No.8 Geghamabak

Information on Existing Water Sources (Gegharkunik)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.8 Community Geghamabak
District Vardenis
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Water main	40	7	7.0	45	48	42.3	2,218	0.5	0.5	0.5
2											
3											
4											
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	
Alternative sources if any	No alternative sources are available.

No.8 Community Geghamabak
District Vardenis
Marz Gegharkunik
Sampling date 27/Aug/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		8.4				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	13.1					
c	TDS	Mg/L	67				1000	1000
1	Al:Aluminum	Mg/L	n.d				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	3				250	350
4	Cr:Chrome	Mg/L	<0.01				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.05				1.50	
7	Hardness	Mg/L	130				500	700
8	Fe:Iron	Mg/L	n.d				0.30	0.30
9	Mn:Manganese	Mg/L	n.d				0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d				0.070	0.250
11	Ni:Nickel	Mg/L	n.d				0.020	0.100
12	Nitrate(NO3+)	Mg/L	2.7				50.0	45.0
13	SO4:Sulfate	Mg/L	3.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d				3.0	5.0
15	As:Arsenic	Mg/L	n.d				0.0	0.1
16	Ba:Barium	Mg/L	<0.01				0.70	0.10
17	Be:Berillium	Mg/L	0.00010				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	n.d				0.00100	0.00050
21	Se:Selenium	Mg/L	0.001				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml	<9				-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml	nd				0	0
26	Total bacteria	bacteria per 1 ml	60				-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.8 Community Geghamabak
District Vardenis
Marz Gegharkunik

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not identified	Not identified
1	01	11	20	0.3	Not identified
2	02	23	22	0.3	Not identified
3	03	26	20	0.3	Not identified
4	04	19	30	0.4	Not identified
5	05	24	24	0.3	Not identified
6	06	21	24	0.3	Not identified
7	07	16	30	0.4	Not identified
8	08	27	26	0.3	Not identified

No. 8 **Marz** Gegharkunik **Community** Geghamabak

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Possible	Possible	
2	Transmission pipeline	Possible	Possible	Pipeline is generally along or close to the road
3	Reservoir	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°07′07.0″	45°48′42.3″	2,218	1950	Concrete	0.5	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	5,000	100	Steel	0.5	1950	Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°09′38.1″	45°48′12.7″	2,069	Concrete	Rectangular	2x3x1.5	9	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	3,500	50	Steel	1950	Huge	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8. PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
1			No	0	Yes

9. DRAINAGE SYSTEM

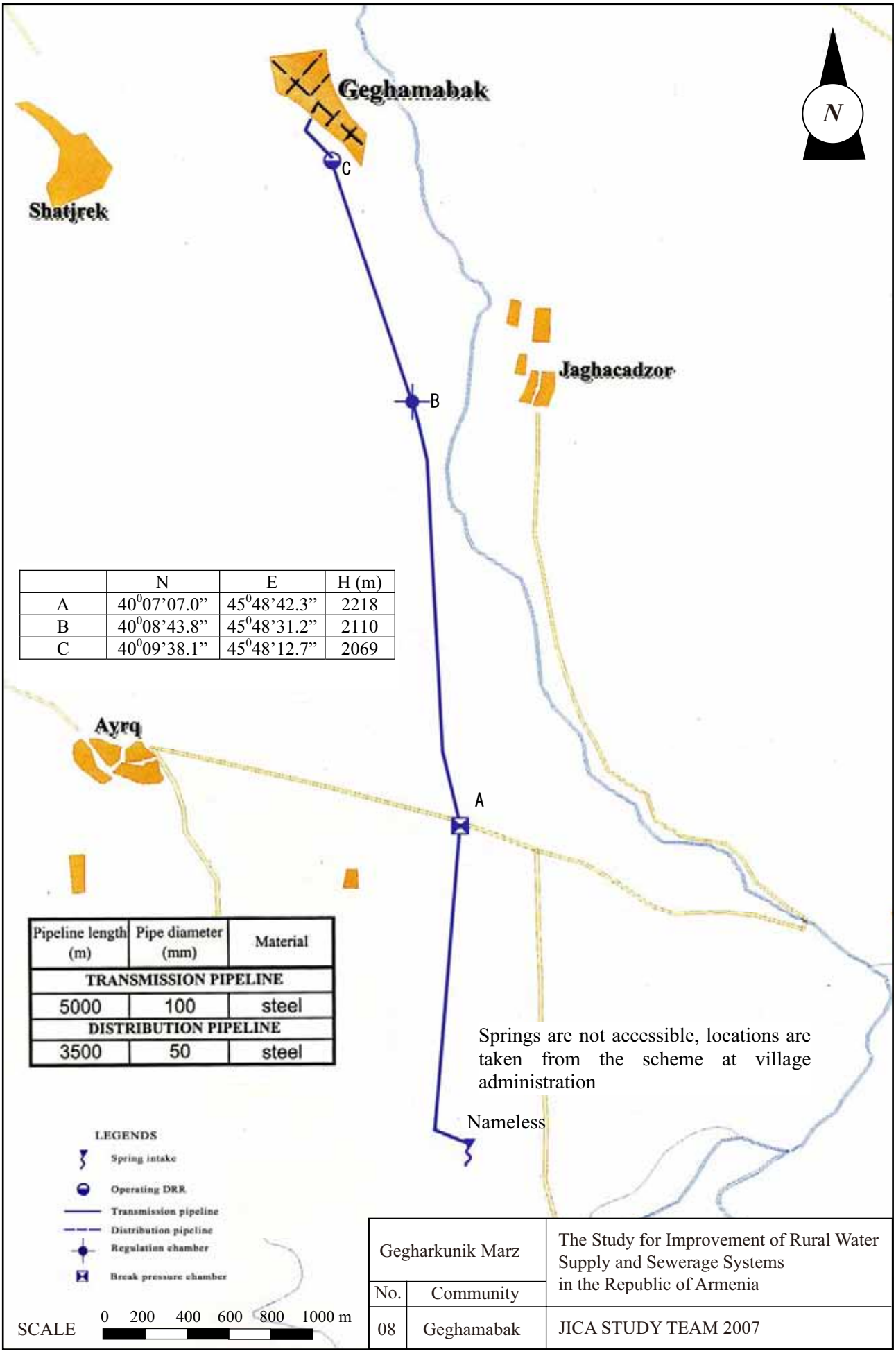
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.8 Geghamabak**
District	**Vardenis**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	150
A2	Actual population in 2007	167
A3	Number of households	36
A4.1	Elderly people	21
A4.2	Population in labor force (age from 16 to 62)	106
A4.3	Children	40
A5.1	Pensioners	11
A5.2	Unemployed	10
A5.3	Receiving benefits	12
A6	Average monthly income of household (AMD)	50,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	13
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	2,888
	Annual Budget of the community 2005, in thousand AMD	2,295
	Annual Budget of the community 2006, in thousand AMD	2,482
	Annual Budget of the community 2007, in thousand AMD	800
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	100
	Amount spent in drinking water sector 2005, in thousand AMD	150
	Amount spent in drinking water sector 2006, in thousand AMD	170
	Amount spent in drinking water sector 2007, in thousand AMD	100
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes,cabbage, cereals, dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	unknown
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	0
D8	How many house connection household set the water meter	0
D9	Number of public taps	6-non - operational, 1-operational
D10.1	How is the regime of water supply in your community in the dry season?	24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	24 hrs
D11	What time of day water is given?	-
D12	Are you pleased with duration of domestic water supply?	-
D13	Are hours of water supply convenient?	-
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	100
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	100-150
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from spring
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	absent
E2	Position	
E3	Telephone	
E4	Quantity and present condition of the water supply facilities: spring/ intake	absent
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-partially rehabilitated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	absent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	deteriorated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	government
E11	Who is engaged in the water supply facilities repairing works?	community and residents
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	none
E14	How you prepare O&M costs?	administration budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	0
	Repair cost(AMD)	100,000
	Others(AMD)	0
	Total (AMD)	100,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.8 Geghamabak



	N	E	H (m)
A	$40^0$07'07.0"	$45^0$48'42.3"	2218
B	$40^0$08'43.8"	$45^0$48'31.2"	2110
C	$40^0$09'38.1"	$45^0$48'12.7"	2069

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
5000	100	steel
DISTRIBUTION PIPELINE		
3500	50	steel

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
08	Geghamabak	JICA STUDY TEAM 2007

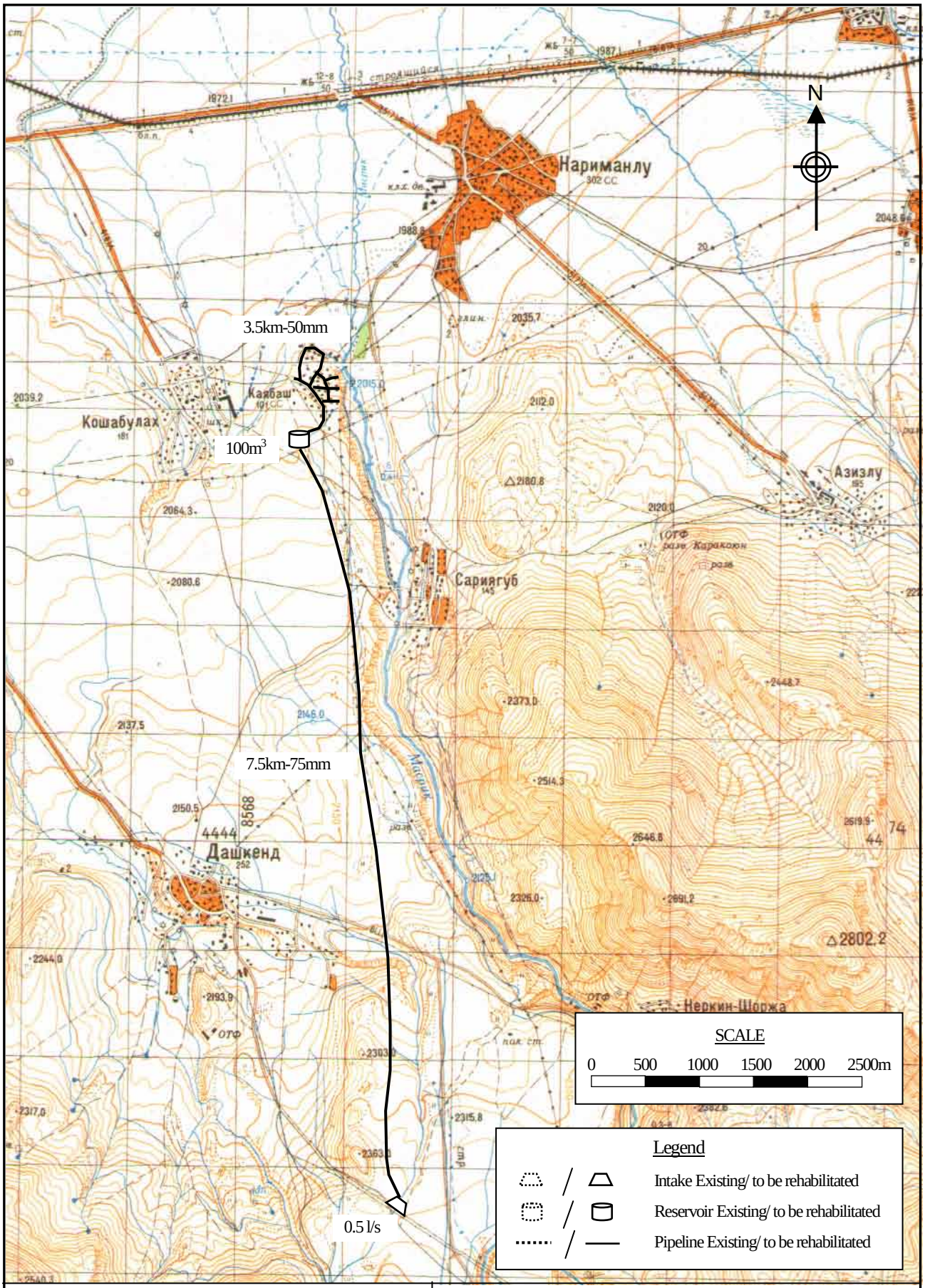
Marz : **Gegharkunik** No.8
Name : **Geghamabak**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	167	persons	16.7	
	2 Factory	-	nos	0.0	
	3 School (pupils)	13	pupils	0.1	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	36	household	3.1	
	Sub-total			19.9	
	Unaccouted for water (20%)			4.0	
1	Average Daily Water Demand			23.9	m3/day
2	Maximum Daily Water Demand			28.7	m3/day
3	Maximum Hourly Water Demand			7.0	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Existing pipeline	1	0.5	lit/sec		43.2	m3/day
`	Total					43.2	m3/day
	2 Required reservoir volume					84	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	1	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter	7,500	m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	100m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	3,500	m
	75mm diameter		m
	90mm diameter		m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	36	nos
6	Water meter installation	36	nos
7	Public tap	1	nos
8	Chlorination	1	nos
9	Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 08	Geghamabak	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **8**
Name : **Geghamabak**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	1	nos	367,700	367,700
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					367,700
2	Transmission Pipe					
		50mm		m	5,520	
		75mm	7,500	m	7,160	53,700,000
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					53,700,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3	1	nos	12,968,300	12,968,300
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					12,968,300
4	Distribution Pipe					
		50mm	3,500	m	5,520	19,320,000
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					19,320,000
5	House Connection		36	nos	74,000	2,664,000
6	Water Meter Installation		36	nos	80,000	2,880,000
7	Public Tap		1	nos	90,000	90,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	1,400	m	3,600	5,040,000
	Total				AMD	97,530,000
					Equivalent to USD	319,226
					Equivalent to JPY	33,678,368
					AMD	USD
	Investment Cost per household		36	HH	2,709,167	8,867
	Investment Cost per person		167	persons	584,012	1,912

