

Strengthening Drought Management and Mitigation in the Caucasus: Report of the Conference Proceedings



**Tbilisi, Georgia
13-14 July 2006**

TABLE OF CONTENTS

Introduction.....	1
Opening Remarks.....	1
Panel 1: Planning and Policymaking for Drought	2
Presentations and Reports	2
Discussion	3
Panel 2: Drought and the Environment.....	5
Presentations and Reports	5
Discussion	6
Panel 3: Community Management and Mitigation of Drought	7
Presentations and Reports	7
Discussion	9
Annex A: List of Participants	11
Annex B: Agenda.....	13

Introduction

On 13-14 July 2006 the World Bank Group convened a conference *Strengthening Drought Management and Mitigation in the Caucasus*, in the Vere Palace Hotel in Tbilisi, Georgia. The objectives of the conference were as follows:

- Discuss the regional and country drought management and mitigation strategies produced by World Bank and national consultants under the *Drought Management and Mitigation Assessment for Central Asia and the Caucasus* and identify the requirements for their implementation.
- Examine needs and capabilities in regional cooperation and the feasibility of developing and implementing a Regional Drought Plan;
- Explore needs and capabilities in policymaking to integrate drought management and mitigation into national and regional development strategies and plans;
- Identify follow-up initiatives and activities.

The agenda of the conference was designed to meet these objectives and cover the mandates of the trust fund allocation for the ESW. Three panels were held: Planning and Policymaking for Drought, Drought and the Environment, and Community Management and Mitigation of Drought. Roundtable discussions were encouraged. The agenda of the conference is included into Annex A of this report.

The conference was attended by representatives of hydrometeorological agencies, line ministries, donors, International Financial Institutions, and other stakeholders. A list of participants is presented in Annex B.

The World Bank is grateful to the host institution of the conference, the National Hydrometeorological Service of Georgia, for its support and cooperation. This conference would not have been possible without the efforts of the staff of the World Bank Georgia Resident Office in Tbilisi, Georgia. In particular, Iliia Kvitaishvili, Maia Duishvili, Nino Mikeladze, and George Valishvili must be thanked for their contributions. Levan Alpaidze provided liaison with Hydromet of Georgia and helped organize conference activities. Mike Thurman provided overall organization of the conference, moderated discussion, and wrote the conference report.

Opening Remarks

Van Roy Southworth thanked the participants for attending the conference and welcomed all guests to Tbilisi. He noted that drought is a recurrent phenomenon in the Caucasus, which causes significant damage to the economy and society. Moreover, drought is likely to become more frequent and severe with climate change. Gradual onset disasters such as drought require constant monitoring. Drought management and mitigation should be guided by sound policy, planning, and support from the governments, as well as participation by communities. The World Bank Drought Management and Mitigation Assessment has conducted fieldwork and data collection and analysis in order to produce national and regional contingency plans to improve drought management and mitigation. The objectives of the conference were emphasized: to

discuss these outputs, to explore potential areas of regional cooperation, and to prioritize measures and investments over the short, medium, and long term.

Panel 1: Planning and Policymaking for Drought

Presentations and Reports

Jemal Dolidze presented the Draft National Drought Plan of the National Hydrometeorological Service of Georgia. He focused upon criteria for determining drought and presented the areas of Georgia most exposed to drought. Based upon analysis of data from the last 40-50 years, severe drought is expected again during the next decade. The unprecedented damages of the drought of 1998-01 were emphasized. The organization and roles and responsibilities of the Center for Monitoring and Prognosis were explained. It was noted that the rate of return for hydrometeorological services in the Caucasus was around seven to one, based upon World Bank calculations. It was proposed to form a Working Group comprised of a variety of stakeholders and more fully develop the Draft National Drought Plan and execute it with the support of donors and IFIs.

Hamlet Melkonyan presented the Draft National Drought Plan of the National Hydrometeorological Service of Armenia. He noted the frequent, intense, and prolonged exposure of Armenia to meteorological, hydrological, and agricultural drought. Climatic anomalies during 1998-2005 have been unprecedented. Climate change will affect weather and soil moisture in ways that will leave Armenia more exposed to drought. However, budgets have not allowed the National Hydrometeorological Service to adequately observe and analyze these developments. For example, soil moisture measurements are lacking for many areas, and data often has many errors, due to the breakdown of observation and transmission systems.

