

ASIAN DEVELOPMENT BANK

TAR: AZE 35081

TECHNICAL ASSISTANCE
(Financed from the Japan Special Fund)

TO THE

REPUBLIC OF AZERBAIJAN

FOR PREPARING THE

FLOOD MITIGATION PROJECT

May 2002

CURRENCY EQUIVALENTS

(as of 18 April 2002)

Currency Unit	=	Manat (M)
M1.00	=	\$0.000207
\$1.00	=	M4,834.00

For the calculations in this report, an exchange rate of M4,834 has been used. This was the rate prevailing at the time of fact-finding.

ABBREVIATIONS

ADB	–	Asian Development Bank
GTZ	–	Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
MENR	–	Ministry of Ecology and Natural Resources
SAIC	–	State Amelioration and Irrigation Committee
TA	–	technical assistance

NOTES

- (i) The fiscal year (FY) of the Government ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

I. INTRODUCTION

1. During the 2001 Country Programming Mission, the Government of the Republic of Azerbaijan (the Government) requested the Asian Development Bank (ADB) to provide project preparatory technical assistance (TA) to help the State Amelioration and Irrigation Committee (SAIC) prepare a flood mitigation project (the Project) for possible ADB financing. The Project will support the Government's program of improved flood mitigation with a focus on the most affected districts in Azerbaijan's near northwest region (including Aghsu, Balakan, Gabala, Gakh, Goychay, Ismailly, Oghuz, Sheki, and Zagatala). A fact-finding mission visited the project area during September-October 2001; held discussions with representatives of SAIC, Ministry of Economic Development, Cabinet of Ministers, Ministry of Finance, Ministry of Ecology and Natural Resources (MENR), Ministry of Agriculture, State Statistics Committee, district administrations, and external funding agencies; and reached an understanding on the objectives, scope, cost, terms of reference, and implementation arrangements for the TA.¹

II. BACKGROUND AND RATIONALE

2. Azerbaijan's annual rainfall varies from 200 millimeters (mm) near Baku at the Caspian Sea, to 1,000 to 1,300 mm on the southern slopes of the Greater Caucasus, and 1,200 to 1,400 mm in the south of Azerbaijan. Many regions in the country are frequently affected by floods caused by snow and glacial melting as well as heavy rainfall in the spring and summer months. Of the more than 8,300 rivers in the country, 154 cause floods and 61 are considered to be treacherous.

3. Most of the treacherous rivers are in the near northwest of Azerbaijan along the southern slopes of the Greater Caucasus. During the past 10 years, 25 of a total of 40 devastating floods have occurred there. They have destroyed houses and other property; washed away fertile agricultural, pasture, and forestland; damaged infrastructure, including irrigation intakes and canals, flood protection facilities, and roads and bridges; and occasionally killed people. While estimates of costs of damage are not readily available, the floods have clearly inflicted great social, economic, and environmental cost on the local and national economies.

4. The region in the near northwest has a combination of geologic, climatic, and topographic conditions that are rarely found elsewhere in the world in regards to producing rapidly peaking river flows that also transport high volumes of boulders, rocks, and sediments.² In addition, the Greater Caucasus mountains are extremely steep—rising nearly 3,000 meters above the broad valley to the south within only 10 to 20 kilometers—with the high slope gradients of the drainage channels giving tremendous power to even moderate flows. Many rivers produce a lot of alluvial debris, which results in a significant unevenness in the riverbeds. During floods, the main path of the flow and material transported often makes sharp deviations in direction, creating riverbeds that are several kilometers wide. As the rivers leave their steep mountain channels, the streambed gradients lower rapidly, which reduces the sediment transport power. Thus the sediments and alluvial material are partly deposited, resulting in elevation of riverbeds, often near cities and villages.

¹ The TA first appeared in the *ADB Business Opportunities* in October 2001.

² Some flows with a very high ratio of alluvial debris to water can have the characteristics of lava, and are termed "mudflows." They contain fine grained silts and clays that normally constitute mud, and a combination of fine and larger materials, up to giant boulders, that are transported to the valleys.