GEGHARKUNIK MARZ
Marutuni District
No 8 Geghamabak

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																										
Consumption water volume	1000m3/yr		7.3																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		40.55	0.00	0.00	0.11	0.21	0.26	0.27	0.46	0.47	0.49	0.50	0.76	0.78	0.81	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.49	1.54	1.60	1.65	1.70	1.76	1.82	1.88	1.94
B Operating Costs																																										
1. Staff salary																																										
Inspectors	person				1																																					
Pump operators	person				0																																					
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																										
Pouring volume	kg/yr				44																																					
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		1.93			0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		21.87			0.12	0.25	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.88	0.90	0.93	0.97	1.00
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.12	0.25	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70	0.72	0.74	0.77	0.79	0.82	0.85	0.88	0.90	0.93	0.97	1.00
5. Pump replacement		0.00																0.00															0.00									
Sub-total		41.50	0.00	0.00	0.37	0.52	0.61	0.62	0.64	0.66	0.68	0.71	0.73	0.76	0.79	0.81	0.83	0.87	0.89	0.92	0.94	0.99	1.02	1.05	1.08	1.11	1.15	1.20	1.23	1.28	1.32	1.36	1.41	1.46	1.50	1.55	1.60	1.66	1.70	1.76	1.82	1.89
C Gross Income (A-B)		-0.95	0.00	0.00	-0.26	-0.31	-0.35	-0.35	-0.18	-0.19	-0.19	-0.21	0.03	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.02	0.03	0.03	0.04	0.04	0.04	0.03	0.04	0.03	0.04	0.04	0.04	0.03	0.04	0.05	0.05	0.04	0.06	0.06	0.06	0.05
D Depreciation cost		92.75						2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
E Interest paid		31.13	0.04	0.07	0.57	1.08	1.31	1.32	1.32	1.32	1.32	1.32	1.32	1.28	1.24	1.21	1.17	1.13	1.09	1.05	1.01	0.96	0.92	0.88	0.84	0.80	0.75	0.71	0.67	0.62	0.58	0.53	0.48	0.44	0.39	0.34	0.30	0.25	0.20	0.15	0.10	0.05
F Net Income		-124.83	-0.04	-0.07	-0.83	-1.39	-1.66	-4.32	-4.15	-4.16	-4.16	-4.18	-3.94	-3.91	-3.87	-3.84	-3.79	-3.76	-3.71	-3.67	-3.62	-3.59	-3.54	-3.50	-3.45	-3.41	-3.36	-3.33	-3.28	-3.24	-3.19	-3.14	-3.09	-3.06	-3.00	-2.94	-2.90	-2.86	-2.79	-2.74	-2.69	-2.65
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		-124.83	-0.04	-0.07	-0.83	-1.39	-1.66	-4.32	-4.15	-4.16	-4.16	-4.18	-3.94	-3.91	-3.87	-3.84	-3.79	-3.76	-3.71	-3.67	-3.62	-3.59	-3.54	-3.50	-3.45	-3.41	-3.36	-3.33	-3.28	-3.24	-3.19	-3.14	-3.09	-3.06	-3.00	-2.94	-2.90	-2.86	-2.79	-2.74	-2.69	-2.65
OM Cost Recovery Ratio (A/B)		98%	0%	0%	30%	40%	43%	44%	72%	71%	72%	70%	104%	103%	103%	102%	104%	102%	103%	103%	104%	102%	103%	103%	104%	104%	103%	103%	103%	102%	103%	103%	103%	102%	103%	103%	103%	102%	104%	103%	103%	103%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	-124.83	-0.04	-0.07	-0.83	-1.39	-1.66	-4.32	-4.15	-4.16	-4.16	-4.18	-3.94	-3.91	-3.87	-3.84	-3.79	-3.76	-3.71	-3.67	-3.62	-3.59	-3.54	-3.50	-3.45	-3.41	-3.36	-3.33	-3.28	-3.24	-3.19	-3.14	-3.09	-3.06	-3.00	-2.94	-2.90	-2.86	-2.79	-2.74	-2.69	-2.65
2. Depreciation cost	92.75	0.00	0.00	0.00	0.00	0.00	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
3. Interest Paid	31.13	0.04	0.07	0.57	1.08	1.31	1.32	1.32	1.32	1.32	1.32	1.32	1.28	1.24	1.21	1.17	1.13	1.09	1.05	1.01	0.96	0.92	0.88	0.84	0.80	0.75	0.71	0.67	0.62	0.58	0.53	0.48	0.44	0.39	0.34	0.30	0.25	0.20	0.15	0.10	0.05
Sub-total	-0.95	0.00	0.00	-0.26	-0.31	-0.35	-0.35	-0.18	-0.19	-0.19	-0.21	0.03	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.02	0.03	0.03	0.04	0.04	0.04	0.03	0.04	0.03	0.04	0.04	0.04	0.03	0.04	0.05	0.05	0.04	0.06	0.06	0.06	0.05
B Finances																																									
1. Project Loan	132.01	3.91	2.79	49.99	51.03	23.26	0.58	0.45																																	
2. Local fund	44.28	1.29	0.91	16.93	17.18	7.84	0.07	0.06																																	
Sub-total	176.29	5.20	3.70	66.92	68.21	31.10	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	2.05	0.00	0.00	0.26	0.31	0.35	0.35	0.18	0.19	0.19	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	162.02	0.04	0.07	0.57	1.08	1.31	1.32	1.32	1.32	1.32	1.32	5.08	5.09	5.09	5.10	5.09	5.10	5.09	5.09	5.08	5.09	5.08	5.08	5.08	5.08	5.07	5.09	5.08	5.08	5.08	5.07	5.07	5.09	5.07	5.06	5.07	5.08	5.06	5.05	5.05	5.06
Sub-total	164.07	0.04	0.07	0.83	1.39	1.66	1.67	1.50	1.51	1.51	1.53	5.08	5.09	5.09	5.10	5.09	5.10	5.09	5.09	5.08	5.09	5.08	5.08	5.08	5.08	5.07	5.09	5.08	5.08	5.08	5.07	5.07	5.09	5.07	5.06	5.07	5.08	5.06	5.05	5.05	5.06
Total Cash Inflow	339.41	5.24	3.77	67.49	69.29	32.41	1.97	1.83	1.32	1.32	1.32	5.11	5.11	5.11	5.12	5.12	5.12	5.12	5.12	5.12	5.11	5.11	5.11	5.12	5.12	5.11	5.12	5.12	5.11	5.12	5.11	5.11	5.12	5.11	5.11	5.12	5.12	5.12	5.11	5.11	5.11
APPLICATION OF FUNDS																																								
D Project disbursement	176.29	5.20	3.70	66.92	68.21	31.10	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	131.99											3.79	3.83	3.87	3.91	3.95	3.99	4.03	4.07	4.11	4.15	4.19	4.23	4.28	4.32	4.36	4.41	4.45	4.49	4.54	4.58	4.63	4.68	4.72	4.77	4.82	4.87	4.92	4.96	5.01	5.06
2. Interest paid	31.13	0.04	0.07	0.57	1.08	1.31	1.32	1.32	1.32	1.32	1.32	1.32	1.28	1.24	1.21	1.17	1.13	1.09	1.05	1.01	0.96	0.92	0.88	0.84	0.80	0.75	0.71	0.67	0.62	0.58	0.53	0.48	0.44	0.39	0.34	0.30	0.25	0.20	0.15	0.10	0.05
Sub-total	163.12	0.04	0.07	0.57	1.08	1.31	1.32	1.32	1.32	1.32	1.32	5.11	5.11	5.11	5.12	5.12	5.12	5.12	5.12	5.12	5.11	5.11	5.11	5.12	5.12	5.11	5.12	5.12	5.11	5.12	5.11	5.11	5.12	5.11	5.11	5.12	5.12	5.12	5.11	5.11	5.11
Total Cash Outflow	339.41	5.24	3.77	67.49	69.29	32.41	1.97	1.83	1.32	1.32	1.32	5.11	5.11	5.11	5.12	5.12	5.12	5.12	5.12	5.12	5.11	5.11	5.11	5.12	5.12	5.11	5.12	5.12	5.11	5.12	5.11	5.11	5.12	5.11	5.11	5.12	5.12	5.12	5.11	5.11	5.11
F Net Surplus Cash (A+C2)-E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cost recovery by water fee + subsidy ((A+C2)/E)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

