

PD-ABR-547

**ENVIRONMENTAL ASSESSMENT**

**ARMENIA**

**PROPOSED ENVIRONMENTAL PROGRAMS**

**FOR**

**USAID ASSISTANCE**



By

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**ENVIRONMENTAL ASSESSMENT AND RECOMMENDED PRIORITIES  
OF PROPOSED ENVIRONMENTAL PROGRAMS  
FOR USAID ASSISTANCE TO THE REPUBLIC OF ARMENIA**

**Summary:** In August, 1998 USAID/Armenia requested field assistance in preparing an environmental assessment to be used in Mission strategy development. A two-person assessment team including Carl Mitchell (Environmental Planner) and Carl Maxwell (Environmental Engineer) representing USAID/ENI Bureau's Office of Environment, Energy & Urban Development, visited Armenia during a 10-day period in September and October to prepare this assessment. Background documents previously prepared by the World Bank, by USAID contractors in the energy sector, and the Cambridge/Yerevan Sister City Association were reviewed in advance of the field visit.

During a ten-day visit to Armenia the team interviewed 17 representatives of the Government of Armenia (GOA), National Assembly, USAID contractors and various international donors. From this interview process, 41 recommendations of various interventions to address the environmental concerns were derived and documented. Of these, 24 interventions are rated at a high priority in terms of severity of risk to human health, the economy, and ecosystems (i.e. Rehabilitate and upgrade existing wastewater treatment plants and water distribution systems). These recommendations are further screened and prioritized one through four to address the mission's capability considering personnel and funding limitations for implementation over a four-year period. For example the priority one interventions, Lead removal from gasoline, Wastewater and drinking water treatment and Forest recovery program which are key concerns identified by the GOA could cost in the order of \$2.9 million in FY 99 and LOP funding of \$17.0 million.

The assessment report summarizes the environmental issues facing Armenia, suggests a prioritization of these issues and identifies potential programs and cost (priority 1 & 2) for USAID assistance to address these issues.

**Recommendation:** Mission should devote five to ten percent of its discretionary resources to environment because of the key role these issues play in economic restructuring and public health. At a minimum the Priority 1 recommendations should be incorporated in the mission program.

## Environment Profile:

Industrial air and water pollution in Armenia has declined since the collapse of Communism because of shutdown of industrial chemical factories. Although this has reduced the population's exposure to toxic chemicals, it also brought an abrupt end to guaranteed markets for Armenian products to the Soviet Union. That event was only the second of three economic shocks near the turn of the decade. In 1988, an earthquake devastated parts of Armenia, severely damaging the country's infrastructure. 25,000 people were killed and 500,000 rendered homeless. Then, in the early 1990s, the Nagorno-Karabkh conflict intensified the economic decline due to the loss of trade routes caused by Turkish and Azerbaijani blockades and acute hyperinflation. The Armenian government will face an uphill battle over the next five to seven years to restore economic growth without environmental deterioration. The exposure to lead and dust in cities, particularly in Yerevan, the capital, is much greater than in the rural areas. While most drinking water is derived from good-quality groundwater sources, old pipes and infrastructure, leaks, and poor management heavily compromise the availability and quality of the drinking water. Competing demands for scarce financial resources, a still limited environmental consciousness among the public, and a reviving economy will challenge the government to reduce pollution emissions and ambient levels, many of which substantially exceed US and European Union (EU) levels. It will probably take a decade or more for policy improvements, market-based incentives, and improved finances to reach a level of sustainability, nevertheless the government is taking action, changes are taking place, and progress is being made. For example, Armenia's draft National Environmental Action Plan (NEAP), produced with the support from the World Bank, focuses attention on two priorities: improved water supply and utilization, and phasing out lead in gasoline and mitigating exposure to lead, especially among young children. Following are highlights of the environmental assessment:

- Contamination of the drinking water distribution system in Yerevan is a major problem caused by cross contamination of sewage from leaking pipes. Water quality testing showed 35% of samples with human fecal coliform and 50% for total coliform. Chlorine levels are not controlled properly and can vary from none to high. The Yerevan wastewater treatment plant (YWWTP) is treating 50% of the wastewater it receives and the remaining flows directly into the Hrazdan River. Regions outside Yerevan have no treatment of any kind, for example wastewater effluent is draining into Lake Sevan from the bordering towns. Over-extraction of water from the lake for hydropower and irrigation needs is adversely affecting the lake ecology (i.e. lost native fish population). Lake Sevan is viewed by the people of Armenia as a symbol or heart of Armenia. During the Soviet era pre-

treatment of industrial waste was required and there are still existing standards of effluent quality for the various industrial wastes produced. The problem lies in enforcement which is effectively non-existent. Water quality is likely to deteriorate further, owing to the growth of water-polluting industries and municipal water use, poor maintenance practices, and the high costs of water treatment.

- Air pollution from unleaded gasoline is one of the most critical problems in Yerevan. Imported vehicles from the past are obsolete but still in operation using poor quality fuel which is adding to the air pollution problem. In June 1998 Armenia signed in Aarhus, Denmark an agreement to phase out of the use of unleaded gas and change to un-leaded fuel by 2005. The date was revised to 2008 because of the economic problems in Armenia. Some of the actions proposed to improve air quality are directed towards transport, both public and private. They foresee the control of emissions, phasing out leaded gasoline and improving fuel quality, making catalytic converters mandatory and introducing a vehicle inspection program. The control of emissions from factories and power stations is also envisaged, with regular monitoring of air quality. This includes assessing the effects of pollution on crops and natural vegetation. They have laws on air pollution adopted in 1994--according to this law they will develop regulatory acts and revise/improve existing laws as necessary.

Surging automobile and truck use will lead to increased emissions of lead, nitrogen oxide, and carbon monoxide until laws requiring catalytic converters and the phasing in of unleaded gasoline are fully implemented and enforced.

The public transportation system--electric trams, trolleys, metro--is in great need of maintenance and repair.

- Pesticides are passing through the food chain to breast-fed infants. Farmers are unaware of safe practices on the use of pesticide and fertilizer or viable alternatives. There needs to be an education program in this area for the farmers. Also, water logging and salinization is a large agricultural problem in the Ararat Valley.
- Contamination of soil is probably the number one problem in the agriculture sector. There is a high level of individual agricultural activity using soils contaminated with heavy metals (15 elements) generated from past industrial practices. Many cities including Yerevan have high levels of heavy metal contamination. Half the population is consuming vegetables grown in these contaminated agricultural areas. There are no sharp toxic effects showing up now but there is a very high incidence of stillbirths in the general population.

The Center for Ecological-Noosphere Studies has developed a map illustrating the current levels of contamination as compared to acceptable norms for various elements in the air and soils in Yerevan. All exceed the acceptable standards significantly of one or more metals. For example, 90% of the lead in air is caused by transportation and exceeds the allowable levels by 5%. Their analysis indicates that at least half of the population is receiving high doses of metals via produce.

There are no clean agricultural areas because most (80%) of Armenia was highly industrialized to extract various elements or process imported ores from other regions of the USSR. These inherited problems and current agricultural practices exacerbate the environmental problem.

■ Nuclear Safety is a high priority in the eyes of the public of Armenia. Concerns were expressed both about operational safety, seismic risk and long term impact to the surrounding ecology, environment, and health of the workers at the plant and local population.

The energy sector has been weakened by (1) the 1988 earthquake that led to the 1989 closure of the Medzamor Nuclear Power Plant, leading to a greater reliance on fuel imports, (2) the embargo on natural gas and oil imports by Azerbaijan as a result of the conflict over Nagorno-Karabakh, (3) the civil disturbances in Georgia that led to disruption of natural gas transport through that country to Armenia, and (4) historically low energy prices and low collection rates that have both fostered excessive energy use and resulted in insufficient revenues to cover the maintenance and investment needs of the energy sector, as well as cover the costs of imported fuel. Unit 2 of the Medzamor NPP was restarted in Nov, 1995 but, as a type of reactor considered unsafe by the G-7, represents a potential environmental hazard of great magnitude.

While the GOA has taken advantage of the shutdown of Medzamor to make many repairs and enhancements to Unit 2, the design flaws (e.g., no containment dome, poor fire control systems) inherent in Soviet-designed VVER-440/230 reactors still make operating this plant a potential source of significant environmental hazard.

While the GOA wishes to retire the plant by 2004-2005, this can only occur if sufficient power generation facilities are available through the development of new facilities or the rehabilitation of existing power generation facilities to replace the electricity generated by the 440 MW unit at Medzamor.

- Transboundary pollution, and issues such as nuclear safety, the transport of hazardous materials, and competition for water resources will remain potential sources of intra-regional friction between Turkey, Azerbaijan, Georgia and Iran. This is particularly true in Armenia's nine-year old conflict with Azerbaijan over the Nagorno-Karabakh enclave.
- There is no separation of domestic and industrial waste (chemical, toxic, hospital, etc.), and this is viewed as a very serious problem. There are too large waste dump sites with clay liners outside Yerevan but the department does not know how much leachate is leaking into the fresh water aquifer. The legislation exists and looks good on paper but it is not being implemented. Separate landfills would solve the problem but the country is too small to allocate land for this purpose and there are not enough funds to make this change in the areas where the landfills are needed.
- In the privatization process there is an expressed concern by Dr. Radik Martirosyan, a professor of technical science, about the environmental consequences of privatization. This is especially true in mining operations. On the other hand, private sector companies are reluctant to buy into a business because of the uncertainty of potential liabilities for existing contamination and waste. For example, existing mines have produced large amounts of waste, what cleanup will be required? Who will pay for it? What are the rules? If these concerns can be overcome, privatization and foreign investment are likely to accelerate plant modernization, which will reduce pollution and produce commensurate improvements in health conditions.
- Based on the Burns and Roe Enterprises, Inc. technical report dated June, 1998 - The electrical energy production sector (Thermal and Hydropower plants) is indeed negatively impacting the environment and health of the Armenian people. The extent of this sector's contribution to countrywide pollution levels cannot be accurately estimated at this time. However, existing practices occurring at the facilities listed in the report include the following:
  - Hydropower plants discharge untreated sewage, plant-derived washwater, and cooling water directly to the associated water body,
  - Polychlorinated biphenyls (PCBs) are present at all electrical energy production facilities and in many cases spills or leaks of PCB-contaminated materials are discharged directly to water bodies,
  - Oil/Water separation devices are either not provided

(hydropower plants) or are extremely inefficient and aged beyond their useful life (thermal powerplants),

- Controls and regulations are not in place for management of hazardous substances such as asbestos (especially evident at thermal power plants),

- Solid waste, hazardous waste, and/or contaminated materials originating from the facilities are either buried or burned at the sites, or are disposed of at a municipal dump. No regulations regarding disposal of hazardous materials were found.

To facilitate the World Bank's transmission/distribution system rehabilitation loan, Burns and Roe completed the first Environmental Assessment (EA) of the Armenian power sector. The EA included field sampling which detected the presence of hazardous PCBs at many sites in Armenia. B&R has since finalized its report and has worked with the GoA and World Bank to develop a PCB mitigation plan to protect the Armenian environment and public health. When finalized, both the EA document and the mitigation plan will be delivered to the World Bank and the GoA, and many of these results will be incorporated into the Armenian National Environmental Action Plan in 1998.

**PERSONS AND ORGANIZATIONS INTERVIEWED**  
**9/30/98 - 10/07/98**  
**YEREVAN, ARMENIA**

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1. **Greens Union of Armenia** - PhD Hakob Sanasaryan, President
2. **Professor of Technical Science** - Dr Radik Martirosyan
3. **Socio-Ecological Association** - Ms Srбуhi (Angela) Haroutyunian
4. **Environmental Public Advocacy Center (EPAC)**  
Prof Aida Iskoryan, President  
Gahmk Markarian, Liaison - EPAC  
Suren Kristasatiryan, Staff Attorney - EPAC  
Ara Nazaryan, Staff Attorney - EPAC
5. **Initiative & Investment Cultural Fund "KHAZER"**  
Aram Gabrielian, President
6. **Youth Ecological Group** - Mr Sergey H Arevshatyan, President
7. **National Academy of Sciences** - Dr Armen K Sagatelian, Dir
8. **Association for Human Sustainable Development**  
Karine Danielyan, President
9. **Ministry of Health** - Manvel H Manrikian, Chief and Ms Nune Bakunts, Coord of National Environmental Health Action Plan
10. **IRIS** - Richard Blalock
11. **United States Department of Agriculture (USDA)** - Ruth Harris
12. **Environmental Research and Management Center**  
**American University of Armenia** - Robert Kurkjian, Research Engineer and Charles Dunlap
13. **Commission on Society, Health and Environmental Protection, National Assembly of Armenia** - Gegham T Gharibjanian, Chairman
14. **Hagler Bailly** - Leszek Kasprowicz, Senior Associate and Paul Christian Moulin
15. **Ministry of Nature Protection** - Hosnik Kirakosyan, Coord Lake Sevan Study and NEAP, Dr Simon R Papyan, First Deputy Minister
16. **Technical Assistance to the Commonwealth of Independent States (TACIS)** - Didier de La Mettrie, Project Manager
17. **United States Development Program (UNDP)** - Anahit Simonian, Project Officer

18 **Environmental Public Advocacy Center (EPAC)** - Janet Katz

19 **EU-TACIS** - Paul Tibbs, Team Leader

20 **Union of Ecological Organizations** - Dr Armen K Sagatelian,  
President

## **Environmental Issues**

The following list highlights of the environmental issues discussed through the interviews conducted in Yerevan. Recommendations to address these issues are ranked and prioritized on the following pages.

