertheless, in order to tackle health, economy and the social situation, rather radical changes in the production patterns are needed, as well as in the whole development structure of the countries. Governments should perhaps not be criticised for not moving quickly enough, but the move has to be part of the overall solution.

Dr Klein pointed out that changing *what to grow* during the last 50 years has completely destroyed the system. By deciding not to grow what they are growing now, the way forward is planned. By analogy with Central Africa, 99 percent of the water may easily be wasted by producing cotton with open irrigation. You can destroy everything without providing people next door with drinking water. This is going on in many arid areas.

Dr Klein strongly recommended refocusing on agriculture for agricultural purposes, i.e. producing for the people instead of producing for a market that does not exist any longer. People attempting this kind of agriculture need support in their efforts to change. Again, this is NGO business that needs policy support. To continue in the direction chosen 50 years ago is not a change. It is time for a new direction, for bringing the present situation to an end. It certainly may be difficult to build public support in these countries for such a change.

But, change has begun, and we do well to recall what happened in Western countries in the 60s and 70s. It took them 20–30 years to build up an NGO culture. The countries in Central Asia should receive support in the form of experience so as not to need another 30 years. Perspectives on the political arena and pressure from existing needs seem to be quite encourag-

ing for such a process. The solution is obvious, but cannot be reached within the next three years. The direction has to be clear, though.

Mr Göte Larsson brought up the issues of reforestation and agro-forestry. There was not time enough to discuss these questions with regard to the mountain areas in the Aral Sea basin, watershed management and so on. But the whole issue of forestry, today one of the main issues discussed internationally, will have to be applied also in the Aral Sea region.

Another question raised was *where to grow and how*. In the past, agriculture was developed along the rivers, mainly more upstream than today. Water was channelled but ran more or less naturally through the channels. Water surplus (river water or rain) occurred only once a year. During the rest of the year, the evaporation led to rising ground water that diluted salt from lower levels, bringing it to the surface, thus making the soil salinised. During the flood season, the salt was washed out, and the soil could be used for agriculture.

As the demand for larger crops and even crops twice a year increased, so did the demand for water. To manage this, a special technique was developed. After the harvest of the first crop of cotton, the salt was artificially flushed out of the soil to make it "clean" again for the next planting. However, flushing the salt out of the soil implies an extensive transportation of water through the soil, without using the water for any other purposes. It also means that beneficial salts are washed out, resulting in an increased need to apply fertilisers – an addition of chemicals that is costly both to economy and ecology.

When the soil is completely devastated, people usually abandon the area and move on to new land without providing for rehabilitation of the land they leave. Since there is plenty of land around, they think it is all right to use a "pristine" area.

The children

Mairam Akaeva brought the discussion over to issues about children. She suggested that Swedish lawyers organise a lecture course for people living in the Aral Sea region on their rights to a healthy environment and on children's rights. She offered two projects, by name of *Save the Aral Sea children* to the organising committee of the conference.

Kajsa Dahlström has taken the initiative and is the founder and manager of a very successful operation called the Globe Tree. Her interest is focussed on how children can be allowed to take part in decision-making. When addressing children, it is important to *talk with* them. We have an old kind of education, going top-down, and we need to change this pattern and treasure new ideas. We need to see education in another context. Getting artists

involved, using them as bridge-builders, is one way of learning and finding new approaches to certain problems.

We look for new ideas but educate children to become similar to us. Then, when they are similar to us, they will set up conferences like this, where participants are 50 years or older. Children also need to meet around the world. When children meet, they have very fresh attitudes, open eyes, and are not burdened with all the grey stuff that old people carry around. Ms Dahlström invited participants to a meeting in October, when children from all over the world will meet to talk about Agenda 21 and the Convention of the Rights of the Child, and to see how they work in a playful way, not through rigid discussion. There will also be good seminars with distinguished speakers, who will help our generation to understand what is going on in the children's arena; they will be the bridge-builders from that point of view.

Ms Dahlström then told the conference about Bali, where they have an extremely good way of handling water together with art ceremonies: living water and culture life in an integrated manner. It will give you new ideas.

Conclusions by a veteran

The discussion was very appropriately concluded by Dr Amanbay Mambetkadirov, a Chief district medical practitioner for 30 years in Muynak, situated right in the most affected Aral Sea region:

> We have discussed the ecological catastrophe and its consequences for children, women and the environment. It is important to know that people living in the Aral Sea region do not only worry about their region but about the whole world. Therefore, it is important to arrange conferences of the kind we have today, in the Swedish Parliament building, being so friendly received. It has been very interesting to hear the lectures of Mrs Thurdin, Dr Akaeva, Dr Haralanova, Dr Aladin and all the other scientists about the ecological catastrophe, especially about drinking water and medical and sanitary help.
>
> We, participants from Uzbekistan and Karakalpakstan, living in Muynak, live in the very centre of the catastrophe. I personally worry about the questions which we have talked about, because I was born in Muynak and I have lived and worked there as a doctor for over 30 years. I know what the sea and the environment looked like before. Now, in the centre of this catastrophe, our own organisations are not enough. *The whole world has to get involved.*
>
> Our republic Uzbekistan is doing a lot to solve the disastrous problems. We are working to realise different governmental programmes, the programme on clean water, questions of medicine for the mothers and children, medical screening of mothers and children so that the children will be born

healthy. We are trying to solve the problems together with a lot of international organisations, such as WHO, UNICEF, UNFPA, USAID and non-governmental organisations as Doctors Without Borders. Organisations are working with the help of the community, studying the dust of the Aral region and social aspects of the Aral crisis. They have all shown some results during the last five years. You can tell that the situation for mothers and children is getting better.

However, we know that the ecological problems of the last 10 years cannot possibly be solved in a short time. We need help from governments and more international organisations to radically change the situation.

We must work to get clean water by creating small lakes, the size of 3–5 kilometres in diameter, by using the tidal flood and the waters of Amu Darya and Syr Darya to fill them up. There is money to build water plants. We need to control the implementation of programmes like the clean water programme with the help of international organisations, the number of which is rising for every year. We need to provide medical help to the people who live there. When Uzbekistan became an independent republic of Central Asia, the situation changed dramatically. Therefore, the UN and the WHO and other organisations have to continue to help. We must safeguard the environment of the Aral region. Together with scientists in the world, we need to work out a programme to save the environment.

We have a proverb: when asked to give, give what you can spare. We need humanitarian aid, but it is also very important to look for our own resources and work hard.

The final round among the panelists should deal not with the general issues but with the main question of this conference, which is how to protect the population in the present situation. How could the work of this conference and the Swedish NGOs best be accommodated within the present framework? The present situation is there and the *people cannot wait.*

The Panel Summing Up

Dr Oral Atanyazova, Perzent

Others have mentioned the many opportunities for collaboration between Swedish and local organisations. The question is how we shall implement such projects and how to get started. The target group should perhaps be women and children in our region, where there are many women's NGOs. My own organisation, the Karakalpak Centre for Reproductive Health and Environment, Perzent, is one such example. It is a grassroot organisation. It would be very interesting to begin setting up networks between these NGOs. Locally, we have many problems concerning communication issues. It would be good to improve the communication between the local NGOs, in the form of seminars, round tables and perhaps some form of networking.

As for scientific collaboration, I think it is true that we have enough data now on the health and environmental situation in the area, data that have been collected by local and international scientists. The problem is that international scientists do not read Russian, and our local scientists do not write in English. So when people ask me for publications, I have a problem. We have a lot of scientific data on the effects of environmental factors on human health. When I did my PhD in Moscow, I noticed that very good research was done there on for example toxic elements. The first was done in the 1930s on effects of manganese, chromium and other elements, and I could not find it in the reports from any international laboratories or on MEDLINE.