Ramaz Chitanava noted that Armenia's National Hydrometeorological Service has a center for seasonal, short-, and long-term forecasts and enquired concerning its usefulness in drought forecasting and early warning. **Hamlet Melkonyan** replied that the data obtained and analyzed in this center is not utilized for forecasting drought.

Mike Thurman gave a heuristic presentation designed to promote discussion. He synthesized the results of the fieldwork and planning exercise conducted under Phase Two as follows:

- Stakeholders define drought in several different ways. Therefore, operative, site-specific definitions of drought emerging from those most impacted are required for linkage with triggers in contingency plans. Several specializations and perspectives are required for successful planning, which entails the involvement of a wide range of stakeholders in the planning process. This process has only begun under Phase Two. It is important that operative contingency plans be developed, as well as constantly updated. If old plans are referred to only after another drought-related emergency situation develops, severe damages will be incurred.

- Exposure to drought is changing with the climate. However, regional prognoses of climate are unavailable. The significant discrepancies among the projections of various countries should be reconciled under the Second Communication to UNFCCC. There needs to be greater capacity for analyzing the likelihood of another drought anomaly on the magnitude of 1998-2001.
- There is a lack of data concerning the present state of groundwater and glacier resources, which are critical for drought management and mitigation. It is necessary to update this data and include it into both short and long term drought forecasts.
- Vulnerabilities to drought and capacities in management and mitigation have changed since the Soviet period, which makes an adjustment in planning and greater community involvement not only desirable, but necessary. For example, kolkhozy used to provide agrometeorological services, and now some other institution must fulfill this function. Many stakeholders would prefer to acquire a more significant role in drought management and mitigation, while in other instances a “dependency psychology is still in place.”

Discussion

Discussion began with an examination of indices for determining drought, which was prompted by **Sahib Khalilov**'s enquiry concerning the criteria for mapping exposure to drought as part of the Georgia Draft National Drought Plan. After the presenters of the Draft National Drought Plans explained in brief the methodologies utilized in their countries, discussants made the following points:

- Drought criteria do not coincide with other indices commonly utilized by FAO and other organizations.
- Even within countries, much less at regional level, there is inadequate coordination among agencies and organizations in defining drought, owing to a lack of support from the state. Data available to ministries varies, as do methodologies, which leads to different prognoses of exposure, vulnerability, and impacts. Standardization is important for countries such as Georgia, in which drought is one of the most frequent, widespread, and damaging natural disasters.

Armen Serdakyan noted that data management and standardization of indicators will be required. He briefly described EC/FAO Food Security Information for Action Programme in which he is involved (www.foodsecinfoaction.org). It is not enough to simply create a computer database and GIS system. Institutions that are expected to apply these technologies must be developed, which requires a great deal of time, effort, and training.

Sahib Khalilov commented that the agrometeorological database in Azerbaijan was well developed in the Soviet period, but deteriorated significantly in the 1990s. A small project is required to restore this database. Other urgent tasks are working out drought criteria (Palmer, Russian, Georgian, and other methods), finding adequate funding, and exploring financial risk management mechanisms such as insurance.

Abdulrahim Hajiev stated that the harmonization of datasets at the regional level is desirable. It is necessary to have joint support and have data and analyses in place in advance of a drought.

Tamaz Tourmanidze remarked that the situation is not encouraging with regard to the collection and transmission of temperature, precipitation, and soil moisture data. There is virtually no state budget for these tasks. Whereas previously there were around 150 agro-meteorological stations in Georgia, now they are almost absent, and staff involved in this work has also been reduced.

Discussion of harmonization of drought indices and data exchange and management led to a lively exchange of views concerning regional initiatives in drought management and mitigation.

Ramaz Chitanava noted that with regard to coordination of work in drought management and mitigation, there are essentially two elements: 1) monitoring, forecasting, and early warning and 2) relief and recovery. The former is the job of the Hydromet. Because drought is a regional phenomenon in the Caucasus, a regional approach along these two tracks is required. Moreover, a regional monitoring center would eliminate duplication in the application of expensive modern technologies and help to reconcile approaches to criteria for determining drought and dealing with it thereafter. GEF and other donors may be more willing to support such an approach than development strictly along national lines.

There was universal agreement among participants that a regional monitoring center was desirable. It was asserted that World Meteorological Organization regional centers for observing and analyzing global and regional meteorological phenomena had already proven their worth long ago. Draft National Drought Plans should be developed and later incorporated into a Regional Drought Plan.