### Policy, Legislation and Institutions

- incomplete legislation (flaws and lack of implementing regulations)
- lack of enforcement (political will, resources, and training all inadequate)
- lack of public and institutional awareness of environmental issues and their intersection with economic recovery

### Environmental Health

- drinking water quality poor due to leaking system and service interruptions
- 20 partially functioning or non-functioning WWTPs
- cholera in summer, 1998 from above problem
- industrial and population co-location
- food safety (metals contamination in soils)

### Air Quality and Management

- leaded gasoline
- automobile exhaust in Yerevan

### Water Quality and Resource Management

- irrigation waterlogging and salinization
- pollution of waterways and lakes, especially Lake Sevan
- conflict between hydropower, ecosystem, and recreation in Lake Sevan

### Solid Waste Management

- uncontrolled dumping of 40% of Yerevan's domestic waste
- lack of landfill sites/ existing Yerevan sites full
- co-mingling of toxic industrial and domestic waste

### Forestry and Land Resources Management

- deforestation
- erosion
- lack of fuel wood

### Ecosystems and Biodiversity

- endangered species due to habitat loss

## COMPARATIVE RISK ASSESSMENT

Applying the concept of comparative risk, recommendations for programs to address environmental problems were ranked according to the severity of the risk these problems posed to three criteria as listed below (see worksheet, Appendix B)

<u>Criteria</u>	<u>Rank</u>
• human health	(high, medium, low)
• the economy	(high, medium, low)
• and ecosystems	(high, medium, low)

These qualitative rankings (high, medium, low) were based on professional judgement informed by the background documents reviewed and interviews conducted

Recommendations carried forward into this document are those which ranked "high" for at least one or more of the three criteria above and are further prioritized in terms of mission capability on the following pages

## PRIORITIZATION

**FIRST PRIORITY** Address high-risk problems which

- *can be integrated into existing USAID/Armenia programs,*
- *are of limited-cost which can either stimulate local solutions by cost efficiencies or lead to non-USAID grants or loans,*
- *are key concerns identified by the GOA as their top priorities based on the National Environmental Action Plan (NEAP) prepared jointly with the World Bank and international donors*

**SECOND PRIORITY** Address high-risk problems as in the first priority category with the exception that these are not identified by the GOA as their top priority

- *can be integrated into existing USAID/Armenia programs,*
- *are of limited-cost which can either stimulate local solutions by cost efficiencies or lead to non-USAID grants or loans,*

**THIRD PRIORITY** Address high-risk problems as in the first priority category with the exception that these are not easily integrated into existing USAID/Armenia programs

- *are of limited-cost which can either stimulate local solutions by cost efficiencies or lead to non-USAID grants or loans,*
- *are key concerns identified by the GOA as their top priorities based on the National Environmental Action Plan (NEAP) prepared jointly with the World Bank and international donors*

**FOURTH PRIORITY** Address high-risk problems which

- *Require more significant investments of USAID funds or management time*

Additional opportunities for coordination and synergy between other donors programs may also be important for Mission consideration, however insufficient information was available to fully integrate with the plans of other key donors, such as the EU-TACIS program or UNDP. Subsequent versions will include recommendations for coordination with plans of other donors

## RECOMMENDATIONS

**FIRST PRIORITY RECOMMENDATIONS** Address high-risk problems which

- can be integrated into existing USAID/Armenia programs,
- are of limited-cost which can either stimulate local solutions by cost efficiencies or lead to non-USAID grants or loans,
- are key concerns identified by the GOA as their top priorities based on the National Environmental Action Plan (NEAP) prepared jointly with the World Bank and international donors

- Lead Removal from Gasoline (assist via reviews of laws by ABA/CEELI and USEPA, follow with USEPA program) Support GOA adherence to recently signed convention to phase out lead in gasoline by 2008 Existing ABA/CEELI program now reviews GOA environmental legislation, USEPA should be willing to provide gratis advice/legal reviews Support more extensive program in out years as legal foundations are established, use USEPA through travel support and donated labor [In support of IR 1 6 3a]

- Design program (establish data base)
- Establish policy/regulations (legislation)
- Institutional development/equipment
- Public information program
- Implement program (monitor, data collection, compliance)

Proposed Duration 3-4 years

Estimated Budget for 1999 \$400,000 (LOP \$2 5 million)

- Wastewater and Drinking Water Treatment Improvement (via USAID community level public health initiatives or new program) Important to repair/replace leaking water distribution systems and to rehabilitate and upgrade existing wastewater treatment plants Provide demonstration program of low cost improvements to existing systems, planning for appropriate technologies, targeted maintenance, hydraulic modeling, service pricing (cost-recovery), energy efficiency and other reforms to support grants and/or IFI loans for rehabilitating treatment systems Consider USEEP for potential partnership with U S Municipality [In support of IR 1 6 3a]

- Institutional assessment (water/sewage departments)
- Integrated water resources management plan
- Design/contract prep
- Develop cost-recovery program
- Public information campaign

- Implementation pilot project/s

Proposed Duration 3-4 years

Estimated Budget for 1999 \$1 5 million (LOP \$10 0 million)

- Forest Recovery Program (via USAID LG community-based initiatives and/or leveraging program) Establish pilot programs to initiate reforestation and erosion control, in concert with government and legal training programs to leverage grants and/or IFI loans [In support of IR 1 6 3b]

- Policy reform/institutional assessment

- Establish data base/watersheds/land areas for projects

- Training/demonstration projects

- Public Awareness

- On-going pilot projects

Proposed Duration 2-3 years

Estimated Budget for 1999 \$1,000,000 (LOP \$4 5 million)

**SECOND PRIORITY RECOMMENDATIONS** Address high-risk problems as in the first priority category with the exception that these are not identified by the GOA as their top priority

- *can be integrated into existing USAID/Armenia programs,*
- *are of limited-cost which can either stimulate local solutions by cost efficiencies or lead to non-USAID grants or loans,*
- Implement Environmental Legislation (via ABA/CEELI or ENI's regional CEEP program) Provide technical support in developing regulations to implement environmental legislation and make needed revisions to new laws Environmental laws are largely complete but include flaws and often lack the regulations to implement them [In support of IR 1 6 1]
  - Environmental legislation assessment
  - Develop regulations
  - Training (government staff)/Public Information Program
  - Provide assistance in implementation

Proposed Duration 2-3 years

Estimated Budget for 1999 \$600,000 (LOP \$3 0 million)

- Increase Enforcement (via ABA/CEELI or new policy advisor recommendation below) Many environmental requirements are not enforced due to lack of training and funding Institute training to improve enforcement capability for non-compliance of environmental laws already on the books concerning drinking water and sewage, toxic disposal, solid waste, deforestation and other problems [In support of IR 1 6 1]
  - Develop training program
  - Laboratory facilities/equipment
  - Operations/maintenance/training (2 years)
  - Review effectiveness of environmental compliance

Proposed Duration 3-4 years

Estimated Budget for 1999 \$1 0 million (LOP \$12 0 million)

- Environmental Liability in Privatization (via USAID's privatization contractor/s and either the policy advisor or WEC) Incorporate (1) evaluations of sites being privatized for potential environmental liabilities and disclose this information to purchasers and (2) legal and policy reform to clearly establish legal liability for past toxic industrial contamination at plants being privatized Both

actions would serve to make costs transparent to the GOA and prospective purchasers. The GOA could better understand either its own liability or the discount to value created by past contamination. Purchasers gain confidence that due diligence had been conducted, that liabilities were fixed and transparent, and can reflect this knowledge in their purchasing decisions, lowering their risk and increasing the potential for the GOA capturing the value of firms being privatized [In support of IR 1 6 2]

- Develop data base (evaluations/inventory)
- Establish legislation
- Training/Institutional development
- Implement Privatization Program

Proposed Duration 3-4 years

Estimated Budget for 1999 \$1 0 million (LOP \$4 0 million)

- Environmental Law Training (via judicial reform program and EPAC) Reinforce and increase USAID programs to train judges and procurators in existing and planned environmental laws and enforcement issues to increase awareness of the need for these laws. Train legislators in principles of environmental legislation and legislative drafting techniques. Train professors in law school/s to produce students with stronger skills in the above [In support of IR 1 6 4]

- Develop Training Program
- Training of trainers
- Training supplies/equipment
- Implement Program

Proposed Duration 2-3 years

Estimated Budget for 1999 \$1 5 million (LOP \$3 5 million)

- Local Government Environmental Training (via USAID LG community-based initiatives) Train Marzpet and municipal officials in local environmental issues, role of local governments in environmental protection for their populations. Provide assistance for demonstration program/s of local environmental plans to solve problems locally. Key into pertinent issues mentioned above [In support of IR 1 6 4]

- Develop Training Program
- Training of trainers
- Training supplies/equipment
- Implement Program

Proposed Duration 3-4 years

Estimated Budget for 1999 \$1 5 million (LOP \$4 5 million)

- Environmental NGO Small Grants Program (via both ABA/CEELI's EPAC and existing Caucasus CA with Institute for Social Action and Responsibility (ISAR) Provide support for environmental NGOs via small grants through ISAR (Institute for Social Action and Responsibility), which is performing similar work in the other two Caucasus states as well as most other NIS nations Focus on both villages and local communities as well as national NGOs in Yerevan Ensure the involvement of qualified environmental specialists in grants Include system of communications utilizing the Internet for NGO's and associated ministries and relevant agencies within each of the 10 provinces (Marzes) in Armenia, including Yerevan [In support of IR 1 6 5]

- Develop Program
- Supplies and Equipment (computer/web)
- Training program/Institutional development
- Pilot projects

Proposed Duration 3-4 years

Estimated Budget for 1999 \$1 0 million (LOP \$10 0 million)

- Public Environmental Awareness (via media support programs and EPAC) Develop a public awareness plan to educate citizens, industrial leaders and public officials about the health, economic and ecological advantages of environmental protection, cleaner production and sustainable development Educate media about environmental issues and provide outside sources and broadcast materials for distribution and to spur development of local stories, documentaries and other materials to raise public awareness of environmental problems Consider using one or more national symbols (e g , Lake Sevan, Shining Seagull) in public awareness campaign to promote protection of the environment [In support of IR 1 6 5]

- Develop Program
- Training/Equipment/Office
- Institutional development
- Operations (2 years)

Proposed Duration 3-4 years

Estimated Budget for 1999 \$1 5 million (LOP \$5 5 million)

**THIRD PRIORITY RECOMMENDATIONS** Address high-risk problems as in the first priority category with the exception that these are not easily integrated into existing USAID/Armenia programs

- are of limited-cost which can either stimulate local solutions by cost efficiencies or lead to non-USAID grants or loans,
  - are key concerns identified by the GOA as their top priorities based on the National Environmental Action Plan (NEAP) prepared jointly with the World Bank and international donors
- Food Safety Program-Metals and PCBs (via World Bank/GOA program or USDA) Soil and food contamination by metals from industrial and transportation sources and PCBs from power sector have significant export and public health implications Agricultural practices (see below) also add pesticides to the potential contaminants Assist World Bank/GOA PCB mitigation plan for PCBs from power sector and/or Armenian Academy of Sciences/GOA pilot metals program for Yerevan Address classification of soils and produce testing [In support of IR 1 6 3a]
  - Irrigation Reform (via firm-level and community assistance and credit programs such as SCF, VISTAA, IESC, SME training, and the Caucasus SEFP) Initiate demonstration projects for irrigation reform, incorporating water pricing reform, water user associations and conversion to drip irrigation or other water conserving techniques Provide credit and technical assistance [In support of IR 1 6 3a]
- Note** Water pricing may fit better at a policy level (I R 1 6 1)  
Water use efficiency plus policy reform
- Sustainable Farming (via firm-level and community assistance and credit programs such as VISTAA, IESC, SME training, and the Caucasus SEFP) Replicate sustainable farming program developed with German assistance at "Gisane" enterprise in Dmitrov village in Ararat Valley Program more than doubled per hectare yields and minimized dependence on pesticides and inorganic fertilizers and built better soil structure [In support of IR 1 6 3a]
  - Lake Sevan Water Management [via GOA/World Bank National Water Management Plan (NWMP)] Developing a rational, sustainable allocation of water among numerous competing beneficial uses is key to arresting degradation and beginning restoration of this national symbol of Armenia Implications for energy production, agricultural production, irrigation policy, regional security, and long term sustainable development of Armenia are all tied to this allocation

Provide direct support to the Ministry of Nature Protection for the NWMP as well as a pilot program for restoration of Lake Gilly, an impoundment adjacent to Lake Sevan which was drained and unsuccessfully used for agriculture. This area was an important stop-over for migrating waterfowl, and still draws many species. Plans call for inundating this area with flows from Masrik River, restoring ecosystems in this portion of the Lake Sevan system and placing it under the National Park (est costs \$500,000). This pilot program could represent both an important symbol of tangible US support and would build confidence and pride in Armenia's ability to begin restoration of the much larger and more critical Lake Sevan. [In support of IR 1 6 3b]

FOURTH PRIORITY RECOMMENDATIONS Address high-risk problems which

- *Require more significant investments of USAID funds or management time*
- Environmental Economics Policy Advisor Place senior advisor with government for 2-4 years to focus policy reform on the intersection of economic restructuring and environmental improvement Policy changes could include resource pricing, legislative reform, sources of funding for environmental enforcement, privatization liability, environmental investment funds and other investment programs [In support of IR 1 6 1]
- Seismic-Related Toxic Release Avoidance Institute and enforce building codes and safety standards to avoid or limit potential for toxic industrial leaks following seismic events [In support of IR 1 6 3a]
- Solid Waste Classification and Disposal<sup>1</sup> (via firm-level and community assistance and credit programs such as SCF, VISTAA, IESC, SME training, and the Caucasus SEFP or new program) Without a classification system, domestic waste is mixed with toxic industrial waste, hospital waste, and other hazardous residuals Half of Yerevan's solid waste is disposed in unregulated, uncovered sites outside the city Two overfilled and unlined landfills near Yerevan receive the remaining materials Similar issues exist throughout Armenia Provide TA and demonstration funding to institute classification system and operate pay-as-you-go solid waste management at the industrial, municipal and village levels [In support of IR 1 6 3a]
- Alternative Energy Sources Investigate alternative energy sources (solar, geothermal, wind and coal) for the production of heat and/or electricity [In support of ENI Objective 1 5 *A more economically sustainable and environmentally sound energy sector* ]

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<sup>1</sup> - are key concerns identified by the GOA as their top priorities based on the National Environmental Action Plan (NEAP) prepared jointly with the World Bank and international donors

## SUMMARY PROGRAM RECOMMENDATIONS (1st and 2nd Priority)

Intervention	Priority	Duration years	FY 99 \$US millions	LOP \$US millions	Remark /s
Lead removal from gasoline	1	3-4	0 4	2 5	•Inst •equip
Wastewater Drinking water treatment	1	3-4	1 5	10 0	•Mgt Plan •pilot proj /s
Forest recovery program	1	3-4	1 0	4 5	Pilot proj /s
<b>Sub-total</b>			<b>2.9</b>	<b>17.0</b>	
Environmental Legislation	2	2-3	0 6	3 0	
Increase Enforcement	2	3-4	1 0	12 0	•Facilities •equip
Env Liability in privatization	2	3-4	1 0	4 0	
Environment Law training	2	2-3	1 5	3 5	
Local government Env training	2	3-4	1 5	4 5	
NGO Small grants program	2	3-4	1 0	10 0	•Equip •Pilot proj /s
Public Env Awareness	2	3-4	1 5	5 5	
<b>Sub-Total</b>			<b>8 1</b>	<b>42 5</b>	

PHOTOGRAPHS OF ARMENIA

BY  
CARL MAXWELL



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Yerevan, Armenia  
Mt Ararat in distance  
Medzamor Nuclear Plant

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Demonstration Farm started in  
1990 by German specialist - No  
use of pesticides or chemical  
fertilizers

