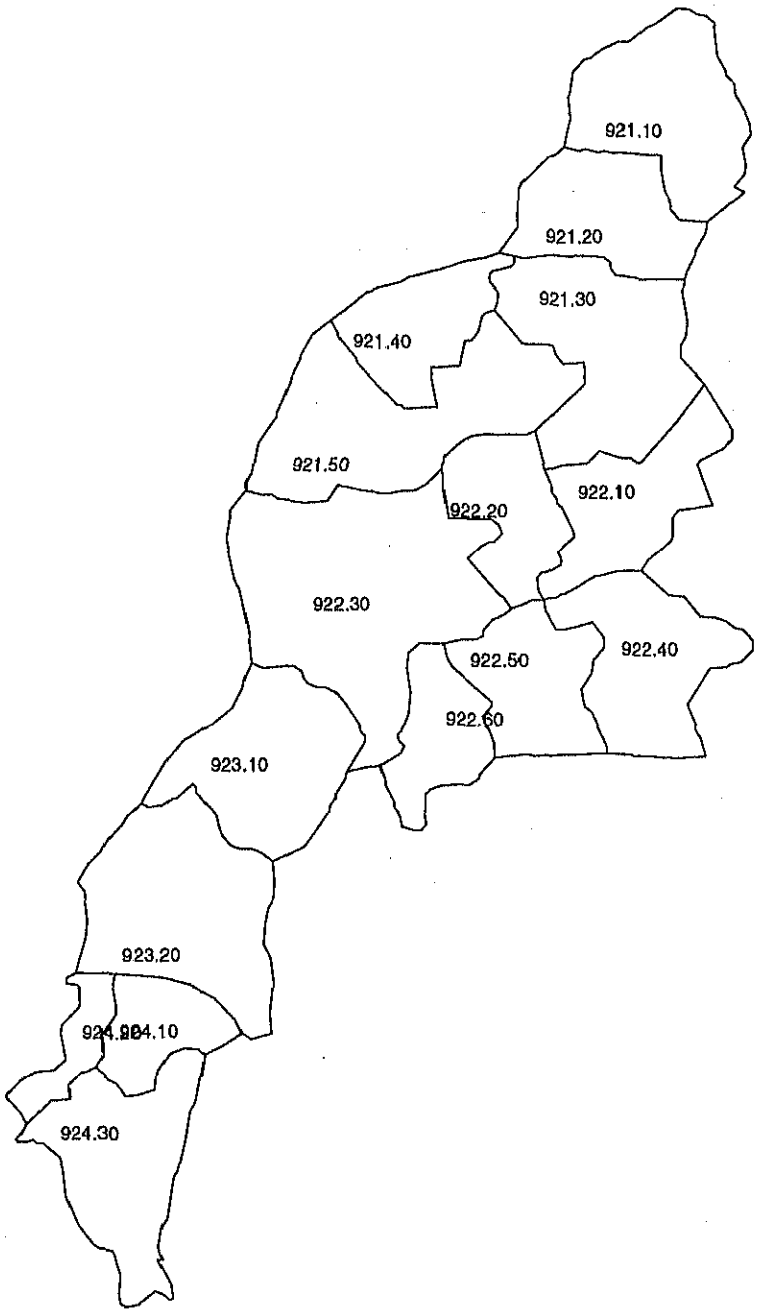
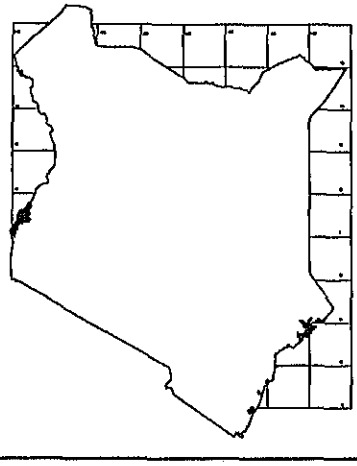
Busia

District

Fig.