Zurab Jincharadze enquired concerning the type of regional body in question. A concrete proposal was needed. A regional “supercenter” would be too expensive and probably infeasible.

Ilia Kvitaishvili interjected that a legal basis would need to be established. Moreover, support at the ministerial level in all three countries would be required.

George Kordzhakia responded that a regional center would be a simple organ staffed by specialists mandated to facilitate direct data exchange, work out new methods for prognosis, and provide meteorological and hydrological forecasting and early warning services. Ten persons could manage such a center, with an annual operating budget of around \$60,000.

Levan Alpaidze commented that, although he supported the creation of the regional center, it was necessary to think through its establishment from the perspective of the end

users. After prognosis, what types of products would be delivered to which stakeholders, and how?

Marina Shvangiradze asked whether or not cost-benefit analysis work had been conducted concerning the creation of a regional center. **Ramaz Chitanava** referred to the World Bank cost-benefit analysis calculation for meteorological services. **Ilia Kvitashvili** remarked that eventually a cost-benefit calculation will be required to compare the effectiveness of investing into a regional center and/or national centers.

Armen Sedrakyan noted that unless there is adequate capacity to execute prognosis and early warning at the national level, a regional center would be of little benefit. The development of national capacity for drought management and mitigation should be synchronized with regional initiatives such as the establishment of a drought management and mitigation center.

Jemal Dolidze suggested that a regional center be multi-functional, covering drought as well as associated natural disaster phenomena such as floods.

The discussants eventually solicited the opinion of **Mike Thurman and T.V. Sampath** concerning the possibility of World Bank support for a regional drought monitoring and early warning center. **T.V. Sampath** noted that in order for projects to be funded, they must be covered in a Country Assistance Strategy. Hydromets and other stakeholders should lobby their own governments to include drought management and mitigation into national poverty reduction and development strategies that support the CAS.

Mike Thurman remarked that in considering a regional center, it was better to proceed from the basis of developing existing institutions, such as the Georgia Hydromet, rather than creating new organizations. The development of any regional institution will require significant time and effort, as well as political will from the top levels of government. Therefore, its structure and mandates should be simple at the outset. After core capacities are developed, additional functions can be added to the developing institution. Input obtained in the conference would be incorporated into the World Bank drought management and mitigation strategy for the Caucasus.

Panel 2: Drought and the Environment

Presentations and Reports

Sahib Khalilov described the warming trend in Azerbaijan in recent decades and predicted its continuation. Models to forecast the amount of precipitation provide inconclusive results. Water resources availability is expected to decline. The role of the state in drought management and mitigation in Azerbaijan is as follows:

- Work out a management and mitigation strategy
- Provide observation and early warning
- Provide insurance and other financial risk management mechanisms
- Mainstream drought management and mitigation into the overall strategy for development of the country

The observation network, especially that utilized for agrometeorology, fell into decay in the 1990s. The Hydromet budget has grown significantly since 2002, which has permitted some modernization and replacement of outdated and dilapidated observation posts.

Tamaz Tourmanidze briefly described the exposure of Georgia to meteorological and hydrological drought and noted that the most vulnerable sectors are agriculture and hydropower. To address the decline in agrometeorological observations in Georgia during the 1990s, **Mr. Tourmanidze** and Felix Kogan of the United States National Oceanic and Atmospheric Administration began to experiment with monitoring vegetation health utilizing satellite observation (Normalized Differentiated Vegetation Index, or NDVI). Two stations have been established in Georgia for this purpose, which have provided accurate results to date.

Severe drought on the magnitude of 1998-2001 can be expected in Georgia within the next five to ten years. There is a need to speed up the process of creating strategies and establish an effective early warning system. Another critical area requiring greater attention is integrated water resources management at the basin level. WMO and World Bank should support the creation of a regional drought monitoring center along the lines discussed in Panel 1.

Discussion

Discussion began with questions to **Sahib Khalilov** from colleagues in Georgia and Armenia concerning the models, methods, and software utilized for assessing climate change, as well as the methodology for cleaning and correcting data. **Hamlet Melkonyan** noted that after many of the Armenia Hydromet staff were trained abroad, many mistakes were eliminated in assessing the magnitude of temperature increases under conditions of climate change.

