(4) Emphasis on Women's Development

The gender approach to development is based on the knowledge that as much as development affects both men and women; full and active participation by both sides is very important. It is also essential to remove all discrimination against women. There is a need of effecting changes in traditional and cultural practiced development programmes.

For example, water is a big problem for women. Always they travel long distances to fetch water. Therefore, will the improved water supply provision improve or worsen the gender relations? Will it add an extra workload on the part of women or will it alleviate the water problem and enable women to fetch water in the neighborhood, and ultimately give them ample time to attend to their normal daily routines ?

The availability of water will necessitate the debate on whether women will be too willing to boil water for human consumption bearing in mind the scarcity of fuel wood.

8 - 6 - 4 Mobilizing the Community

(1) Starting Sanitary Education in the Community

Proper water use and sanitation can contribute to the prevention of certain diseases in Monduli district if everyone in the community makes the necessary changes in behavior. If these behavioral changes were to take place even without the Monduli Community fully understanding how these diseases are spread, most water-borne diseases could be prevented in Monduli district. For an animator as a sanitary worker in Monduli Community to do his/her work effectively he/she should know the followings:

i) Know the target group - This is composed of all members of the Monduli Community which includes:
   - Children
   - Adults (men and women)
   - Educated and uneducated groups

ii) Know what type of bad sanitary behavior in the community should be changed. These include:

- Do the Monduli people have toilets?
- Do the Monduli people have properly constructed toilets?
- Do the Monduli people use their toilets?
- Where is the Monduli Community getting their water from ? ponds, dams, holes, wells, furrows, rivers, streams, taps, roofs of houses?
- How do the Monduli people fetch water to their consumption points? drums, pots, gourds, tins, buckets, skin bags etc.
- How is the cleanliness of their fetching utensils maintained ? rusty, soil, muddy, cracked and ill repaired?
- Are there any differences between their drinking and washing water?
- Do animals and human beings consume water from the same source?

(2) Starting a Sanitary Education Programme

Sanitary education programme will be successful to the Monduli Community through involvement of all its members. In practice it is not easy to get every person in the community to participate one hundred percent. Hence we need to start health education programmes through three main groups: - viz

i) Teachers and schoolchildren.

ii) People in leadership positions in the community: these include government leaders, such as DC, DED, Division/Ward executive officers, village leaders, 'balozi' cell leaders, political leaders, MPs councilors - district and villages, religious leader - Pastors, Reverends, Padres, Sheikhs, heads of the clans.

iii) The whole community: It is expected that after educating groups (a) and (b) the majority of this last group will also receive sanitary education directly or indirectly.

If possible, a public launching will be of great help in publicizing the programme. This can be done through well-organized public meetings which are aimed at providing sanitary education only. It is important to make sure that politicians do not use such public sanitary education meetings for their own

benefits and also government leaders should not use the meetings to force sanitary education.

The rate of newspapers reading in Tanzania has risen very fast within one year especially in urban areas and to a lesser extent in the rural areas such as Monduli rural. Hence it will be of great help to organize one or two articles in one of the most-read newspapers such as 'Majora, Uhuru etc. Such an article will motivate the Monduli Community to realize that there are some people (important, educated, respected) who are interested in their programme. If possible, radio interviews or pieces of news will also motivate the Monduli community.

Through experience and generally through general observation; Tanzania people believe more in curative than preventive services. Therefore, in order for the programme to be successful, it should be identified through hospital/medical personnel who provide curative services to the community and are therefore much trusted.

(3) Communication in Sanitary Education

In order for Monduli community members to understand how they can improve their health there is a need for a sanitary educator to find out firstly what the Monduli Community knows about the following water and excreta-disposal related diseases:

- Diarrhea
- Dysentery
- Eye diseases
- Malaria
- Skin diseases
- Worms

Also, the sanitary educator should find out what the Monduli Community doesn't know about the above-mentioned diseases. Hence from this point of view then, the sanitary educator will be in a position to communicate with the target audience of Monduli Community which is composed of:

- School teachers and school children.
- People in leadership positions.
- The general community and communicate to them what to do in order to improve their health viz-diseases mentioned above.