GEGHARKUNIK MARZ
Marutuni District
No 8 Geghamabak

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	40.55	20.0%
	Subsidy	162.02	80.0%
	Total	202.57	100.0%
2	**Expenditure**		
	OM cost	41.50	20.5%
	Loan repayment	131.99	65.2%
	Interest paid	31.13	15.4%
	Surplus cash	0.00	0.0%
	Total	204.62	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																								
1. Investment Cost	118.42	3.82	2.73	45.70	45.20	20.02	0.53	0.42																																
2. Operation and Maintenance Cost																																								
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	1.11			0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	11.17			0.12	0.25	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Pump replacement	0.00																0.00															0.00									
Sub-total	21.40			0.37	0.51	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Total Outflow	139.82	3.82	2.73	46.07	45.71	20.59	1.10	0.99	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
B BENEFIT																																								
1. Water Tariff	25.57	0.00	0.00	0.11	0.21	0.26	0.27	0.46	0.47	0.49	0.50	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
2. Subsidy	132.94	0.00	0.00	0.26	0.31	0.35	0.35	0.18	0.19	0.19	0.21	3.76	3.81	3.85	3.89	3.92	3.97	4.00	4.04	4.07	4.13	4.16	4.20	4.24	4.28	4.32	4.38	4.41	4.46	4.50	4.54	4.59	4.65	4.68	4.72	4.77	4.83	4.86	4.90	4.95	5.01
Total Inflow	158.51	0.00	0.00	0.37	0.52	0.61	0.62	0.64	0.66	0.68	0.71	4.52	4.57	4.61	4.65	4.68	4.73	4.76	4.80	4.83	4.89	4.92	4.96	5.00	5.04	5.08	5.14	5.17	5.22	5.26	5.30	5.35	5.41	5.44	5.48	5.53	5.59	5.62	5.66	5.71	5.77
NET BENEFIT	18.69	-3.82	-2.73	-45.7	-45.2	-20.0	-0.48	-0.35	0.09	0.11	0.14	3.95	4.00	4.04	4.08	4.11	4.16	4.19	4.23	4.26	4.32	4.35	4.39	4.43	4.47	4.51	4.57	4.60	4.65	4.69	4.73	4.78	4.84	4.87	4.91	4.96	5.02	5.05	5.09	5.14	5.20
FIRR =	**0.66%**																																								

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-34.13	-4.20	-3.00	-50.3	-49.7	-22.0	-0.53	-0.39	0.09	0.11	0.14	3.95	4.00	4.04	4.08	4.11	4.16	4.19	4.23	4.26	4.32	4.35	4.39	4.43	4.47	4.51	4.57	4.60	4.65	4.69	4.73	4.78	4.84	4.87	4.91	4.96	5.02	5.05	5.09	5.14	5.20
	2	Capital cost 20% up	-45.25	-4.58	-3.28	-54.8	-54.2	-24.0	-0.59	-0.43	0.09	0.11	0.14	3.95	4.00	4.04	4.08	4.11	4.16	4.19	4.23	4.26	4.32	4.35	4.39	4.43	4.47	4.51	4.57	4.60	4.65	4.69	4.73	4.78	4.84	4.87	4.91	4.96	5.02	5.05	5.09	5.14	5.20
2	1	OM cost 10% up	-24.51	-3.82	-2.73	-45.7	-45.2	-20.0	-0.54	-0.41	0.03	0.05	0.08	3.89	3.94	3.98	4.02	4.05	4.10	4.13	4.17	4.20	4.26	4.29	4.33	4.37	4.41	4.45	4.51	4.54	4.59	4.63	4.67	4.72	4.78	4.81	4.85	4.90	4.96	4.99	5.03	5.08	5.14
	2	OM cost 20% up	-26.01	-3.82	-2.73	-45.8	-45.3	-20.1	-0.59	-0.46	-0.02	0.00	0.03	3.84	3.89	3.93	3.97	4.00	4.05	4.08	4.12	4.15	4.21	4.24	4.28	4.32	4.36	4.40	4.46	4.49	4.54	4.58	4.62	4.67	4.73	4.76	4.80	4.85	4.91	4.94	4.98	5.03	5.09
3	1	Revenue 10% down	-33.33	-3.82	-2.73	-45.7	-45.2	-20.0	-0.54	-0.41	0.02	0.04	0.07	3.50	3.54	3.58	3.62	3.64	3.69	3.71	3.75	3.78	3.83	3.86	3.89	3.93	3.97	4.00	4.06	4.08	4.13	4.16	4.20	4.25	4.30	4.33	4.36	4.41	4.46	4.49	4.52	4.57	4.62
	2	Revenue 20% down	-43.63	-3.82	-2.73	-45.8	-45.3	-20.1	-0.60	-0.48	-0.04	-0.03	0.00	3.05	3.09	3.12	3.15	3.17	3.21	3.24	3.27	3.29	3.34	3.37	3.40	3.43	3.46	3.49	3.54	3.57	3.61	3.64	3.67	3.71	3.76	3.78	3.81	3.85	3.90	3.93	3.96	4.00	4.05

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	0.23%	18.88	5.30%
	2	Capital cost 20% up	-0.16%	-51.68	-1.93%
2	1	OM cost 10% up	0.59%	1.26	79.54%
	2	OM cost 20% up	0.51%	2.89	34.63%
3	1	Revenue 10% down	0.11%	52.85	1.89%
	2	Revenue 20% down	-0.51%	-23.01	-4.35%

No.9 Geghamavan

Information on Existing Water Sources (Gegharkunik)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.9 Community Geghamavan
District Sevan
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	Spring	40	35	5.8	44	55	43.6	1,962	0.5	1.8	1.8
2	Spring	40	34	55.9	44	56	6.6	2,038			
3	Spring	40	34	56.3	44	56	7.8	2,046			
4	Spring	40	34	55.9	44	56	8.6	1,920			
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	There are 8 water sources here.
Alternative sources if any	In case of capturing 8 free springs in the area, water amount will increase by 1,9l/sec

No.9 Community Geghamavan
District Sevan
Marz Gegharkunik
Sampling date 12/Jul/2007

	Parameters analysed	Units	No.1				Guidelines	
							WHO	Armenia
a	pH		7.92				6.5-8	6.0 - 9.0
b	Temperature	Deg.C	15.4					
c	TDS	Mg/L	91				1000	1000
1	Al:Aluminum	Mg/L	n.d				0.10	0.50
2	B:Boron	Mg/L	n.d				0.70	0.50
3	Cl:Chloride	Mg/L	6				250	350
4	Cr:Chrome	Mg/L	n.d				0.05	0.05
5	Cu:Copper	Mg/L	n.d				2	1
6	F:Fluoride	Mg/L	0.18				1.50	
7	Hardness	Mg/L	170				500	700
8	Fe:Iron	Mg/L	0.10				0.30	0.30
9	Mn:Manganese	Mg/L	n.d				0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d				0.070	0.250
11	Ni:Nickel	Mg/L	n.d				0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8				50.0	45.0
13	SO4:Sulfate	Mg/L	15.0				250.0	500.0
14	Zn:Zink	Mg/L	n.d				3.0	5.0
15	As:Arsenic	Mg/L	n.d				0.0	0.1
16	Ba:Barium	Mg/L	0.02				0.70	0.10
17	Be:Berillium	Mg/L	n.d				NA	0.00020
18	Cd:Cadmium	Mg/L	n.d				0.0030	0.0010
19	Pb:Lead	Mg/L	0.001				0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002				0.00100	0.00050
21	Se:Selenium	Mg/L	<0.001				0.010	0.010
22	Sr:Strontium	Mg/L	<0.7				NA	7.0
23	CN:Cyanide	Mg/L	n.d				0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.9 Community Geghamavan
District Sevan
Marz Gegharkunik

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not identified	Not identified
1	02	13	45	-	Not identified
2	03	27	45	-	Not identified
3	04	17	45	-	Not identified
4	06	04	200	2.3	Not identified
5	07	02	200	2.4	Not identified
6	08	01	45	-	Not identified

No. 9 **Marz** Gegharkunik **Community** Geghamavan

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
	Intake	Difficult	Difficult	
	Intake	Difficult	Difficult	
2	Transmission pipeline	Difficult	Difficult	Pipeline is generally along or close to the road
3	Reservoir	Possible	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°35′05.8″	44°55′43.6″	1,962	1980	Concrete	1.8	Yes
2	Spring	40°34′56.3″	44°56′07.8″	2,046	2004	Concrete		No
3	Spring	40°34′55.9″	44°56′06.6″	2,038	1984	Concrete		Yes
4	Spring	40°34′55.9″	44°56′08.6″	1,920		Concrete		Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	1,500	80	Steel	1.8	1984	Little	Yes
2	3,500	125	Steel			Little	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°33′44.3″	44°53′54.7″	1918	reinforced concrete	Circle	R=6m	500	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	6000	125	Steel	1984	Huge	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
1	1984		Yes	100	No

9. DRAINAGE SYSTEM

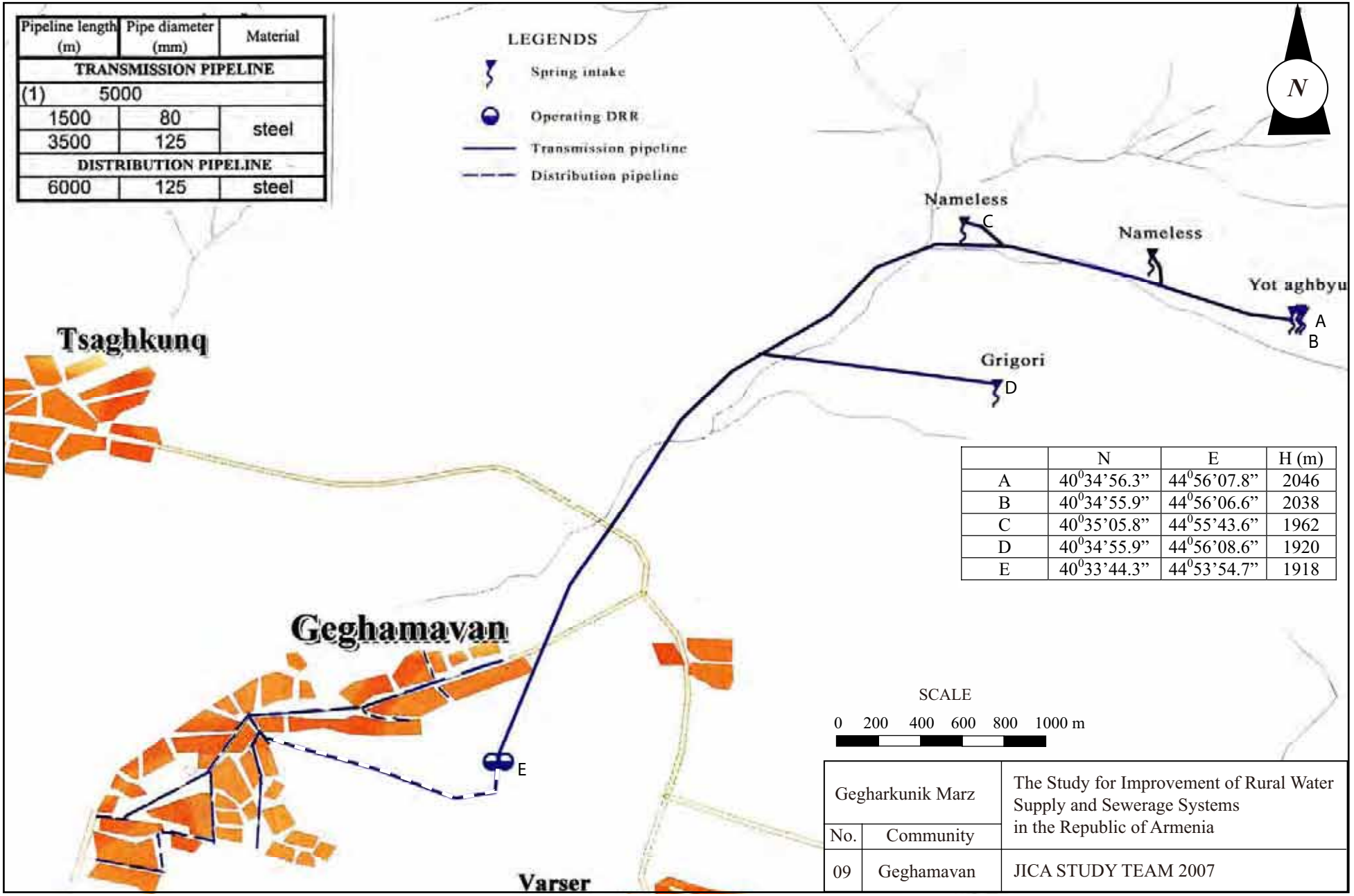
Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