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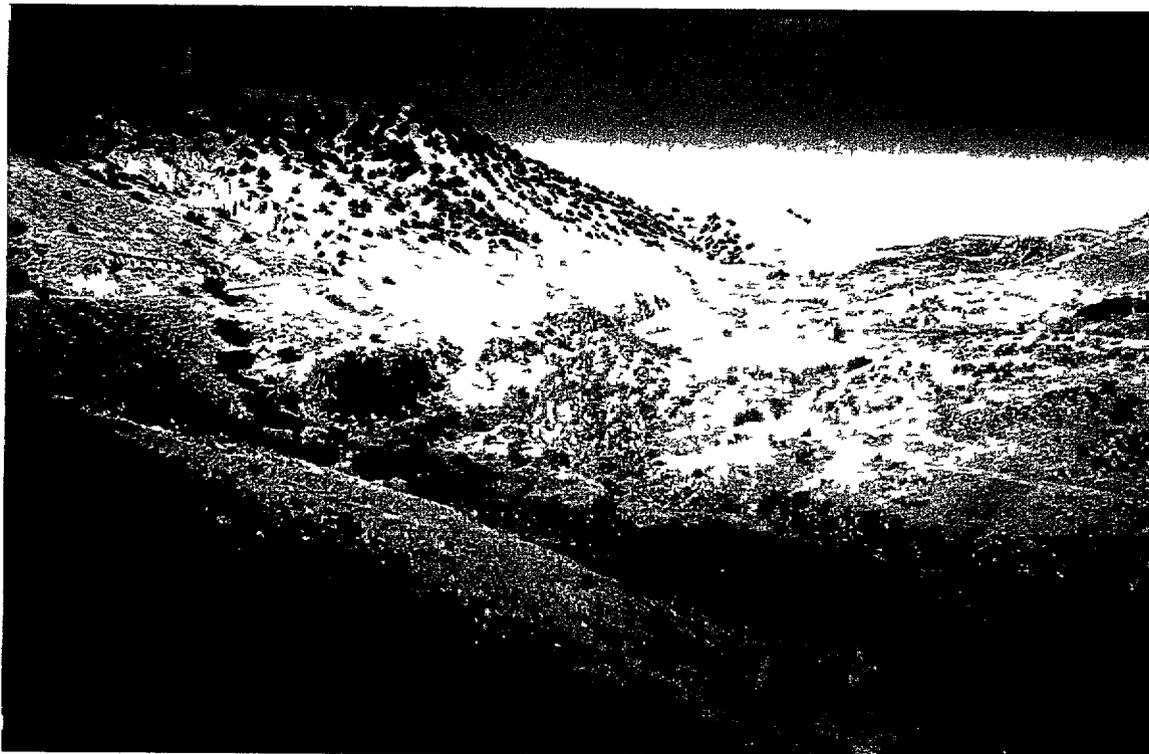




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Lake Sevan source of water  
for Hrazdan River drainage

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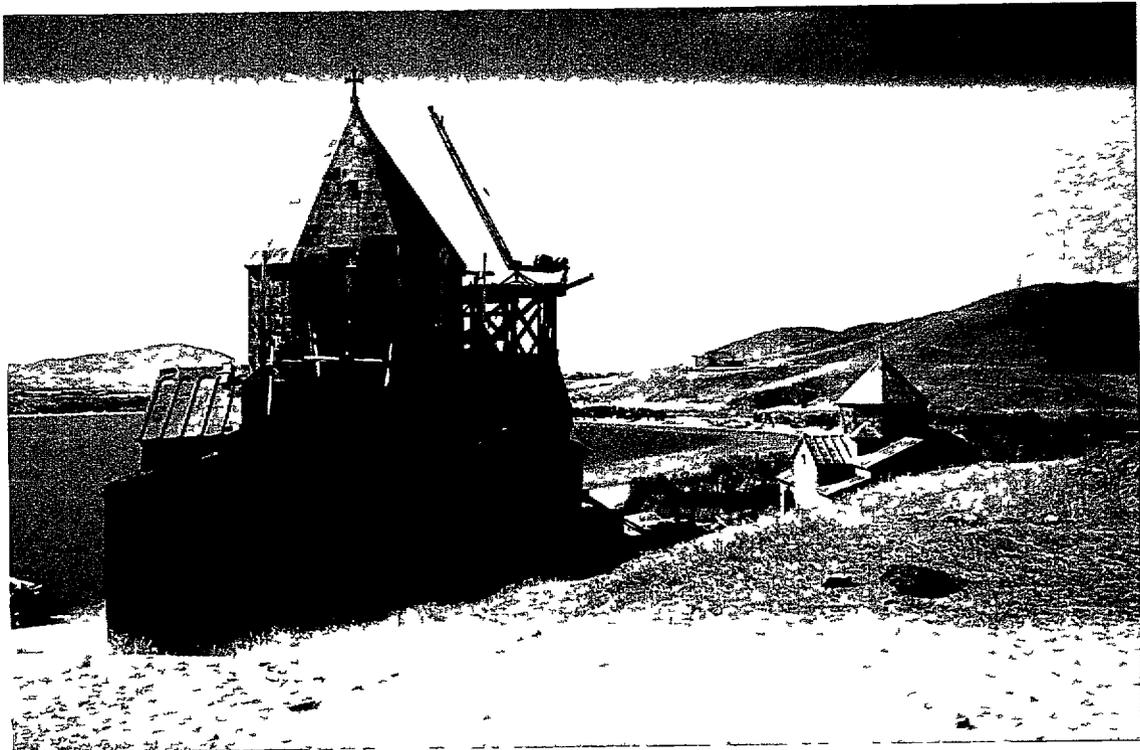




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Lake Sevan, Armenia  
Stone Churches

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Wedding procession at Lake  
Sevan Below are ancient  
stones near church

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Lake Sevan, Armenia  
Closeup of ship

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# INTERVIEWS

YEREVAN, ARMENIAN

BY

Carl Mitchell & Carl Maxwell

9/30/98 - 10/7/98

Summary of interviews carried out in Yerevan

**Interview No 1** Greens Union of Armenia  
**Date** September 30, 1998  
**Place** AID Office/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 PhD Hakob Sanasaryan, President  
 Greens Union of Armenia

**Issue discussed**

1 **Nuclear Safety** All other environmental impacts diminish under the shadow of this potential if not existing safety problem Concerns were expressed both about operational safety, seismic risk and long term impact to the surrounding ecology, environment, and health of the workers at the plant and local population

Background Two nuclear reactor plants are located near Yerevan and have very old Russian made generating systems (BBR 442) The plant sites lie over a major water aquifer and in areas of significant seismic risk The Armenian government with assistance from the French government constructed in 1955 a pilot project dry method type nuclear waste area to store high level processed fuel from the plant The waste area was reported as constructed on an inactive volcano area

Problems discussed There is a lack of monitoring the effects of contamination from the plant and nuclear wasted dump for the following areas

- Flora and Fauna
- Health of population
- Lack of information concerning safe practices and effects of contamination for both the working force at the plant and local populace Recent scientific investigations has turned up evidence of insect mutations at the site

2 **Industrial and domestic waste**

3 **Food safety/contamination**

4 **Flora and fauna endangered**

## 5 Domestic environmental assessment (Expertiza) needs reform

**Recommendations**

- Institute Public Awareness program (IR 1 6 5)
- Initiate Monitoring Program (IR 1 6 4)
- Investigate alternative energy sources (solar, hydro, wind) for the production of heat and electricity (IR 1 6 3a)
- Based on monitoring results initiate policy change on energy production (IR 1 6 1)
- Phase out Nuclear Power Plant (IR 1 6 3a)
- Provide Ecological Training (IR 1 6 4)

**Interview No 2** Dr Radik Martirosyan  
Professor of Technical Science

**Date** September 30, 1998

**Place** AID Office/Yerevan

**Participants** Carl Mitchell/ENI/Wash  
Carl Maxwell/ENI/Wash  
Dr Radik Martirosyan

### Issues discussed

1 Privatization "Ecological problems" are a high priority Without one hundred percent certainty of the environmental intent of purchasers, the government should not proceed in turning it over to the private sector On the other hand, private sector companies are reluctant to buy into a business because of the uncertainty of what is entailed to meet environmental requirements for existing contamination and waste For example, existing mines have produced large amounts of waste, what cleanup will be required? Who will pay for it? What are the rules?

2 Technical Genetics A phenomena describing the environmental impacts as a result of damaged to structures from natural disasters Concern was expressed regarding inadequate attention to planning for likely environmental impacts of industries affected by earthquakes, floods and other natural disasters

3 Inadequate environmental laws

4 Environmental management

### Problems

1 Current laws are ineffective to address the problem of cleanup of pre-existing environmental problems such as waste and contamination

2 The environmental political process is ineffective

3 Thermal energy is producing exorbitant pollution For example A thermal power station and cement factory produce sulphur dioxide and dust which interact and produce pollution with synergistic effects

4 Lack of adequate building codes and safety standards to mitigate ecological and environmental impacts as a result of damaged to structures from natural disasters (earthquakes, flooding)

- 5 Laws in place for other environmental areas such as timber resources, water, are either flawed or not enforced
- 6 Public is not aware of environmental impacts and their causes For example Urban industrial development (i e thermal power plant and cement factory) impacts the natural forest surroundings
- 7 Lack of financial resources at the level of government to clean up existing pollution

#### **Recommendations**

- 1 Institute and enforce building codes and safety standards to earthquake standards (IR 1 6 3a)
- 2 Update antiquated laws on the books to reflect current situation in terms of changed conditions of depleted resources (i e Molybdenum) and new technology (IR 1 6 1)
- 3 Institute public awareness program to protect the environment and adherence to environmental laws (IR 1 6 5)
- 4 Develop environmental protection program for the 10 provinces (Marz's) including Yerevan in Armenia (IR 1 6 3a)

**Interview No 3**            Socio-Ecological Association (SEA)  
**Date**                        September 30, 1998  
**Place**                        AID Office/Yerevan  
**Participants**            Carl Mitchell/ENI/Wash  
                                  Carl Maxwell/ENI/Wash  
                                  Ms Srбуhi (Angela) Haroutyunian  
                                  Socio-Ecological Association (SEA)

Background of SEA Ms Haroutyunian is one of the founders of an earlier environmental group called the Greens Union. She worked in ecological preservation in Armenia from 1991-1998. She realized that the GOArm had insufficient resources to preserve the natural resources of the republic and therefore founded the Socio-Ecological Association which was legalized through the Ministry of Justice in January 1998. Since its start the organization has accomplished the following tasks:

- Radio broadcast on the forests of the Armenian mountains
- Carried out an inventory of the Greenbelt around Yerevan
- Surveyed the natural resources of the Hrazdan canyon and
- developed a computer software program to monitor the entire river resources of the Hrazdan river

#### **Issues discussed**

- 1 Lake Sevan    SEA is in the early stages of developing a computer software program to model conditions detected by monitoring pollution of 28 rivers and springs which feed into Lake Sevan. The highest incidents of pollution occur in 12 of the 28 rivers which are located next to large settlements. The waste treatment plants are inadequate to treat industrial chemical pollutants from these sites and as a result the untreated effluent is dumped into the river. This software should allow development of an action plan for Lake Sevan. The Soros Foundation will be asked to fund completion of the model.
- 2 Lack of awareness of the impacts on the ecology by the public in general, industry and government officials is one of the biggest problems.
- 3 Pollution of Lake Sevan
- 4 Heavy metals in reservoirs
- 5 Soil erosion,
- 6 Sewage
- 7 Power stations on the River Hrazdan
- 8 Recreational opportunities    This will be secondary data as far as the survey is concerned. There is tourism potential where pollution is under control and will require a public awareness

program

9 Mine tailings (waste) Tailings from copper/molybdenum or waste left over after extracting the mineral have substantial amounts of other minerals such as gold that should be recovered Canadian company is doing some mineral recovery in this area It was also suggested that the waste could also be utilized for agricultural use

10 Discussed the national tree, animal and flower The Silver Shining Sea gull or eagle is considered the national bird A certain tree species similar to oak for the tree, the deer as the national animal and a pink trout from Lake Sevan as a natural fish were also discussed The history of peaches and apricots during the time of Alexander the Great was also discussed These national symbols could be utilized in a public awareness campaign for promoting the protection of the environment

11 Nuclear plant potential for damage to the environment was discussed No new information beyond what was reported in interview No 1 with Greens Union was brought up

12 Controversial issues such as the nuclear plant are generally not printed by the local press since the government controls the printing paper and to print articles against government policy could jeopardize the companies bottom line It is interesting to note in a later interview with the Environmental Public Advocacy Center (EPAC) this same issue came up EPAC gets around this reluctance of the mass media to print controversial articles by inviting reporters to quarterly round table discussions This kind of open forum with the media more readily promotes their willingness to print controversial articles, whereas NGOs who submit articles without prior discussion do not succeed

### **Recommendations**

- 1 Action plan Develop an action plan based on the monitoring program conducted by the GOArm and the computer model mentioned above (IR 1 6 3b)
- 2 Environmental norms/standards From the monitoring program and model develop norms and standards of allowable pollution levels (IR 1 6 3b)
- 3 Awareness Program Develop an ecology awareness program for the public, industry and public officials (IR 1 6 5)
- 4 Mineral recovery program Provide continued support of mineral recovery of old mine tailings and/or waste and study the possibility for agricultural use (IR 1 6 3a)
- 5 National Environmental Logo Utilize the national symbols (animal, tree, flower) in public awareness campaign to promote protection of the environment (IR 1 6 5)

**Interview No 4**      Environmental Public Advocacy Center (EPAC)  
**Date**                      October 1, 1998  
**Place**                      EPAC Office/Yerevan  
**Participants**              Carl Mitchell/ENI/Wash  
                                  Carl Maxwell/ENI/Wash  
                                  Prof Aida Iskoyan, President  
                                  Gahmk Markarian, Liaison  
                                  Suren Kristasatiryan, Staff Attorney  
                                  Ara Nazaryan, Staff Attorney

Organization Background      See EPAC Goals and Activities sheet attached

**Issues discussed**

Most of the discussion during this interview focused on the accomplishments of EPAC since its start in 1977. Following are highlights of the discussion. A more detailed report of their activities can be read on the attached activities sheet mentioned above.

The most important problems can be divided in two categories

- 1      Environmental pollution
  - 2      Demands of legislation - How the environmental law works, its implementation and enforcement
- Information on environmental pollution in general comes from the NGOs and the mass media. Previously the NGOs were not coordinating information regarding implementation and enforcement of environmental legislation.
  - In 1997 EPAC introduced scientifically-based environmental interpretation of laws because of the lack of understanding by the ministry.
  - EPAC sponsored seminars and workshops on environmental laws and provides free consultation and legal advice to local citizens in handling environmental legal issues.
  - Sponsored round table discussions monthly with environmental NGOs and mass media resulting in a better understanding and awareness of the general public of environmental problems and issues.
  - EPAC handled 16 court cases during 1997 and has another 12 active this year. Last years cases are outlined in the attached activities sheet.