Regular access to the international scientific literature is of course very important. But local scientists cannot reach the Internet and we cannot use MEDLINE. In Karakalpakstan, we have no library at all. It would certainly be a good start to publish in English the results of relevant scientific research from the former Soviet Union on environmental health issues, and distribute them through the Internet.

It would also be good to have some follow-up meetings with organisations that are interested in collaboration, at the end of this year, to discuss and work out a programme for the next steps to be taken.

Mr Michèl-Sellier, IFRC

Let me make Mr Birerdinc's question from yesterday my starting point: why should we provide assistance to the Aral Sea area? The International Red Cross has conducted a survey in Kazakhstan during the last year and, in the light of the dramatic results of this survey, we decided without hesitation to launch an appeal for Kazakhstan for the winter of -97 and -98, and this

appeal is still going on today. The survey showed the most affected areas in Kazakhstan to be the north-west, west, south and north-east, so of course the Aral Sea was included at the first stage of our project.

As for Uzbekistan, we will try to conduct a survey this year, to evaluate the situation in the Aral Sea region and to define a better approach for the selection of the most vulnerable in the area. We will do the same for Turkmenistan. The International Red Cross will support and try to implement developing programmes also in this area, convinced that this is deeply important for people's future and even for their survival.

Maybe we are flying a little bit too high here. What are we actually doing for the people? We must care about the water, we must care about the collaboration between the countries, about crops and so on. But we feel that today the best medicine for the Aral Sea area and its population is certainly food and clean water and the distribution of water filters. In the future, we should take on the more long-term and overriding issues mentioned above. Hopefully, development programmes will improve the situation, thus making it possible for the next generation to go much further. But for the present generation *every day is a great enough challenge*, and I believe we have to begin in a very concrete way to think of the survival of this people.

Ms Maria Israelsson, Sida

We have to treat this as a two-level problem. One problem is that long-term solutions can only be found at a regional level, through the co-operation of the five states and through the agreements on water distribution and resources. The other level is the affected population, where we need to work closely with practical issues. This is where I think Swedish and other NGOs have a role to play. When it comes to the empowerment of women, to the strengthening of local NGOs and local communities in general, to improving the situation more concretely with for example improved health systems, probably Swedish and other NGOs could play an important part. Environmental monitoring may also be an interesting field for Swedish environmentalists. We look forward to continuous discussions in the future with Swedish NGOs and with the NGOs in the region.

Mr Pierre Ferry, UNICEF

UNICEF's programme plan, ASPERA, is addressing a wide range of social sectors and components like nutrition and education as well, so it offers a nice frame for co-operation. We are also initiating a programme in Kiesnooblast. That part offers possibilities for useful collaboration at local level. There is a common goal for all people in the area and all the local NGOs. We hope that all national and international agencies will join in this project.

Last week, UNICEF organised a conference on the Aral Sea and health issues with professor Mazhitova in Almaty. The second day of that conference was very important to us, because we had the deputy Prime Minister of Karakalpakstan with us. Everybody agreed that we should try to set up an ASPERA programme for the Aral Sea. It should include local NGOs, international NGOs, donors, local authorities and the private sector as well. Probably several companies working in old business from the Soviet period could help with donations.

Mr Kjellén, moderator

How is the co-operation between, for instance, UNICEF and WHO? I noted that many of your projects were dealing with health issues for children and also education, so obviously you co-operate with UNESCO. Naturally, we would like to see maximum co-ordination achieved by the governments themselves, and by the resident UNDP, of course. Would you just comment very briefly on how you see the co-ordination aspect coming up?

Dr Klein, WHO

There is definitely a fruitful collaboration with WHO in all health issues. A lot of meetings have been held together with WHO. UNICEF gets much support from WHO experts on health and other issues. As for UNESCO, yes we speak sometimes...

Mr Kjellén, moderator

For the international NGOs, who put in much effort into co-operation with local NGOs trying to operate at the local level, it is obviously important to know that other actors, working at higher levels, with the governments for example, are well co-ordinated. There are difficulties with this, but in all statements from international organisations we underline that it is the duty of international organisations to co-operate efficiently.

Mr Zharas Takenov, UNDP

As for co-ordination, we manage to co-ordinate several donors' activities through our national project. We are delighted that NGOs like "Mercy Course International", an American organisation, is providing funds for projects prepared by locals, on the basis of assistance they receive from our project support centres. Also, several projects are financed by the Dutch Government, by the Embassy of the United Kingdom, by INTAS, the international scientific organisation. Also, the World Bank provided a small amount of money, about 45,000 dollars, for developing a micro-credit scheme. We will now, one year after the evaluation report that showed that many people

paid back their loans, apply for more money. On the basis of this success, we hope to receive a positive answer.

We also supported the Government in the co-ordination of donors in the region at one of our project support centres, situated at the centre of an oblast close to the Aral Sea. This is both a project support centre and an economy development centre. The oblast, Kzyl-Orda, is now declared a free economy zone, and it was during a presentation of the oblast that the "Akiim", the governor of the oblast, presented the centre as a centre for co-ordination of donor activities. If it is going to work out depends on the activities and wishes of other donor organisations in the region.

I would also like to bring up again the water problems. When we talk about water sharing, we mean water sharing between countries. But there can be problems also when water is shared between small lakes and the sea, for example in Kazakhstan. We have talked about fishing and about water for animal breeding and water for vegetable cultivation, but we did not say that this water mostly comes from small lakes, as in the Aralsk region from small lakes in the delta. Now, most fishing activities take place not in the Aral Sea itself but in these lakes close to it. They depend very much on dam management. One of our projects is therefore directed to getting funds in order to assist local farmers in the creation of water users' organisations, or other kinds of co-operative organisations, that can manage these dams. There may be room for Swedish NGOs in this particular issue.

Dr Demydenko, UNDP

The main reason to support the Aral Sea area is that here we have an example, perhaps the clearest example, of the man-made unsustainable approach to development. This is the main reason for providing assistance to the region.

Regarding scientific information, especially the responsibility of scientists for the collection and compilation of it, we must remember that – unfortunately but naturally – scientists are interested in providing information of interest to them. They are much less active in preparing information that could be useful for other groups in society, such as the public and, especially, decision-makers. There is a great need to collect information in such forms as could be used by decision-makers, especially in the Aral Sea region.

Yesterday, somebody mentioned that he had got 23,000 hits on the Internet on the Aral Sea. When you get that kind of pile of information on your desk, it is not information. It is noise. I am thankful for having found out that there exists a WHO information centre for Central Asian republics. We who work on UNDP support to IFAS are going to establish a documentation, information and networking centre, just at IFAS, and invite you to use

this centre for all information on UNDP support as well as other support to the Aral Sea region.

As for public participation, particularly by women, we have a programme that provides some room for other groups at IFAS and the regional sustainable development commission. If women groups would come, I would be more than happy to provide room for them. But they are not knocking at my door, nor at the door of IFAS, believe me.

As for the extremely important overall co-operation, there are some good and some bad examples of UNDP co-operation with different international organisations in the region. I think co-operation with WHO will go from bad to good now that there is an information centre for the Central Asian republics.

Unfortunately, there is no co-operation between UNICEF and UNDP regarding the Aral Sea, and almost no co-operation with UNEP. However, there is very close co-operation with the World Bank, and I am indeed surprised that the World Bank is not present at this conference, as they are the key international organisation in the region. There is also very good co-operation with the EU-Tacis programme for the Aral Sea. We are sitting in the same building in Tashkent. We co-operate closely with USAID approaches in the region. We have regular meetings and simply inform each other of what is going on in the region.