Marz	**Gegharkunik**
Number and Name of Community	**No.9 Geghamavan**
District	**Sevan**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	1,850
A2	Actual population in 2007	1,923
A3	Number of households	561
A4.1	Elderly people	151
A4.2	Population in labor force (age from 16 to 62)	1,317
A4.3	Children	455
A5.1	Pensioners	290
A5.2	Unemployed	absent
A5.3	Receiving benefits	60
A6	Average monthly income of household (AMD)	17,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	300
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,440
	Annual Budget of the community 2005, in thousand AMD	6,767
	Annual Budget of the community 2006, in thousand AMD	4,781
	Annual Budget of the community 2007, in thousand AMD	1,590
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	240
	Amount spent in drinking water sector 2005, in thousand AMD	240
	Amount spent in drinking water sector 2006, in thousand AMD	240
	Amount spent in drinking water sector 2007, in thousand AMD	240
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	dairy, meat
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	unknown
D5	Present condition of the water supply volume of Domestic use	insufficient
D6	Present condition of the water supply volume of Irrigation water	insufficient
D7	Number of house connection to drinking water system	550
D8	How many house connection household set the water meter	0
D9	Number of public taps	1
D10.1	How is the regime of water supply in your community in the dry season?	irregularly 0.5 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly 2-3hrs
D11	What time of day water is given?	9^{00}-12^{30}, 9^{00}-11^{00}
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly convenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	4-5hrs
D14.2	Estimate quantity of domestic water use of each household (litter per day)	600
D15.1	How long the taps are open to provide the each household for filling	6 hrs
D15.2	Estimate quantity of water for filling containers of each household (litter per	1,000
D16	Drinking water monthly water fee per household	0
D17	How often do you usually pay water fees?	-
D18	Water fee structure 1Flate rate, 2 Having water tariff	-
D19	Where do you acquire the irrigation water?	from Hrazdan river by pipelines
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Muradyan Varazdat
E2	Position	inspector
E3	Telephone	-
E4	Quantity and present condition of the water supply facilities: spring/ intake	2-good, 2-partially rehabilitated, 7-deteriorated,
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	1-deteriorated,
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-deteriorated, 1-excellent
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	rehabilitated
E10	Who is the owner of the water supply facilities?	community
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	by ourselves
E13	Who is in charge of the repair work in the community?	none
E14	How you prepare O&M costs?	administration budget
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	240,000
	Repair cost(AMD)	200,000
	Others(AMD)	0
	Total (AMD)	440,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.9 Geghamavan



	N	E	H (m)
A	$40^0$34’56.3”	$44^0$56’07.8”	2046
B	$40^0$34’55.9”	$44^0$56’06.6”	2038
C	$40^0$35’05.8”	$44^0$55’43.6”	1962
D	$40^0$34’55.9”	$44^0$56’08.6”	1920
E	$40^0$33’44.3”	$44^0$53’54.7”	1918

Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
09	Geghamavan	JICA STUDY TEAM 2007

Marz : **Gegharkunik** No.9
Name : **Geghamavan**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	1,923	persons	192.3	
	2 Factory	-	nos	0.0	
	3 School (pupils)	300	pupils	3.0	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	7 Livestocks (87lit/household)	561	household	48.8	
	Sub-total			244.1	
	Unaccouted for water (20%)			48.8	
1	Average Daily Water Demand		177.5	292.9	m3/day
2	Maximum Daily Water Demand			351.5	m3/day
3	Maximum Hourly Water Demand			34.3	m3/hr

B	**WATER SUPPLY PLAN**					
	1 Water source type	Nr.	Total vol.			
	a Spring	4	1.8	lit/sec	155.5	m3/day
`	Total				155.5	m3/day
	2 Additional water source					
	2 Required reservoir volume				411	m3

C	**WATER SUPPLY FACILITIES REHABILITATION PLAN**			
No	Item	Quantity	Unit	
1	Intake			
	1m3	3	nos	
	2m3		nos	
	3m3		nos	
	4m3		nos	
2	Transmission pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter	1,000	m	
	110mm diameter	5,200	m	
	150mm diameter		m	
	200mm diameter		m	
	250mm diameter		m	
3	Reservoir			
	400m3 capacity	1	nos	
4	Distribution pipe			
	50mm diameter		m	
	75mm diameter		m	
	90mm diameter		m	
	110mm diameter		m	
	150mm diameter	6,000	m	
	200mm diameter		m	
	250mm diameter		m	
5	House connection	11	nos	
6	Water meter installation	561	nos	
7	Public tap	6	nos	
8	Chlorination	1	nos	
9	Pumps	-	nos	

Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 09	Geghamavan	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **9**
Name : **Geghamavan**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	1,000	m	8,040	8,040,000
		110mm	5,200	m	9,680	50,336,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					58,376,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3	1	nos	36,388,000	36,388,000
		450m3		nos	39,392,500	
		500m3		nos	42,520,900	
	Sub-total					36,388,000
4	Distribution Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm		m	8,040	
		110mm		m	9,680	
		150mm	6,000	m	13,140	78,840,000
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					78,840,000
5	House Connection		11	nos	74,000	814,000
6	Water Meter Installation		561	nos	80,000	44,880,000
7	Public Tap		6	nos	90,000	540,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	2,400	m	3,600	8,640,000
	Total				AMD	230,081,100
					Equivalent to USD	753,080
					Equivalent to JPY	79,449,974
					AMD	USD
	Investment Cost per household		561	HH	410,127	1,342
	Investment Cost per person		1,923	persons	119,647	392

GEGHARKUNIK MARZ
Sevan District
No 9 Geghamavan

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																										
Consumption water volume	1000m3/yr		89.1																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		499.78	0.00	0.00	3.21	3.21	3.21	3.31	5.61	5.80	5.99	6.19	9.27	9.58	9.90	10.22	10.56	10.91	11.27	11.64	12.02	12.42	12.83	13.25	13.69	14.14	14.61	15.09	15.59	16.10	16.64	17.18	17.75	18.34	18.94	19.57	20.21	20.88	21.57	22.28	23.02	23.78
B Operating Costs																																									
1. Staff salary																																									
Inspectors	person				2																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		35.40			0.48	0.50	0.51	0.53	0.55	0.56	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73	0.76	0.78	0.81	0.83	0.86	0.89	0.92	0.95	0.98	1.01	1.05	1.08	1.12	1.15	1.19	1.23	1.27	1.31	1.36	1.40	1.45	1.50	1.54	1.60
2. Chlorine																																									
Pouring volume	kg/yr				535																																				
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		23.68			0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.59	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		28.78			0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.59	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.26	1.30
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.39	0.4	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.59	0.61	0.63	0.66	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07	1.10	1.14	1.18	1.21	1.26	1.30
5. Pump replacement		0.00																0.00															0.00									
Sub-total		87.86	0.00	0.00	1.19	1.23	1.27	1.31	1.36	1.40	1.44	1.49	1.55	1.59	1.64	1.71	1.76	1.81	1.88	1.93	2.01	2.07	2.14	2.20	2.28	2.35	2.44	2.51	2.60	2.68	2.78	2.86	2.96	3.05	3.15	3.26	3.37	3.48	3.60	3.71	3.83	3.97
C Gross Income (A-B)		411.92	0.00	0.00	2.02	1.98	1.94	2.00	4.25	4.40	4.55	4.70	7.72	7.99	8.26	8.51	8.80	9.10	9.39	9.71	10.01	10.35	10.69	11.05	11.41	11.79	12.17	12.58	12.99	13.42	13.86	14.32	14.79	15.29	15.79	16.31	16.84	17.40	17.97	18.57	19.19	19.81
D Depreciation cost		218.75						6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
E Interest paid		68.56	0.04	0.07	2.77	2.80	2.82	2.82	2.82	2.82	2.82	2.82	2.83	2.75	2.66	2.58	2.50	2.41	2.33	2.24	2.15	2.07	1.98	1.89	1.80	1.71	1.61	1.52	1.42	1.33	1.23	1.14	1.04	0.94	0.84	0.74	0.64	0.53	0.43	0.32	0.22	0.11
F Net Income		124.61	-0.04	-0.07	-0.75	-0.82	-0.88	-7.07	-4.82	-4.67	-4.52	-4.37	-1.36	-1.01	-0.65	-0.32	0.05	0.44	0.81	1.22	1.61	2.03	2.46	2.91	3.36	3.83	4.31	4.81	5.32	5.84	6.38	6.93	7.50	8.10	8.70	9.32	9.95	10.62	11.29	12.00	12.72	13.45
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		124.61	-0.04	-0.07	-0.75	-0.82	-0.88	-7.07	-4.82	-4.67	-4.52	-4.37	-1.36	-1.01	-0.65	-0.32	0.05	0.44	0.81	1.22	1.61	2.03	2.46	2.91	3.36	3.83	4.31	4.81	5.32	5.84	6.38	6.93	7.50	8.10	8.70	9.32	9.95	10.62	11.29	12.00	12.72	13.45
OM Cost Recovery Ratio (A/B)		569%	0%	0%	270%	261%	253%	253%	413%	414%	416%	415%	598%	603%	604%	598%	600%	603%	599%	603%	598%	600%	600%	602%	600%	602%	599%	601%	600%	601%	599%	601%	600%	601%	601%	600%	600%	600%	599%	601%	601%	599%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	124.61	-0.04	-0.07	-0.75	-0.82	-0.88	-7.07	-4.82	-4.67	-4.52	-4.37	-1.36	-1.01	-0.65	-0.32	0.05	0.44	0.81	1.22	1.61	2.03	2.46	2.91	3.36	3.83	4.31	4.81	5.32	5.84	6.38	6.93	7.50	8.10	8.70	9.32	9.95	10.62	11.29	12.00	12.72	13.45
2. Depreciation cost	218.75	0.00	0.00	0.00	0.00	0.00	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
3. Interest Paid	68.56	0.04	0.07	2.77	2.80	2.82	2.82	2.82	2.82	2.82	2.82	2.83	2.75	2.66	2.58	2.50	2.41	2.33	2.24	2.15	2.07	1.98	1.89	1.80	1.71	1.61	1.52	1.42	1.33	1.23	1.14	1.04	0.94	0.84	0.74	0.64	0.53	0.43	0.32	0.22	0.11
Sub-total	411.92	0.00	0.00	2.02	1.98	1.94	2.00	4.25	4.40	4.55	4.70	7.72	7.99	8.26	8.51	8.80	9.10	9.39	9.71	10.01	10.35	10.69	11.05	11.41	11.79	12.17	12.58	12.99	13.42	13.86	14.32	14.79	15.29	15.79	16.31	16.84	17.40	17.97	18.57	19.19	19.81
B Finances																																									
1. Project Loan	282.77	3.91	2.79	269.95	3.48	1.61	0.58	0.45																																	
2. Local fund	95.26	1.29	0.91	91.47	1.16	0.30	0.07	0.06																																	
Sub-total	378.03	5.20	3.70	361.42	4.64	1.91	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	23.38	0.04	0.07	0.75	0.82	0.88	0.82	0.00	0.00	0.00	0.00	3.24	2.97	2.69	2.45	2.16	1.85	1.57	1.25	0.94	0.61	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	23.38	0.04	0.07	0.75	0.82	0.88	0.82	0.00	0.00	0.00	0.00	3.24	2.97	2.69	2.45	2.16	1.85	1.57	1.25	0.94	0.61	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	813.33	5.24	3.77	364.19	7.44	4.73	3.47	4.76	4.40	4.55	4.70	10.96	10.96	10.95	10.96	10.96	10.95	10.96	10.96	10.95	10.96	10.96	11.05	11.41	11.79	12.17	12.58	12.99	13.42	13.86	14.32	14.79	15.29	15.79	16.31	16.84	17.40	17.97	18.57	19.19	19.81
APPLICATION OF FUNDS																																									
D Project disbursement	378.03	5.20	3.70	361.42	4.64	1.91	0.65	0.51																																	
E Total debt services																																									
1. Loan repayment	282.77											8.13	8.21	8.29	8.38	8.46	8.54	8.63	8.72	8.80	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32	10.43	10.53	10.63	10.74	10.85
2. Interest paid	68.56	0.04	0.07	2.77	2.80	2.82	2.82	2.82	2.82	2.82	2.82	2.83	2.75	2.66	2.58	2.50	2.41	2.33	2.24	2.15	2.07	1.98	1.89	1.80	1.71	1.61	1.52	1.42	1.33	1.23	1.14	1.04	0.94	0.84	0.74	0.64	0.53	0.43	0.32	0.22	0.11
Sub-total	351.33	0.04	0.07	2.77	2.80	2.82	2.82	2.82	2.82	2.82	2.82	10.96	10.96	10.95	10.96	10.96	10.95	10.96	10.96	10.95	10.96	10.96	10.96	10.96	10.96	10.95	10.96	10.95	10.96	10.95	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.95	10.96	10.96
Total Cash Outflow	729.36	5.24	3.77	364.19	7.44	4.73	3.47	3.33	2.82	2.82	2.82	10.96	10.96	10.95	10.96	10.96	10.95	10.96	10.96	10.95	10.96	10.96	10.96	10.96	10.96	10.95	10.96	10.95	10.96	10.95	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.96	10.95	10.96	10.96
F Net Surplus Cash (A+C2)-E	83.97	0.00	0.00	0.00	0.00	0.00	0.00	1.43	1.58	1.73	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.45	0.83	1.22	1.62	2.04	2.46	2.91	3.36	3.83	4.33	4.83	5.35	5.88	6.44	7.01	7.62	8.23	8.85
Investment Cost Recovery Ratio (%)																																									
Cost recovery by water fee (A/E)	117%	0%	0%	73%	71%	69%	71%	151%	156%	161%	167%	70%	73%	75%	78%	80%	83%	86%	89%	91%	94%	98%	101%	104%	108%	111%	115%	119%	122%	127%	131%	135%	140%	144%	149%	154%	159%	164%	170%	175%	181%
Cost recovery by water fee + subsidy ((A+C2)/E)	124%	100%	100%	100%	100%	100%	100%	151%	156%	161%	167%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	101%	104%	108%	111%	115%	119%	122%	127%	131%	135%	140%	144%	149%	154%	159%	164%	170%	175%	181%