However, it is also very important to sensitize the target audience about the Major Top 10 Diseases prevalent in Monduli District.

i) Diarrhea and dysentery
ii) Eye diseases
iii) Malaria
iv) Malnutrition
v) Measles
vi) Sexually Transmitted Diseases (STD)
vii) Skin diseases
viii) Tuberculosis (TB)
ix) Typhoid
x) Worms

Note that through this process of communication with the Monduli community, there is also a need for one to observe and become familiar with the Monduli community's social and psychological factors such as:

- What to tell men in the presence of women/children.
- What to tell women in the presence of men and children.
- What ,e.g. to demonstrate in public.
- What to communicate to children for parents' consumption (e.g. go and tell your parents to use toilets).

The Monduli community largely lives in the rural areas with very few in urban areas (Monduli town, Makuyuni, etc.). The Monduli rural community is mainly governed by the Masai social, moral, and cultural norms which should be observed. These include the following:

- Position of elected leaders.
- Position of the elders.
- Position of youth.

- Position of the women.
- Position of children.

For the Monduli urban community, on top of the above listed social groups, there are other extra groups to be taken into consideration such as:

- Leaders: government, religious, political, traditional, etc.
- Businessmen.
- Intellectuals.

There is also the issue of the different beliefs held in the Monduli community. It is important for the animator to find out what beliefs are held high in the community as regards:

- Water
- Use of toilets
- House flies
- Children's forces
- General personal cleanliness
- Animals sleeping in the same house as human beings.

Table 8-1 ECONOMIC COST AND BENEFIT ANALYSIS : MONDULI WATER SUPPLY PROJECT

Case 2 Based on Willingness to Pay 5,000Tsh/month/household

Year	Item Definition Equation,Col Unit ProjectYear	Population A	PJ Contribution 15,30LPD A*15,A*30-175 m3/day B	O&M Cost TruckPLine 1000Tsh C	ConstCost Cost*SCF .75 .60*truck 1000Tsh D	Total Cost C + D 1000Tsh E	Willing to Pay 5000Tsh/hh/month 1000Tsh F	EIRR 12.23% 1000Tsh G
1995	1	18,811	0	0	0	0	0	0
1996	2	19,432	0	0	221,966	221,966	0	-221,966
1997	3	20,073	0	0	562,056	562,056	200,729	-361,327
1998	4	20,735	136	44,652	0	44,652	207,353	162,701
1999	5	21,415	146	44,652	0	44,652	214,150	169,498
2000	6	22,122	157	44,652	0	44,652	221,217	176,565
2001	7	22,852	168	44,652	527,731	572,383	228,517	-343,866
2002	8	23,606	179	44,652	790,613	835,265	236,058	-599,207
2003	9	24,385	557	91,884	0	91,884	243,848	151,964
2004	10	25,203	581	15,372	15,163	30,535	252,030	221,495
2005	11	26,035	606	23,058	105,575	128,633	260,347	131,714
2006	12	26,894	632	23,058	0	23,058	268,938	245,880
2007	13	27,781	658	23,058	0	23,058	277,813	254,755
2008	14	28,698	686	99,570	0	99,570	286,981	187,411
2009	15	29,628	714	61,314	0	61,314	296,280	234,966
2010	16	30,606	743	23,058	0	23,058	306,057	282,999
2011	17	31,616	773	23,058	0	23,058	316,157	293,099
2012	18	32,659	805	23,058	0	23,058	326,590	303,532
2013	19	33,737	837	99,570	0	99,570	337,368	237,798
2014	20	34,854	871	61,314	0	61,314	348,540	287,226
				790,632	2,223,105			

Notes:

Col A: Population Projection in Monduli for the period between 1994 and 2014
Col B: Water demand at 15 liters per capita per day for year 3 to 7, at 30LPD
Water demand at 30 LPD for year 8 thru 20
Col D: Construction costs = .5*Local cost + .6*Fforeign cost
Col F: Monthly household water bill is based on willingness to pay 5,000Tsh/month
Col G: Financial Internal Rate of Return

Depreciation allowance for pumps and generators was included as part of O&M cost
SCF(Standard conversion factor) of .6 for foreign construction cost, .5 for Local costs