There is also good co-operation with Dutch NGOs active in the region, but unfortunately not with other NGOs. Maybe this is not their fault only, but rather our fault first of all, but I would be very happy to meet Médecines sans frontières representatives. I have been in the region only a couple of months, but please contact me on any issues relating to UNDP support in the region.

Mr Bo Kjellén, moderator

A point of clarification: the World Bank was of course, as a major actor, invited to participate but could not come. With regard to your co-operation with NGOs, we certainly hope that one result of this conference will be Swedish NGOs knocking on your door in Tashkent.

Dr Gunter Klein, WHO

The World Bank in Central Asia is a part of the problem, not just part of the solution. A week ago I had a meeting with the World Bank on environmental health and economy, hosted by a minister of finance. This, I think, was a break-through. There are two entry points to the process. One is to the big money, and one is to the big needs. To put it blandly, the World Bank should be treated as part of the disease in the region and part of the mechanisms that have been put in place.

As for the question of collaboration, I fully agree that we have to improve it. WHO is a poor organisation, joining up with poor ministries, i.e. the ministry of health and the even poorer ministry of environment, making some efforts to change things. We have been surprised, over the past 3–4 years, by the strong movement of individuals and very concerned ministries of environment and health in some of the Central Asian republics to build up a common approach. On one or other occasion, they even collaborated with the World Bank. Environmental and health policies have been brought together, and the World Bank mobilised around 50,000 USD for this collaboration. We must find even more resources that are needed for this kind of coordination.

I would briefly refer back to what Maria Haralanova told you yesterday. WHO activities on anaemia, respiratory diseases, tuberculoses, diarrhoea and vaccination – in close collaboration with the other organisations – did really initiate a change. Polio is eradicated. There remains a handful of cases in one country. The issue of treating diarrhoeas properly is taken up quite seriously. We have only a few staff members doing this, so we cannot do it alone. Networking with the Red Cross, UNICEF, local institutes is necessary. We wish to strengthen and build capacity in the country to multiply the efforts from Swedish NGOs. Sweden is a small but very effective country. So let us use these scarce resources and have them multiply in the region.

I am also very pleased to mention that a "liaison officer" from Kyrgyzstan on our staff is in the audience, together with the Minister of Health. Using "liaison officers" is one principle by which we try to enhance the collaboration, and I think it is doing quite well in these countries.

Finally, at a coming conference, probably in November, WHO envisages to bring environment and health issues together. It is a follow-up conference to the Issy-Kul conference in June, 1995. It will certainly benefit largely from this conference, and it will be a platform for more integration with NGOs. We also want more integration with the heads of state, through the interstate council, so we can address both the bottom-up and top-down processes in an effective way.

We should support the Central Asian republics, because there is good future perspectives for these countries, as well as an obvious willingness to really change paired with a general wish to look forward.

Jacqueline Sims, WHO

I seem to have a string of somewhat disjointed reactions to various issues that have been brought up during the past hour or so. Firstly, as Ms Hannan-Andersson pointed out, there is no guarantee of benefits to any one population group, without there being special attention on achieving that benefit.

And it is for that reason that we are now making a push to make sure that gender enters all activities, as well as the general WHO focus, through the environmental health programmes. We will run this gender process in parallel through the environmental health programmes at all levels of the organisation, which will mean for example, that even WHO's NEHAP processes will eventually be gendered. Eventually, we will start to answer those questions of who, what, when, how and why that are the beginning of the gender analysis and arrive at a more specific understanding of how we can deliver better approaches and benefits to different population groups, like men, women and children respectively.

Now, as Dr de Vylder pointed out yesterday, we often seem to have divided ourselves into a hardware and a software approach. We have done this when talking about water and capital, as I think he gave as examples of hardware approaches, and when talking about social capital and cultural fabrics that you might say are the software approaches. We have there again to ensure that the gender process is part of both these approaches, at micro and macro level.

One point brought up this morning is water politics, and that makes me think that the order of our approaches is very significant. It is going back again to the software approach. We have no choice but to find the right and necessary measures to help different population groups. If we do not, we are obviously going straight down the spiral into political chaos for not having provided benefits to people, rather than going up the spiral to efficient regional management. What we need to establish now is a joint health and social framework, so that all environment impacts, social impacts, livelihood issues, gender impacts and all related issues bearing on the health problems in this area can be addressed within an integrated and inter-sectoral framework, in the local context and with local partners. That is the only instant vision I can produce at this time, but from what we have heard today, I believe that it can be implemented.

Mr Tuylegan Tajiabaevich Sarsembekov, IFAS

Sustainable water resource management and development systems are the basis for optimum satisfaction. Water requirements of the five Central Asian states are thus one important component of programmes for concrete action. Water pollution, by industry and agriculture and criminal waste, has a negative impact on the environment, including people's health and economy in the Aral Sea basin. In this context, it is necessary to develop principles for limiting discharges of such waste, from all sources, and a system of share treatment. Water quality management must include also the next position, i.e. establishing a water quality monitoring system, establishing a pollution

sources accounting system and studying the ground water pollution, all to develop a protection strategy. So, finally I would like to ask Dr Demydenko to give us some details about the big programmes.

Dr Andriy Demydenko, UNDP

In the absence of a World Bank representative, I could say a few words on the World Bank GEF project that is soon to begin. It is an example of co-operation. About 20 million USD are invested in GEF projects to help the Aral Sea. They will be managed by IFAS through a special implementing agency to be established under IFAS. It will be managed totally by the representatives of the five countries, with some supervision by the World Bank. The World Bank, together with the five Central Asian states, established one component of this project, on about 4 million USD, especially for participation and public awareness issues. So, if the World Bank is not only a part of the solution, but a part of the problem as well, according to Dr Klein, at least in this GEF case, they learned.

Their decision to hand over the authority of implementation to the countries themselves is a very good one. And there are not only dam constructions and other such typical World Bank proposals, but some "software" proposals and components as well that will hopefully support the sustainable development project, at least in the participatory part. And I strongly suggest that you contact the World Bank, because the 4 million USD is probably more than all our organisations together could provide for this participatory component.

Mr Bo Kjellén, moderator

I would be grateful, since you refer to your co-operation with the World Bank, if you inform them about this conference and the points that have been made. I once again express the regret that the World Bank could not attend on this occasion. There are, of course, several other organisations that could not be invited to this occasion but would have made very useful contributions. There will be other occasions though. Personally, I recall the Convention to combat desertification in the region, where we have legally binding commitments of governments to provide also an enabling environment for local action and local empowerment.

It would be presumptuous of me to try to summarise this rich discussion, but allow me to make a few final points. First, obviously we have to recognise that all these countries are still in a very difficult period of transition. Second, in this context, long-term economic, social, and ecological sustainability must be achieved through a long-haul effort. That has to do with the future production patterns, the future of agriculture and so on. There will be sup-

port in different ways for doing this, and I think we all feel the need for international co-operation.

However, let us not forget that in the centre of it all is this major ecological and human catastrophe, the Aral Sea, the fact that the Sea has been shrinking and all the consequences of this. It is quite obvious that what happens to one of the largest in-land seas of the world is really something that concerns everybody on the planet. It is not just a problem for the riparian states. The Aral Sea belongs to the world, and that has to be reflected in our action.

Finally, short-term action. The local people are suffering, and we have lots of evidence in the various statements that have been made. Actions undertaken by Swedish NGOs in co-operation with local NGOs may very well be small projects, but they will still be important in the broader framework that has been presented to us by the panel. I hope that we have got enough ideas for the follow-up of this conference. As to the concrete aspects of it, we have the word of Ms Israelsson that there are resources available, and we heard yesterday from Commissioner Gradin, that the EU is ready to support our work through their various programmes. That holds promises for the future.