5. The early settlements developed hundreds of years ago near where the rivers exit the mountains and water for household and irrigation was most abundant. The settlements have since grown into moderate sized cities, with some of the expansion close to the rivers, resulting in an increased potential of being flooded. Human activities in the upper reaches of the watersheds have increased significantly during the past few decades. These activities, in particular livestock grazing and timber cutting, have contributed to triggering landslides in geologically unstable locations, and resulted in an increase in the volume of alluvial materials being transported by the rivers.

6. These effects have intensified during the 1990s. After the break-up of the former Soviet Union, Azerbaijan experienced great political and economic instability, which contributed to an increased number of people deriving their livelihood from agriculture. In the near northwest regions, most households depend on agriculture as their main source of income. Despite fundamental reforms since 1996, including the abandonment of almost all collective and state farms and the introduction of private land ownership, the agriculture sector has remained in crisis with uncertain export markets, low inputs and productivity, and marginal incomes. A 1995 World Bank survey ranked the near northwest as the third poorest of nine regions in the country. About 64 percent of the population was considered poor, with 21 percent being very poor. In this situation, livestock has become an important asset as it serves both as savings and a means of earning cash income. Livestock numbers, in particular sheep, have substantially increased and, concomitantly, the grazing pressures on the traditional summer pastures in the upper watersheds. Deforestation is also occurring at an alarming rate. Azerbaijan was a major importer of wood and coal from the Soviet Union but, with the interruption of traditional trade links, imports have now dwindled. In addition, the gas distribution network in the near northwest region has for several years been without supply, in part owing to fuel shortages due to the stoppage of gas imports from Turkmenistan. Many rural households had to revert to wood as a household fuel and are cutting down trees to meet their energy needs. At the same time, the country has not been able to keep up its earlier pace of providing flood protection facilities and other flood management measures in the flood prone areas. The consequence of these developments is increased soil erosion and a higher risk of devastating floods downstream.

7. SAIC has the responsibility for establishing and operating and maintaining irrigation and flood amelioration infrastructure, including the strengthening of riverbanks to prevent floods, mudflows, and erosion. SAIC is still very much a centrally managed organization comprising some 160 organizations at all levels. Most of its workforce of about 20,000 people are in district irrigation departments, which are mainly engaged in operating and maintaining irrigation and flood protection facilities. SAIC has gone through an initial restructuring and has reduced staff by around 5,000 through divestiture and consolidation of several institutions and departments. During the last decade, SAIC's activities have been severely constrained by a lack of budget, in particular for capital expenditures. In flood protection, the main activity comprises the shaping of riverbeds to prevent the water flows from establishing new channels. As rivers are the source of water for irrigation systems feeding adjacent lands, the shaping of riverbeds and diversion channels is also important for directing the water to the irrigation system intake. However, due to aging equipment, SAIC's capability to carry out this work is decreasing.

8. In 1990, the Government initiated a comprehensive assessment and analysis of the flood-prone areas and prepared an investment program for improving the flood protection level along 61 rivers considered to be most treacherous. The study was carried out by SAIC and recommended structural measures at 27 sites as the most critical for early implementation.

Initial designs and cost estimates have been prepared for the measures.³ They mostly consist of proposals for establishing concrete walls along rivers that threaten to damage district capitals or smaller villages. Except for the German Agency for Technical Cooperation (GTZ), which has assisted villagers and farmers in one district to construct small brush and rock walls for flood protection and guidance of flow channels, no other external agencies have been involved.

9. In addition to providing a portion of the immediate needs for flood protection facilities, the Government is aware of the need for a broader and more integrated approach to flood management, which includes both structural and nonstructural measures. Beside the provision of funding for some of the Government's high priority structural measures, the proposed Flood Mitigation Project could help (i) improve the effectiveness of riverbed shaping and channeling; (ii) strengthen the process of monitoring and controlling the conditions in the upper watersheds, particularly regarding land use; (iii) expand the collection and analysis of hydrometeorological data; (iv) prepare and disseminate emergency preparedness plans; and (v) build capacity for improved flood management that would involve closer coordination among the agencies involved in water and land use management, and enable them to be more effective by seeking and assisting beneficiary communities' participation.