Mike Thurman solicited the opinions of the group concerning linkages between climate change, desertification, and drought. **Tamaz Tourmanidze** noted that desertification has already accelerated in eastern Georgia. In part, this is due to drought, which robs the soil of moisture. Under the USSR, there was a major initiative “Combating Desertification.” However, this work stopped in 1991. **Marina Shvangiradze** noted that grants for work on desertification under the United Nations Convention to Combat Desertification should be expanded to cover issues such as the linkages between drought and desertification.

Mike Thurman enquired whether or not desertification process in the Caucasus were making drought more frequent. This is occurring in Central Asia, where the desiccation of the Aral Sea and desertification of its delta has induced climate change.

Sahib Khalilov noted that Azerbaijan is at great risk from desertification. Salinization, which is the first stage of desertification, is becoming more widespread. Livestock and rangeland management are poor, leading to desertification and rendering pasturelands more vulnerable to drought than before. Moreover, sands from the Kara Kum Desert in

Turkmenistan are being carried over the Caspian Sea to Azerbaijan. There is no Institute for Desert Studies in the Caucasus as in Central Asia (Ashgabat, Turkmenistan). Observation of desertification processes is difficult, resulting in a lack of reliable statistical data.

T.V. Sampath observed that when there is a severe deficit of soil moisture and the temperature rises four to five degrees C, the organic content in soil literally burns up. Moisture retention capacity is reduced, and the soil becomes less fertile and more vulnerable to erosion.

Panel 3: Community Management and Mitigation of Drought

Presentations and Reports

Abdulrahim Hajiev described the high exposure of lowland areas of Azerbaijan to meteorological and hydrological drought, which necessitates irrigation and the impoundment of water resources in reservoirs. Vulnerabilities in water management are as follows:

- Reservoir management is strained between uses for irrigation, hydropower, sanitary needs, and ecological flows. In 2001, parts of Mingechevir Reservoir had to be dredged to release emergency reserves of water, which was difficult to deliver even for municipal use.
- Pontoon pumps such as those located on the lower section of the Kura River are vulnerable to fluctuations in the level of the river.
- Due to lack of funds for maintenance, infrastructure has deteriorated, which in turn makes delivery of water problematic.
- On-farm irrigation and drainage systems are in poor condition, and irrigation application techniques are inefficient, which greatly increases demand for water and makes it difficult to introduce emergency conservation measures. Sprinkler irrigation and other advanced methods that were under development in the 1980s are no longer practiced, owing to lack of maintenance and the eventual disappearance of the equipment and/or infrastructure.

Vulnerabilities in irrigation and drainage sector are being addressed with the help of World Bank and other investments. Further investment is needed into the construction of multi-use reservoirs on rivers in foothill areas, which, owing to high variability of water flows, are susceptible to mudslides and floods in spring and dry up entirely during summer. This investment would mitigate water scarcity, generate power, and reduce the risk of mudslides and floods.

Azerbaijan is a downstream country that must pay attention to transboundary water allocation and its legal bases. Transboundary arrangements with Iran are satisfactory. Water allocation from rivers in the Nagorno-Karabagh to adjacent districts of Azerbaijan remains problematic.

Marina Shvangiradze asked how Azerbaijan has gone about rebuilding reservoirs and its irrigation and drainage system. **Abdulrahim Hajiev** responded that this effort was

preceded by feasibility studies. Development of the water management has been incorporated into national, sector, and regional development programs.

Levan Alpaidze asked how on-farm water losses are being reduced. In response, **Mr. Hajiev** answered that the effort has only begun. The main directions are the implementation of cost recovery through a payment for water delivery, the establishment of Water Users' Associations countrywide, and the rehabilitation of on-farm irrigation and drainage systems by WUAs and SAIA. **Mike Thurman** added that community participation and integrated water and land management are critical for drought planning in Azerbaijan, which has limited supplies and many valuable water-using sectors.

Levan Alpaidze presented the methodology and results of Stakeholder Assessment conducted in selected drought-prone districts of Georgia under Phase Two. According to the respondents, the main impact of drought is reduced crop yields and lack of means to sell products, although several other impacts were noted. Early warning and the improvement of irrigation and drainage were identified as the most frequently mentioned means of combating drought. However, the wide range of answers provided makes it clear that a comprehensive, mutually reinforcing set of measures is required.