Concluding Remarks

The Gender Perspective: Carolyn Hannan-Andersson

The Children's Perspective: Rolf Zetterström

The Environmental Perspective: Bo Kjellén

Conclusions for Action

Carolyn Hannan-Andersson

Senior adviser, Sida, Stockholm

The Gender Perspective

During the course of the conference, many people have asked me if I could say something about concepts. It seems a little bit strange to be coming to concepts at the end of the conference. But so many different people have said that we need to have clarity around the concepts we are using, that I think I will take my time to look at those. We are starting to sum up the conclusions and to think about follow-ups, and I think it is very important that we are all talking about the same things. This will effect the goals we set, the approaches we develop and also the methodologies we use. Stefan de Vylder talked yesterday about equality, saying that this is a development goal in itself. But what do we mean by equality, for example when we talk about equality between women and men?

Equality

There are three basic elements that we must keep in mind when talking about equality: that women and men should have the same rights, the same responsibilities and the same opportunities. It is as simple, or as complex, as that. We also need to consider that equality has two very important dimensions. Sometimes we focus only the quantitative dimension, the one that is

about numbers, about balance, about getting equal numbers of women and men on different committees, participating in different projects.

This is the dimension of statistics. We have statistics from one of the countries here, saying that a higher percentage of women than of men complete higher education. In the same country, statistics tell us that women do not have the same possibilities to participate in decision-making at top levels. So, we have an imbalance, shown to us in statistics, that we have to work with.

But to work with equality is not only to play a numbers' game. It is not about getting 50–50 or 60–40 or whatever percent you want. It is also about a qualitative perspective, about making sure that we bring in the values, the knowledge and the experience of both women and men. If we want a good development, we need to have the knowledge, the values and the experience of both women and men. So this is a perspective that enriches development. It makes development better and improves its quality.

Gender

Other people have been talking about gender. Jackie Sims from WHO mentioned gender several times. What, then, is gender? Gender can be explained simply as a system of roles and relationships between women and men, which are determined by social, political and economic context. It is not determined by biology, by the fact that we were born women and men. The discussion yesterday, the presentation by Merrick Tabor, was very good, because it showed us that gender is influenced by history, by ideology, by culture, by socio-economic factors. So it is not the fact that you were born male or female, it is the society that you were born into, that creates gender roles and distributes responsibilities between women and men.

Both men and women

So a very, very important point that we need to come back to is that gender is a question about both women and men. Gender is not the same as women. It is not the approach we used to call "women and development", because then we looked at women in isolation. We only saw their situation and did not compare it with the situation of men. Working with a gender perspective, we look at women, we look at men, and we compare the situation between women and men, because women and men have different roles, responsibilities and access to resources. The relations between women and men affect those roles, responsibilities and the access to resources.

We have to talk about men

If we talk about gender, we have to talk about men. Looking back at the past day and a half, we have not talked about men very much at all. We have

talked about women and children, but not men. We have had quite a lot of discussion on reproductive health. If we are going to work effectively on reproductive health, we must look at men and their attitudes and behaviours that influence reproductive health. We need to understand who makes the decisions about family planning. Is it enough to reach women at the clinics, or do we also need to involve men? This is also a very important aspect of the gender perspective.

Value added

We say that we must have a gender perspective in what we are doing. It is very important for two reasons. Firstly, it is a matter of social justice and rights. We want to make sure that we do not leave women out. They must have their rights seen to, as well as men. Secondly, the gender perspective is important for effective development. You cannot have efficient programmes, if you forget half the population. Women are not another group, a marginal group or a group that diverges from the male norm. Women make up 50 percent of the population. Efficiency tells us we should be looking at both women and men.

I found Stefan de Vylder's examples yesterday very illustrative. He said that an economist that does not look at both women and men is a poor economist, that he/she must include this perspective in his/her analyses. He also said that investing in education is the most cost-efficient investment that a country can make. So, having a gender perspective is not about being nice to women. It is about effective development, improved quality. Using a gender perspective means adding a potential, a gain, a value to what you are doing. We really *cannot afford not to use a gender perspective*, we cannot afford to leave out this 50 percent of the population, the women.

Immediate action

During the discussion, we have talked about intervention at *three levels*. One is to deal with the *immediate problems* that the catastrophe has presented us. A second level is to start working a little more developmentally, to have interventions that are improving the possibilities for a *sustainable livelihood* in the areas around the Aral Sea. The third level of intervention is the macro-level, the economic and political level, where we must have *structural changes*, dealing with the causes of the problem. At all these three levels, it is very important to include the gender perspective. Here is a very simple strategy for moving forward, *two things* that we could all go back and start doing now, tomorrow, working with whatever we are working with.

The first thing is to de-aggregate *statistics according to sex*. Are we talking about women or men? Are we talking about girls or boys? This conference

and its discussions on reproductive health have shown that statistics only showing the situation of women are not enough. We need to be able to compare with men, all health aspects, for example. If we find that women are suffering from a particular health problem, we need to know if men also are suffering from that problem. If women are suffering to a greater extent, then why? Is it due to the way women work and live compared to men, or due to other factors? We need to understand what we must be looking for. And if we are using statistics that have not been de-aggregated, we should point that out, since that is very important information.

Gender analysis is the second tool I would suggest that we use. Analyse the roles, the responsibilities and the access to resources of both women and men. You do not always need to do a separate analysis. You can include it as part of any analysis you are doing. That is probably the best way. If you are going to do analysis in your project, from the very beginning make sure that you are analysing the situation of both women and men. A lot of people are afraid of terms like gender analysis, thinking it is something very complicated and something they could not possibly work with. It is actually very simple. To begin the process, you ask yourself these questions: who does what, for what purpose, with what resources and who makes decisions? And that gives you information on roles, responsibilities, access to resources, needs and problems, but also potentials. Sometimes when we work with women or gender, we focus only problems. But it is a potential. Using the gender perspective, we can find new alternatives, new solutions. Doing gender analysis, we ask ourselves how the activity that we are involved in effect women and men, boys and girls. That should give us information to begin the process.

In conclusion, it is very important that we see working with equality, working with the gender perspective as a potential. Those who say that we have so many problems that we must first solve, before we can deal with the gender perspective, are missing the point. We should have a gender perspective as we deal with the problems, thus finding new ways of looking, new information, and possibly new solutions. Countries in transition must give this priority. They cannot afford to work without a gender perspective. If you are working with the whole population, with all target groups, you will gain efficiency and quality. In relation to the environment, we need to know who uses the natural resources, and what do they use them for?

Rolf Zetterström

RSAS, Professor of Pediatrics, Karolinska Hospital Stockholm, Sweden

The Children's Perspective

When the Soviet regime decided to grow cotton in the Aral Sea region, this decision completely changed the living conditions for people in the area, in the republics of Kazakhstan, Uzbekistan and Turkmenistan. Their traditional economies, based on cattle breeding and agriculture, were changed into forced work on state-owned cotton fields. The water of the main tributaries to the Aral Sea, the Syr Darya and, especially, the Amu Darya was used for irrigation. The concentration of salt in the Aral Sea was tripled, and enormous amounts of pesticides were spread. The original fish specimens that were an important source of protein for the population disappeared. Today, the local population lives under extremely poor socio-economic conditions. Particularly the most vulnerable, pregnant women and children, suffer from the disastrous conditions.