There are 10 Marzs or administrative sub-divisions plus Yerevan in Armenia. EPAC sponsored a conference for these Marzs

and invited various ministries (Energy, Finance) EPAC was instrumental in pushing through the legislative branch of government a law which would require public hearings This law will be enacted in November of 1998

As a result of EPAC's work the Ministry of Environment now has a public information department EPAC is also providing training to 10 law students on legal procedures Additionally, a workshop is planned for judges and attorneys A newsletter is published quarterly They are promoting a Memorandum of Understanding between the ministry and EPAC under which would formalize EPAC's role in reviewing new legislation concerning the environment

It was pointed out that Armenia had, prior to Soviet rule, a very good legal system but under the Soviets it developed into a investigative system and this mentality needs to be changed It was further pointed out that the educational system does not provide adequate schooling of legislative drafters The current legal system is adopting laws of other countries without the politicians really understanding implications on the Armenian reality

**Conclusion** It was evident from the discussions with the staff of EPAC that their organization has a very successful track record and has been effective in protecting the environment through legal means and with positive results This organization should continue to be supported

**Interview No** 5 Initiative & Investment Cultural Fund  
 "KHAZER"  
**Date** October 1, 1998  
**Place** USAID Office/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 Aram Gabrielian, President

**Background** Mr Gabrielian stated his philosophy in that environment is a human problem and this problem is integrated with the culture. Environmental problems should primarily be resolved at the site where the problem occurs. The mistake is people think the government should solve the problem and not the people themselves. KHAZER tries to involve the students and community in resolving environmental problems.

#### **Actions**

- The organization has discovered that few villages, not all, are willing under their own initiative to restore forests and provide erosion control measures
- They have initiated an educational project to increase awareness of teachers and students
- Initiated restoration of water to Lake Gilly which was depleted through agriculture irrigation. This area is an important flyway stop for migratory birds
- Working with church choir of Gearhardt church through UNESCO on protection of nature and cultural heritage. Choir performed at Carnegie Hall

#### **Most important environmental problem areas by priority**

- 1 Erosion of soils
- 2 Conservation of forests and plants
- 3 Preservation of lakes

#### **Discussion**

Lake Sevan Keep lake level at an ecological or natural balance, that is maintain lake at a level which will not adversely affect the eco-systems dependent on the lake. The lake level affects local temperature and precipitation. There is a conflict of use on the amount of water available for electric power generation and agriculture irrigation. The demand for these purposes is greater than the recharge rate of the lake which has a

detrimental effect on the lake's eco-system

- Information from Israel and other sources on utilization of drip irrigation will be studied for application in Armenia to mitigate wasteful irrigation practices and resulting water-logging and salinization of soils. Reduction of water use through more efficient irrigation methods will help in maintaining the water balance of the Lake Sevan system
- A public awareness program is promoted to disseminate environmental issues but NGO programs should concentrate efforts at the local level where it will have the most effect
- Villages in general have a positive attitude concerning protection of the environment and are willing to help in environmental preservation activities
- Poplar trees have a 8-12 year harvest rotation and can be planted in strategic locations to ameliorate water logging and salinity buildup in soils. The harvested timber can be utilized as firewood

**Conclusion** Although no specific actions were recommended the general subject of conversation indicated a need to develop a more effective public awareness program (IR 1 6 5)

**Interview No 6** Youth Ecological Group (YEG)  
**Date** October 2, 1998  
**Place** USAID Office/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 Mr Sergey H Arevshatyan, President

Accomplishment The Youth Ecological Group has developed and published an Ecological Dictionary. It is written in Armenian and Russian with English equivalents for the various terms. This is a key step in meeting their goal of environmental education regarding global problems of deforestation and the environmental impacts on Lake Sevan.

Problems One of the major problems is that NGO's are not working to their full capacity. This is a result of the environmental NGO community working in isolation from each other and their lack of environmental experts. On the question of AID focusing resources for training, Sergey responded that training is secondary and almost useless, especially for Ministry officials he felt would take no action.

What is needed is a regional NGO coordinating office in Yerevan to coordinate the NGO efforts. In addition, the grants should be distributed from one unit or one body with a monitoring mechanism in place to assure grant objectives are met.

Professors and other environmental experts are not getting involved in NGO activities because they are not part of the grant process and therefore not aware of the environmental objectives of the various grants awarded. Special emphasis should be placed on utilizing environmental experts who are in country in carrying out the grant objectives.

Use of the Internet Internet would be useful to all the NGO's but it is very expensive. The older established NGO's have access to the internet. The Institute of Physics has an internet server, hardware and software and skills for use but their server needs upgrading and the organization needs additional resources. The NGO's could tie into their system and the Institute could serve as the coordinator for NGO environmental activities.

*Note Separately it was learned from U S contractor IRIS that Armenia has only three internet service providers (ISPS), one for-profit (Arminco), and two not-for-profit (the Nat'l Academy of Sciences and the Institute of Physics). Armintel, the recently privatized telephone monopoly has attempted to buy out Arminco. Telephone lines are very poor and effective internet access often requires a radio-modem to skip local lines to reach*

*the ISP Armintel has blocked separate satellite-based ISPS from being established*

The internet would serve the NGO's as follows

- communications with public and other NGO's
- receiving and distributing information
- serve as a scientific data base
- serve as a source of outside information
- publicizing environmental problems

Institute for Social Action and Responsibility (ISAR) The question was asked about the use of ISAR as a vehicle for small grants in Armenia

"Discussions on this have been going on since 1995 ISAR would be a very good option if the political roadblocks could be overcome Although the role of the NGO Center (NGOC) is declining it is still a viable option, but ISAR would be better suited to meet the needs "

Ministry of Environment (MOEn) The MOEn is an antiquated bureaucratic system which does not fit the current reality of the Armenia An example of this is during hard times of the past energy crisis in Armenia, people had to cut trees down for fuel but although the crisis has been long over, trees are still being cut down This illustrates a lack of sensitivity on the ministries part You can find in the market places today "Mother" trees cut down and being sold as firewood These are the trees which provide seed for future regeneration of trees Because of these practices being overlooked the credibility of the MOEn is very low with the Armenian people

### **Recommendations**

- 1 Institute a NGO coordinating office in Yerevan (IR 1 6 5)
- 2 Institute one body to issue and monitor grants (IR 1 6 3b)
- 3 Stipulate use of qualified environmental specialists in the grants (IR 1 6 4)
- 4 Develop system of communications utilizing the Internet for NGO's and associated ministries and relevant agencies within each of the 10 provinces (Marzes)<sup>1</sup> in Armenia, including Yerevan (IR 1 6 5)

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<sup>1</sup> - It was learned from Narine Karminian that the IBRD School Reform project (PACD of 2001) includes a component in support of the Education department to provide internet capability to the Marzes

5 Institute Internet coordinating office (IR 1 6 4)

**Interview No** 7            National Academy of Sciences  
                                  Center for Ecological-Noosphere Studies  
**Date**                        October 2, 1998  
**Place**                        USAID Office/Yerevan  
**Participants**               Carl Mitchell/ENI/Wash  
                                  Carl Maxwell/ENI/Wash  
                                  Dr Armen K Sagatelian, Dir

Dr Sagatelian explained there are three main general problems in Armenia, they are in the areas of economics (resource consumption, water resources, and soils)

**Problem no 1** Economics and resource consumption This involves deforestation, Lake Sevan, soils degradation and the transition from the planned economy to the market economy. Neither economic instruments or legislation have been developed for management of resources and this has been the main problem

- Previous system's resource protection have broken down and no longer function
- Lack of enforcement of existing laws in a social crisis where everyone is trying to survive alone, government doesn't work. The lack of state working mechanism endangers the natural resources such as water, forests and eco-systems
- There is no program for non-renewable resources (minerals)
- To fill the gap the government is providing concessions for mining of gold and copper but the funds generated are not being funneled back to develop a program for the non-renewable resources or other productive long term instruments, but are expended on other expenses of government
- Research in environmental economics developed in the West is not being applied in Armenia. For example the lake level of Lake Sevan is reduced during the winter months to heat homes of the general population with electricity produced from hydropower. The buildings being heated are not insulated which results in 30% in energy losses. Perlite stone is an excellent insulator and is available in Armenia but is not used. Utilization of this natural resource for insulation would effectively reduce electrical energy requirements dramatically which would result in decreased need of water from Lake Sevan and thereby maintaining the lake level

**Problem no 2** Water Resources Management

City drinking water There is a contamination problem of drinking in major cities throughout the country. The source of the water is clean but becomes contaminated with sewage water because of leaky pipes and negative pressures during periods of interrupted supply which allow fecal contamination to enter the potable water distribution system.

Agricultural districts The traditional methods of irrigation were developed when water in the Republic of Armenia was plentiful and cheap. Over-irrigation has caused marshes to build up in some areas while in other dry areas, water is insufficient. Natural stream courses are running their course unimpeded and eventually flow across the country's boundaries and lost. These waters should be utilized more effectively for agricultural needs. For example, Agreements with Turkey divide Hrazdan River's water 50/50, but Armenia fails to utilize its share.

**Problem no 3** Soil Contamination of soil is probably the number one problem. There is a high level of individual agricultural activity due to economic circumstances, using soils contaminated with heavy metals (15 elements) generated from past industrial practices. Many cities including Yerevan have high levels of heavy metal contamination. Half the population is consuming vegetables grown in these contaminated agricultural areas. There are no sharp toxic effects showing up now but there is a very high incidence of still-born baby deaths in the general population.

The Center for Ecological-Noosphere Studies has developed a map illustrating the current levels of contamination as compared to acceptable norms for various elements in the air and soils in Yerevan. All exceed the acceptable standards significantly of one or more metals. For example, 90% of the lead in air is caused by transportation and exceeds the allowable levels by 5%. Their analysis indicates that at least half of the population is receiving high doses of metals via produce.

There are no clean agricultural areas because most (80%) of Armenian was highly industrialized to extract various elements or process imported ores from other regions of Russia. These inherited problems and current agricultural practices exacerbate the environmental problem.

Three conditions have contributed to the current environmental problems facing Armenia. They are 1) the recent past earthquake which devastated 1/3 of the land, 2) economic downturn caused by

the blockade, and 3) strong ecological crisis resulting from heavy metals soil contamination had a synergistic effect with the first two factors

There is a lack of a effective mechanism to mitigate these problems at the state level

### Possible solutions

1 In order to provide healthy food, develop soil maps indicating contaminated soils locations/areas and determine risks for agricultural crops grown in these areas Certain soils with various levels of contamination could be used for certain agricultural crops

Associated problem Because of the poverty level of 80 percent of the population they have to grow crops in small illegal lots throughout the cities The lots would also need to be evaluated for heavy metals contamination and those exceeding the norm will need to be condemned This would cause a serious social problem

The Center for Ecological-Noosphere Studies knows of available technology to clean up soils They have used the mass media for public education and held conferences on heavy metals This was very well accepted by the general public and people have come in to the center for advice, but for lack of resources the center is unable to address all of their concerns

### Recommendations

1 The laws are substantially complete but lack the regulations or acts to enforce them Institute the regulations (IR 1 6 1)

2 Institute strict technical policy on heavy metals to solve the contamination problem (IR 1 6 1)

3 Institute a Natural Resources Consumption Policy (IR 1 6 1)

4 Develop an awareness plan to explain advantages of the new policies/technology (IR 1 6 5)

**Interview No** 8            Association for Human Sustainable Development  
**Date**                            October 2, 1998

**Place**                            USAID Office/Yerevan

**Participants**                Carl Mitchell/ENI/Wash  
                                      Artak Vardanian/USAID/Yerevan  
                                      Karine Danielyan, President AHSD

**Background**    Ms Danielyan's work has centered for some time on the concept of sustainable development as applied to Armenia. She authored the chapter on Armenia in the soon-to-be-published "Sustainable Development in Transitional Countries" by the United Nations Environmental Program (UNEP)

#### **Actions**

- The association includes 200 members, about 100 active, in five regional branches
- Building on the emphasis on indicators at the Rio Conference, the association has prepared a system of factors and indicators reflecting sustainable development in Armenia, allowing aggregation into a single index for sustainable human development. This index was developed using United Nations Development Program (UNDP) techniques in the publication Sustainable Human Development Concept, Theory, Practice
- The association represents Armenia and participates in various international conferences on sustainable development (e.g., Minsk in 1997). They sponsored the first national conference in Armenia on sustainable development, in April 1997, jointly with Armenia State University

#### **Most important environmental problems by areas of priority**

- 1    Insufficient Investment
- 2    Insufficient Technical Means to Resolve Environmental Problems

#### **Discussion**

Ms Danielyan stresses that four ingredients are needed to resolve the environmental problems of her nation: science, technology, awareness and finance. She feels that her nation possesses the science and the awareness within the educated population, but lacks the technical means (drip irrigation) and capital investment to solve their environmental problems.

- There is conflict between the population's need for environmental quality and the actions of the government

Armenia's environmental movement was created to improve the quality of life, but politicians has hijacked this for their own ends

- Over the past 15 years (1983-1998) there has been a lack of real investment in environment. Scientific research is funded and laws are passed but nothing happens. During her work for the Ministry of Environment, she wrote a 1983 National Ecological Program which was passed by the Armenian parliament, but only the scientific research part was ever funded.

- Regarding the recent plans prepared with the assistance of the World Bank the Lake Sevan Plan and the National Environmental Action Plan (NEAP). She explains that her nation is economically unable to borrow for implementing these, that grants are needed instead.

- Ms Danielyan mentions the need in Armenia for sustainable agriculture, both to address food contamination, costs of agricultural chemicals and the need for more sustainable agricultural practices to protect various resources such as Lake Sevan. She gives an example of a demonstration farm established during 1990 in a small village near the town of Ararat. Here a German specialist has worked for eight years to demonstrate German, European and US approaches to sustainable agriculture, adapted to the Armenian situation. This demonstration farm has shown that productivity is possible under Armenian conditions with no use of pesticides or chemical fertilizers. She would like to obtain a grant to establish a center to disseminate this model across Armenia. Previous support by EU-TACIS of similar programs in Bulgaria, Romania and Hungary was cited. She is preparing a proposal to request EBRD or World Bank support.

### **Recommendations**

1 Ms Danielyan suggests establishing an education center to disseminate this model across Armenia. The need for grants to allow farming practices to be modified, rather than loans was stressed due to the difficult economic conditions in Armenia.

2 International assistance should focus on providing Armenian applications of technology such as drip irrigation or sustainable farming, as well as investment to accomplish these programs.