III. THE TECHNICAL ASSISTANCE

A. Objectives

10. The objective of the TA is to prepare the proposed investment Project for possible funding by ADB⁴ to help the Government achieve its flood mitigation targets. The Project will aim at reducing the adverse economic, social, and environmental impacts of flooding in the nine most affected districts in the near northwest region of Azerbaijan. The Project will assist the Government to adopt an improved and more integrated approach to flood mitigation in the flood-prone areas. The relationships between the goal, purpose, and assumptions and risks are shown in the preliminary project framework in Appendix 1.

B. Scope

11. The TA will be implemented in two phases, with the first phase being completed in about two months and the second in about three months. The first phase will comprise a comprehensive review and analysis of the flood phenomena, the existing flood protection facilities and the appropriateness of their design, the riverbed shaping and channeling practices, the conditions in the upper watersheds, hydrometeorological data collection and analysis, flood preparedness, and zoning. This will be followed by a prioritization of potential interventions based on criteria such as urgency; economic, social, and environmental impact; and need for a future flood management strategy. Government agencies engaged in activities that have an impact on the magnitude of floods and on the protection against floods will be assessed regarding their human resource capacities and budget resources, and their responsibilities and needs for improving activities, procedures, interagency coordination, and community involvement relating to flood management will be evaluated. A participatory approach to the design and analysis of the Project will be used including extensive consultation with

³ Twenty-two of the sites are located in districts along the southern slopes of the Greater Caucasus, including Aghsu (1), Balakan (3), Gabala (2), Gakh (4), Goychay (1), Ismailly (2), Oghuz (2), Sheki (3), and Zagatala (4). In addition, one site each is proposed for Gusar District in the north and Astara District in the south of the country, and three sites are envisaged for the Autonomous Republic of Nakchivan.

⁴ The proposed ADB financing for the Flood Mitigation Project is estimated at \$22 million equivalent.

stakeholders from the national to the district and municipal level, as well as communities in flood-prone areas. A special emphasis will be placed on discussing at the different levels the range of structural and nonstructural measures, including their strengths, weaknesses, benefits, and costs.

12. The second phase of the TA will involve feasibility studies of selected interventions for improving flood mitigation, with a view of formulating an investment project for possible funding by ADB. This will include developing rationale, objectives, and scope of the Project; preparing feasibility-level designs of the flood protection facilities at each site; preparing cost estimates and a financing plan; defining implementation arrangements and schedule; formulating procurement needs and corresponding procurement arrangements; preparing a project performance monitoring system; justifying the Project in financial, economic, social, and environmental terms; and assessing risks and mitigation measures. An outline terms of reference is shown in Appendix 2.

C. Cost Estimates and Financing Plan

13. The TA is estimated to cost \$875,000 equivalent, comprising \$515,000 in foreign exchange and \$360,000 in local currency costs (Appendix 3). It is proposed that ADB will provide \$700,000 to finance the entire foreign exchange costs and a part of the local currency costs, amounting to \$185,000 equivalent. The TA will be financed by ADB on a grant basis from the Japan Special Fund, funded by the Government of Japan. The Government will meet the balance of the local currency costs, amounting to \$175,000 equivalent. This will include office accommodation, counterpart staff time as well as travel and communications expenses, and support for surveys and investigations. The Government has assured ADB of the availability of counterpart services, facilities, and funds by the expected commencement date of the TA. The Government also has been advised that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