General Aspects on Child Health

Due to poor health, life expectancy at birth is gradually declining. Perinatal mortality increases and is now about 80 per 1000. The incidence of low birth weight has increased to 12 percent, and infant mortality is estimated to be as high as around 70 per 1000. In addition, the incidence of intrauterine growth retardation is doubled compared to 50 years ago, as is also that of severe congenital malformations.

Due to deficient immuno-competence, neonatal septicemia, respiratory infections and tuberculosis increase. The high prevalence of tuberculosis is particularly alarming. An increment of prevalence of chronic gastrointestinal and liver disease as well as mental retardation is observed. Due to poor food and water hygiene, diarrhoea is very common and, when persistent, may cause malnutrition.

Dr. Mazhitova reported on the main clinical features of children admitted from the Kazakh Aral Sea region to a specialist hospital in Almaty. The children suffered from growth retardation, with no growth spurt at 11 years of age, delayed onset of puberty, anaemia, skin pigmentation, hyperkeratosis and dysplasia of mucous membranes of the oesophagus and stomach. In addition, many children were handicapped due to psycho-neurological retardation or chronic cardiac, respiratory, liver, pancreatic and renal diseases. Early neonatal death caused by neonatal septicaemia is common, and

respiratory and other lethal infections are prevalent during infancy, which may indicate immunological incompetence.

Environmental Pollutants – Examples

The exposure to pesticides – such as DDTs, PCBs and HCHs – and to heavy metals – such as lead and cadmium – undoubtedly have an adverse effect on human health.

Table 1. Concentrations of Chlorobiphenyl Compounds in Blood Plasma (in microg per kg plasma-fat). From (1).

Substance	Stockholm		KZ, Aral Sea		KZ, Almaty
	SW-1	SW-2	Village - 1	Village - 2	
α-HCH	n.d	n.d	600	400	400
β-HCH	n.d	n.d	200	400	200
γ-HCH	n.d	n.d	70	90	70
Σ-HCH	---	---	900	900	700
HCB	< 10	< 10	40	20	10
DDE	140	80	2800	3200	2400
DDD	n.d	n.d	n.d	n.d	n.d
DDT	9	9	500	600	700
"Σ-DDT"	150	90	3300	3800	3100
Σ-PCB	600	700	1900	1900	300

HCH= HexaChlorocycloHexane (γ-HCH = Lindane)
HCB = HexaChloroBenzene
DDE= "Dichlorophenyl-DichloroEtylene"
DDD= "Dichloro-Diphenyl-Dichloroethane"
DDT= "Dichloro-Diphenyl-Trichloroethane"
PCB= PolyChlorinated Biphenyls
Σ-HCH = Sum of α + β + γ-isomers
"Σ-DDT"= Sum of DDE + DDD + DDT
n.d.= not detectable (= below detection limit)

The levels of organochlorine compounds are much higher in the blood lipids of children living in the Aral Sea region than in children living in Stockholm as shown in Table 1 (1). None of the HCH-isomers that are found in high concentrations in the Aral Sea children occur in detectable concentrations in the Swedish reference group. In another study group, the children had extremely high individual values of β-HCH and DDT compounds of approximately 5000 ppb. In the same study, it was found that the level of lead in the hair of Kazakhstani children was 30 times higher than the upper limit in hair from children in Hamburg, Germany. As for erythrocytes, it was approximately 5 times higher than in children from Stockholm (Table 2). The corresponding relation for cadmium in erythrocytes was 2.5 (2,3).

Table 2. Concentrations of Lead and Cadmium in Whole Blood from Children (microg/l) from the Aral Sea Region and Almaty in Kazakhstan (medium levels)

Sample	Lead	Cadmium
Aral Sea[1]		
1	187	0.50
2	160	0.57
3	150	0.70
Almaty[1]		
1	86	0.37
2	68	0.40
3	108	0.44
Swedish standards[2]	30 (medium) (range 13-79)	0.24 (medium) (range 0.18-0.30)

[1]From(3) [2]From (2)

In many instances, the daily intake of chlorinated contaminants in exclusively breast-fed infants exceeds the level that WHO finds acceptable (4). Most alarming is the finding of the extremely toxic compound 2.3.7.8-tetrachlorodibens-para-dioxin (TCDD) at a concentration of around 50 pg . g-1 lipid in the milk of mothers from agricultural districts in Kazakhstan, as shown in Table 3 (4). This is more than 10 times higher than in the milk from Swedish mothers (5). We may also mention that in milk from Russian mothers more than 80 percent of the total dioxin consists of this extremely toxic substance, whereas it only accounts for about 10 percent in breast-milk from West-European countries (6). This finding clearly indicates that TCDD in human milk in Kazakhstan emanates from impure formulations of the herbicide 2.4.5-trichlorophenoxyacetic acid (used as a defoliant in the Vietnam war in the 1960s).

Table 3. The concentration of 2,3,7,8-TCDD in human milk by geographic area. (Mean±SD). From (4).

	pg/g fat
Agricultural district [1]	48 ± 4
Almaty	8 ± 2
Atyrau	8 ± 1
Aralsk	4 ± 0.3
Chimkent	8.5 ± 1
QzylOrda	5 ± 0.4

1 Close to Kasalinsk and near the Amy Darya

The cause of poor child health

Among the many factors contributing to deteriorating health in the Aral Sea region, increasing poverty with inadequate nutrition, crowding, poor housing and sanitation, low educational level, and a collapse of the health system probably are the most important.

The cause of poor child health in the region is obviously multi-factorial, and it is difficult to assess the role of exposure to toxic chemicals in relation to other predisposing factors, such as deficiencies in macro- or micro-nutrients, poor nutrition, frequent episodes of diarrhoea and other infectious diseases. However, many of the abnormal findings in the Aral Sea children, such as hyperkeratosis, skeletal malformations and kidney disease, have also been observed in the Yushu disease, an epidemic of PCB poisoning in Japan, which affected people who had ingested rice oil contaminated with Kanechlor 400, a PCB mixture (7). Similar symptoms have been observed in seals, otters and minks from the Baltic Sea after exposure to PCBs and DDTs (8). It is known that prenatal exposure to polychlorinated biphenyls causes developmental toxic effects in experimental animals (9). Infants born to mothers, who have accidentally been poisoned by PCB-contaminated rice oil or have eaten fish containing organochlorines, have intrauterine retardation of growth (10,11) and a retarded cognitive and psychomotor development, as found in studies from Lake Michigan (12). It may be assumed that the Aral Sea children are affected by the same developmental defects. To prevent further exposure, the ways of exposure have to be considered. In Sweden, as around Lake Michigan, the main exposure route for PCBs and other persistent organochlorine compounds seems to be consumption of fatty fish. This hypothesis is supported by the finding that such fish from the North Sea coast may have high concentrations of dioxins (9).

Concluding Remarks

The present situation in the Aral Sea region, sometimes even characterised as an ecocide, is a man-made disaster. Measures to protect the population from further toxic exposures are urgently needed. Our knowledge about the effect on human health of the various toxic compounds (such as salt, various chlorinated biphenyls, and heavy metals), to which the inhabitants in the Aral Sea region are exposed, is incomplete. Therefore, we need clinical, toxicological and epidemiological studies. The consequences in the foetus of exposure via trans-placental transfer, and in infants via contaminated breastmilk and various food products and drinking water, also have to be studied. Inhalation of dust containing toxic compounds is an additional way of exposure, and the high prevalence of bronchiectasies in children from the Aral Sea region may have such a background. It may also be mentioned that

although the distance between the Aral Sea region and the Scandinavian countries is very long, toxic compounds can be transported over large areas, as demonstrated after the Chernobyl catastrophe in 1987. It is estimated that winds, yearly, transport 43 million tonnes of sediments, containing salt, minerals and pesticides, from an area of 30,000 km^2 of former Aral seabed to surrounding regions, as far as to China and India (13).