Table 8-2 ECONOMIC COST AND BENEFIT ANALYSIS : MONDULI WATER SUPPLY PROJECT

Case 1 Based on Willingness to Pay 5,000Tsh/month/household

Year	Item Definition Equation,Col Unit ProjectYear	Population A	PJ Contribution 15,30LPD A*15,A*30-175 m3/day B	O&M Cost PLine 1000Tsh C	ConstCost Cost*SCF .5LC; .7FC 1000Tsh D	Total Cost C + D 1000Tsh E	Willing to Pay 5000Tsh/hh/month 1000Tsh F	EIRR 9.93% 1000Tsh G
1995	1	18,811	0	0	0	0	0	0
1996	2	19,432	0	0	229,750	229,750	0	-229,750
1997	3	20,073	0	0	837,773	837,773	200,729	-637,043
1998	4	20,735	136	15,372	873,237	888,609	207,353	-681,255
1999	5	21,415	146	15,372	0	15,372	214,150	198,778
2000	6	22,122	157	91,884	0	91,884	221,217	129,333
2001	7	22,852	168	15,372	0	15,372	228,517	213,145
2002	8	23,606	179	15,372	0	15,372	236,058	220,686
2003	9	24,385	557	15,372	0	15,372	243,848	228,476
2004	10	25,203	581	15,372	17,661	33,033	252,030	218,997
2005	11	26,035	606	61,414	120,594	182,008	260,347	78,339
2006	12	26,894	632	99,570	0	99,570	268,938	169,368
2007	13	27,781	658	23,058	0	23,058	277,813	254,755
2008	14	28,698	686	23,058	0	23,058	286,981	263,923
2009	15	29,628	714	61,584	0	61,584	296,280	234,696
2010	16	30,606	743	99,570	0	99,570	306,057	206,487
2011	17	31,616	773	23,158	0	23,158	316,157	292,999
2012	18	32,659	805	23,158	0	23,158	326,590	303,432
2013	19	33,737	837	23,158	0	23,158	337,368	314,210
2014	20	34,854	871	23,158	0	23,158	348,540	325,382
					2,079,014			

Notes:

- Col A: Population Projection in Monduli for the period between 1994 and 2014
- Col B: Water demand at 15 liters per capita per day for year 3 to 7, at 30LPD
  Water demand at 30 LPD for year 8 thru 20
- Col D: Construction costs = .5*Local cost + .7*Fforeign cost
- Col F: Monthly household water bill is based on willingness to pay 5,000Tsh/month
- Col G: Financial Internal Rate of Return

Depreciation allowance for pumps and generators was included as part of O&M cost
SCF(Standard conversion factor) of .7 for foreign construction cost, .5 for Local costs

Table 8-3 PROJECT CONTRIBUTION TO FINANCIAL CASH FLOW, MONDULI

Calendar Year	Project Year	Population Number A	Without Proj OM Cost 1000Tsh/Yr B	Without Proj Revenue 1000Tsh/Yr C	With Proj OM Cost Truck:3to7Yr Pipe:8to20Yr 1000Tsh/Yr D	With Proj W 350Tsh/m3 5.4 m3/month 1890T/month/hh 160m3/day97-01 30LPD/Pline/01-14 1000Tsh/Yr E	Project W - WO OM Cost D - B 1000Tsh/Yr F	Contribution W - WO Revenue E - C 1000Tsh/Yr G	Financial Cash Flow W - WO Net CashFlow Diff (G and F) FIRR W350Tsh/m3 33.13% WtrBill/Income 6.23% 1000Tsh/Yr H	Cash Flow W - WO Net CashFlow Diff(I and F) FIRR W330Tsh/m3 30.25% WtrBill/Income 5.88% 1000Tsh/Yr I
1995	1	18,811	13,527	894	3,498	0	-10,029	-894	-10,923	-10,923
1996	2	19,432	13,527	894	3,498	0	-10,029	-894	-10,923	-10,923
1997	3	20,073	13,527	894	3,498	20,440	-10,029	19,546	9,517	8,349
1998	4	20,735	13,527	894	44,364	20,440	30,837	19,546	-11,291	-12,459
1999	5	21,415	13,527	894	44,479	20,440	30,952	19,546	-11,406	-12,574
2000	6	22,122	13,527	894	46,594	20,440	33,067	19,546	-13,521	-14,689
2001	7	22,852	13,527	894	47,710	20,440	34,183	19,546	-14,637	-15,805
2002	8	23,606	13,527	894	48,825	89,230	35,298	88,336	53,038	47,939
2003	9	24,385	13,527	894	122,678	92,175	109,151	91,281	-17,870	-23,138
2004	10	25,203	13,527	894	21,794	95,267	8,267	94,373	86,106	80,662
2005	11	26,035	13,527	894	23,387	98,411	9,860	97,517	87,657	82,034
2006	12	26,894	13,527	894	24,223	101,659	10,696	100,765	90,069	84,260
2007	13	27,781	13,527	894	25,060	105,018	11,533	104,119	92,586	86,586
2008	14	28,698	13,527	894	127,918	108,479	114,386	107,585	-6,801	-13,000
2009	15	29,628	13,527	894	77,742	111,994	64,215	111,100	46,885	40,485
2010	16	30,606	13,527	894	27,569	115,690	14,042	114,796	100,754	94,143
2011	17	31,616	13,527	894	28,406	119,507	14,879	118,613	103,734	96,905
2012	18	32,659	13,527	894	29,242	123,451	15,715	122,557	106,842	99,788
2013	19	33,737	13,527	894	132,096	127,525	118,569	126,631	8,062	775
2014	20	34,854	13,527	894	81,952	131,748	68,425	130,854	62,429	54,901
	Sum	521,140	270,540	17,880	964,528	1,522,349	693,988	1,504,469	750,307	663,316