Code	Location	Population
921.1	North Teso	19,774
921.2	Central Teso	14,346
921.3	East Teso	17,898
921.4	West Teso	14,688
921.5	South Teso	32,875
922.1	East Bukhayo	13,054
922.2	Central Bukhayo	9,094
922.3	West Bukhayo	42,941
922.4	Marachi East	22,985
922.5	Marachi Central	17,781
922.6	Marachi West	14,827
923.1	Samia North	24,394
923.2	Samia South	23,120
924.1	East Bunyala	9,400
924.2	West Bunyala	7,645
924.3	South Bunyala	13,020



920 Busia

THE STUDY
ON
THE NATIONAL WATER MASTER PLAN

JAPAN INTERNATIONAL COOPERATION AGENCY

1. Socio-Economic Profile : 920 Busia District

1-1 Population Projection

(Unit:1000)

Code	Location	Land Area (sq.km)	Town Name	1990			2000			2010		
				Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
920	Busia District	1,631		453.6	15.4	438.2	639.4	52.5	586.9	796.6	86.1	710.5
921.1	North Teso	116		31.7	-	31.7	42.5	-	42.5	51.5	-	51.5
921.2	Central Teso	86	Amagoro(Kocholia)	23.0	-	23.0	32.4	1.5	30.8	39.4	2.1	37.3
921.3	East Teso	137		28.7	-	28.7	38.5	-	38.5	46.6	-	46.6
921.4	West Teso	70		23.6	-	23.6	31.6	-	31.6	38.2	-	38.2
921.5	South Teso	158	Busia	26.2	13.3	12.9	58.7	41.4	17.2	91.0	70.1	20.9
922.1	East Bukhayo	88		21.0	-	21.0	28.1	-	28.1	34.0	-	34.0
922.2	Central Bukhayo	68	Nambale	16.7	2.1	14.6	24.8	5.3	19.6	31.7	8.0	23.7
922.3	West Bukhayo	223		68.9	-	68.9	92.3	-	92.3	111.8	-	111.8
922.4	Marachi East	104	Butula(Muandas)	36.9	-	36.9	50.7	1.3	49.4	61.6	1.8	59.8
922.5	Marachi Central	76		28.5	-	28.5	38.2	-	38.2	46.3	-	46.3
922.6	Marachi West	57		23.8	-	23.8	31.9	-	31.9	38.6	-	38.6
923.1	Samia North	115	Funyula(Nangina)	39.2	-	39.2	53.8	1.3	52.4	65.3	1.8	63.5
923.2	Samia South	148	Hakati	37.1	-	37.1	50.7	1.0	49.7	61.6	1.4	60.2
924.1	East Bunyala	48		15.1	-	15.1	20.2	-	20.2	24.5	-	24.5
924.2	West Bunyala	24	Port Victoryia	12.3	-	12.3	17.1	0.6	16.4	20.8	0.9	19.9
924.3	South Bunyala	113		20.9	-	20.9	28.0	-	28.0	33.9	-	33.9

1-2 GRDP Projection

Item	1990	2000	2010
1) GRDP (K.Pound million)	183.5	333.8	485.4
Percentage to GDP	2.4%	2.4%	2.4%
2) GRDP per Capita (K.Pound)	404.5	522.1	609.4
Ratio to GDP per capita	1.19	1.16	1.20
Urban (K.Pound)	993.2	550.9	643.0
Rural (K.Pound)	383.8	519.5	606.4

1-3 Present District Profile (1990)

1) Agricultural Production (1989)

Product	Production	Unit
Maize	36,040	tons
Sorghum/Millet	-	tons
Potato	14,445	tons
Rice	1,775	tons
Wheat/Barley	-	tons
Coffee	40	tons
Tea	-	tons
Milk	511	tons
Meat	2,237	tons

2) Number of Manufacturing Establishments (1986)

Type of Industry	Number
Food	3
Textile	2
Wood	2
Paper	0
Chemical	0
Non-metal	0
Metal	0
Machinery	0
Others	0
Total	7

3) Water Supply Schemes in Service Centre

Piped system	14
Communal water points	1
Other sources	24

4) Educational Facilities

Primary school	338
Secondary school	44
Institute	12

5) Medical Facilities

Hospital	3
Health Centre	12
Dispensary	10
Others	0

6) Out-patient of Infective Diseases in Relation to Water Supplies (1985-89 Average)

Diarrhoeal Diseases	9,363
Leprosy	10
Infectious Hepatitis	62
Bilharzia	150
Eye Infections	2,838

2. Land and resources

2.1 Present Land Use

Unit : km2

Total Area	Land Area	Water Area	Forest & Park	Swamp	Town	Barrenland	Agriculture Land	Other Land
1,766	1,629	137	2	184	159	0	455	829