GEGHARKUNIK MARZ
Sevan District
No 9 Geghamavan

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	499.78	95.5%
	Subsidy	23.38	4.5%
	Total	523.16	100.0%
2	**Expenditure**		
	OM cost	87.86	16.8%
	Loan repayment	282.77	54.1%
	Interest paid	68.56	13.1%
	Surplus cash	83.97	16.1%
	Total	523.16	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																									
1. Investment Cost	258.44	3.82	2.73	246.27	3.21	1.46	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	18.24			0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Chlorine	12.53			0.32	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	14.82			0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Pump replacement	0.00																0.00															0.00									
Sub-total	45.59			1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Total Outflow	304.03	3.82	2.73	247.46	4.41	2.66	1.73	1.62	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
B BENEFIT																																								
1. Water Tariff	314.63	0.00	0.00	3.21	3.21	3.21	3.31	5.61	5.80	5.99	6.19	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27
2. Subsidy	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.22	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	315.29	0.00	0.00	3.21	3.21	3.21	3.31	5.61	5.80	5.99	6.19	9.68	9.49	9.30	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27	9.27
NET BENEFIT	11.26	-3.82	-2.73	-244.3	-1.2	0.6	1.58	3.99	4.60	4.79	4.99	8.48	8.29	8.10	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07

FIRR = 0.21%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-88.30	-4.20	-3.00	-268.9	-1.5	0.4	1.53	3.95	4.60	4.79	4.99	8.48	8.29	8.10	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07
	2	Capital cost 20% up	-112.84	-4.58	-3.28	-293.5	-1.8	0.3	1.47	3.91	4.60	4.79	4.99	8.48	8.29	8.10	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07
2	1	OM cost 10% up	-66.96	-3.82	-2.73	-244.4	-1.3	0.4	1.46	3.87	4.48	4.67	4.87	8.36	8.17	7.98	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95
	2	OM cost 20% up	-70.16	-3.82	-2.73	-244.5	-1.4	0.3	1.34	3.75	4.36	4.55	4.75	8.24	8.05	7.86	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83
3	1	Revenue 10% down	-85.12	-3.82	-2.73	-244.6	-1.5	0.2	1.25	3.43	4.02	4.19	4.37	7.51	7.34	7.17	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14
	2	Revenue 20% down	-106.48	-3.82	-2.73	-244.9	-1.8	-0.1	0.92	2.87	3.44	3.59	3.75	6.54	6.39	6.24	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	-0.25%	-18.21	-5.49%
	2	Capital cost 20% up	-0.66%	-13.13	-7.62%
2	1	OM cost 10% up	0.12%	6.73	14.86%
	2	OM cost 20% up	0.04%	42.11	2.37%
3	1	Revenue 10% down	-0.39%	-15.32	-6.53%
	2	Revenue 20% down	-1.05%	-11.98	-8.34%

No.10 Gegharkunik

Information on Existing Water Sources (Gegharkunik)

Study for Improvement of Rural Water Supply and Sewage Systems in RA

No.10 Community Gegharkunik
District Kamo (Gavar)
Marz Gegharkunik

No	Water source	Latitude			Longitude			Atidute	Yeild(L/sec)		
		deg	min	sec	deg	min	sec	(m)	Min	Max	At site
1	1st spring	-	-	-	-	-	-	-	4.0	5.0	4.5
2	2nd spring	40	14	26.1	45	7	54.1	2,227	3.0	4.0	4.0
3	3rd spring	40	14	26.5	45	7	51.7	2,230	1.5	2.0	2.0
4											
5											
6											
7											
8											
9											
10											

Notes:

Latitude, Longitude, Atitude:	*Measured at site*
Yield (Min, Max):	*Interviewed to the Community*
Yield (at site):	*Measured / estimated at site in summer of 2007*

Users Acceptnce for water quality	Acceptable
Notes	A total of 5 springs here. The road to the 1st spring was impassable/destroyed. Leakage in internal network - 60-80%
Alternative sources if any	Alternative source will not be needed, if water supply service level is increased

No.10 Community Gegharkunik
District Kamo (Gavar)
Marz Gegharkunik
Sampling date 19/Jul/2007

	Parameters analysed	Units	No.1 Pokr aghbyur	No.2 Mets aghbyur	No.3 Sari jur		Guidelines	
							WHO	Armenia
a	pH		7.8	8.1	7.1		6.5-8	6.0 - 9.0
b	Temperature	Deg.C	6.9	6.4	7.2			
c	TDS	Mg/L	53	44	10		1000	1000
1	Al:Aluminum	Mg/L	0.01	0.02	nd		0.10	0.50
2	B:Boron	Mg/L	n.d	nd	nd		0.70	0.50
3	Cl:Chloride	Mg/L	4	4	4		250	350
4	Cr:Chrome	Mg/L	< 0.01	<0.01	<0.01		0.05	0.05
5	Cu:Copper	Mg/L	n.d	nd	nd		2	1
6	F:Fluoride	Mg/L	0.60	0.68	0.55		1.50	
7	Hardness	Mg/L	120	115	25		500	700
8	Fe:Iron	Mg/L	n.d	nd	nd		0.30	0.30
9	Mn:Manganese	Mg/L	n.d	nd	nd		0.40	0.10
10	Mo:Molibdenum	Mg/L	n.d	nd	nd		0.070	0.250
11	Ni:Nickel	Mg/L	n.d	nd	nd		0.020	0.100
12	Nitrate(NO3+)	Mg/L	1.8	3.5	0.9		50.0	45.0
13	SO4:Sulfate	Mg/L	5.0	3.0	2.0		250.0	500.0
14	Zn:Zink	Mg/L	n.d	nd	nd		3.0	5.0
15	As:Arsenic	Mg/L	n.d	nd	nd		0.0	0.1
16	Ba:Barium	Mg/L	0.01	0.01	0.01		0.70	0.10
17	Be:Berillium	Mg/L	0.00009	0.00010	0.00010		NA	0.00020
18	Cd:Cadmium	Mg/L	n.d	nd	nd		0.0030	0.0010
19	Pb:Lead	Mg/L	<0.001	<0.001	<0.001		0.010	0.030
20	Hg:Mercury	Mg/L	<0.0002	<0.0002	<0.0002		0.00100	0.00050
21	Se:Selenium	Mg/L	n.d	0.001	nd		0.010	0.010
22	Sr:Strontium	Mg/L	n.d	nd	nd		NA	7.0
23	CN:Cyanide	Mg/L	n.d	nd	nd		0.070	0.035
24	Coli form bacteria	bacteria per 100 ml					-	0
25	Thermo-tolerant coli form bacteria	bacteria per 100 ml					0	0
26	Total bacteria	bacteria per 1 ml					-	50

Information on Existing Water Sources
Existing Bacteriological Test

No.10 Community Gegharkunik
District Kamo
Marz Gegharkunik

No.	Month	Date	Total amount of bacteria	Total amount of coliform bacteria	Coliform bacteria tolerant to heat
			nos/1mL	MPN/100mL	nos/100 mL
			Less than 50nos/1mL	Not identified	Not identified
1	01	10	45	-	Not identified
2	01	15	40	-	Not identified
3	02	19	45	-	Not identified
4	04	27	45	-	Not identified
5	05	17	45	-	Not identified
6	06	27	30	0.9&1.5	0.9&1.5
7	07	26	45	-	Not identified
8	08	17	45-50	1.1-2	1.1Not identified2