14. The TA will be implemented by a team of international consultants in association with domestic consultants. The consultants, to be engaged through a firm, will be selected in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the engagement of domestic consultants. A total of 73.5 person-months (15.5 international and 58 domestic) of consulting services will be required. The international specialists will include (i) a team leader with expertise in flood management and knowledge of ADB procedures and guidelines, (ii) a water resources engineer, (iii) a roller-compacted concrete specialist, (iv) a flood disaster management specialist, (v) a watershed management specialist, (vi) a community development specialist, and (vii) a financial and economic analyst with expertise in estimating benefits from flood damage avoidance. The domestic specialists will include (i) a deputy team leader with expertise in flood management, (ii) a meteorologist, (iii) two hydrologists, (iv) a flood damage assessment specialist, (v) a topologist, (vi) two hydraulic structure design engineers, (vii) a construction planning and scheduling engineer, (viii) two construction contracts and specifications specialists, (ix) a watershed management specialist, (x) an irrigation engineer, (xi) two community development specialists, (xii) an institutional development specialist, (xiii) an environmental assessment specialist, and (xiv) two financial and economic analysts. Equipment and supplies to be used during the TA will be procured by the consultants in accordance with procedures acceptable to ADB.

15. SAIC will be the Executing Agency, and will assign experienced staff to serve as full-time counterparts to the consultants. MENR will provide guidance on hydrometeorologic and geologic conditions and on the management of natural resources in the upper watersheds. A steering committee, headed by the first deputy chairman of SAIC, will be formed and meet as often as necessary but at least once every month during the TA. It will be composed of senior personnel from the Ministry of Economic Development, Ministry of Finance, MENR, Ministry of Agriculture, State Committee for Land and Cartography, and SAIC. The steering committee will coordinate implementation and ensure that the interests of the relevant national and district agencies and municipalities are safeguarded. The steering committee will assign suitable counterpart staff at the national and, as appropriate, at the district level, to participate and assist in the TA's implementation. In addition, a representative will be appointed by the Governor's office in each of the selected districts to help coordinate TA activities at the local level.

16. The TA will support stakeholder workshops involving personnel from national and district agencies and representatives of municipalities, villages, and concerned external aid agencies. The first workshops will be held at the conclusion of phase I to bring national and district personnel together to reach a consensus on the objectives, timing, and support to be provided for the subsequent project design activities. Phase II workshops will be held in each of the districts and will focus on reaching a consensus on the specific programs and investments to be supported under a possible ADB loan, and on the national, district, and community resources that need to be committed to the Project.

17. The TA is expected to commence in August 2002 and be completed in January 2003. It will be undertaken in two phases. Phase I will produce an inception report and a phase I report. The output of phase II will be a draft phase II report and a final phase II report. Tripartite meetings between representatives of the Government and ADB will review the consultants' inception report, the phase I report, and the draft phase II report.

IV. THE PRESIDENT'S DECISION

18. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance, on a grant basis, to the Government of the Republic of Azerbaijan in an amount not exceeding the equivalent of \$700,000 for the purpose of preparing the Flood Mitigation Project, and hereby reports such action to the Board.

PRELIMINARY PROJECT FRAMEWORK

Design Summary	Performance Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Goal</p> <p>To reduce the adverse economic, social and environmental impacts of flooding with a focus on the near northwest region.</p>	<p>(Values to be defined in the course of project preparation)</p> <ul style="list-style-type: none"> • Losses due to floods reduced by ___ percent. • Destruction of houses and other property reduced by ___ percent. • Destruction of infrastructure (such as irrigation intakes and canals, flood protection facilities, roads and bridges) reduced by ___ percent. • Number of people displaced and time of displacement reduced by ___ percent. • Loss of agricultural, pasture and forestry land along rivers reduced by ___ percent. • Land use and conditions in watersheds generally improved. • Soil erosion in upper watersheds reduced by ___ percent. 	<ul style="list-style-type: none"> • State and district statistics • Monitoring and evaluation reports of the State Amelioration and Irrigation Committee (SAIC) • Ministry of Ecology and Natural Resources (MENR) statistics 	
<p>Purpose</p> <p>To adopt an improved and more integrated approach to flood mitigation in the flood prone areas.</p>	<ul style="list-style-type: none"> • Data collection and analysis on hydrometeorology, streamflows, and flood events improved. • Structural and nonstructural measures better planned and coordinated. • Interagency coordination at the national level and between national and district levels improved. • Stakeholder involvement improved. 	<ul style="list-style-type: none"> • MENR statistics • Monitoring and evaluation reports of SAIC • Project monitoring and evaluation reports • Project performance monitoring system • Loan review missions • Project completion report • Monitoring and evaluation reports of SAIC 	<ul style="list-style-type: none"> • No extraordinary climate conditions. • Implementation capacity of agencies involved in flood mitigation improves. • Continued support more integrated approach to flood mitigation. • Sufficient operation and maintenance funds provided by the national Government, with commensurate contributions from beneficiaries.