Table 8-4 RISK UNDER 4 SCENARIOS

Base	Sensitivity Scenario 1	Financial Scenario 2	Analysis Scenario 3	Scenario 4
W - WO Net CashFlow Contribution FIRR W350Tsh/m3 33.13% WtrBill/Income 6.23%	W - WO Net CashFlow W Revenue10%Dn FIRR 28.05%	W - WO Net CashFlow W OMCost10%Up FIRR 28.60%	W - WO Net CashFlow W 2yearDelay FIRR 32.95%	W - WO Net CashFlow W Revenue20%Dn FIRR 22.68%
1000Tsh/Yr	1000Tsh/Yr	1000Tsh/Yr	1000Tsh/Yr	1000Tsh/Yr
A	B	C	D	B
-10,923	-10,923	-10,923	0	-10,923
-10,923	-10,923	-10,923	0	-10,923
9,517	7,473	9,867	-10,923	5,429
-11,291	-13,335	-15,727	-10,923	-15,379
-11,406	-13,450	-15,854	9,517	-15,494
-13,521	-15,565	-18,180	-11,291	-17,609
-14,637	-16,681	-19,408	-11,406	-18,725
53,038	44,115	48,155	-13,521	35,192
-17,870	-27,088	-30,138	-14,637	-36,305
86,106	76,580	83,927	53,038	67,053
87,657	77,816	85,318	-17,870	67,975
90,069	79,903	87,646	86,106	69,737
92,586	82,085	90,080	87,657	71,584
-6,801	-17,649	-19,592	90,069	-28,497
46,885	35,685	39,111	92,586	24,486
100,754	89,185	97,997	-6,801	77,616
103,734	91,784	100,894	46,885	79,833
106,842	94,497	103,918	100,754	82,152
8,062	-4,690	-5,148	103,734	-17,443
62,429	49,254	54,234	106,842	36,079

Table 8-5 CASH FLOW ANALYSIS

	CASH FLOW W-WO Pj	LoanPay W 15%Int	CashReq	LoanPay W 20% Int	Cash Req	LoanPay W 30% Int	Cash Req
	A	B	C	1000Tsh B1	1000Tsh C1	1000Tsh B2	1000Tsh C2
FIRR	33.13%	0	0				
	-10,923	-1,638	-12,561	-2,185	-13,108	-3,277	-14,200
	-10,923	-1,638	-12,561	-2,185	-13,108	-3,277	-14,200
	9,517						
	-11,291	-1,694	-12,985	-2,258	-13,549	-3,387	-14,678
	-11,406	-1,711	-13,117	-2,281	-13,687	-3,422	-14,828
	-13,521	-2,028	-15,549	-2,704	-16,225	-4,056	-17,577
	-14,637	-2,196	-16,833	-2,927	-17,564	-4,391	-19,028
	53,038						
	-17,870	-2,681	-20,551	-3,574	-21,445	-5,361	-23,232
	86,106						
	87,657						
	90,069						
	92,586						
	-6,801						
	46,885						
	100,754						
	103,734						
	106,842						
	8,062						
	62,429						