When asked to rank the institution most appropriate for drought management and mitigation, respondents most frequently selected the local municipality, local irrigation department, and district administration (25% apiece), followed by the central government, population, Hydromet service, and Ministry of Agriculture (13-16% apiece). The creation and execution of drought plans in the Caucasus must account for the perspective of those most impacted and involve all stakeholders engaged in prognosis, early warning, and assessment for various types of impacts, as well as relief and recovery operations.

Armen Sedrakyan noted that in Armenia crops are subjected a variety of natural disaster phenomena. According to fieldwork conducted by the Hydromet of Armenia under Phase Two, for every year during 2000-05 damages to agriculture resulting from drought have comprised 15-40% in all marzes of Armenia except Tavush and Shirak.

It is critical for agriculture in Armenia that methods be worked out for the prognosis and assessment of the onset, end, length, and intensity of drought. This will involve re-equipping the agometeorological network, the creation of a database, and improvement of methodologies for forecasting the growth, development, and yield of crops, proceeding from factors of climate change. The observation and early warning system is designed to disseminate data directly to farmers from stations in the field. However, poor equipment and communications impede prognosis and early warning.

A strategy for improving agometeorological service in Armenia would begin with the rehabilitation and modernization of observation posts, as well as communications systems. A database management system should be established. Early warning should be established in the areas most exposed and vulnerable to meteorological drought.

Measures to improve water management should focus upon areas with chronic water scarcity that are most prone to hydrological drought. These measures include the improvement of monitoring of water resources in order to determine the amount available for irrigation, continuation of institutional development (including regulatory measures and the development of Water Users' Associations), the rehabilitation of infrastructure in priority locales and sectors, cost recovery, and improvement of on-farm water and land management technologies and practices.

Farmers also lack the financial resources to mitigate against drought or to recover from it. Thus, a strategy for drought mitigation in the agriculture sector should account for the provision of credit and financial risk management mechanisms such as insurance. Land tenure and consolidation of farm units also must be addressed. Armenia will need the cooperation of international organizations and donors in order to implement these measures and achieve food security under conditions of climate change and increased frequency of drought.

T.V. Sampath described various types of drought and used photos to illustrate how inadequate cropland and rangeland management in Tajikistan makes soils vulnerable to drought and erosion. During 200-01 damages were severe, and the ad hoc nature of relief and recovery operations made the cost of the drought much higher than was necessary. Conflicts over water sometimes led to violence and even fatalities. In many instances around three years were required for farmers to restore production. In order to address these issues, the World Bank has created the Tajikistan Community Watershed Project. **Mr. Sampath** concluded his presentation with a description of the components of the project and their contribution to drought mitigation in rural areas of Tajikistan.

Discussion

Marina Shvangiradze remarked that little had been said heretofore concerning impact assessment of damages resulting from drought. An economic assessment of costs and benefits would help determine which measures are needed. **Armen Sedrakyan** and **Hamlet Melkonyan** responded that figures concerning drought damages in Armenia are obtained from Hydromet and the Ministry of Agriculture. Previously data had been collected for impact assessment concerning other natural disasters, but not drought.

T.V. Sampath noted that the contribution of drought to damages in agriculture and other sectors is difficult to assess. **Mike Thurman** added that this was due to due to the multitude of intervening factors, as well as the wide range of impacts across the economy, society, and environment. A thorough cost-benefit analysis would involve the collection of an immense amount of data and complex econometric calculations requiring resources and time unavailable to Phase Two. Given the problems with data and its harmonization, even such a calculation would be bound to produce questionable results. Instead, Phase Two had arrived at a rough, yet still incomplete, approximation of the opportunity cost of not adequately managing and mitigating drought, in terms of damages to agriculture and relief and recovery operations.

A discussion ensued concerning the use of various types of software, methodologies, and data for impact assessment. Discussants made the following points:

- Software such as that provided by FAO does not always match the impact assessment needs of the country or district.
- Data is sometimes unavailable or inaccurate.
- There is poor linkage among various impact assessment initiatives. Duplication among donors is sometimes evident among these projects and programs.
- The timing of impact assessment greatly influences the results.
- Further work is required concerning the differences between impacts and mitigation before and after the collapse of the USSR.