(Reference in text: page 3, para. 10)

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Phase I: Review and Initial Design

1. **Initial Activities.** The consultants will compile and make a preliminary review of the flood management approach at the national level and in the 12 districts which, according to a 1990 study of the State Amelioration and Irrigation Committee (SAIC), most urgently need investments in flood protection facilities. At the national level, the consultants will review the Government's policies and strategies; legal framework; financing; activities, human resource capacities, and budget resources of the agencies involved in flood management; interagency coordination at the national level and between national and district levels; and the major perceived constraints on improved flood management. At the district level, the information to be collected will include streamflow records; historical major flood events and the associated damage; previous performance of flood protection facilities; current practices relating to structural and nonstructural flood management by the different agencies involved, as well as their financing and coordination; the impact of the ongoing Government reorganization on the agencies' ability to improve these practices; community needs and demands; and the major problems faced in mitigating floods and their potential impact. The advantages and disadvantages of different structural and nonstructural measures and their combinations will be discussed extensively at the national, district, and community levels.

2. Based on the discussions, site visits, and available reports, the consultants will prepare an inventory of current conditions. A representative sample of potential beneficiaries and others who may be affected by proposed interventions will be interviewed to help in the design of social surveys to be conducted later during the technical assistance (TA). These initial activities will form the basis of the inception report describing the preliminary findings. A tripartite meeting will be held to discuss the preliminary findings and decide on the watersheds and districts to be included for further study during phase I.

3. **Flood Frequency Analysis.** The consultants will collect and examine the streamflow records of the selected rivers to determine the distribution of flood over as many years as possible. A graphical analysis will be made to determine the flood peak flow rates versus the reoccurrence interval, to estimate flood peak flows from at least the 5 through 50 year flood reoccurrences. In addition, the written records of key flood events will be studied, and Government staff and residents in the flood-prone areas will be interviewed to determine the geographic extent of key flood events. Where possible, an approximate flood return interval will be selected as the level of flood that would initiate significant mudflows.

4. The consultants will collect data from topographic maps of the riverbed configuration in flood-prone areas and make computerized hydraulic calculations of the flow depths and lateral boundaries of the 10, 25, and 50 year floods. For each river, a map of the flooded zones in the lower basin will be prepared to show (i) the approximate limits of the 10, 25, and 50 year floods; (ii) the location of both irrigated and rainfed agricultural lands, infrastructure such as railroads and roads, inhabited areas, and previously placed flood protection facilities; (iii) a tabulation of the estimated number of residents at risk; and (iv) existing flood protection facilities that are still functional, linked to a tabular reference describing the type and extent of each. The consultants will acquire copies of aerial photographs of the flood-prone areas to utilize them in delineating the developed features (such as roads, railroads, and villages) and assessing the boundaries of historically flooded areas.

5. **Flood Damage Estimates.** Data on the major flood events of each selected river will be collected to prepare estimates of previous flood damage. An estimate of the approximate return interval of floods will be noted on the basis of the flood frequency analysis. The nature of damage

(Reference in text: page 4, para. 12)

to agricultural land, irrigation and diversion systems, water supply facilities to cities and villages, and flood protection facilities will be identified. Information will be collected through reports and interviews on the economic activities, income levels, and social situation of the population living within the limits of the 10 and 25 year flood areas. Based on this information, the total flood damage potential on each river associated with a 10 and 25 year flood magnitude will be estimated, and used to guide the selection and design of structural and nonstructural flood mitigation measures.