**Interview No 9** Ministry of Health (MOH)  
**Date** October 2, 1998  
**Place** MOH Office/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 Manvel H Manrikian, Chief of Sanitation  
 Ms Nune Bakunts, Coord of Nat'l Env  
 Health Action Plan

**Discussion**

There are less environmental problems in Armenia because of shutdown of industrial chemical factories since the time of the Soviet Union Nevertheless the following problems continue to exist in the sewage and waste disposal area as follows

1 Water Transmission System One of the main problems are the existing sewage treatment plants function as an aeration system which is insufficient to meet the minimum standards for public health

- The existing water transmission system was constructed in 1950 and has an estimated leakage of 45%-55% The water distribution system does not have water 24 hours a day and as a result is not under positive pressure at all times Sewage mains cross under the water mains a distance of 1.5 meters and are leaking Because of periodic negative pressure (suction), sewage water enters the potable water system Sewage contamination of the drinking water recently caused a cholera outbreak south of Yerevan infecting 300 people

2 Sewage Treatment System Sixty to eighty percent of the Armenian population has a centralized sewage system and of these plants, 90-95 percent have inadequate treatment capability and only act as sedimentation ponds with high energy consumption It was reported by Mr Manrikian that the biological oxygen demand is unknown because there are no functioning laboratories in country Another problem is the industrial waste bypasses the system and usually ends up in the major stream courses such as the Hrazdan river During the Soviet era pre-treatment of industrial waste was required and there are still existing standards of effluent quality for the various industrial wastes produced The problem lies in enforcement which is effectively non-existent

"Approximately 600,000 cubic meters per day (m<sup>3</sup>/day) of wastewater from Yerevan is sent to the wastewater treatment plant Only half of this passes through the secondary treatment works The rest is discharged directly to the Hrazdan River If the treatment plant were working at full capacity, it could

handle nearly all of the wastewater supplied to it (design capacity 550,000 m<sup>3</sup>/day )"<sup>2</sup>

3 Solid Waste System There is no separation of domestic and industrial waste (chemical, toxic, hospital, etc ), and this is viewed as a very serious problem. The legislation exists and looks good on paper but it is not being implemented. Separate landfills would solve the problem but the country is too small to allocate land for this purpose and there are not enough funds to make this change in the areas where the landfills are needed.

- Pollution prevention program is a cost-effective method in the long run for industrial plants to reduce waste and cost.
- Waste-generator incinerators for domestic waste are very expensive and the country is not in the position to invest in the high capital investment required and income generated would only offset the cost of operation and maintenance.

4 Lake Sevan Only reservoir of drinking water for future generations.

5 Transportation Imported vehicles from the past are obsolete but still in operation using poor quality fuel which is adding to the air pollution problem.

- The public transportation system is very old.

### **Recommendations**

- 1 Rehabilitate and upgrade existing wastewater treatment plants (IR 1 6 3a)
- 2 Repair/replace leaking water distribution systems (IR 1 6 3a)
- 3 Institute enforcement capability for non-compliance of environmental laws already on the books concerning water and sewage (IR 1 6 1)

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<sup>2</sup> - Needs Assessment by Cambridge-Yerevan Sister City Assc ,Inc , April 27, 1998, p 18

**Interview No** 10 IRIS  
**Date** October 5, 1998  
**Place** AID Office/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 Richard Blalock

Transportation/Transport

IBRD did a transportation review in 1997. General impression is that it was a superficial study. Fuel is refined outside the country (Russia, Italy, Bulgaria). IBRD proposed tax incentives to punish the polluter--which would be repressive to the low-income population and would generate more bureaucracy and inherent corruption that currently prevails.

The GOArm has a \$70 million highway budget which is insufficient to handle the transportation system. The traffic is getting worse and the current transportation network is inadequate to handle future traffic loads and parking.

Need to consider mass transit as a viable option to reduce air pollution and traffic congestion. This was not considered in the IBRD report.

Currently gasoline fuel costs 3600 Drams/20 liters or approximately \$1.44/gallon.

Metro fare 40 Drams

Minibus fare 100 Drams

It was learned in another interview that the low-income elderly and pensioners depend on the metro for transportation.

**Recommendation**

- Support measures to upgrade the metro, trams and trolley bus transportation system (IR 1.6.3a)

**Interview No** 11 United States Department of Agriculture  
(USDA)

**Date** October 5, 1998

**Place** AID Office/Yerevan

**Participants** Carl Mitchell/ENI/Wash  
Carl Maxwell/ENI/Wash  
Ruth Harris

**Discussion** The USDA's main focus is on marketing and economics and sanitation practices related to marketing. They work in collaboration with veterinarians as well. Contact person is Haney Khalil. Phone 555-315 or cellular (822) 408048

- Pesticides They employ unsafe practices in the use of pesticides and are importing substantial amounts from Georgia. The farmers have informal associations to purchase fertilizers and pesticides in quantity to reduce cost.
- USDA has supported pesticides imports are used to control Wire Worms which affect cereal crops.
- A training program through agricultural extension agents is needed on safe handling and use of pesticides. The Agricultural Academy should be involved in this program.
- An awareness program is needed to inform farmers and food handlers on proper sanitation standards, cheese making (flies), control of mice and rats, testing of milk products and animal health.
- Food safety is a critical problem. They don't have grading standards. For example, in their food processing the spoiled produce is processed along with the good fruits and vegetables. Food processing factories are not kept to sanitary standards. Everyone has some relation that has died of some food-borne illness. Need food testing kits.
- USDA works with the United Methodist Committee of Relief (UMCOR) on health issues.
- Methane from sewer gas are entering homes for lack of sewer traps and venting systems incorporated in the house or apartment plumbing.
- Many homes only have water 1 to 2 hours per day. Faucets are left on causing wastage and there are broken water pipes which allow contamination from sewage and other contaminants entering the water system. As a result there have been

outbreaks of cholera and meningitis

- Under the Agriculture Reform Project, IBRD is purchasing vehicle/s for the extension program. The project needs some money for per diem expenses to travel to villages. Training aids are also needed and would be very useful.
- USDA is implementing a Red Worm Project for composting and improving soil fertility. There is a large salinity problem.

**Recommendations**

1. Develop an awareness program for the public concerning safe agricultural and food handling practices.
2. Set up training program for extension agents. Best time to do this would be during the winter because most agents are farmers and only make about \$20/month.

**Interview No 12** Environmental Research and Management Center  
American University of Armenia in affiliation  
with the American University of California

**Date** October 5, 1998

**Place** USAID/Yerevan

**Participants** Carl Mitchell/ENI/Wash  
Carl Maxwell/ENI/Wash  
Robert Kurkjian, Research Engineer  
Charles Dunlap

**Discussion** The AUA pointed out that preparation of a Geographical Information System (GIS) is under way and will have the capability to provide area location of heavy metals contamination, topography, various habitat areas, wetlands, forest, etc This is on the internet/www (UNEP server)

Three approaches taken by the AUA are 1) Education in environmental management (law), 2) Research and 3) Public outreach programs For example they will present an environmental conference for 60 teachers of primary and secondary schools The AUA did a survey to determine the program Although environmental studies are not taught in secondary schools, environmental studies in biology are offered at the Yerevan State University (YSU)

Most critical problems

- **Air** Air pollution from unleaded gasoline is one of the most critical problems in Yerevan They are not sure from where gasoline is imported from, but think it may be from Russia, Italy and Bulgaria
- **Agriculture** Pesticides are passing through the food chain to breast-fed infants Farms are ignorant of safe practices on the use of pesticide and fertilizer or viable alternatives There needs to be an education program in this area for the farmers, also water logging and salinization is a large agricultural problem in the Ararat Valley
- **Water/Sewage** Contamination of the drinking water distribution system in Yerevan is a major problem caused by cross contamination of sewage from leaking pipes Water quality testing showed 35% of samples with human fecal coliform and 50% for total coliform Chlorine levels are not controlled properly and can vary from none to high The department does not have the equipment to test the water or sewage When equipment is available, there needs to be a

secondary source of calibration of lab work done in country to ground truth the results of initial lab testing The Yerevan wastewater treatment plant (YWWTP) is treating 50% of the wastewater flows it receives (and this is badly done) The remaining flow go directly into the Hrazdan River Regions outside Yerevan have no treatment of any kind

- **Solid waste** There are too large waste dump sites with clay liners outside Yerevan but the department does not know how much leachate is leaking into the fresh water aquifer
- **Lake Sevan** Wastewater effluent is draining into the lake from the bordering towns Over extraction of water from the lake for hydropower and irrigation needs is adversely affecting the lake ecology (i e lost native fish population) Lake Sevan is viewed by the people of Armenia as a symbol or heart of Armenia

#### **Other items**

- The AUA team reported that Mr Florian Maldonado, a geologist with USGS may have maps indicating aquifers and general geology of the region He can be contacted via fax no (303) 236-0214
- The Medzamor Nuclear Power Plant could be an issue in terms of contamination It was brought out by a later interview with EU-Tacis that the government has made a commitment to close this plant by 2004 It was also pointed out that the nuclear waste storage poses a big problem and is potentially catastrophic
- The GOAr has good relations with Iran and have energy related agreements with them There is a potential for Armenia to sell water to Iran if they knew how much they had
- Mining operations are contaminating the environment with acid used in the mining process
- Accumulation of lead in soils could lead to lead poisoning and also limits learning capability, especially for children who are most affected
- There is a lack of waste management and enforcement Lack of funds is a big factor but if available from donors would require strict control on use
- Internet would be very effective and useful for information sharing especially amongst the NGO's and others in the environmental field
- Another AUA research group (the Engineering Research Center)

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is doing work on solar power and alternate energy sources  
Contact Artak Hambarian [ahambari@aua.am] for more information

**Interview No 13** Commission on Society, Health and  
Environmental Protection (SHEP)  
National Assembly of Armenia

**Date** October 5, 1998

**Place** National Assembly Building/Yerevan

**Participants** Carl Mitchell/ENI/Wash  
Carl Maxwell/ENI/Wash  
Gegham T Gharibjanian, Chairman  
National Assembly Commission on SHEP

### **Environmental problems by areas of priority**

Deforestation Armenia's environmental problems are like those of the other transitional countries of the former Soviet Union and Warsaw Pact, but were greatly increased by the earthquake and blockade. During the period of severest crisis, many of the nation's few forests were lost or damaged by desperate people. In this situation, even Armenia's forestry laws were powerless to control the losses. He hopes Armenia has turned the corner on deforestation.

He feels that nations that have water in the 21st century may be as wealthy as those with energy resources in the 20th century. Armenia may be in the position of having excess water resources if they were properly managed. World Bank loans can assist in saving Lake Sevan, but just improving the many malfunctioning wastewater treatment plants (WWTPs) discharging to streams leading to the lake will not resolve the problem. Public awareness and concern is not sufficient and Armenia could lose the value of Lake Sevan due to agricultural and energy demands on its limited resources.

As in other transition nations, the environment was a key issue in the fall of the old government, but little of substance has been done since then to address environmental problems.

### **Actions of the National Assembly**

Two new laws, one addressing flora (plant species) and another addressing fauna (animal species) are being considered by the National Assembly (NA), but the drafts submitted to the NA are not specific to Armenia and need revision. Concern was expressed that the Executive Branch of the government is negotiating to sign international conventions on various issues without these being submitted to the NA for consideration, comment or review. Positive developments are seen on the legislative front, including changes to the law on mineral resources and mining to clarify limits on these activities and taxation of foreign

automobiles being trans-shipped through Armenia, with the proceeds earmarked for the Ministry of Environment. Last year the NA considered a law on environmental education, but this was not passed at that time. Its provisions are, instead--being incorporated in a new general law on education which will probably be adopted later this year.

### **Discussion**

When asked about his understanding of the role of cleaner production in the region's economic transition, Mr. Gharibjanian agreed that this is important but expressed concern that there was not enough awareness of these issues (intersection of economy and environment) in the society in general and in the NA in particular. When asked about education programs for the general population or the NA, Mr. Gharibjanian suggested USAID focus on the NA. He suggested an open forum or discussion of environmental issues with the Assembly, with media invited to ensure broad distribution through print and electronic media of the discussions and resulting plans, then media could follow up on the promises and plans made during the discussion. He added that he had held numerous productive discussions with USAID's Susanne Olds about these concerns, but with her departure this contact was lost. He expressed his strong interest in re-involving USAID in discussions of environmental concerns. He indicated that directing USAID resources toward concrete results rather than advice and reports would be better, e.g., buy us fifty solid waste compactor trucks for municipal solid waste collection rather than simply paying US consultants to advise the government.

Mr. Gharibjanian noted one of Armenia's greatest problems in transition is the attitude that "the law is me," and that nobody takes responsibility or is held accountable. Whoever enforces the law acts as if they are the final arbitrator, not the law itself. He gave an example of the recent cholera outbreak, where over 300 citizens were infected, and explained that, while the media helped get out the word and thankfully avoided a greater crisis, nobody was ever held responsible for failing to perform treatment, or failing to invest enough, or held accountable for any other failures. He gave a second example, saying that nobody cares about drinking water quality, everyone buys bottled water and looks out for themselves, but nobody takes responsibility for solving the problem. Without a change of attitude or an economic recovery he felt it was hard to envision improvement.

USAID asked if the National Assembly could be convinced to attend a forum or discussion such as he suggested earlier and he responded that he, and his allies, would do their best to bring them together if something was planned. Asked if staffing was an issue for members of the NA, he explained that the nation's experts are technical experts without the political or

legislative experience and with too many old attitudes Without some type of training this will not improve Another approach to education he suggested would be a program to train 200 students per year in the west could change the Armenian society as the students returned to work in solving the nations many problems

Mr Gharibjanian again pointed out the need for concrete projects, even at a demonstration level USAID explained that its resources wouldn't permit large enough grants to solve Armenia's environmental problems, but perhaps a process of public legislative discussion, followed by some limited demonstrations, followed by international loans could tackle some of the problems He expressed strong willingness to cooperate should USAID decide to move in this way He pointed out the nearness of NA elections, the "lame duck" nature of the current NA, and the schedule for the new Assembly to be in place in May, 1999 In closing, even if he loses his seat in the NA, he expressed willingness to work with USAID in the future to see that the environment improves

#### **Recommendations**

- 1 Initiate an open forum or discussion of environmental issues with the Assembly, with media invited to ensure broad distribution through print and electronic media of the discussions and resulting plans (**IR 1 6 5**)
- 2 Provide demonstration projects (i e provide sufficient dump trucks to handle the solid waste problem) (**IR 1 6 3a**)
- 3 Initiate a process of public legislative discussion, followed by some limited demonstrations, followed by international loans to tackle some of the immediate environmental problems (**IR 1 6 2**)

**Interview No** 14 Hagler Bailly  
**Date** October 5, 1998  
**Place** USAID/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
Carl Maxwell/ENI/Wash  
Leszek Kasprowicz, Senior Associate  
Paul Christian Moulin

#### **Discussion**

When the Medzamor Nuclear Plant closes as planned in 2004, what will replace it? Ancillary effects will be caused by the closure. The Medzamor Nuclear Plant can store fuel rods up to 50 years but only keep them for three years on site then ship them to Russia at a cost of \$2000/kg

- There are no preventative safety measures or close-out costs included in present tariff structure for the plant

Solar and/or Wind generation plants cannot be privatized easily. May have to be done on a grant basis. At any rate, studies would have to be made to select prime wind generating sites.