The fact that 80 percent of the pregnant women in Karakalpakstan are anaemic is alarming. To prevent such anaemia, we must know whether it is nutritional, due to malabsorption or to bleedings from the gastrointestinal tract (due to parasite infestations). In addition, it is important to investigate whether food habits during pregnancy, lactation and childhood are adequate with regard to micro- and macro-nutrients. The course of pregnancy has to be studied, for instance regarding nutritional intake, weight increase and blood pressure. In new-born infants, particular attention should be given weight, length and head circumference. Information about the relation between gestational age, the incidence of various malformations and perinatal mortality rate is important, and concentrations of pesticides in the blood of the mother and in the cord have to be obtained. Furthermore, the relation between the blood concentration of different pesticides and psychoneurological symptoms should be studied.

Many other studies are relevant as well, such as whether there is any relation between the high incidence of neonatal septicaemia and immunodeficiency, and if the high prevalence of chronic renal disease and malabsorption among Aral Sea children is related to toxic exposures. As the incidence of leukaemia and other types of cancer is reported to be higher in the Aral Sea region than in Western Europe, it should be elucidated whether toxic exposures have genetic consequences. It has recently been reported that the risk of breast cancer increases with organochlorine exposure (14).

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Bo Kjellén

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The Environmental Perspective

1. The Aral Sea crisis is a major environmental disaster, perhaps one of the most serious on the planet. It gives rise to many sobering thoughts: the decisions that have led to the catastrophe were taken in Moscow fifty years ago. But what decisions do we make today that might have a major and negative impact on environmental conditions by the middle of next century? One example could well be our use of energy in the perspective of the climate issue. At the same time, we must remember that the democratic system gives us all a possibility to force on the decision-makers the necessary corrections.
2. Another aspect that needs to be high-lighted is the interrelationship between various environmental phenomena. In the case of the Aral Sea region, we see how errors in land management, in water management and in the use of chemicals have all added up to create the present disaster. We need to consider very carefully the linkages and the synergies.
3. Another lesson we can draw is the need to support civil society and NGOs if we really wish to redress the situation. This is perfectly in line with the recommendations and the general thrust of Agenda 21.
4. The problems in the region can never be solved if we let the Aral Sea disappear. We must find ways to stabilise the sea level, thereby offering prospects for stabilising the shores and creating new perspectives on how to make the region productive.
5. We have to see these environmental factors in the general perspective of sustainable development; we must give the necessary attention to social conditions and the struggle against poverty, as well as the re-establishment of food security.

Conclusions for Action

The Stockholm 1998 Conference covered broad aspects of the Aral Sea crisis, in particular the health consequences for women and children. It was recognised that the situation is unique in terms of environmental health, and that it is important to engage the whole international community to resolve the issues at stake. It was felt that one of the main objectives of the Conference, namely to raise public interest and awareness in Sweden and in the broader international community about the nature and consequences of the Aral Sea catastrophe, had been achieved. Furthermore it was clear that efficient action, to improve the situation would involve all stakeholders in and outside of the region. An important element is to establish cooperative projects at the local level, designed to support major projects involving international donors. The Conference proposed that the following activities be pursued.

Background for action

Important efforts should be made to improve and enlarge the flow of information about the situation in the region.

The need for more, and more reliable, statistical data was underlined, taking into account the absolute need for gender dis-aggregated statistics.

Priority areas for further research should be defined in cooperation between stakeholders.

Communication with the region has to be improved; information technology is a tool.

Joint projects

NGOs should try to agree on possible joint projects relating to health issues, both physical and psycho-social, taking into account the gender aspects and the particular problems of children, in accordance with the *UN Convention on the Rights of the Child*. Outlines of such projects should be developed before October 1, 1998.

In particular, efforts should be made to develop projects at the local level, possibly in connection with twinning between municipalities in the Aral region and Sweden.

The potential for micro-financing schemes should be fully explored.

Follow-up

The proceedings of the Conference will be published in an easily accessible form as soon as possible.

A report will be made in an appropriate form to the ongoing session of the Commission on Sustainable Development (CSD), which has freshwater as a special priority item.

The possibilities for follow-up seminars in Sweden on relevant themes should be explored. Such seminars could be held at the regional level and involve interested NGOs and/or other entities.

Final Words from the Organisers

Görel Thurdin

The Swedish Save the Children (Rädda Barnen)

I feel that we have worked together in a very good atmosphere. This is what we wanted to achieve when we invited you to this conference; and all of you have been part of it. You have brought knowledge, ideas and constructive thinking about the Aral Sea problems.

Why did *Rädda Barnen*, the Swedish Save the Children, join this initiative, when Gia Kjellén asked us? We did so because we work with Agenda 21 and with the Convention on the Rights of the Child. We see the links between the environment and the prospects for children to grow up in a healthy way.

We have worked very much with the psycho-social situation of children earlier, so we know that if they are not healthy from a very early age, it is very difficult to create a good psycho-social environment later on. We have seen from statistics, that if the brains of children are not developed normally to begin with, the children may be deprived of their right to a normal life.

The Convention on the Rights of the Child declares that every nation that signed it has the responsibility to do everything to make it possible for children to grow up normally in an atmosphere of harmony. It says that we should co-operate all over the world, for the sake of the children. We are not responsible only for our own nation. Furthermore, the Convention reminds us about the gender perspective: the child has the right to have both a father and a mother, and both should be involved in the upbringing of the child. As we all know, it is important that both women and men take care of their children. Of course we know that there are traditions and cultural structures, according to which it is not common practice for women and men to work together in this way.

But one has to start somewhere when developing new customs; it was not so long ago that we began this in Sweden. We also have to work out "child impact assessments". We have to know the effects of different measures on children before we go into action. Therefore, it is very important to work out programmes with favourable long-term effects. If I consider the engagement and responsibility of the Swedish Save the Children, I note that there is a need for more – and more reliable – statistical data on the long-term effects. Mr. Aladin said that we already have a lot of data, and of course this is so, but quite often these data are not really analysed or put together in a relevant way.

However, we feel a responsibility to pursue this initiative through discussions with our collaborators, the Royal Swedish Academy of Sciences and the Swedish UNIFEM Committee, about the follow up process of this conference. We will try to begin the planning process for concrete projects before the beginning of October 1998.

I end this talk with this promise, or intention, even if planning is a difficult concept. I used the word "physical planning" in my opening speech; you may call it the "thinking process", if you like. We have to think before we act, and collect knowledge before we act, and that is what I mean with the democratic planning process. It is a process that brings the actors into the mainstream, where you can have discussions in small groups. You bring all the knowledge in, and you have an open process in which everybody can express his or her opinion. Therefore, Save the Children in Sweden also want the children to be part of the process. We have seen, when working in many types of cultures, that when you teach a child, you also teach the parents. So, you can use many methods and ways to have the process going in the right direction.

Regional co-operation is of course needed, and we have good examples also from the Baltic Sea region, where we decided to have a common goal, a vision for the future. No doubt, circumstances are very different, but I think it is essential that we have a common vision for the Aral Sea region. The world is marked by globalisation. We have interaction, we have communication and transportation that makes everything different for all of us. The capital market is becoming international, also influencing all of us. All of us are in a kind of transition, and I think that is a good base to start from.