No. **10** **Marz** Gegharkunik **Community** Gegharkunik

1. ACCESSIBILITY TO THE SITE

No.	Structures	Access by vehicle	Machine construction	Remarks
1	Intake	Difficult	Difficult	
	Intake	Fair	Possible	
	Intake	Fair	Possible	
2	Transmission pipeline	Difficult	Difficult	Pipeline is generally along or close to the road
3	Reservoir	Fair	Possible	

2. INTAKE STRUCTURE

No.	Water source	N	E	El. (m)	Year	Material	Volume (l/s)	Rehabilitation Necessity (Y/N)
1	Spring	40°14′26.1″	45°07′54.1″	2,227	1976	Concrete	4.0	Yes
2	Spring				1953	Concrete	4.5	Yes
3	Spring	40°14′26.5″	45°07′51.7″	2,230	1954	Concrete	2.0	Yes

3. TRANSMISSION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Flow rate (l/s)	Year	Leakage	Rehabilitation Necessity (Y/N)
1	4,000	100	Steel	3.0	1976	Huge	Yes
	3,500	100	AsbestosCement			Huge	Yes
2	6,500	100	Steel	2.0	1953	Huge	Yes
3	6,000	80	Steel	2.0	1954	Huge	Yes

4. RESERVOIR

No.	N	E	El. (m)	Material	Shape	Dimension (m)	Volume (m3)	Rehabilitation Necessity (Y/N)
1	40°14′52.2″	45°08′24.1″	1955	Concrete	Rectangular	12x12x4	500	Yes

5. CHLORINATION EQUIPMENT

No.	Existence (Y/N)	Location	Chlorine type	Chlorine duration
1	No			

6. DISTRIBUTION PIPELINE

No.	Pipeline length (m)	Pipe diameter	Material	Year	Leakage	Rehabilitation Necessity (Y/N)
1	2,300	80	Steel	1975	Huge	Yes
2	2,600	50	Steel	1975	Huge	Yes
3	1,100	32	Steel	1975	Huge	Yes

7. PUMP STATION

Existence (Y/N)	Power source	Type	Capacity (l/s)	Pump head (m)	Tank cap. (m3)	House size (m)	Rehabilitation Necessity (Y/N)
No							

8, PUBLIC TAPS

No. of taps	Old one (year)	New one (year)	Valves (Y/N)	Valve rate (%)	Rehabilitation Necessity (Y/N)
5	1975	1975	Yes	66	No

9. DRAINAGE SYSTEM

Existence	Rehabilitation	Remarks
No	Yes	

Questionnaire on Existing Water Supply Conditions by Socio-Economic Survey

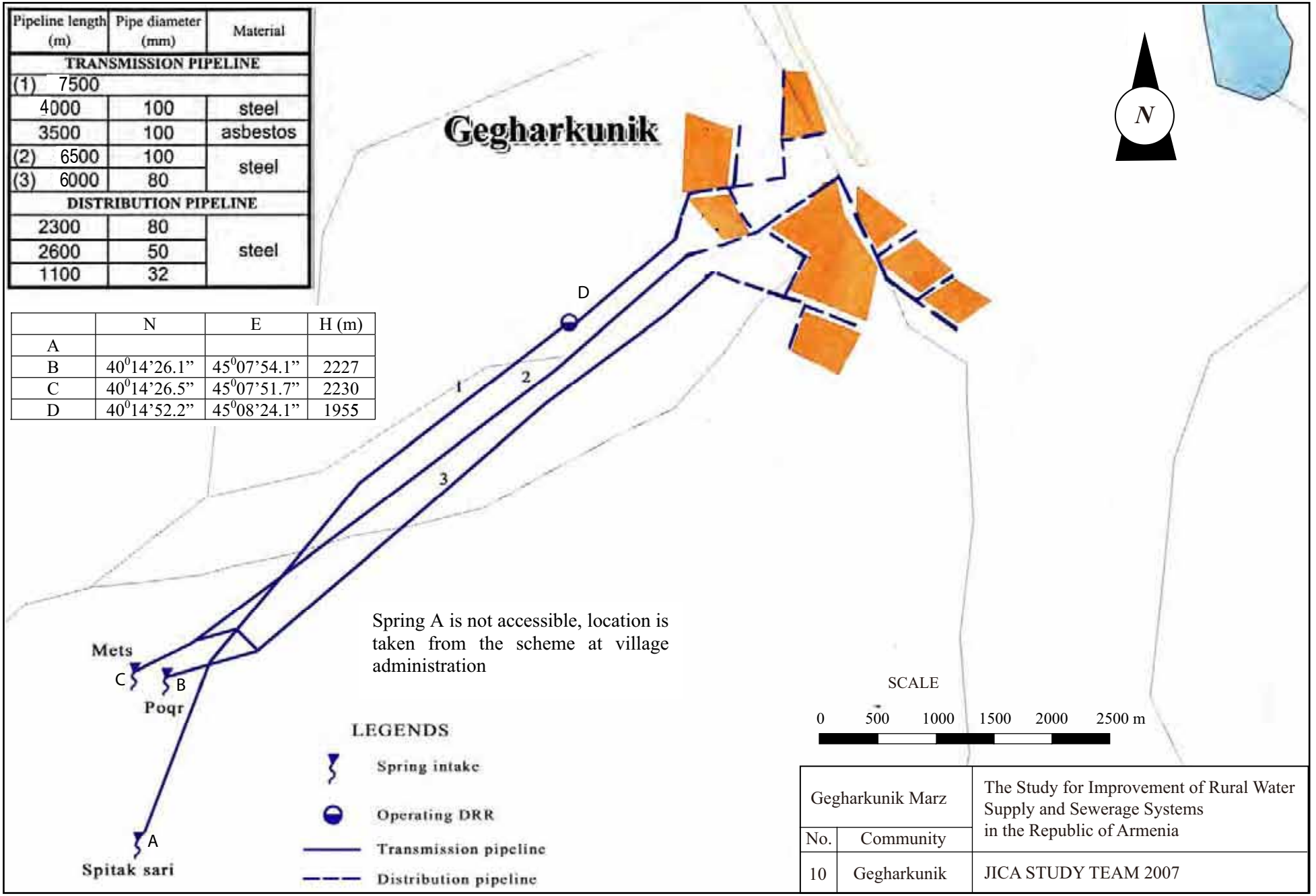
Marz	**Gegharkunik**
Number and Name of Community	**No.10 Gegharkunik**
District	**Kamo**

No.	Question	Answer
A: Baseline Data		
A1	Actual population in 2001	2,000
A2	Actual population in 2007	2,083
A3	Number of households	369
A4.1	Elderly people	209
A4.2	Population in labor force (age from 16 to 62)	1,326
A4.3	Children	504
A5.1	Pensioners	275
A5.2	Unemployed	0
A5.3	Receiving benefits	96
A6	Average monthly income of household (AMD)	37,000
A7	Number of medical ambulance staion/first and health post	absent
A8	Number of beds in each medical ambulance staion	0
A9	Number of school	1
A10	Number of pupils	307
B: Budget		
B1	Annual Budget of the community 2004, in thousand AMD	3,479
	Annual Budget of the community 2005, in thousand AMD	2,569
	Annual Budget of the community 2006, in thousand AMD	3,714
	Annual Budget of the community 2007, in thousand AMD	5,962
	Annual Budget of the community 2008, in thousand AMD	is not planned
B2	Amount spent in drinking water sector 2004, in thousand AMD	0
	Amount spent in drinking water sector 2005, in thousand AMD	0
	Amount spent in drinking water sector 2006, in thousand AMD	0
	Amount spent in drinking water sector 2007, in thousand AMD	0
	Amount spent in drinking water sector 2008, in thousand AMD	is not planned
C: Socio-Economic Survey		
C1	Major industries of the community:	potatoes, cereals
C2	Is there any community activities carrying out by women? 1-Yes, 2-No	no
D: Water Usage and Water Demand Survey		
D1	Does the community hold water use permit? 1.Yes 2.No	no
D2	Water use permit number	-
D3	Date of expiry of water use permit	-
D4	Planned date of obtaining water use permit	2007
D5	Present condition of the water supply volume of Domestic use	almost sufficient
D6	Present condition of the water supply volume of Irrigation water	almost sufficient
D7	Number of house connection to drinking water system	360
D8	How many house connection household set the water meter	0
D9	Number of public taps	3
D10.1	How is the regime of water supply in your community in the dry season?	regularly` 70% 3-4hrs, 30%-24 hrs
D10.2	How is the regime of water supply in your community in the wet season?	regularly` 70% 5-7hrs, 30%-24 hrs
D11	What time of day water is given?	08^{00}-12^{00}, 08^{00}-15^{00}
D12	Are you pleased with duration of domestic water supply?	generaly displeased
D13	Are hours of water supply convenient?	generaly inconvenient
D14.1	How long the taps are open to provide the domestic water (cooking, washing, foodstuffs, dishes, Landry, bathing, etc) of each houshold a day?	-
D14.2	Estimate quantity of domestic water use of each household (litter per day)	300
D15.1	How long the taps are open to provide the each household for filling	-
D15.2	Estimate quantity of water for filling containers of each household (litter per	350
D16	Drinking water monthly water fee per household	60drams per capita/month, 100drams per capita /month(24
D17	How often do you usually pay water fees?	each month
D18	Water fee structure 1Flate rate, 2 Having water tariff	flat rate
D19	Where do you acquire the irrigation water?	deep well
D20	Are you satisfied with irrigation water supply volume?	insufficient.
E: Present Operation and Maintenance Works		
E1	Name of responsible for water supply	Hakobyan Sirina
E2	Position	water distributor
E3	Telephone	with the help of administ. head
E4	Quantity and present condition of the water supply facilities: spring/ intake	3-deteriorated
E5	Quantity and present condition of the water supply facilities: pipeline/transmission	3-deteriorated
E6	Quantity and present condition of the water supply facilities: DRR(Daily Regulatory Reservoir)	1-deteriorated
E7	Quantity and present condition of the water supply facilities: net/distribution	deteriorated
E8	Quantity and present condition of the water supply facilities: public tap	rehabilitated
E9	Quantity and present condition of the water supply facilities: pump	absent
E10	Who is the owner of the water supply facilities?	community, WUA
E11	Who is engaged in the water supply facilities repairing works?	community
E12	How do you repair the water supply facilities?	inviting a specialist
E13	Who is in charge of the repair work in the community?	hired specialist fromcommunity(A. Hakobyan)
E14	How you prepare O&M costs?	water fee
E15	Please indicate the O&M cost breakdown per year for water supply	
	Electricity (AMD)	0
	Labor cost (AMD)	240,000
	Repair cost(AMD)	0
	Others(AMD)	0
	Total (AMD)	240,000
E16	Do the residents participate in the O&M works?	manpower
E17	What kind of OM method is preferable to you?	water fee
F: Initial Environmental Examination (IEE)		
F1	Are any of the following areas located inside or around the project site?	
F1.1	National park, protected area designated by the government (coast line, water lands, reserved are for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or proposed areas.	absent
F1.2	Virgin forests, tropical forests	absent
F1.3	Ecological improvement habits areas (coral reef, mangrove wetland, tidal	absent
F1.4	Habit of valuable species protected by domestic laws or international treaties	absent
F1.5	Likely salts cumulus or soil erosion areas on a massive scale	absent
F1.6	Remarkable desertification trend areas	absent
F1.7	Archaeological historical or cultural valuable areas	absent
F1.8	Living areas of ethic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas	absent