2.2 Rain fall

Unit : mm

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
57	76	149	251	211	97	82	119	136	144	158	72	1,558

2.3 River Flow

Unit : m3/sec

Gauge Code	Catchment Area (km2)	Mean Flow	Low Flow Frequency			
			80%	90%	95%	Min.
1AD02	473	3.1	0.7	0.7	0.7	0.7
1AH01	1450	12.0	8.4	8.4	7.8	6.8

2.4 Groundwater

Aquifer Characteristics

Elevation (m)	Total Depth (m)	Water Struck (m)	Level Rest (m)	Yield (m3/hr)	Draw Down (m)
1231.97	53.97	36.7	12.84	3.31	13.66

Safe Abstruction Yield

Unit : m3/year

Borehole	Shallow	Total
500,180	1,659,538	2,159,718

2.5 Agriculture

Suitable Area for Major Crops

Unit: km2

Maize	Wheat	Rice	Sorghum	Potato	Coffee	Tea
932	0	960	932	0	0	0

Area of Irrigation Potential

Unit : ha

Surfce Water		Groundwater	
Upland	Lowland	Upland	Lowland
6,996	8,466	19.2	14.2

Livestock Population

Unit: 1,000

Cattle	Sheep/Goats	Camels	Donkeys
156.63	74.42	-	0.08

3 Water Demand Projection

Unit: cu.m/day

Location	1990				2000				2010			
	Rural	Urban	Livestock	Industry	Rural	Urban	Livestock	Industry	Rural	Urban	Livestock	Industry
Busia District	14,381	2,228	3,725	247	23,019	7,735	5,107	465	36,967	12,927	6,548	685
North Teso	986	0	267	0	1,557	0	362	0	2,453	0	460	0
Central Teso	634	0	194	57	968	222	266	105	1,460	312	339	152
East Teso	829	0	242	0	1,283	0	328	0	1,971	0	417	0
West Teso	855	0	199	0	1,397	0	269	0	2,302	0	342	0
South Teso	458	1,924	136	153	744	6,107	235	287	1,219	10,526	343	421
East Bukhayo	754	0	177	0	1,229	0	239	0	2,021	0	304	0
Central Bukhayo	530	304	127	0	866	776	178	0	1,427	1,207	230	0
West Bukhayo	2,502	0	581	0	4,089	0	786	0	6,740	0	1,000	0
Marachi East	1,339	0	311	0	2,189	193	423	0	3,608	270	539	0
Marachi Central	1,036	0	241	0	1,693	0	325	0	2,791	0	414	0
Marachi West	864	0	201	37	1,413	0	271	73	2,327	0	345	112
Samia North	1,383	0	330	0	2,247	194	449	0	3,678	273	572	0
Samia South	1,032	0	313	0	1,580	149	425	0	2,390	209	541	0
East Bunyala	404	0	127	0	613	0	172	0	913	0	219	0
West Bunyala	293	0	103	0	436	93	141	0	635	130	180	0
South Bunyala	482	0	176	0	715	0	238	0	1,032	0	303	0

4 Action Plan

4.1 Urban Water Supply

Urban Name	Population	Present Raw Water Source	Future Raw Water Source	G/P	Pipe line (km)	Pump lift (m)	Cost 1000 US$
Busia	70,200	Sio River	Sio river	p	13.4	100	14,087
Nambale	8,100	Boreholes	Sio river	p	0.7	40	2,219

g: gravity p: pump

4.2 Small Scale Irrigation Scheme

Scheme Name	Area (ha)	Farmers No (Nos)	Division	Location	Type of Project	Imp. Agency	Cost million Kshs	Basin
Magombe	8	0	Budalangi	Magombe	Irrigation	IDB	0.328	1EF
Bumayenga	50	0	Funyula	Samia	Irrigation	IDB	2.05	1EF
Mudembi	60	0	Budalangi	E/Bunyala	Irrigation	MOA	4.5	1EF
Nambale Dr.	162	?	?	?	Drainage	?	6.642	1EF
Bukangasi	235	0	Budalangi	Magombe	Irrigation	IDB	9.635	1EF
Up'R Nzoia	0	0	?	?	Irrigation	MOA	?	?