There is an article in the Convention on the Rights of the Child that really puts the finger on children's rights to health and health care, and on the struggle against child mortality. It is very well developed in article 24. It would be wise to start an education programme on the Convention on the Rights of the Child. During such an education, you learn how to look at things from a child's perspective, and you have to train your own brain to be able to see things from the perspective of the child. It is not always easy. But I can promise you, that we will work together with the initiators to find possibilities for the Swedish Save the Children to do something in this area.

Erling Norrby

Professor, Secretary General of the Royal Swedish Academy of Sciences

The Royal Swedish Academy of Sciences is one of the co-organisers of this conference on the ecological catastrophe in the Aral Sea.

You may ask yourself why a national academy should involve itself in problems of the kind discussed during the last two days. I think the answer is rather simple. The academy is a forum for integrating all new knowledge that now accumulates at an ever increasing speed. Knowledge, insight and understanding represent the primary and exclusive platform for political, economic and commercial decision-making. Admittedly, analyses of the ecological balance system, like the one involving the Aral Sea basin, are very complex. Some of the consequences of the withdrawal of irrigation water from the two main tributaries, the Syr Darya and the Amu Darya, might have been foreseen, but many of them came as a surprise. So, there have been very hard lessons that we have learnt from this experience.

Now it is characteristic and unique for the human species that we have two forms of inheritance. One is the more classic Darwinian one, involving surviving genes that accumulate in our human hereditary material. But the other is of course more of a Lamarckian nature: the accumulation of new knowledge, transferred from one generation to the next, via civilisation guided mechanisms, perhaps particularly pronounced in our current information society. We can learn from experience and this is emphasised in the concluding comments from several speakers. Now, the particular focussing of the conference has been on the health of women and children. In our relations to children, epigenetic mechanisms release urges for empathy and care. Each new generation should be given a start that allows a full expression of the potential that is hidden in every individual. Restrictions in this regard, emanating from careless and selfish actions of preceding generations, can simply not be accepted.

In order to give myself some background to the theme discussed at this conference, I read an article by Norman Precoda in the May 1991 issue of the academy journal Ambio that relates to human environment. The article was appropriately called “Requiem for the Aral Sea”. I learnt horrible things, and I asked myself: how could all this have happened? And in particular, how could these scaring events have been prevented? I trust that reflections on these matters have been aired during the conference, on the same time as guidance has been provided as to how restorations can be made of the consequences of the catastrophe.

The title given to this little contribution, “Final words”, sounds ominous and it makes me think of T. S. Elliot’s poem *The Waste Land* that ends: “so

shall the world end, not with a bang, but with a whimper". Still, it is in moments of despair, that the human species unravels a unique capacity to move from egocentricity to altruism. And maybe our ultimate genes for survival come into action in this case. So to end, I hope this conference has deepened our understanding of the catastrophe of water withdrawal from the Aral Sea, with particular reference to the dire consequences for the health of women and children. And in particular I hope that it has provided a background for an action plan. Let us hope that it will be possible to reconstitute the sea in some form, reflecting the original names of this lake: the Kyrgyz name Aral Dengiz – the Sea of Islands – and the Russian name Sinyeye Morye – the Blue Sea.

Gia Kjellén

Chairperson, Swedish UNIFEM Committee

It is clear that we can now start the work to develop projects.

What I have seen as a common theme all through the conference, in the speeches and in the discussions, has been co-operation. Without co-operation we are not going to get anywhere.

As one of the organisers of the conference, I have worked with very many people. I would therefore like to start by thanking all those who believed in this conference in the first place – my UNIFEM colleagues, Save the Children and the Royal Swedish Academy of Sciences.

We all know that for a conference of this kind to function, you are dependent on many people. I would like to thank all of you who have worked hard by giving of your time, thus contributing to making this conference a success.

I would also like to thank all of you who have come here for your excellent contributions. I have learnt a lot and I am sure we all have. We will go away with new knowledge about what is happening around the Aral Sea and of the situation of women and children in the region.

And finally, I especially want to thank all of you who have come all the way from Kazakhstan, Kyrgyzstan and Uzbekistan to share with us your knowledge – and your frustrations. We have learnt about the painful and stressful situation for the millions of women, men and children in the Aral region. But we have also heard that there is hope for the future. And I think we should build on that.

So let us now all go back to our respective countries and to our organisations where we should continue to work, using what we have learnt during these two days.

Thank you all so very much! I hope we shall see each other again and that we can then report to each other that we have come a lot further.

Thank you.

Conference Programme

Thursday, 23rd April

Moderator: Film maker Bo Landin, Scandinature Films

09.00–09.20	*Welcome* *The UN Convention on the Rights of the Child and Agenda 21* Ms. Görel Thurdin, Chairperson Rädda Barnen/ Swedish Save the Children Chairperson International Save the Children Alliance Deputy Speaker of the Swedish Parliament
09.20–09.30	*The United Nations Development Fund for Women – UNIFEM* *Aims and strategies* Ms. Birgitta Olausson, Chairperson Swedish UNIFEM committee
09.30–10.00	*Environmental issues – the emergence of the crisis* Professor Anders Rapp, Royal Swedish Academy of Sciences, Stockholm
10.00–10.30	*Hydrology and ecology* Professor Nikolai V. Aladin, Russian Academy of Sciences St. Petersburg, Russia
10.30-11.00	Coffee break
11.00-11.30	*What were the grounds for the catastrophe? Historic, ethnic and cultural development in the Aral Sea region* Mr. Merrick Tabor, Department of Political Science Stockholm university, Eurasian Research Centre – Project Adviser

Moderator: Dr. Barbro Westerholm, M.D., MP

11.30–12.00	*Community participation* *Importance of civil society* Commissioner Anita Gradin, European Commission, Brussells
12.00–12.30	*Health consequences for women* Dr. Oral Ataniyazova, M.D., Director of the Karakalpak Centre for Reproductive Health and Environment "Perzent", Nukus, Uzbekistan
12.30–13.00	*Health consequences for children* Professor Zaira Mazhitova, M.D., National Children's Rehabilitation Center "URPAK", Almaty, Kazakhstan
13.00–14.30	Lunch Press conference Film maker Bo Landin Swedish Save the Children press centre

Moderator: Ms. Margareta Israelsson, MP
The Swedish Network of Parliamentarians for Children's Rights

14.30–14.50 *Women's health and the Aral Sea crisis*
The role of the World Health Organisation – WHO
Dr. Maria Haralanova, MD, WHO, European Office, Copenhagen

14.50–15.10 *Quality of life and economic development*
Dr. Stefan de Vylder, Economist, Stockholm

15.10–15.30 Fruit and juice

15.30–16.00 *Women's empowerment in the rebuilding process*
Ms. Galiya Khasanova, Director UN Country office in Kazakhstan Gender in Development Bureau, Almaty, Kazakhstan

16.00–16.20 *The Social Side of the Aral Sea Crisis*
Mr. E. Birerdinc, UNICEF Area Representative for the Central Asian Republics and Kazakhstan (CARK), Islamabad, Pakistan

16.20–16.45 *Question time*
The three moderators sum up their sessions

17.15–17.45 Concert

Friday, 24th April

Moderator: Ambassador Bo Kjellén

09.00–11.00 Description of projects in the Aral Sea region relating to women and children
Panel discussion
Central Asia Executive Committee of the International Fund for Saving the Aral Sea – IFAS
Mr. Tuylegan Sarsembekov, IFAS, Ministry of Agriculture, Akmola, Kazakhstan
The World Health Organisation – WHO
Dr. Gunter Klein, Director, WHO, Copenhagen
Ms. Jacqueline Sims, Technical Officer, WHO, Geneva
United Nations Development Program – UNDP
Mr. Andriy Demydenko, Project Manager, Aral Sea Basin Capacity Development
Mr. Zharas Takenov, Sustainable Development Adviser, Almaty, Kazakhstan
United Nations Children's Fund – UNICEF
Mr. Ekrem Birerdinc, CARK, Islamabad, Pakistan
Mr. Pierre Ferry, UNICEF Project Office, Almaty, Kazakhstan
Swedish International Development Cooperation Agency – Sida
Ms. Maria Israelsson, Area Manager, Sida, Stockholm