Gegharkunik
No.10 Gegharkunik

Pipeline length (m)	Pipe diameter (mm)	Material
TRANSMISSION PIPELINE		
(1) 7500		
4000	100	steel
3500	100	asbestos
(2) 6500	100	steel
(3) 6000	80	
DISTRIBUTION PIPELINE		
2300	80	steel
2600	50	
1100	32	

	N	E	H (m)
A			
B	$40^0$14'26.1"	$45^0$07'54.1"	2227
C	$40^0$14'26.5"	$45^0$07'51.7"	2230
D	$40^0$14'52.2"	$45^0$08'24.1"	1955



Gegharkunik Marz		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
No.	Community	
10	Gegharkunik	JICA STUDY TEAM 2007

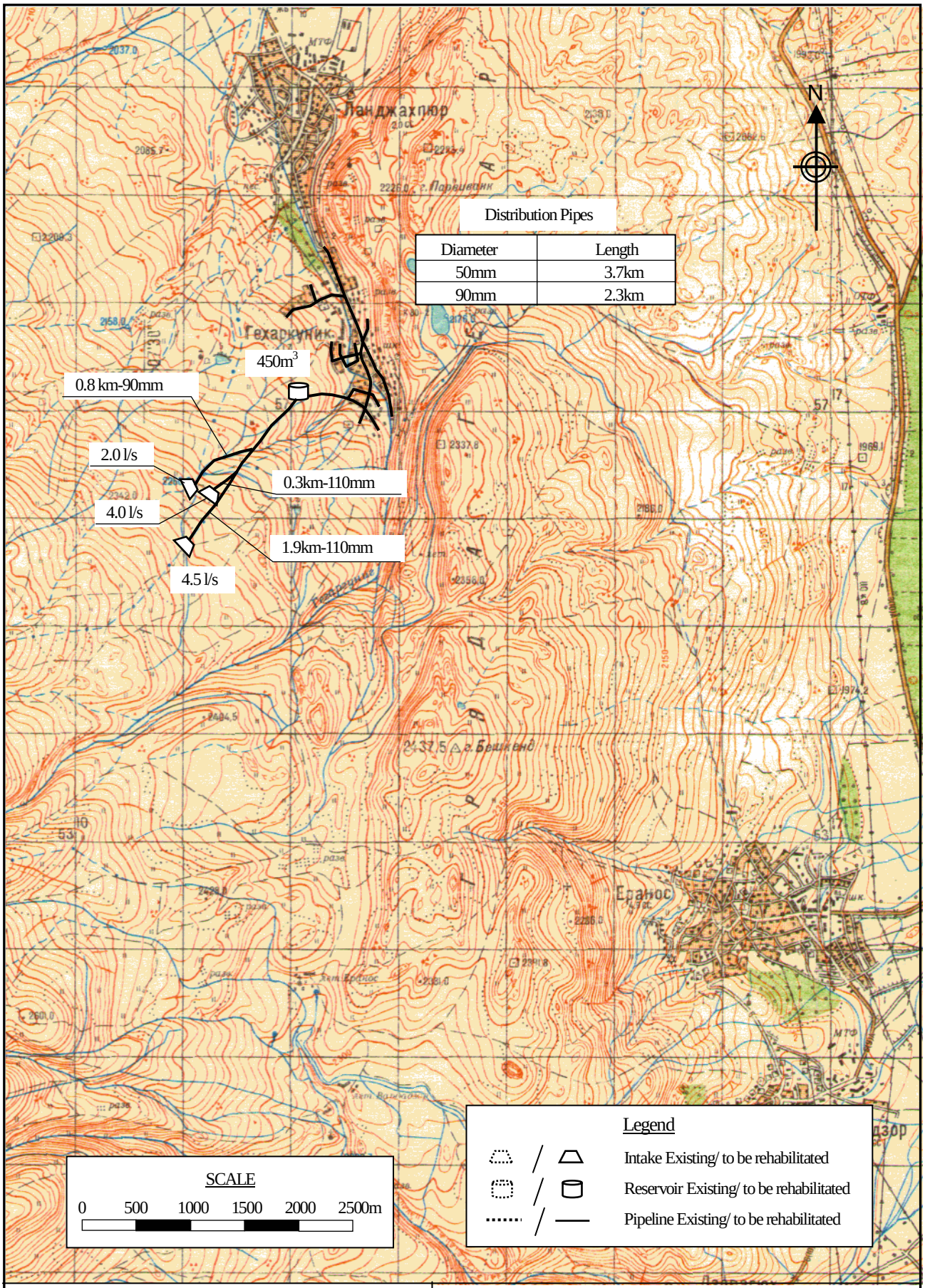
Marz : **Gegharkunik** No.10
Name : **Gegharkunik**

No.	Item	Quantity	Unit	Water demand (m3/d)	
A.	**WATER DEMAND**				
	1 Population	2,083	persons	208.3	
	2 Factory	-	nos	0.0	
	3 School (pupils)	307	pupils	3.1	
	4 Medical Ambulance Station	-	nos	-	
	5 Policlinic	-	nos	-	
	6 Livestocks (87lit/household)	369	household	32.1	
	Sub-total			243.5	
	Unaccouted for water (20%)			48.7	
1	Average Daily Water Demand			292.2	m3/day
2	Maximum Daily Water Demand			350.6	m3/day
3	Maximum Hourly Water Demand			34.2	m3/hr

B	**WATER SUPPLY PLAN**						
	1 Water source type	Nr.	Total vol.				
	a Spring	1	4.0	lit/sec		345.6	m3/day
	B Spring	1	4.5	lit/sec		388.8	m3/day
	C Spring	1	2.0	lit/sec		172.8	m3/day
`	Total					518.4	m3/day
	2 Required reservoir volume					410	m3

C WATER SUPPLY FACILITIES REHABILITATION PLAN

No	Item	Quantity	Unit
1	Intake		
	1m3	3	nos
	2m3		nos
	3m3		nos
	4m3		nos
2	Transmission pipe		
	50mm diameter		m
	75mm diameter		m
	90mm diameter	800	m
	110mm diameter	2,200	m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
3	Reservoir		
	450m3 capacity	1	nos
4	Distribution pipe		
	50mm diameter	3,700	m
	75mm diameter		m
	90mm diameter	2,300	m
	110mm diameter		m
	150mm diameter		m
	200mm diameter		m
	250mm diameter		m
5	House connection	9	nos
6	Water meter installation	369	nos
7	Public tap	4	nos
8	Chlorination	1	nos
9	Pumps	-	nos



Water Supply Facilities Rehabilitation Plan		The Study for Improvement of Rural Water Supply and Sewerage Systems in the Republic of Armenia
Marz	Gegharkunik	
No. 10	Gegharkunik	JICA STUDY TEAM

Marz : **Gegharkunik**
No. : **10**
Name : **Gegharkunik**

No	Item	Specification	Quantity	Unit	Unit Price	Total
1	Intake					
		1m3	3	nos	367,700	1,103,100
		2m3		nos	545,000	
		3m3		nos	669,100	
		4m3		nos	805,100	
	Sub-total					1,103,100
2	Transmission Pipe					
		50mm		m	5,520	
		75mm		m	7,160	
		90mm	800	m	8,040	6,432,000
		110mm	2,200	m	9,680	21,296,000
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					27,728,000
3	Reservoir					
		50m3		nos	8,363,900	
		100m3		nos	12,968,300	
		150m3		nos	18,804,500	
		200m3		nos	22,524,600	
		250m3		nos	25,952,800	
		300m3		nos	29,630,400	
		350m3		nos	33,528,700	
		400m3		nos	36,388,000	
		450m3	1	nos	39,392,500	39,392,500
		500m3		nos	42,520,900	
	Sub-total					39,392,500
4	Distribution Pipe					
		50mm	3,700	m	5,520	20,424,000
		75mm		m	7,160	
		90mm	2,300	m	8,040	18,492,000
		110mm		m	9,680	
		150mm		m	13,140	
		200mm		m	19,440	
		250mm		m	27,040	
	Sub-total					38,916,000
5	House Connection		9	nos	74,000	666,000
6	Water Meter Installation		369	nos	80,000	29,520,000
7	Public Tap		4	nos	90,000	360,000
8	Chlorilation Equipment		1	nos	500,000	500,000
9	Pump Replacement			nos	10,000,000	
10	Drainage and Sewerage	concrete surfa	2,400	m	3,600	8,640,000
	Total				AMD	146,825,600
					Equivalent to USD	480,576
					Equivalent to JPY	50,700,775
					AMD	USD
	Investment Cost per household		369	HH	397,901	1,302
	Investment Cost per person		2,083	persons	70,488	231