**Interview No** 15 Ministry of Nature Protection  
**Date** October 7, 1998  
**Place** Ministry/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 Hosnik Kirakosyan, Coord Lake Sevan  
 Study and NEAP, Dr Simon R Papyan,  
 First Deputy Minister

### **Discussion**

#### Restoration of Lake Gilly and the Catchment Area of Masrik River

There is a need for restoration and future protection of Lake Gilly, which is important for biodiversity not only regarding flora but also for fauna, particularly birds. After restoration the Gilly lake would be put under the management of the National Park with full area control as a preserve. There is also a need for management control as a preserve of the river Masrik which is the water source of Lake Gilly. The activities: ecological base-line survey, plans, contracting, establish land-use with local population, commodities (vehicles and equipment) and monitoring would cost in the order of \$500,000.

- Biggest problem is distribution of water resources. The IBRD National Plan on Water Resources is included in the 1999 plans of the government. Funds are needed to develop this plan.

#### Discussions with Dr Papyan

IBRD funded projects Before investing in the environment the problems of the area need to be known. The MNP managed to conduct certain studies on the environment one in which they received assistance from the IBRD in designing (Lake Sevan). This project was presented to the government in May. Priorities and various actions were presented to maintain the lake's eco-balance.

The next important project was the development of the National Environmental Action Plan (NEAP) funded again by IBRD. The project started in 1996 and will be presented to the GOAr in November 1998. A Project Co-ordination Office was established in the Ministry of Nature Protection. Eight working groups were set up in Environmental Policy, Regulatory and Institutional Issues, Environment and Health, Air Quality Protection, Water Quality and Water Resources Management, Municipal and Industrial Waste Management, Land Resources Management, Forestry and Biodiversity. Altogether some 15 international experts worked together with

about 40 Armenian experts and several representatives of non-governmental organizations (NGO's) This will be the main planning document for the GOAr

Global Environmental Facility (GEF) GEF with UNDP will have main problems and priorities established through a Bio-diversity/Bio-Resources project The next step will be obtaining funds for implementation

USAID Last year USAID helped in the study of coal resources A package of other projects were submitted but to date no action has been taken

Other Certain negotiations have taken place with GEF, IBRD and Holland on drafting two projects based on the NEAP a National Water Resources Plan and a Clean Water Plan As a result of a presentation made in Tbilisi to the Sub-Regional Project Preparation Committee (PPC) the National Water Resources Plan (NWRMP) was approved for funding for \$1 0 million The WRMP timeline is 1 5 years for preparation It would be useful to involve AID in the development of this plan as later funding will be required for various interventions recommended

#### Partnerships Opportunities

The technical experts involved in the development of the Lake Tahoe Management Plan would be very useful for the implementation of Lake Sevan Study recommendations This same idea would apply to the Chesapeake Bay study USAID offered that it might be very cost effective to bring in experts of the US Environmental Protection Agency (EPA) Since this only requires paying their travel and living expenses and not salaries

#### Leaded Gasoline

In June 1998 Armenia signed in Aarhus, Holland an agreement to phase out of the use of unleaded gas and change to un-leaded fuel by 2005 The date was revised to 2008 because of the economic problems in Armenia Some of the actions proposed to improve air quality are directed towards transport, both public and private They foresee the control of emissions, phasing out leaded gasoline and improving fuel quality, making catalytic convertors mandatory and introducing a vehicle inspection program The control of emissions from factories and power stations is also envisaged, with regular monitoring of air quality This includes assessing the effects of pollution on crops and natural vegetation They have laws on air pollution adopted in 1994-- according to this law they will develop regulatory acts and revise/improve existing laws as necessary

- Will incorporate a lead tax on gasoline Those who use unleaded fuel will pay more--this is hoped to be the

incentive to change to unleaded fuel

**Interview No 16**      Technical Assistance to the Commonwealth of Independent States (TACIS)

**Date**                      October 7, 1998

**Place**                      The UN Building/Yerevan

**Participants**              Carl Mitchell/ENI/Wash  
Carl Maxwell/ENI/Wash  
Didier de La Mettrie, Project Manager

**Discussion**

TACIS has six projects for Armenia classified by sector

**Human resources development sector**      Projects in this sector include

1 Training support on legal and juridical reform (ECU 1,000,000)

USAID has an ongoing program of assistance to legal and judicial reforms in Armenia, which focuses on short-term training for legal professionals, including judges. This program will be complemented by long-term training organized by a judicial training center.

2 Reform of public administration (ECU 1,000,000)

A number of donors have been involved in providing advice on public administration and civil service to the Government including USAID, the World Bank, GTZ and EU member states. However, these actions have been mainly limited to small-scale policy advice and training. The TACIS Program has been providing assistance to individual Ministries through its sectoral projects with policy advice. It has assisted with the establishment of a School of Public Administration, which has become a national training institution for the upgrading and requalification of civil servants and for training of the next generation.

3 Assistance on employment policy (ECU 1,000,000)

The overall objective is to assist the sustainable economic development of Armenia by strengthening the National Employment Service.

4 Strengthening of regional development (ECU 1,000,000)

The main objective will be to create as a pilot case, an institutional framework in the Lori Marz which is capable of

playing an effective and positive role in a democratic society and in creating an adequate environment for a modern market economy

**Enterprise restructuring and development** Projects in this sector include

1 Assistance to post-privatization and private sector development

The overall objective of the project (ECU 2,000,000) is to create an environment conducive to the development of private enterprises. Given the different kinds of obstacles that companies are facing, the project will address different target groups, namely political decision-makers, entrepreneur associations, local enterprise support structures (consultancies) and enterprises.

**Energy Sector** Projects in this sector include

1 Assistance to the Energy Strategy Center (ECU 1,000,000)

At present, the energy crisis has been practically overcome. However, because of the geographical location of the country, its further economic development relies on the modernization of its obsolete and unsafe energy infrastructure. Therefore, a new development strategy for the sector, which takes into account open market economy rules, needs to be designed and implemented. TACIS is also providing substantial assistance for the improvement of nuclear safety at Medzamor Nuclear Power Plant. This aims to support the commitment of the Government to close this plant by 2004. Today, Unit 1 of Medzamor has already ceased operating as a result of the efforts of Armenia and the international community to increase alternative power supplies. Armenia is now even exporting electricity into neighboring countries.

**Other comments**

- ECU 100 = \$US 110
- Alternative energy (wind, solar) has not been looked at
- There is a big potential for solar power
- More and more of the energy will be privatized
- A segment of the Araks River borders with Iran, Azerbaijan and Turkey but not sure of the kinds of agreements/treaties are in place for its use

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- Need to tie reforestation to the water sector (groundwater improvement, erosion control, runoff, etc )

**Interview No** 17 United Nations Development Program (UNDP)  
**Date** October 7, 1998  
**Place** The UN Building/Yerevan  
**Participants** Carl Mitchell/ENI/Wash  
 Carl Maxwell/ENI/Wash  
 Anahit Simonian, Program Officer

**Discussion** The environmental sector is one of UNDPs main areas of focus. The priorities of UNDP are (1) The protection of the land (erosion, etc ), (2) Re-forestation and (3) Lake Sevan and Water Resources Management. Armenia is a small country with very few areas suitable for agriculture. The majority of the other areas are arid. For this reason land is high on the priority to protect.

- In October, 1996 the First International Conference on Lake Sevan was organized by the Ministry of Environment of the Republic of Armenia, the United Nations Development Program (UNDP) and the Embassy of France in Armenia. Eighteen experts from the World Bank, UNDP, UNESCO as well as from France and CIS countries participated in the conference to assess the Lakes situation and envisage solutions for its restoration. Actions resulting from this conference still need to be followed up.
- One of the critical areas is water resource management (UNDP is not doing anything in this).

UNDP on-going and planned assistance

- Strengthen the management structure of the Ministry of Nature Protection Central office (completed in July 98)
- Provide computer equipment including Internet capability (to be added later)
- Development of "National Environmental Information System (NEIS)". This multipurpose and integrated system will link vertical and horizontal structures of the Environmental Management Ministries and Departments. This 16-month project still needs to be funded (\$750,000). This high-priority project was proposed for funding to the Danish government, but to date, there has been no response.

Projects under the Global Environmental Facility (GEF)

**Background** In 1992 the GOA has signed the UN Framework Convention on Climate Change (UNFCCC) and UN Convention on

Biodiversity (CBD) Later on Armenia joined the Convention to Combat Decertification (1997) and a number of UN ECE Environmental Conventions

GEF (the financial mechanism) has approved the following projects to fulfill Armenia's commitments to the Conventions mentioned above

- Armenia's First National Report on Climate Change (\$350,000) is complete Base-line data is to the 1990 -1995 levels and will basically provide an inventory of emissions
- National Biodiversity Strategy, Action Plan and First National Report to Convention on Biodiversity (CBD) (\$174,800)
- In-situ Conservation and sustainable Use of Agro-biodiversity in Armenia approved in 1997 (\$90,000) This is a preparatory project to leverage larger projects in the future
- Removing barriers to Energy Efficiency in Municipal Heat and Hot Water Supply for Armenia Submitted 6/98 Purpose is to lower the overall fuel consumption and the associated greenhouse gas emissions

Other thoughts The key actors to solve the environmental issues are the local communities Currently the communities don't feel a sense of awareness or ownership in protecting the environment There is a need to provide grants to NGO's to help in public awareness There are village councils which are well organized and are the basic administrative unit of the village population centers They could be tapped as a resource to carry out a small grant program and are willing to implement projects (with or without funding) but lack the authority

**Interview No** 18      Second Meeting with ABA/CEELI Environmental Policy Advocacy Center (EPAC)

**Date**                      October 8, 1998

**Place**                      Yerevan

**Participants**              Carl Mitchell/ENI/Wash  
Janet Katz, Project Monitor

**Discussion**

1 Ministry of Nature Protection      As a follow up question to our discussions earlier, we asked if the EPAC could offer an opinion as to why, with laws on the books that went unenforced (such as legal limits on tree cutting) that deforestation was reported as a continuing problem. EPAC has tried to use experience from other countries to manage problems. In working with the Ministry of Nature Protection (MNP), EPAC has concluded they need continuous training, not just a single seminar or training session. This training for their staff should be structured using an evaluation of their needs. EPAC always asks the MNP about their needs, offering lists of options and structuring their training accordingly.

Another key problem in the MNP is the need to restructure the functions of the organization. This is probably the most important single improvement that could be made. We ask how effective the recent restructuring described by the MNP to USAID had been. There was no scientific or logical basis for this restructuring. Different approaches from various countries were combined in ways that resulted in a weak, ineffective structure. Two exceptions which were improvements were (1) the new Public Relations Division was a good change and (2) the establishment of a Legal Division was also a good change. But other problems are common. For example, in many cases both the users of resources and the regulators of resource use are combined in the same parts of the organization. The natural conflict that results is one reason the MNP is ineffective. Is the MNP opposed to the idea of separating these functions? No, but talk of change doesn't result in any actions. Two functions in one body remains a problem in all of Armenia's ministries.

Another reason enforcement is weak is the failure to devolve authority down to the local or regional levels. Marz-level and municipal-level legal authority is insufficient. EPAC has proposed more local authority, with the MNP providing scientific background. For example, the MNP had a Scientific Committee which was very useful in furthering this approach of the MNP as a scientific arbitrator, but this was disbanded.

It seems that the MNP tries to follow up in good faith when EPAC brings issues to their attention, but does very little on its own. Environmental assessment work is one exception to this lack of proactive involvement in environmental problems. Mainly the MNP addresses the most well-known problems, but everything is linked and too little is done on the other issues. For example, cheap poor-quality gasoline imported to Armenia causes serious air pollution problems. EPAC asked about the MNP role in inspecting gasoline quality, or working with other Ministries with these responsibilities, such as the Ministry of Internal Affairs (MIA). The MIA is responsible for automobile inspection and for gasoline too, but MNP does no coordination with the MIA on these questions.

One of the weakest parts of the MNP is the Inspection Department. Their qualifications as well as their training are both inadequate. There is little understanding of how to file, evaluate, take cases forward, etc. Often the staff is unaware of the nation's laws and regulations. A lack of training is not the key problem here. While training is still needed, you can't bake a cake without all the ingredients (e.g., if the yeast is missing). Another example: if a gas station is planned by an individual, they pay the MNP inspector the fees, and a form is filled out, but no real environmental assessment is done. The staff of the MNP Inspection Department is incapable of conducting a meaningful assessment and there are no private sector consultants available or required. Enforcement and inspection are keyed toward penalties, but these hold little relationship to actual damages. Judges have no technical basis on which to estimate actual environmental damages for setting penalties appropriate to the cost to the environment. Would including this type of information in EPAC's plans for training judges and prosecutors (procurators) be a good idea? Yes, they suggest that the MNP could act as the lead organizer for their training of judges and prosecutors because of the greater credibility of an NGO working with a government agency versus an NGO alone.

We ask about the flow of funds from fines and fees, do these go to the MNP? No, these go to the national budget, not to MNP alone. Most of the funds from fines allocated to the MNP go to senior employees' salaries, however inspectors do receive tiny bonuses. There used to be a more direct relationship between fines collected and inspectors' salaries during Soviet times, but this led to corruption. The Russian tax police have a newer system which works better where a percentage of collections go to the tax service for distribution to salaries.

2 Small Grants Program Implementor We ask their opinion on which organization would be the appropriate home for conducting a small grants program for environmental NGOs in Armenia: EPAC or the NGO Center or a new agreement with the Institute for Social Action and Responsibility (ISAR). This is a difficult question.

EPAC has conducted monthly environmental NGO roundtables at their offices (on all issues, not just legal ones) They also have provided training for both NGOs and governmental officials

When EPAC polled NGOs in Armenia, 80% of these said they worked with the EPAC NGOs respect EPAC for their support for the rule of law However, a dedicated grants program is the most efficient way of developing NGOs

On the question of using the NGO Center versus working with ISAR, they point out that whoever runs a small grants program for environmental NGOs should be experts in environment and should work out of a separate office dedicated to environmental NGOs For example, Armenia's 1995 law on environmental impact assessment called for assessments for all activities Even tree planting by an NGO should have an assessment, and a dedicated office would best conduct this work Knowing how ISAR worked in Georgia with NGOs, EPAC is very impressed with their professionalism Announcements of grant rounds, grant selection, etc, must all be very transparent and professional One problem of using the NGO Center is its close affiliation with the Association of Armenian Americans (AAA) and the Armenian government This represents a conflict of interest for an organization so close to the government being responsible for developing strong NGOs that may need to challenge government decisions

#### **Other comments**

- Asked their opinion of an MNP proposal for a National Environmental Information System (NEIS) which UNDP explained had been given to them for possible funding, the EPAC indicated no knowledge of this but promised to look into this proposal with their government contacts Asked whether any useful monitoring data exist or are regularly collected for incorporation in an NEIS, EPAC responded that there was not much and its quality was low Only one person is responsible for taking samples nationwide and she has no vehicles or resources
- We explained that USAID is familiar with the role and importance of EPAC's NGO and media roundtables and indicate that ISAR would work closely with them, should USAID choose to set up a small grants program through ISAR

**Interview No 19**      Second Meeting with EU-TACIS Coordinating Unit in Armenia

**Date**                      October 9, 1998

**Place**                      Ministry of Economy and Finance

**Participants**              Carl Mitchell/ENI/Wash  
David Avakian, EU-TACIS, Assistant to  
Director Paul Tibbs, EU-TACIS, Team Leader

**Discussion**

1 EU-TACIS Program in Armenia Reviewed the outline of active and recently completed program activities. The TACIS program for common environmental policies has been working to harmonize the various CIS nations' requirements. Work on Dobris Plus 3 has been completed. Support has been provided to several of the working groups providing input to Armenia's World Bank supported National Environmental Action Plan (NEAP). A media awareness program has worked closely with the NGO Center, but is nearly complete.