International Federation of Red Cross and Red Crescent Societies (IFRC)
Mr. Eric Michèl-Sellier, Regional Relief Co-ordinator for Central Asia, Almaty, Kazakhstan
Karakalpak Centre for Reproductive Health and Environment "Perzent", Nukus, Uzbekistan
Dr. Oral Atanyazova, M.D., Director

11.30-12.30 Coffee break

12.00-13.00 Concluding remarks from:
The gender perspective
Ms. Carolyn Hannan-Andersson, Senior adviser
Sida, Stockholm
The children's perspective
Professor em Rolf Zetterström, M.D.
Royal Swedish Academy of Sciences
The environmental perspective
Summing up
Ambassador Bo Kjellén
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Stockholm
Final words
Ms. Görel Thurdin
Chairperson Rädda Barnen/Swedish Save the Children
Chairperson International Save the Children Alliance
Deputy Speaker of the Swedish Parliament
Professor Erling Norrby
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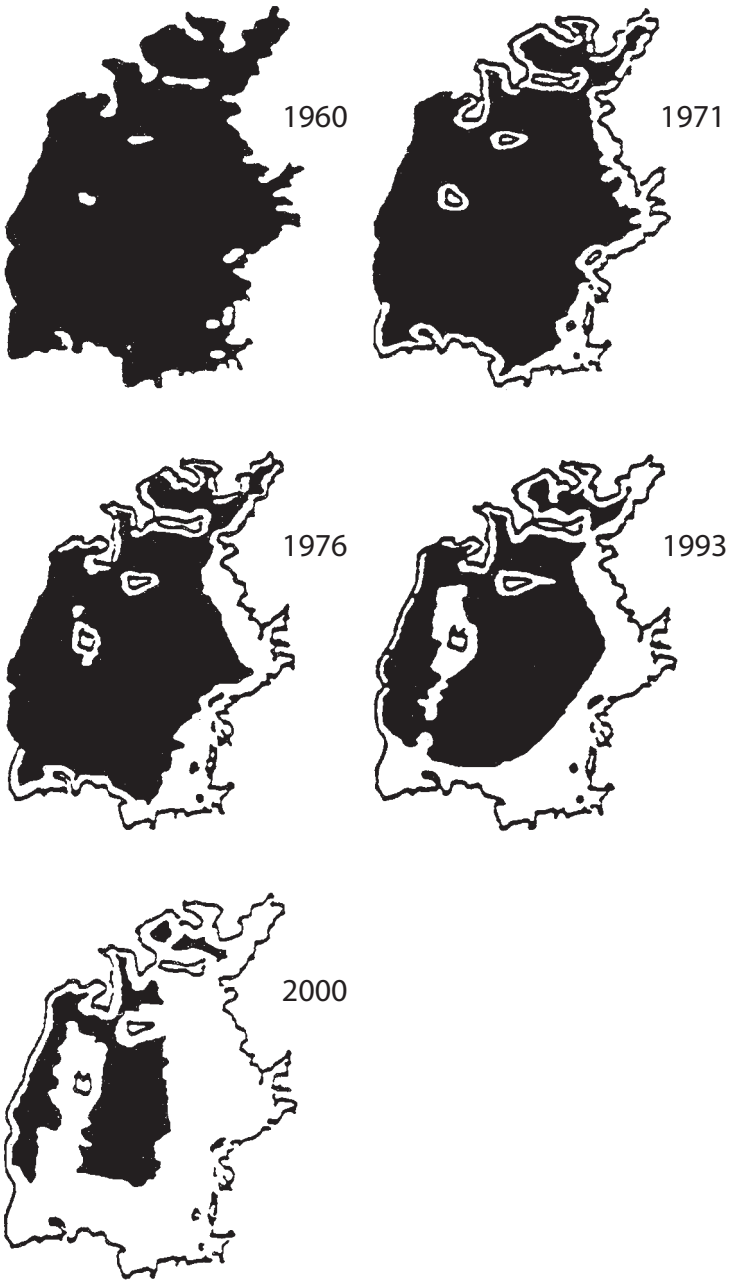
Abbreviations and Acronyms

ARI	Acute Respiratory Infections
ASPERA	Aral Sea Project for Environmental and Regional Assistance
ASWI	ARAL Sea Watch International
BCG	Bacille Calmette-Guérin vaccine
BMI	Body Mass Index
CAR	Central Asian Republics
CARK	Central Asian Republics and Kazakhstan
CIS	Commonwealth of Independent States
DDT	Dichloro-Diphenyl-Trichloroethane
EU	European Union
FAO	Food and Agriculture Organisation
FSA	Interstate Fund for Saving the Aral Sea
g/l	Grams per liter
GEF	Global Environment Facility
GID	Gender in Development
HCH	Hexachlorocyclo Hexane
ICWC	Interstate Commission for Water Coordination
IFAS	International Fund to Save the Aral Sea
IFIAS	International Federation of Institutes for Advanced Science
IFRC	International Federation Red Cross and Red Crescent Societies
LEHAP	Local Environmental Health Action Plans
m a s l	meter above sea level
MEDLINE	Medical Literature Database: National Library of Medicine, USA
MP	Member of Parliament
MSF	Médecins sans Frontières
NAP	National Action Plan
NEAP	National Environmental Action Plan
NEHAP	National Environmental and Health Action plan
NGO	Non Governmental Organisation
NIS	Newly Independent States
OSCE	Organisation for Security and Cooperation in Europe
PCB	Poly Chlorinated Biphenyls
PHC	Primary Health Care
REC	Regional Environment Centre
RSAS	Royal Swedish Academy of Sciences
SD	Standard Deviation
SDC	Sustainable Development Commission
Sida	Swedish International Development Agency
STD	Sexually Transmitted Diseases

TACIS	Technical Assistance Program to CIS countries (EU)
TB	Tuberculosis
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
UNCED	United Nations Conference on Environment and Development
UNICEF	United Nation Children's Fund
UNIFEM	United Nations Development Fund for Women
URPAK	National Children's Rehabilitation Centre, Kazakhstan
US	United States
USAID	United States Agency for International Development
USGS	United States Geological Survey
USSR	Union of Soviet Socialist Republics
WARMAP	Water Resource Management and Agricultural Production in Central Asia
WHO	World Health Organisation



Chronology of Aral Sea Changes. Source: The Aral Sea. UNEP 1992.

Forty years ago, the Aral Sea was the fourth largest inland sea in the world. Today, it is reduced by half as a result of Soviet efforts to introduce large-scale irrigated cotton production in the Aral Sea basin. The health of the people, especially that of women and children, has deteriorated rapidly. No baby born today in Karakalpakstan, close to the Aral Sea, is born healthy.

The shrinking Aral Sea is one of the most staggering human, environmental and social disasters of the twentieth century. It is of global importance and should be a global concern. The decisions leading up to it were made in Moscow 50 years ago, a fact that gives rise to many sobering thoughts. What decisions do we make today that might have a major negative impact on environmental conditions 50 years from now?

This report on the proceedings of a major international conference gives an up-to-date account of the course of the catastrophe. It focuses on the alleviation of consequences of this ecological and human disaster.

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