6. **Flood Protection Facilities.** The flood protection facilities established over the last decade will be assessed, including the design, site preparation, materials, transportation, field installation, and average cost per kilometer. The consultants will also present new techniques in the design and construction of facilities that may be suitable to protect the areas adjacent to flood-prone rivers. Consideration will be given to using labor-intensive construction techniques, and options for community involvement in maintenance will be explored. An alternative design that could lead to substantial cost savings is the use of roller-compacted concrete in protective structures. The consultants will provide the criteria and direction for a trial roller-compacted concrete mix test program to be followed by a field placement demonstration. This placement and subsequent strength testing of a roller-compacted concrete protective wall will be carried out along one of the rivers and consist of a wall and levee of at least 20 meters (m) in length with a total height of 7 m (3 m below river grade and 4 m above). SAIC will provide the necessary equipment, labor, and materials for the field placement and for the laboratory strength tests of the mix design samples. Estimates of the costs of this type of construction will be made for at least two alternative design shapes.

7. **Riverbed Shaping and Restoration.** Based on discussions with staff of district irrigation departments, the areas of the riverbeds where cleaning and channel shaping operations are being or have been performed, will be identified. Tabular data will be collected to estimate the total days of operation of various types of equipment annually over the last five years. The types and numbers of equipment used in the separate riverbed mechanical operations will be documented, and the expenditures in labor and operating cost (including equipment maintenance) for the last five years estimated. Work in the river channels to reestablish water supplies for household use and irrigation systems should be included. The need for supplementary equipment will be assessed, and the options for renting such equipment. In addition, the efforts of villagers to construct smaller brush and rock walls for flood protection or guidance of flow channels will be assessed. At least one public workshop will be held in each district to explore the cooperation and coordination between community initiatives and government activities for protecting and restoring water supply services following a damaging flood event.

8. **Land Use and Conditions of Upper Watersheds.** At least three upper watersheds of key rivers will be inspected and assessed. A generalized map of the watersheds will be produced with classifications of the type and extent of vegetative cover. A narrative assessment of the erosive nature of the native soil structures will be made and conclusions presented regarding the degree of overgrazing and deforestation that has occurred during the past decade. In addition, the impact of this degradation on changes in streamflows and flooding will be investigated. The institutional arrangements at the national, district, and municipal level for land use management will be evaluated, including the need for a greater monitoring and enforcement capability regarding land use practices. The consultants will also examine the Government's geologic mapping of upper watersheds, summarize the extent of steep geologically unstable areas, and assess their potential for releasing large quantities of rock and earth debris during periods of high intensity rainfall.

9. **Hydrometeorology.** An estimate will be made on how many hydrometeorologic stations in the river basins are operational with up-to-date records and how many are no longer functioning. A

sample of hydrometeorologic stations in the selected watersheds will be inspected, and their conditions documented. An assessment will be made whether the staff collecting the hydrometeorological data have in the past five years given advance notice to district officials of upper watershed conditions (such as snowmelt potential, rain forecast, or flood danger) that were effective in providing an early warning of flood events. The need for rehabilitating, replacing, or augmenting hydrometeorologic stations will be assessed, including the feasibility of installing stations with modern communication facilities that could provide early warning of major flood events to the population centers in the lower basins.

10. **Flood Preparedness and Flood Fighting.** The consultants will assess flood emergency preparedness plans outlining actions to be taken during major flood events, and current practices at the local level for preparing for flood events. The communications capability that can be used in the districts during major flood events will also be evaluated. Potential beneficiaries will be interviewed regarding ideas about assisting with labor for emergency situations during floods.

11. Flood fighting actions that have occurred in the past in each district will be documented, including institutional arrangements and procedures for mobilizing citizen action during major flood events. Data will be collected on the type and volume of stockpiled materials in place for flood fighting, such as prefabricated sandbags and soil sources for filling them. The availability and capability of heavy materials handling equipment (e.g., front-end loaders, dump trucks, crawler tractors, road graders, and other equipment) in district agencies and municipalities will be documented. Information will be collected regarding arrangements for hiring private construction companies to provide equipment and operators during emergencies.