The New Regional Environment Center (NREC) for the Caucasus, located in Tbilisi Georgia, is supported by their program, but has not worked out as a regional program for the Caucasus as originally hoped. Not much in the NREC's current program for Armenia. This has been driven partially by the location (Georgia was the only neutral option, with Armenian and Azerbaijani hostility, only Georgia was a likely location) and partially by the location of the only EU delegation in the Caucasus being located in Tbilisi.

Separate proposals from all three Caucasus states to TACIS on the issue of desertification and deforestation have been made and are being considered. The Kura River is of particular concern to the Georgians. On the status of the MNP, TACIS conducted an auditing seminar, but much more than one week of training is needed. MNP is still using and applying old Soviet standards, new norms need to be calculated that are reasonable. The polluter pays approach is still not applied here. Awareness work with the legislators on environmental issues has been conducted under the NGO Center, but more is needed.

**Other comments**

- USAID should coordinate with the EU-TACIS program through each organizations' offices in Brussels. The field offices know only part of the story.
- When asked about the eventual role of solar power in Armenia, it was suggested that USAID contact the EU's Energy Strategy Center. Also mentioned was Dr. Artax Hambarian (Telephone 27-33-58, AUA program) who is working on solar

power questions for Armenian application

**Interview No** 20      Union of Ecological Organizations

**Date**                      October 9, 1998

**Place**                      Armenian National Academy of Sciences,  
Center for Ecological-Noospheric Studies

**Participants**              Carl Mitchell/ENI/Wash  
Dr Armen K Sagatelian, President

### **Discussion**

1 Follow up on issues from previous meeting where we spoke about metals in local soils and about deforestation problems

Heavy Metals in Armenia Soils      The first issue was a follow-up question related to our first discussions with Mr Sagatelian on October 2. Among other issues we had discussed the contamination of Armenia's soils, especially in Yerevan, with heavy metals and the potential for these to accumulate in produce. Mr Sagatelian was asked to expand on the sources of these metals in Armenia's soils, especially those other than lead, whose origins in emissions from vehicles burning leaded gasoline was discussed earlier. Metals other than lead in Armenian soils have their origin in three sources

1 Dryfall from industrial sources (up to 80% of Yerevan's metals originate here)

2 Irrigation by contaminated water (even in Yerevan). Drinking water is commonly used for irrigating personal produce gardens in Yerevan, which lowers the availability of water in the system and contributes to shortages. Outside of Yerevan sources are usually surface water contaminated by causes such as those in the third point below.

3 During recent years of mismanagement, solid waste is also a source of metals in soils both from landfills and from the dumping of toxic solid waste into illegal sites.

Deforestation      Despite laws to the contrary, deforestation continues. Is this a result of a lack of enforcement resources or because of corruption? It is mainly corruption. Bear this in mind when working with these issues. Identify very concrete steps with monitoring and inter-linkages to make diversion of resources and failure to perform difficult.

2 The Union of Ecological Organizations (UEO). When asked to describe the work of the UEO, Mr Sagatelian explained that we first required some background on the state of environmental NGOs in Armenia. He explained that Armenian environmental NGOs fit into three categories

(1) The first category includes so-called environmental NGOs which existed during the Soviet period. Most of these were supported with subsidies by the government and most still exist. Examples include the Society of Nature Protection, the Geographical Society of Armenia, Mountain Climbers Association, Speleological Association, Botanical Society. These organizations had a good material basis in the past. They published magazines and conferences. They received monitoring funds. Many were professional organizations. We are shown annual issues of Nature of Armenia from the 1980s, a glossy magazine in color about natural wonders of the country. Press run was 5,000 copies. Various articles dealt with preservation issues, new parks, etc. We are also shown a comparatively sad, black and white, newsprint edition of Nature of Armenia, published in 1994. The magazine was published by the Republican Society of Nature Protection, a member of the UEO.

(2) The second category of Armenian environmental NGOs were formed during the collapse of the USSR and rode on the wave of political dissent. These include such organizations as the Green's Union, the Socio-Ecological Union, and others. These groups demanded the shut down of major factories responsible for pollution, many of these industries remain closed. Many of those involved in these groups have joined the government. These people came to power on the wave of political dissent, and when they got into government they completed the destruction of these industries. Not smart enough to change attitudes once reaching power (e.g., closed Medzamor Nuclear Plant for a time, resulting in enormous deforestation and in damage to Lake Sevan from enormous drawdowns of reserve water. Also opposed new water reservoirs, which could have eased the demands on Lake Sevan). This illustrates the constructive versus the destructive approach to environment. These organizations were more extreme than Greenpeace. Helping build this attitude was an approach that called for wrecking the old system at any cost by destroying the old trading relationships of the USSR--this accelerated the closing of Armenian industries.

(3) The third category of NGOs includes several dozen groups established shortly after the collapse of the USSR through the support of several international funds working in the NIS. Donors attempted to restructure Armenian society through these groups. This rapid growth of NGOs with outside financial support at a hard time in Armenia attracted many dislocated professionals of high quality. Another phenomenon: scientific organizations received no support while NGOs received donor support, so this shift in professionals from scientific to NGO groups was accelerated by these outside funds. But these small grants were given to organizations with little capability in managing. One example: the Youth Ecological Organization (YEO) recently published an Ecological Dictionary (see earlier interview with YEO). They received a tiny grant (\$3000-enough for 100 copies).

but as a citizens group, they needed the help of outside professionals to produce strong, credible content. As a result, the National Academy of Sciences, through Mr. Sagatelian both provided another \$3000 grant to help the YEO pay for technical specialists and the Center for Ecological-Noospheric Studies needed to take the role of matchmaker to pull together advice and input for the dictionary.

The Union of Ecological Organizations (UEO) includes 10-12 organizations as members, all registered with the government as NGOs. The UEO itself has not registered, so as not to compete with its member organizations as yet another NGO. The NGO Center at first supported the third category of environmental NGOs mentioned above. In Armenia there are over 1000 registered NGOs in all sectors. There was a rush to register at first to obtain outside support. Only a small number now do real work and there are few or no new NGOs these days. The NGO Center has had a positive impact, but the environmental NGOs it supported have had no positive impact. Further, the NGO Center actively and successfully worked to keep the Institute for Social Action and Responsibility (ISAR) out of Armenia. ISAR's work in Georgia has been good, targeted projects, but the NGO Center didn't have this focus. Mr. Sagatelian agrees with the EPAC's conflict of interest observation regarding the NGO Center's close identification with the Armenian government acting as an obstacle to their supporting a strong NGO community that challenges the government. Mr. Sagatelian mentions ISAR's formation of the Caucasus Committee on ISAR. The NGO Center's purely Armenian focus hampers pan-Caucasus integration over environmental issues in a way ISAR would not. **He points out that environment is something that even Armenia and Azerbaijan could agree on if there were more avenues for cooperation.** He mentions a pan-Caucasus meeting held in 1997 (or 1998) which called for there to be no military solutions to the problems of the Caucasus, the first cooperative resolution adopted by these nations. If ISAR was supported by USAID, then his Center for Ecological-Noospheric Studies would cooperate closely and even offer them office space in the Center's building.

#### Other comments

- Proceedings of a conference on heavy metals in soils in Armenia were supplied on disk and are included with other project documents from this assessment.
- The Center for Ecological-Noospheric Studies offers to cooperate closely with any ISAR small grants program for NGOs that USAID might support and further, offers them office space in the Center's building.

WORK SHEET

RECOMMENDATIONS

AND

RISK RATING

BY

Carl Mitchell & Carl Maxwell

9/30/98 - 10/7/98

SUMMARY OF RECOMMENDATIONS

BY STRATEGIC OBJECTIVE/INTERIM RESULT CATEGORY

Strategic Objective 1.6 Increased Environmental Management Capacity to Promote Sustainable Economic Growth

IR 1 6.1 Strengthened Policy, Legal, and Regulatory Framework

	Health	Econ	ECO RISK
■ Based on monitoring results initiate policy change on energy production	L	M	M
■ Update antiquated laws on the books to reflect current situation in terms of changed conditions of depleted resources (i.e. Molybdenum) and new technology	L	M	L
■ The laws are substantially complete but lack the regulations or acts to enforce them. Institute the regulations	L	M	L
⊙ Institute strict technical policy on heavy metals to solve the contamination problem	H	M	H
■ Institute a Natural Resources Consumption Policy <i>Reinvestment</i>	L	M	M
⊙ Institute enforcement capability for non-compliance of environmental laws already on the books concerning water and sewage <i>PCB related</i>	H	M	M
■ <u>Environmental Economics Policy Advisor</u> Place senior advisor with government for 2-4 years to focus policy reform on the intersection of economic restructuring and environmental improvement. Resource pricing, legislative reform, taxation tie-ins	L	M	L

IR 1 6.2 Increased Environmental Trade, Finance, and Investment

⊙ <u>Pollution Prevention</u> Demonstrate in selected industrial sectors the immediate economic benefits and pollution reductions of low-cost approaches to industrial efficiency (more-efficient use of water, power and raw materials) via the World Environment	M	H	M
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	Health	Economy	Eco-Risk
Center's industrial efficiency program Tie into firm-level assistance for later, larger investments in cleaner production Program begins in demonstration factories, replicates to others within the chosen sector/s, then establish sustainable pollution prevention center within Armenia	M	H	M
<p>④ <u>Environmental Liability in Privatization</u> (via privatization program) Enhance existing privatization program to incorporate (1) legal and policy reform to clearly establish legal liability for past toxic industrial contamination at plants being privatized and (2) evaluate sites being privatized for potential liabilities and disclose this information to purchasers Both actions would serve to make costs transparent to the GOA and prospective purchasers The GOA could better understand either its own liability or the discount to value created by past contamination Purchasers would gain confidence that due diligence had been conducted, that liabilities were fixed and transparent, and could reflect this knowledge in their purchasing decisions, lowering their risk and increasing the potential for the GOA capturing the value of firms being privatized</p>	L	H	L
<p>■ <u>Improve weatherization and insulation</u> (via ESCOs or other energy programs) Energy demand creates pressure on water resources, air pollution, reliance on nuclear power and other effects which could all be reduced through more efficient heating Continue supporting or increase support to ESCOs to improve insulation of existing and new structures Consider use of perlite and other locally available insulating materials</p>	M	M	M
<p>④ ■ Initiate a process of public legislative discussion, followed by some limited demonstrations, followed by international loans to tackle some of the immediate environmental problems (IR 1 6 2) <i>high impact</i></p> <p><i>Depending on the intervention selected</i> →</p>	H	M	H

IR 1.6.3a "Best Practices" Adopted by Industrial and Public Sectors

present  
to 15

15

P

combining

	Health	Economy	Env-Risk
Investigate alternative energy sources (solar, hydro, wind) for the production of heat and electricity	M	H	M
Phase out Nuclear Power Plant	M	L	H
Institute and enforce building codes and safety standards to earthquake standards	H	M	L
Develop environmental protection program for the 10 provinces (Marz's) including Yerevan in Armenia	M	M	M
Mineral recovery program Provide continued support of mineral recovery of old mine tailings and/or waste and study the possibility for agricultural use	M	M	L
Rehabilitate and upgrade existing wastewater treatment plants	H	M	H
Repair/replace leaking water distribution systems	H	M	L
Food Safety and PCBs (via World Bank/GOA program) Assist World Bank/GOA PCB mitigation plan based on USAID to prioritize addressing food safety ramifications of existing contamination sites Food safety and contamination	H	M	H
Wastewater and Drinking Water Treatment Improvement (via public health initiatives) Provide demonstration program of low cost improvements to existing systems, planning for appropriate technologies, service pricing and other reforms to support borrowing for rehabilitating treatment systems	H	M	M
Irrigation Reform (via <u>firm</u> -level assistance and credit programs such as SCF, VISTAA, IESC, SME training, and the Caucasus SEFP) Initiate demonstration projects for irrigation reform, incorporating water pricing reform, water user associations and conversion to drip irrigation or other water	M	M	H (Lake Sevan Impact)
Lead in gasoline	H	M	M

	Health	Economy	Eco-Risk
conserving techniques Provide credit and technical assistance	<del>M</del>	<del>M</del>	<del>H</del>
Sustainable Farming (via <u>firm</u> level assistance and credit programs such as VISTAA, IESC, SME training, and the Caucasus SEFP) Replicate sustainable farming program developed with German assistance in XXXXXX village in Ararat Valley to minimize dependence on <u>pesticides and inorganic fertilizers</u> and to build better soil structure	<del>M</del> H	M	H
Provide demonstration projects (i.e. provide sufficient dump trucks to handle the solid waste problem)	H	<del>L</del> M	M

Group into solid waste program  
 Hospital waste

IR 1.6.3b Improved Management of the Natural Resources and Biodiversity

- Develop an action plan based on the monitoring program conducted by the GOArm and the computer model

Health	Economy	ECO-RISK
M	L	M
L	L	H

- Institute one body to issue and monitor grants

*Department / Reformation*

IR 1.6.4 Increased Institutional Ability to Identify and Remedy Environmental Problems

- Initiate Monitoring Program

Health	Economy	ECO-RISK
M	L	L

- ~~Provide Ecological Training~~ *MNP & ENVI training for Central Govt*

Health	Economy	ECO-RISK
L	M	L

- Stipulate use of qualified environmental specialists in the grants

Health	Economy	ECO-RISK
L	L	L

- Institute Internet coordinating office

Health	Economy	ECO-RISK
M	M	M

- Environmental Law Training (via judicial reform program) Reinforce and increase EPAC and other mission programs to train judges and procurators in existing and planned environmental laws and enforcement issues to increase awareness of the need for these laws Train legislators in principles of environmental legislation and legislative drafting techniques Train professors in law school/s to produce students with stronger skills in the above

Health	Economy	ECO-RISK
H	M	M

- Local Government Environmental Training (via LG initiatives) Train Marzpet and municipal officials in local environmental issues, role of local governments in environmental protection for their populations Provide assistance for demonstration program/s of local environmental plans to solve problems locally