Table 8-6 CAPITAL FUND REVENUE COLLECITION

Funds with 100%Collection Efficiency	Capital Funds W 80% Revenue Collection Efficiency	
Cash Flow Shortage - Surplus + FIRR 33% A		Loan Arrangement FederalLoan ForeignLoan Short Loan B
-10,923	Shortage	-10,923
-10,923	Shortage	-10,923
9,517	Surplus	5,429
-11,291	Shortage	-15,379
-11,406	Shortage	-15,494
-13,521	Shortage	-17,609
-14,637	Shortage	-18,725
53,038	Surplus	35,192
-17,870	Shortage	-36,305
86,106	Surplus	67,053
87,657	Surplus	67,975
90,069	Surplus	69,737
92,586	Surplus	71,584
-6,801	Shortage	-28,497
46,885	Surplus	24,486
100,754	Surplus	77,616
103,734	Surplus	79,833
106,842	Surplus	82,152
8,062	Surplus	-17,443
62,429	Surplus	36,079

Table 8-7 BALANCE SHEET

Balance Sheet, Monduli Water Supply Project Year 1

Unit:	1000 Tsh		1000 Tsh
Current Assets		Current Liability	
Cash	10,923	Short Term Liability	10,923
Assets		Long Term Liability	
4 Trucks	562,056		
		Capital	
		4 Trucks	562,056
		Profit or Loss	
Total	572,979	Total	572,979

Balance Sheet, Monduli Water Supply Project Year 20

Unit:	1000 Tsh		1000 Tsh
Current Assets		Current Liability	
Cash	113,750	Short Term Liability	0
Assets		Long Term Liability	
	1,499,103		
		Capital	1,499,103
		Profit or Loss	113,750
Total	1,612,853	Total	1,612,853

1 Funds needed to cover OM cost for Project Year 1
in the amount of 10,923(1000 Tsh) to cover loan cost
2 Assets = 4 water trucks = 562 Million Tsh

Assets Value in year 2014

	60% of Deep Wells(586,438)
	50% of Pumps(130,653)
	100% of Pump House(37,450)
	60% of Pipe Works(1,740,773)
Total	1,499,103 (1000 Tsh)

ANNEX LIST OF STUDY TEAM AND COUNTERPART PERSONNEL

ANNEX: LIST OF STUDY TEAM AND COUNTERPART PERSONNEL

JICA Study Team

1.	Mr. Kunio OTA	Team Leader/Water Supply Planning
2.	Mr. Hisao ANDO	Hydrogeology/Groundwater Development
3.	Mr. Sumitada OKAMOTO	Water Supply Facilities/Operation and Maintenance
4.	Dr. James BUGENGO	Social Analysis/Sanitary Education
5.	Dr. Tatuo TSUCHIGANE	Economic and Financial Analysis
6.	Satosi MARUYAMA	Geophysics
7.	Yasumasa TOHYAMA	Water Quality/Environment
8.	Kazuhiro SASAKI	Well Drilling
9.	Yudai NAKAZAWA	Coordination

Counterpart

1.	M.A. Babu	Director, Arusha Regional Directorate (RDD), Regional Commissioner,s Office
2.	P.A.M. Chikira	Regional Planning Officer, RDD
3.	S.E. Kiwoli	Acting Planning Officer, RDD
4.	J.M. Lyatuu	Executive Director, Monduli District
5.	F.Q.M. Fissoo	Executive Director, Monduli District (Former)
6.	S. Rwakatare	Regional Water Engineer, Regional Commissioner,s Office
7.	E.J. Dambal	Regional Water Engineer (Former)
8.	M.A. Macha	Design Engineer, Ministry of Water, Energy and Minerals, Dar es Salaam
9.	L.S. Temba	Acting Regional Hydrogeologist, RDD
10.	H.S. Halili	Zonal Superintendent for Drilling, RDD
11.	M.B. Loiseng'er	Design Engineer, RDD
12.	T. Masao	District Planning Officer, Monduli District
13.	D.L. Mollel	District Planning Officer, Monduli District
13.	B.G. Matemu	Acting District Water Engineer, Monduli District
14.	J. Makaidi	Acting District Water Engineer, Monduli District
15	E. Sadikieli	Senior Drilling Technician, RDD
16.	Kanana W.K.	Drilling Technician, RDD
17.	G. Lyatuu	Technician for Hydrogeology