Tamaz Tourmanizde enquired concerning the role of NGOs in facilitating community participation in drought management and mitigation. **Mike Thurman** and **Levan Alpaidze** responded that to date the primary contribution of NGOs to drought management had been relief and recovery operations. The role of international NGOs such as Red Cross in this respect in Georgia was significant during 2000-01. Stakeholders consulted during fieldwork for Phase two emphasized their general satisfaction with this aid, when it was available. Targeting of beneficiaries can be improved and the capacity of local NGOs bolstered. Increasingly aid measures focus upon recovery and mitigation, rather than relief. Many NGOs lack adequate capacity for implementing mitigation measures like improving on-farm land and water management.

George Kordzhakia noted that international organizations and NGOs appear to be fairly coordinated with respect to water-related initiatives. The same should be done for other sectors critical for drought management and mitigation.

Mike Thurman enquired concerning the accuracy of satellite observation of NDVI for early warning and impact assessment in a country with uneven topography such as Georgia. **Tamaz Tourmanizde** noted that with sufficient correction excellent results had been obtained. NOAA has requested more frequent observations. There is a need to invest in research in this direction to further develop NDVI methodologies. In parallel, river basin management and community watershed management should be introduced, along with agro-technical management and mitigation measures..

Ramaz Chitanava delivered the closing remarks. He thanked the participants of the conference and noted that they had achieved excellent results. There is need to convince the Government of the significance of hydrometeorological information and to increase budgetary allocations for forecasting and early warning. Huge sums are not required. In parallel, it necessary to better develop linkages among ministries and with other stakeholders. Hydromet would welcome the establishment of a regional drought monitoring center and hopes that donor and IFI support will be forthcoming.

Annex A: List of Participants

Name	Institution	Contact Information
Levan Alpaidze	Consultant, World Bank	levange2001@yahoo.com
Nino Antadze	Chief, Transition Unit, UNDP Office of the Resident Coordinator	nino-antadze@undp.org Phone: (995 32) 94 31 63 Fax: (995 32) 95 95 16
Marina Arabidze	Head International Department, National Hydrometeorological Service, Ministry of Environmental Protection and Natural Resources of Georgia	m.arabidze@yahoo.com
Nino Chikhradze	Center for Monitoring and Prognostication, Ministry of Environment and Natural Resources of Georgia	nchikhradze@yahoo.com
Levan Chikvaidze	Ministry of Internal Affairs of Georgia	Phone: (995 32) 75 04 91/ 75 51 25
Ramaz Chitanava	Director, National Hydrometeorological Service, Ministry of Environmental Protection and Natural Resources of Georgia	ramazchitanava@rambler.ru Phone: (995 32) 95 50 00
Jemal Dolidze	National Hydrometeorological Service of Georgia, Ministry of Environment and Natural Resources of Georgia	Phone: (995 32) 95 64 12 Fax: (995 32) 95 50 06
Maia Duishvili	Operations Officer, World Bank Office, Tbilisi, Georgia	mduishvili@worldbank.org Phone: (995 32) 91 30 96/ 91 23 71/91 23 56
Vasil Gogoladze	Office of the President (Emergency Management)	gogoladze@gsc.gov.ge Phone: 99 530 580
Abdulrahim Hajiev	Director, Directorate for Operation of Reservoirs and Water Distribution Points, State Amelioration and Irrigation Agency, Ministry of Agriculture of Azerbaijan	Phone (99 412) 493 09 40 Fax: (99 412) 493 11 76
Giorgi Jaoshvili	National Hydrometeorological Service of Georgia, Ministry of Environment and Natural Resources of Georgia	gjaoshvili@yahoo.com
Zurab Jincharadze	Georgia Team Leader, USAID South Caucasus Water Program	zurab.jincharadze@pageorgia.ge Phone: (995 32) 92 14 85/86, ext. 122 Fax: (995 32) 94 06 47
Elene Kaukchishvili	Food and Agriculture Organization of the United Nations	fao-ge@fao.org
Sahib Khalilov	Deputy Director, National Hydrometeorological Department, Ministry of Environment and Natural Resources of Azerbaijan	meteo@azdata.net Phone (99 412) 467 88 06 Fax: (99 412) 441 56 85