Health	Economy	ECO-RISK
H	M	H

*level 65*

IR 1 6 5 Increased Participation of NGOs/Citizens in Env Decision Making

Small Grants

	Health	Economy	Eco-Risk
<ul style="list-style-type: none"> <li>■ Institute public awareness program to protect the environment and adherence to environmental laws</li> </ul>	H	M	H
<ul style="list-style-type: none"> <li>■ Develop an ecology awareness program for the public, industry and public officials</li> </ul>	H	M	H
<ul style="list-style-type: none"> <li>■ <u>National Environmental Logo</u> Utilize the national symbols (animal, tree, flower, Lake Sevan) in public awareness campaign to promote protection of the environment</li> </ul>	M	L	M
<ul style="list-style-type: none"> <li>■ Institute a NGO coordinating office in Yerevan</li> </ul>	M	L	M
<ul style="list-style-type: none"> <li>■ <u>Environmental NGO Small Grants Program</u> Provide support for environmental NGOs via small grants through ISAR (Institute for Social Action and Responsibility), which has done similar work in the other two Caucasus states as well as most other NIS nations <i>(Depending on Env Intervention)</i></li> </ul>	H	L	<del>M</del>
<ul style="list-style-type: none"> <li>■ Develop system of communications utilizing the Internet for NGO's and associated ministries and relevant agencies within each of the 10 provinces (Marzes)<sup>1</sup> in Armenia, including Yerevan</li> </ul>	H	L	<del>M</del>
<ul style="list-style-type: none"> <li>■ Develop an awareness plan to explain advantages of the new policies/technology</li> </ul>	L	L	L
<ul style="list-style-type: none"> <li>■ Public environmental awareness campaign (via media support programs) Work to educate media about environmental issues and provide outside sources and broadcast materials for distribution and to spur development of local stories, documentaries and other materials to raise public awareness of environmental problems</li> </ul>	H	M	H

<sup>1</sup> - It was learned from Narine Karminian that the IBRD School Reform project (PACD of 2001) includes a component in support of the Education department to provide internet capability to the Marzes



Initiate an open forum or discussion of environmental issues with the Assembly, with media invited to ensure broad distribution through print and electronic media of the discussions and resulting plans

Health	Economy	Eco-RISK
H	<del>H</del> H	<del>H</del> M

24 High priority Interventions  
out of 40 ≈ Appx 50%

gpc

**ARMENIA<sup>3</sup> - Country Profile.**

**Geography** Armenia is a landlocked country in the Caucasus Mountain region. Its neighbors are Georgia to the north, Azerbaijan to the east and south, Iran to the south, and Turkey to the west. Armenia's area is 12,000 sq miles, slightly larger than the state of Maryland. Eighty percent of land is mountainous.

**Demographics** approximately 3.4 million inhabitants (July 1997 est), 68% urban (1989). Armenia is the second most densely-populated (110.5 persons per square kilometer compared to 12.9 for the former Soviet Union as a whole) of the former Soviet republics. The ethnic makeup of Armenia is exceedingly homogeneous: 93.3% Armenian, 2.6% Azerbaijani, 1.6% Russian, 3% Ukrainian and 2.1% other.

**Recent Political Events** In February 1998 President Levon Ter-Petrossyan resigned over policy towards the disputed Nagorno-Karabakh region. On March 30, former Prime Minister Robert Kocharyan was elected President in the second round of elections. He has promised to take a tougher line on the Nagorno-Karabakh issue.

Long term resolution of Armenia's economic problems will depend on solving the Nagorno-Karabakh conflict, reestablishing normal relations with the neighboring countries of Turkey and Azerbaijan, and lifting the embargoes. A settlement would allow for full attention on the countries existing industrial and agricultural potential, and highly educated and skilled human resources, while extending Armenia's regional trade and supply links with Azerbaijan, Turkey and the Middle East.

**Economic Overview**

The Government of Armenia introduced an economic stabilization program in late 1994, drafted with the help of, and financed by, the IMF and the World Bank. Armenia was the first NIS state to experience a positive GDP growth rate, and GDP has grown since then, however at a slower rate in 1997 than in previous years. Real GDP growth was 6.9 percent in 1996, but slowed to only 2.5% in 1997 as industrial output stagnated. According to projections, real GDP should pick up in 1998 to 4% and continue

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<sup>3</sup> - For more detailed information go to the website [http://www.grida.no/prog/cee/soe\_armenia/soeeng.htm]

positive growth in 1999 to 6% as a result of economic restructuring and increased private and public investment (EIU). The Armenian government's projections are even more optimistic, projecting growth rates of 5.2% for 1998.

Inflation was brought under control by the end of 1997 due to the government and Central Bank's stricter controls which have been pledged to remain throughout 1998. The average rate of inflation for 1997 was 13.8%, down from 18.7% in 1996. Predictions are that inflation will slow to 13% by year end, with an average rate of 17% for the year, and will slow further in 1999 with a year end figure of 7% and average of 9%.

Industrial output is still weak, however a newly formulated industrial development and restructuring plan aims at reversing that trend. The Ministry of Industry and Trade has identified metallurgy, chemicals, light industry, jewelry and high technology areas as targets for industrial development. According to EIU, the plan proposes further reforms of Armenian legal framework and tax system, measures to increase investment, and the development of marketing services which will bring about greater industrial development. Additionally, a new State Council to Protect and Stimulate Investment met for the first time in early 1998 with the purpose of formulating policies creating a more conducive environment for investors.

Armenia maintains a liberal trade regime, without foreign exchange controls, although it faces a persistent foreign trade deficit. Obstacles facing Armenian economic development include the collapse of former markets in the Soviet Union, blockades imposed by neighboring countries due to the conflict in Nagorno-Karabakh, lingering effects of the 1988 earthquake, and an inadequate legislative environment for fostering private business.

Armenia is politically the most stable among its neighbors and is also among the most market oriented, with liberal trade legislation. There is a need for investment in its idle research and manufacturing industries and in its agribusiness sector. Other advantages Armenia possesses include its large pool of highly qualified yet underemployed specialists, an inexpensive labor force, its historically entrepreneurial spirit, and its close ties with the United States through its Diaspora and at the governmental level. Opportunities exist in such areas as power generation, aviation, construction, electronics, apparel, tourism, food-processing, telecommunications, and banking.

The Armenian government, since its formation in 1991, has demonstrated a firm commitment to turning Armenia from a centralized state with a planned economy into a democratic society with free market economic relations. In order to stabilize Armenia's negative trade balance, the government is

working to improve operating industries' export performance. Efforts are being made to develop the banking sector, to liberalize trade regulations and bring business legislation into conformance with internationally recognized norms, to upgrade the energy industry infrastructure, commitment of the Government to close the Medzamor nuclear power plant by 2004, and to search for new sources/suppliers of energy and fuel. The government pays special attention to the re-establishment of economic ties with the NIS states, and Russia in particular. Iran, the only relatively neutral and stable neighbor, is rapidly becoming the number one trade partner with Armenia.

The major privatization of national industries which started in 1994 is considered to be one of the key steps towards improving the economic situation and attracting foreign investment. At the same time, Armenia's strong determination to build a market oriented economy and democratic society has allowed it to engage in loan programs with IMF, World Bank, EBRD, and other financial institutions and foreign countries. Loans have been targeted at eliminating the budget deficit, stabilizing the local currency, developing energy generation, agriculture, food processing, land and air transportation and social sectors, and continuing rehabilitation works in the zone damaged by the 1988 earthquake. At the same time, Armenia remains heavily dependent on humanitarian aid, mostly wheat, rice and fuel. The main suppliers are the United States, EU, and the United Nations.

**Privatization Land** Under one of the most comprehensive programs of land reform in the NIS, nearly all agricultural land was privatized in 1991.

**Enterprises** Privatization has progressed slowly, with only 665 of 3,611 planned enterprises being privatized in 1996-97. Enterprise debts and bankruptcy rulings against some firms have been partly responsible for the low level of privatization seen to date. The Government of Armenia intends to more vigorously pursue privatization through auctions to attract "strategic investors." By decree in July 1997 a number of enterprises were slated for privatization, including the Yerevan Cognac Factory (France's Pernod Ricard has been named the preliminary winner of an international tender for Armenia's Yerevan Pernod Ricard agreed to pay \$30 million for 100% of the shares in the factory. The terms of the contract oblige Pernod Ricard to pay \$2 million upon the conclusion of the final contract and \$28 million by December 10, 1998. Pernod Ricard also agrees to invest \$30 million in additional capital in the plant over the next five years, Mars electronics plant, several hotels, Luis Ltd, and Armentel (the Greek telecommunications firm OTE purchased 90% of Armentel in December 1997).

**Energy Profile** Following the earthquake of 1988, the collapse of the USSR in 1991, and the beginning of embargoes by Azerbaijan

and Turkey, Armenia was plunged into a deep economic and, in particular, energy crisis. The main reason was suspension of the supply of fuel oil and natural gas from Azerbaijan, which immediately had an impact upon electricity and heat generation. In addition to supply problems, energy consumption in 1992-1994 steeply declined due to substantial emigration and idling industry. In 1988 total electricity consumption was about 4,360 kwh per capita and the total generation was 15,280 gwh. Total annual consumption dropped from 12,360 gwh in 1988 to 5,480 gwh in 1995, and then increased to approximately 6,000 gwh in 1996. Electricity production in 1995 was only 36% of that in 1988 and overall energy consumption was 43% of the 1988 level. Thus in 1995 the electrical generation output reached a minimum and then increased in 1996, primarily due to re-opening of the 440 MW unit of the Medzamor nuclear power plant. While the country has installed capacity that exceeds its present demand, many of the facilities are obsolete (some can be decommissioned) and need rehabilitation and modernization. The country has several energy equipment plants which produce electric cables, transformers, motors, mechanisms, and generators. Most of these plants have obsolete machinery and the products are of low quality.

There is virtually no oil industry in Armenia. A review study conducted in 1993 identified four oil and gas prospects whose geological structures have been mapped with considerable confidence and which have potential for hydrocarbon reserves.

The most promising energy sub-sectors include

- High and low voltage electricity transmission and distribution networks rehabilitation of existing networks and installation of modern billing and collection systems. Estimated procurement - \$50 million
- Hydro Power Plants (HPP)/Thermal Power Plants (TPP) the Armenian government is presently considering hydro power development comprised of reconstruction and technical rearmament of existing HPPs, privatization of small HPPs, and construction of 41 new HPPs. No new thermal capacity is needed until at least the year 2005. Development is aimed at completion of the Hrazdan unit, and maintenance/rehabilitation of existing TPPs. Estimated procurement - \$80 million
- Nuclear Power Plants (NPP) Safety improvements at the existing Medzamor plant will continue. Possible construction of a new unit after final decommissioning of Medzamor is being discussed. Estimated procurement - \$70 million
- Gas transmission and distribution pipelines rehabilitation of existing pipelines. Estimated procurement - \$60 million

In 1998, the Government of Armenia unveiled its privatization plan of the electric generation industry which plans for the privatization of all sector companies with the exception of nuclear plants. At least a 51% stake will be offered to investors.

**Agricultural Profile** Only 17% of the land is arable (1.2 million acres), this includes the Ararat plain. The agricultural sector employs approximately 25% of the population. Some of Armenia's most important agricultural products include cotton, dairy products, potatoes, fruit, grapes, grains, sugar-beets and tobacco. Also, crops which cannot be grown outside the Caucasus, such as figs, pomegranates, apricots and peaches, are grown in the republic. Armenian fruits are noted for their excellent quality. Vineyards near Yerevan are famous for brandy (cognac) and other liqueurs. Armenia's chief agricultural imports are bread (60%), and dairy products (65%). There is also a major livestock sector.

Land privatization in Armenia was introduced in 1991 - first among NIS countries. Eighty percent of agricultural land and collective farms was privatized, and the private sector now accounts for the majority of production.

**Industrial Profile** Armenia's industry during the Soviet era consisted of light industrial and some heavy industrial goods production, specialized defense-related industries including electronics and high technology lasers, textiles, chemicals, and construction materials. During the early years of independence, manufacturing was severely curtailed, reaching a low point in most sectors during 1994. By 1995 however, with the partial lifting of the blockade, overall industrial production increased by 10.5%. Growth occurred in chemicals - 15%, mining - 65%, electronics - 11% and construction materials - 93% (source Economist Intelligence Unit Profile - 1997).

Currently, much of its industry is idle or operating at a fraction of its capacity. The defense industry is being partially converted for civilian purposes. More than half of manufacturing output is produced in the food processing sector.

**Resource Base** Armenia is rich in copper, bauxite and precious metals. Substantial deposits of molybdenum, lead and zinc, pumice, marble, Armenian tufa, perlite, and volcanic basalt also exist.

**Transportation** Because of blockades by neighboring Azerbaijan and Turkey, Armenia has found itself in a position where a majority of its land transportation routes - both rail and road - are cut off much of the time. The country is therefore forced to rely mainly on aviation and a few unstable, low-capacity, and insecure land connections via Georgia and Iran.

**Rail** Rail links exist to Russia (through Georgia), Turkey and Iran, but only the connection with Georgia is presently used.

**Aviation** At present, Armenian Airlines - the only official Armenian air carrier - does not have its own cargo planes. Most

air imports are flown to Armenia from Russia or Ukraine, using chartered cargo flights to Yerevan or available space on planes chartered by another business. There are several companies, both public and private, that lease cargo planes in Russia or Ukraine for shipment of goods to and from Armenia. The planes are usually chartered for only one or two flights, or leased for a brief period. Only the three largest of Armenia's six civil airports are operational: Zvartnots, Erebuni and Shirak. The European Bank for Reconstruction and Development (EBRD) approved a loan of \$22.8 million in 1994 for construction of a cargo terminal at Zvartnots airport - expected to be completed in 1997.

**Roads** Armenia has 7,700 km of roads, most of which are in need of repair.

**Telecommunications** Armenia has about 650,000 telephones, average telephone density is 17.7 per 100 persons, international connections to other former republics of the USSR are by land line or microwave and to other countries by satellite and by leased connection through the Moscow international gateway switch. A joint venture was established in 1997 with the U.S. firm, Trans-World Telecom to replace telephone lines with fiber-optic cables, upgrade switching equipment and provide cellular telephone services.

In December 1997, the Greek firm OTE purchased a 90% stake in Armenia's state telephone company, Armentel. OTE will pay \$142.7 million for Armentel with commitments to invest an additional \$300 million to perform upgrades to the network. It will operate domestic and international telephone and paging systems with a 15-year exclusive license.

This profile is provided courtesy of the Business Information Service for the Newly Independent States (BISNIS) on the Web.

**Note** For more detailed information on subjects listed below go to the Web [[http://www.grida.no/prog/cee/soe\\_armenia/soeeng.htm](http://www.grida.no/prog/cee/soe_armenia/soeeng.htm)]

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