GEGHARKUNIK MARZ
Marutuni District
No 10 Gegharkunik

PROJECTED INCOME STATEMENT **Unit: million AMD**

Description	Unit	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A Water Sales Revenue																																											
Consumption water volume	1000m3/yr		88.9																																							
Unit rate	AMD/m3				40.00	40.00	40.00	41.32	70.00	72.31	74.70	77.16	115.65	119.47	123.41	127.48	131.69	136.03	140.52	145.16	149.95	154.90	160.01	165.29	170.75	176.38	182.20	188.21	194.42	200.84	207.47	214.31	221.39	228.69	236.24	244.04	252.09	260.41	269.00	277.88	287.05	296.52
Sub-total		496.10	0.00	0.00	1.31	2.62	3.20	3.31	5.60	5.78	5.98	6.17	9.25	9.56	9.87	10.20	10.53	10.88	11.24	11.61	11.99	12.39	12.80	13.22	13.66	14.11	14.57	15.05	15.55	16.07	16.60	17.14	17.71	18.29	18.90	19.52	20.16	20.83	21.52	22.23	22.96	23.72
B Operating Costs																																										
1. Staff salary																																									
Inspectors	person				1																																				
Pump operators	person				0																																				
Base Salary	AMD/m/p				20,000	20,660	21,342	22,046	22,774	23,525	24,301	25,103	25,932	26,788	27,672	28,585	29,528	30,502	31,509	32,549	33,623	34,732	35,879	37,063	38,286	39,549	40,854	42,202	43,595	45,034	46,520	48,055	49,641	51,279	52,971	54,719	56,525	58,390	60,317	62,308	64,364	66,488
Sub-total		17.70			0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.75	0.77	0.80
2. Chlorine																																										
Pouring volume	kg/yr				534																																					
Unit rate	AMD/kg				600	620	640	661	683	706	729	753	778	804	830	858	886	915	945	976	1009	1042	1076	1112	1149	1186	1226	1266	1308	1351	1396	1442	1489	1538	1589	1642	1696	1752	1810	1869	1931	1995
Sub-total		23.39			0.13	0.27	0.34	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.49	0.50	0.52	0.54	0.56	0.57	0.59	0.61	0.63	0.65	0.68	0.70	0.72	0.75	0.77	0.80	0.82	0.85	0.88	0.91	0.94	0.97	1.00	1.03	1.07
3. Electricity (for pump)		0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Maintenance cost		66.41			0.37	0.77	0.97	1.00	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.43	1.48	1.53	1.58	1.63	1.69	1.74	1.80	1.86	1.92	1.98	2.05	2.12	2.19	2.26	2.33	2.41	2.49	2.57	2.66	2.74	2.83	2.93	3.03
Pump repair					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe repair					0.37	0.77	0.97	1.00	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	1.34	1.39	1.43	1.48	1.53	1.58	1.63	1.69	1.74	1.80	1.86	1.92	1.98	2.05	2.12	2.19	2.26	2.33	2.41	2.49	2.57	2.66	2.74	2.83	2.93	3.03
5. Pump replacement		0.00																0.00															0.00									
Sub-total		107.50	0.00	0.00	0.74	1.29	1.57	1.61	1.67	1.73	1.79	1.84	1.91	1.97	2.03	2.10	2.16	2.25	2.31	2.39	2.47	2.56	2.63	2.72	2.81	2.90	3.00	3.11	3.20	3.31	3.43	3.54	3.66	3.77	3.90	4.03	4.16	4.30	4.43	4.58	4.73	4.90
C Gross Income (A-B)		388.60	0.00	0.00	0.57	1.33	1.63	1.70	3.93	4.05	4.19	4.33	7.34	7.59	7.84	8.10	8.37	8.63	8.93	9.22	9.52	9.83	10.17	10.50	10.85	11.21	11.57	11.94	12.35	12.76	13.17	13.60	14.05	14.52	15.00	15.49	16.00	16.53	17.09	17.65	18.23	18.82
D Depreciation cost		139.65						3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
E Interest paid		44.86	0.04	0.07	0.80	1.55	1.90	1.90	1.90	1.90	1.90	1.90	1.91	1.85	1.80	1.74	1.69	1.63	1.57	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.09	1.03	0.96	0.90	0.83	0.77	0.70	0.63	0.57	0.50	0.43	0.36	0.29	0.22	0.15	0.07
F Net Income		204.09	-0.04	-0.07	-0.23	-0.22	-0.27	-4.19	-1.96	-1.84	-1.70	-1.56	1.44	1.75	2.05	2.37	2.69	3.01	3.37	3.72	4.08	4.45	4.85	5.24	5.65	6.07	6.49	6.92	7.40	7.87	8.35	8.84	9.36	9.90	10.44	11.00	11.58	12.18	12.81	13.44	14.09	14.76
G Tax and duties		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Net Income after deduction of TAX		204.09	-0.04	-0.07	-0.23	-0.22	-0.27	-4.19	-1.96	-1.84	-1.70	-1.56	1.44	1.75	2.05	2.37	2.69	3.01	3.37	3.72	4.08	4.45	4.85	5.24	5.65	6.07	6.49	6.92	7.40	7.87	8.35	8.84	9.36	9.90	10.44	11.00	11.58	12.18	12.81	13.44	14.09	14.76
OM Cost Recovery Ratio (A/B)		461%	0%	0%	177%	203%	204%	206%	335%	334%	334%	335%	484%	485%	486%	486%	488%	484%	487%	486%	485%	484%	487%	486%	486%	487%	486%	484%	486%	485%	484%	484%	484%	485%	485%	484%	485%	484%	486%	485%	485%	484%

PROJECTED CASH FLOW STATEMENT **Unit: million AMD**

Description	Total	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
SOURCES OF FUNDS																																									
A Internal Cash Generation																																									
1. Net Income	204.09	-0.04	-0.07	-0.23	-0.22	-0.27	-4.19	-1.96	-1.84	-1.70	-1.56	1.44	1.75	2.05	2.37	2.69	3.01	3.37	3.72	4.08	4.45	4.85	5.24	5.65	6.07	6.49	6.92	7.40	7.87	8.35	8.84	9.36	9.90	10.44	11.00	11.58	12.18	12.81	13.44	14.09	14.76
2. Depreciation cost	139.65	0.00	0.00	0.00	0.00	0.00	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
3. Interest Paid	44.86	0.04	0.07	0.80	1.55	1.90	1.90	1.90	1.90	1.90	1.90	1.91	1.85	1.80	1.74	1.69	1.63	1.57	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.09	1.03	0.96	0.90	0.83	0.77	0.70	0.63	0.57	0.50	0.43	0.36	0.29	0.22	0.15	0.07
Sub-total	388.60	0.00	0.00	0.57	1.33	1.63	1.70	3.93	4.05	4.19	4.33	7.34	7.59	7.84	8.10	8.37	8.63	8.93	9.22	9.52	9.83	10.17	10.50	10.85	11.21	11.57	11.94	12.35	12.76	13.17	13.60	14.05	14.52	15.00	15.49	16.00	16.53	17.09	17.65	18.23	18.82
B Finances																																									
1. Project Loan	190.85	3.91	2.79	73.38	75.05	34.69	0.58	0.45																																	
2. Local fund	64.64	1.29	0.91	24.85	25.27	12.19	0.07	0.06																																	
Sub-total	255.49	5.20	3.70	98.23	100.32	46.88	0.65	0.51																																	
C Subsidy from Government																																									
1. Subsidy for O&M cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Subsidy for debt services	1.09	0.04	0.07	0.23	0.22	0.27	0.20	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	1.09	0.04	0.07	0.23	0.22	0.27	0.20	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cash Inflow	645.18	5.24	3.77	99.03	101.87	48.78	2.55	4.44	4.05	4.19	4.33	7.40	7.59	7.84	8.10	8.37	8.63	8.93	9.22	9.52	9.83	10.17	10.50	10.85	11.21	11.57	11.94	12.35	12.76	13.17	13.60	14.05	14.52	15.00	15.49	16.00	16.53	17.09	17.65	18.23	18.82
APPLICATION OF FUNDS																																								
D Project disbursement	255.49	5.20	3.70	98.23	100.32	46.88	0.65	0.51																																	
E Total debt services																																								
1. Loan repayment	190.85											5.49	5.54	5.60	5.65	5.71	5.77	5.82	5.88	5.94	6.00	6.06	6.12	6.18	6.24	6.31	6.37	6.43	6.50	6.56	6.63	6.69	6.76	6.83	6.90	6.97	7.04	7.11	7.18	7.25	7.32
2. Interest paid	44.86	0.04	0.07	0.80	1.55	1.90	1.90	1.90	1.90	1.90	1.90	1.91	1.85	1.80	1.74	1.69	1.63	1.57	1.51	1.45	1.39	1.33	1.27	1.21	1.15	1.09	1.03	0.96	0.90	0.83	0.77	0.70	0.63	0.57	0.50	0.43	0.36	0.29	0.22	0.15	0.07
Sub-total	235.71	0.04	0.07	0.80	1.55	1.90	1.90	1.90	1.90	1.90	1.90	7.40	7.39	7.40	7.39	7.40	7.40	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.40	7.40	7.39	7.40	7.39	7.40	7.39	7.39	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.39
Total Cash Outflow	491.20	5.24	3.77	99.03	101.87	48.78	2.55	2.41	1.90	1.90	1.90	7.40	7.39	7.40	7.39	7.40	7.40	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.39	7.40	7.40	7.39	7.40	7.39	7.40	7.39	7.39	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.39
F Net Surplus Cash (A+C2)-E	153.98	0.00	0.00	0.00	0.00	0.00	0.00	2.03	2.15	2.29	2.43	0.00	0.20	0.44	0.71	0.97	1.23	1.54	1.83	2.13	2.44	2.78	3.11	3.46	3.82	4.17	4.54	4.96	5.36	5.78	6.20	6.66	7.13	7.60	8.09	8.60	9.13	9.69	10.25	10.83	11.43
Investment Cost Recovery Ratio (%)																																								
Cost recovery by water fee (A/E)	165%	0%	0%	71%	86%	86%	89%	207%	213%	221%	228%	99%	103%	106%	110%	113%	117%	121%	125%	129%	133%	138%	142%	147%	152%	156%	161%	167%	172%	178%	184%	190%	196%	203%	209%	216%	223%	231%	239%	246%	255%
Cost recovery by water fee + subsidy ((A+C2)/E)	165%	100%	100%	100%	100%	100%	100%	207%	213%	221%	228%	100%	103%	106%	110%	113%	117%	121%	125%	129%	133%	138%	142%	147%	152%	156%	161%	167%	172%	178%	184%	190%	196%	203%	209%	216%	223%	231%	239%	246%	255%

GEGHARKUNIK MARZ
Marutuni District
No 10 Gegharkunik

FINANCIAL ANALYSIS

A COST RECOVERY ANALYSIS

	Item	Millon AMD	Rate
1	**Revenue**		
	Water fee revenue	496.10	99.8%
	Subsidy	1.09	0.2%
	Total	497.19	100.0%
2	**Expenditure**		
	OM cost	107.50	21.6%
	Loan repayment	190.85	38.4%
	Interest paid	44.86	9.0%
	Surplus cash	153.98	31.0%
	Total	497.19	100.0%

B. FIRR CALCULATION **Unit: million AMD**

Description	Total	Year																																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A COST																																									
1. Investment Cost	170.83	3.82	2.73	67.03	66.41	29.89	0.53	0.42																																	
2. Operation and Maintenance Cost																																									
Salary	9.12			0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Chlorine	12.28			0.13	0.27	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Electricity	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mantenance cost	33.88			0.37	0.75	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Pump replacement	0.00																0.00															0.00									
Sub-total	55.28			0.74	1.26	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
Total Outflow	226.11	3.82	2.73	67.77	67.67	31.37	2.01	1.90	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
B BENEFIT																																								
1. Water Tariff	311.47	0.00	0.00	1.31	2.62	3.20	3.31	5.60	5.78	5.98	6.17	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25
2. Subsidy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Inflow	311.47	0.00	0.00	1.31	2.62	3.20	3.31	5.60	5.78	5.98	6.17	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25
NET BENEFIT	85.36	-3.82	-2.73	-66.5	-65.0	-28.2	1.30	3.70	4.30	4.50	4.69	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77

FIRR = 2.13%

C. SENSITIVITY ANALYSIS

No.		Description	PV 1.75%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	Capital cost 10% up	-4.58	-4.20	-3.00	-73.2	-71.7	-31.2	1.25	3.66	4.30	4.50	4.69	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
	2	Capital cost 20% up	-20.60	-4.58	-3.28	-79.9	-78.3	-34.1	1.19	3.62	4.30	4.50	4.69	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
2	1	OM cost 10% up	7.60	-3.82	-2.73	-66.5	-65.2	-28.3	1.15	3.55	4.15	4.35	4.54	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62
	2	OM cost 20% up	3.74	-3.82	-2.73	-66.6	-65.3	-28.5	1.00	3.40	4.00	4.20	4.39	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47	7.47
3	1	Revenue 10% down	-9.57	-3.82	-2.73	-66.6	-65.3	-28.5	0.97	3.14	3.72	3.90	4.07	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85	6.85
	2	Revenue 20% down	-30.59	-3.82	-2.73	-66.7	-65.6	-28.8	0.64	2.58	3.14	3.30	3.46	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92

No.		Description	FIRR	Sensitivity indicator	Swiching value
1	1	Capital cost 10% up	1.61%	3.27	30.54%
	2	Capital cost 20% up	1.14%	8.70	11.49%
2	1	OM cost 10% up	2.00%	0.64	157.20%
	2	OM cost 20% up	1.88%	1.37	73.22%
3	1	Revenue 10% down	1.42%	5.05	19.80%
	2	Revenue 20% down	0.63%	23.60	4.24%