12. **Flood Zoning.** Data will be collected to map the areas under threat from flooding and mudslides and assess the severity of the threat. The villages or sparse residences in these areas should be noted. An assessment will be made of laws or regulations that would allow the designation of "flood zones" with provisions that would prohibit construction within these zones. Discussions with community members will be conducted to learn if they are informed of and have started to implement the Government regulation 56 of March 2000 relating to restrictions in the use of land adjacent to riverbanks.

13. **Identification and Prioritization of Potential Interventions.** Based on the data collected, assessments, and stakeholder consultations, the consultants will (i) identify potential interventions at the national level and in the selected watersheds and districts; and (ii) prioritize the interventions according to criteria such as urgency; economic, social, and environmental impact; and the need of the intervention for a future flood management strategy. The prioritization process should include the cost of alternative interventions, the critical linkages between interventions, and the ease of implementation.

14. A tripartite meeting will be held at the end of phase I to review the consultants' findings and recommendations, at which time the Government and Asian Development Bank (ADB) will select the interventions and their combination into components for detailed study during phase II.

B. Phase II: Formulation and Preparation of an Investment Project

15. The feasibility design of the Project will follow from the review of phase I. To achieve its goal of reducing the adverse economic, social, and environmental impacts of flooding in the designated flood-prone areas, the Project is likely to have two main components: (i) the construction of high-priority flood protection facilities to contain dangerous rivers and mitigate the damage of floods and mudflows at strategic locations; and (ii) flood management measures, including improving the effectiveness of riverbed shaping and channeling; strengthening the

process of monitoring and controlling conditions in the upper watersheds, particularly regarding land use; expanding the collection and analysis of hydrometeorological data; preparing and disseminating emergency preparedness plans; and building capacity for improved flood management, which will comprise close coordination among the agencies involved in the different aspects of water and land use management, and enabling them to be more effective by seeking and assisting beneficiary communities' participation.

16. In preparing the Project, the consultants will undertake the following:

- (i) Conduct a comprehensive assessment of the lessons learned from the implementation of flood mitigation measures in Azerbaijan and other countries in transition.
- (ii) Use a participatory approach to involve stakeholders from the national, district, and municipal levels as well as potential beneficiaries in the analysis and design of the Project.
- (iii) Explain the rationale, objectives, and scope of the Project, including the preparation of a problem analysis and project framework.
- (iv) Prepare a feasibility-level design of the flood protection facilities at each selected site to arrive at the major works components, together with their costs and justification. Prepare design layouts, calculations, and cost estimates for each site to a level of detail consistent with the determination of technical feasibility. Prepare model tender documents for the construction contracts for the flood protection facilities.
- (v) Prepare detailed cost estimates, using the COSTAB software, which should include the categories of land, civil works, equipment and materials, incremental operation and maintenance, incremental administration, and consulting services. Costs will include foreign exchange (direct and indirect costs), local cost components, and physical and price contingencies. The local costs include duties and taxes, which should be identified separately. Prepare a financing plan with contributions from the Government, ADB, the private sector, and beneficiaries.
- (vi) Examine the implementation capacity of the executing and implementing agencies. Describe the organizational arrangements for project implementation, including executing agency, implementing agencies, and project coordination and monitoring. Prepare a detailed implementation schedule and specify TA requirements.
- (vii) Formulate procurement needs and corresponding procurement arrangements.
- (viii) Prepare an initial environmental examination of the Project and a summary initial environmental examination, highlighting the main findings, in accordance with ADB's *Environmental Guidelines for Selected Agricultural and Natural Resources Development Projects*, and the *Environmental Assessment Requirements of the Asian Development Bank*.
- (ix) Identify the expected beneficiaries and communities to be affected by the Project and undertake social assessment in accordance with ADB's *Handbook on Poverty and Social Analysis*. Give particular attention to (a) poverty analysis to ensure that the percentage of poor people benefiting from the Project is higher than the

percentage of the poor in the country; (b) gender analysis in accordance with ADB's *Gender Checklist: Agriculture*; (c) incorporation of concerns of ethnic minorities; (d) participatory development and involvement of nongovernment organizations; and (e) any adverse impacts anticipated from the Project, particularly on minorities and the poor. Appropriate mediation measures should be identified including any necessary resettlement measures in accordance with ADB's *Handbook on Resettlement*.