Konstantin Khmaladze	State Chancellery of Georgia	khmaladze@geo.gov.ge Phone: 93 66 84
Iliia Kvitaishvili	Rural Development Specialist, World Bank Office, Tbilisi, Georgia	ikvitaishvili@worldbank.org Phone: (995 32) 91 30 96/ 91 23 71/91 23 56
George Kordzhakia	Head, Center for Monitoring and Prognostication, Ministry of Environment and Natural Resources of Georgia	g.kordzhakia@web-sat.com Phone: (995 32) 95 91 37
Bakur Kvezereli	Ministry of Environment and Natural Resources of Georgia	kvezereli@geo.gov.ge
Hamlet Melkonyan	Head of Scientific Applied Center of Hydrometeorology and Ecology, National Hydrometeorological Service of Armenia	hmelkonyan@rambler.ru Phone: (3741) 53 36 16 Fax (3741) 53 29 52
Ivane Menteshashvili	Interpreter, Doctor of World History	Phone: (995 32) 34 76 25 ivanem@posta.ge
Nino Ositashvili	Manager, Vere Palace Hotel	ninosit@verepalace.com.ge Phone: (995 32) 25 33 40/41/42
Pridon Sadunishvili	Ministry of Internal Affairs of Georgia	cepgeorgia@posta.ge
T.V. Sampath	Consultant, World Bank	tsampath@worldbank.org Phone: 202-473-7715
Marina Schvangiradze	Head of National Policy Division, Coordinator of SNC of Georgia, Department of Climate Change, Ministry of Environment and Natural Resources of Georgia	mshvangiradze@gol.ge Phone (995 32) 94 15 80 Fax: (995 32) 94 15 36
Armen Sedrakyan	EC-FAO "Food Security information for Action Programme," Information Systems Consultant/ Armenia Ministry of Agriculture	armen@agrounit.am Phone: (3741) 52 92 31
Van Roy Southworth	Resident Representative, World Bank Office, Tbilisi, Georgia	Phone: (995 32) 91 30 96/ 91 23 71/91 23 56
Mike Thurman	Consultant, World Bank	mikethurman@yahoo.com Phone: (301) 984 63 65
Tamaz Tourmanidze	Professor, Correspondent Member, Georgia Academy of Agricultural Sciences	nchikhradze@yahoo.com Phone: (995 32) 96 06 71 Fax: (995 32) 95 02 02

Annex B: Agenda

13 JULY

Registration and Coffee (8:45-9:15)

Opening Remarks: Ilya Kvitaishvili (9:15-9:30)

Panel 1: Planning and Policymaking for Drought (9:30-11:00)

Jemal Dolidze, National Hydrometeorological Service of Georgia, “A Draft National Drought Plan for Georgia”

Hamlet Melkonyan, National Hydrometeorological Service of Armenia, “A Draft National Drought Plan for Armenia”

Discussion

Coffee Break (11:00-11:30)

Panel 1: Planning and Policymaking for Drought (11:30-12:30)

Mike Thurman, Consultant/World Bank, “Drought Management and Mitigation in the Caucasus and Central Asia: A Synthesis of Survey and Field Work in Support of Planning”

Roundtable Discussion

Lunch Break (12:30-14:00)

Panel 2: Drought and the Environment: (14:00-15:00)

Sahib Khalilov, National Hydrometeorological Department, Ministry of Environment and Natural Resources of Azerbaijan, “Drought and Climate Change in Azerbaijan”

Tamaz Tourmanidze, Georgia Academy of Agricultural Science, “Drought and Climate Change in Georgia”

Roundtable Discussion: Regional Prognosis of Drought and Water Resources Availability under Conditions of Climate Change and Desertification (15:00-16:00)

Break (16:00-18:00)

Dinner (18:00-20:00)

14 JULY

Opening Remarks: Georgia National Hydrometeorological Service (9:00-9:30)

Panel 3: Community Management and Mitigation of Drought (9:30-11:00)

Abdulrahim Hajiyev, State Amelioration and Irrigation Service of the Ministry of Agriculture of Azerbaijan, “Planning for Water Shortages in Azerbaijan”

Levan Alpaidze, Consultant/World Bank, “Drought Management and Mitigation in Georgia: A View from the Countryside”

Armen Sedrakyan, Ministry of Agriculture of Armenia, “Agrometeorology and On-Farm Water Management for Drought Management and Mitigation in Armenia”

T.V. Sampath, Rural Development Specialist, World Bank “Community water shed Management for Drought Mitigation”

Discussion (30 minutes)

Coffee Break (11:00-11:30)

Roundtable Discussion: Regional and International Cooperation for Drought Management and Mitigation (11:30-13:00)

Concluding Remarks (13:00-13:30)

Lunch (13:00-14:00)