- (x) Undertake financial and economic analysis of the flood protection facilities at each site, the components, and the Project as a whole, and assess recurrent costs and implications for participating entities and beneficiaries in accordance with ADB's *Guidelines for the Economic Analysis of Projects*. Assess the sustainability of the proposed flood mitigation measures.
- (xi) Based on the project framework, prepare a project performance monitoring system, including adequate monitoring indicators and baseline data, to facilitate project monitoring and evaluation.

C. Consulting Requirements

17. The tasks described will require consultants with substantial experience in advising on flood management procedures, flood control measures, and practices for flood-prone areas in the lower part of steep mountain river basins. Specific experience in Azerbaijan and/or other Caucasus and central Asia countries and a solid knowledge of the governmental structures and responsibilities will be considered a strong advantage. The international consultants will include (input in person-months) (i) a team leader with expertise in flood management and knowledge of ADB procedures and guidelines (5.0), (ii) a water resources engineer (5.0), (iii) a roller-compacted concrete specialist (1.0), (iv) a flood disaster management specialist (1.0), (v) a watershed management specialist (1.0), (vi) a community development specialist (1.0), and (vii) a financial and economic analyst with expertise in estimating benefits from flood damage avoidance (1.5). The domestic consultants will include (i) a deputy team leader with expertise in flood management (5.0), (ii) a meteorologist (2.0), (iii) two hydrologists (6.0), (iv) a flood damage assessment specialist (4.0), (v) a topologist (3.0), (vi) two hydraulic structures design engineers (7.0), (vii) a construction planning and scheduling engineer (3.0), (viii) two construction contracts and specifications specialists (4.0), (ix) a watershed management specialist (4.0), (x) an irrigation engineer (2.0), (xi) two community development specialists (6.0), (xii) an institutional development specialist (3.0), (xiii) an environmental assessment specialist (4.0), and (xiv) two financial and economic analysts (5.0).

D. Reports and Tripartite Meetings

18. The consultants will produce four reports at key stages of the TA. An inception report will be submitted within one month of commencement of the TA to finalize the approach and work plan, and the schedule of the remaining phase I activities. A phase I report will be submitted within two months after the commencement of the TA, including analyses of existing reports and new survey data, and preliminary recommendations of the TA. A draft phase II report, to be submitted at least a month prior to the TA's completion, will cover the detailed project design and cost estimates. A final phase II report will be submitted at the conclusion of the TA, structured in accordance with ADB's format for the report and recommendation of the President, and will reflect comments made by the Government agencies and ADB, and other parties concerned. All reports will be translated into Azeri. The inception report, phase I report, and draft phase II report will be discussed in tripartite meetings.

COST ESTIMATES AND FINANCING PLAN
(\$ '000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	418	0	418
ii. Domestic Consultants	0	112	112
b. International and Local Travel	28	9	37
c. Reports, Communications, Translation, and Interpretation	0	11	11
2. Equipment and Supplies ^a	10	1	11
3. Surveys and Workshops	1	34	35
4. Representatives for Contract Negotiations ^b	10	0	10
5. Contingencies	48	18	66
Subtotal (A)	515	185	700
B. Government Financing			
1. Remuneration and Per Diem of Counterpart Staff	0	35	35
2. Office Accommodation, Utilities, and Transport	0	55	55
3. Surveys and Investigations	0	15	15
4. Workshop and Meeting Facilities	0	10	10
5. Logistical Support in Districts	0	15	15
6. Miscellaneous Administration and Support Costs	0	25	25
7. Contingencies	0	20	20
Subtotal (B)	0	175	175
Total	515	360	875

^a Includes three computers, software, three printers, one fax machine, one photocopier, and one digital camera. This equipment will be turned over to the Executing Agency upon completion of the technical assistance.

^b Includes cost of travel and per diem for Government observers invited for contract negotiations.

Source: Staff estimates.