4.3 Large Scale Irrigation Project

Project	Area (ha)	Water Source	Water Demand (MCM)	Cost (million)		Major Crops
				US$	K£	
Yala Swamp	*7,540*	*Yala River*	*184.2*	*65.0*	*81.9*	Rice, Maize

4.4 Hydropower Development

Project	Description	Executing Agency	Cost(million)		Implementation Schedule																
			US$	K£	93	94	95	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10
-	-	-	-	-																		

★ Design ☆ Study ● Construction

4.5 Flood Mitigation Project

Project	Description	Executing Agency	Cost(million)		Implementation Schedule																
			US$	K£	93	94	95	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10
-	-	-	-	-																		

★ Design ☆ Study ● Construction

4.6 Urban Drainage and Ad-hoc River Improvement Projects

Project	Population	Area (Km2)	Executing Agency	Cost (million)		Implementation Schedule																
				US$	K£	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Busia	13,300	0.1	MOLG	0.9	1.1								☆	☆	☆	●	●	●					

★ Design ☆ Study ● Construction

4.7 Dam Development Plan

Damsites	C.A. (km2)	Purpose	FSL (El. m)	Storage (MCM)	Yield (m3/s)	Height (m)	Cost (1,000US$)
-	-	-	-	-	-	-	-

W:Water Supply I:Irrigation P: Power

4.8 Groundwater Development Projects

Proposed Numbers				Executing Agency	Cost (million)		Implementation Schedule																Remarks
Drinking		Livestock																					
(B/H+D)	(S/W+H)	(B/H+D)	(S/W+II)		US$	K£	93	94	95	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10	
142	1729	28	308	MOCSS	41.1	51.8	☆	●	●	●	●	●	●	●											Small communication supply

★ Design ☆ Study ● Construction

4.9 Source Development Plan for Rural Water Supply

District	Source Development Plan									Total	Implementation Program (%)	
	Surface Water	Borehole	Shallow Well	Roof Catch	Small Dam	Subsur-face Dam	Sand Dam	Rock Catch	Existing Pipeline		Up to 2000	2001-2010
- Quantity (m3/d)	18,134	4,956	10,319	1,082	899	62	53	0	1,420	36,925	38.2	61.8
- No. of Facilities	0	161	1,991	16,717	16	9	8	0	0	18,902		
- Cost (mill.US$)	0	19.04	9.92	10.1	0.51	0.18	0.11	0	0	39.86		
(mill.K£)	0	24.01	12.51	12.74	0.65	0.22	0.14	0	0	50.27		

4.10 Source Development Plan for Livestock Water Supply

District	Source Development Plan							Total	Implementation Program (%)	
	Surface Water	Borehole	Shallow Well	Small Dam	Subsur-face Dam	Sand Dam	Existing Pipeline		Up to 2000	2001-2010
- Quantity (m3/d)	3,860	645	1,643	162	5	4	0	6,319	49.0	51.0
- No. of Facilities	0	28	308	16	3	2	0	357		
- Cost (mill.US$)	0	2.5	1.53	0.09	0.01	0.01	0	4.14		
(mill.K£)	0	3.16	1.92	0.11	0.02	0.01	0	5.22		

4.11 Watering Points in Nomadic Pasturage Area

Asumed Nomadic Pasturage Area (km2)	No. of Watering Points (Nos)	Executing Agency	Cost (million)		Implementaion of Watering Points (No.)	
			US$	K£	up to 2000	2001-2010
-	-	-	-	-	-	-

5 Future Water Resources Developmet Potential and Study Proposal

5.1 Potential Water Source for Future Development

Potential Water Source for Future Development	Purpose	Schemes		
		Water Supply	Irrigation	Hydropower
-	-	-	-	-

W:Water Supply I:Irrigation P: Power

5.2 River Basin Developmetn Study

Description	Executing Agency	Cost (million)		Implementation Schedule																
		US$	K£	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Sio/Malaba River Basin Study	LBDA	2.0	2.5					☆	☆	☆											

★ Design ☆ Study ● Construction

5.3 District Water Resource Study

Related Basin Study Proposed	Remarks	Executing Agency	Cost (million)		Implementation Schedule																
			US$	K£	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Sio		MOWD	2.0	2.5					o	o	o	☆	☆									

☆ Study

o River Basin Study (proposed under separate programme)

Kakamega/Vihiga

District

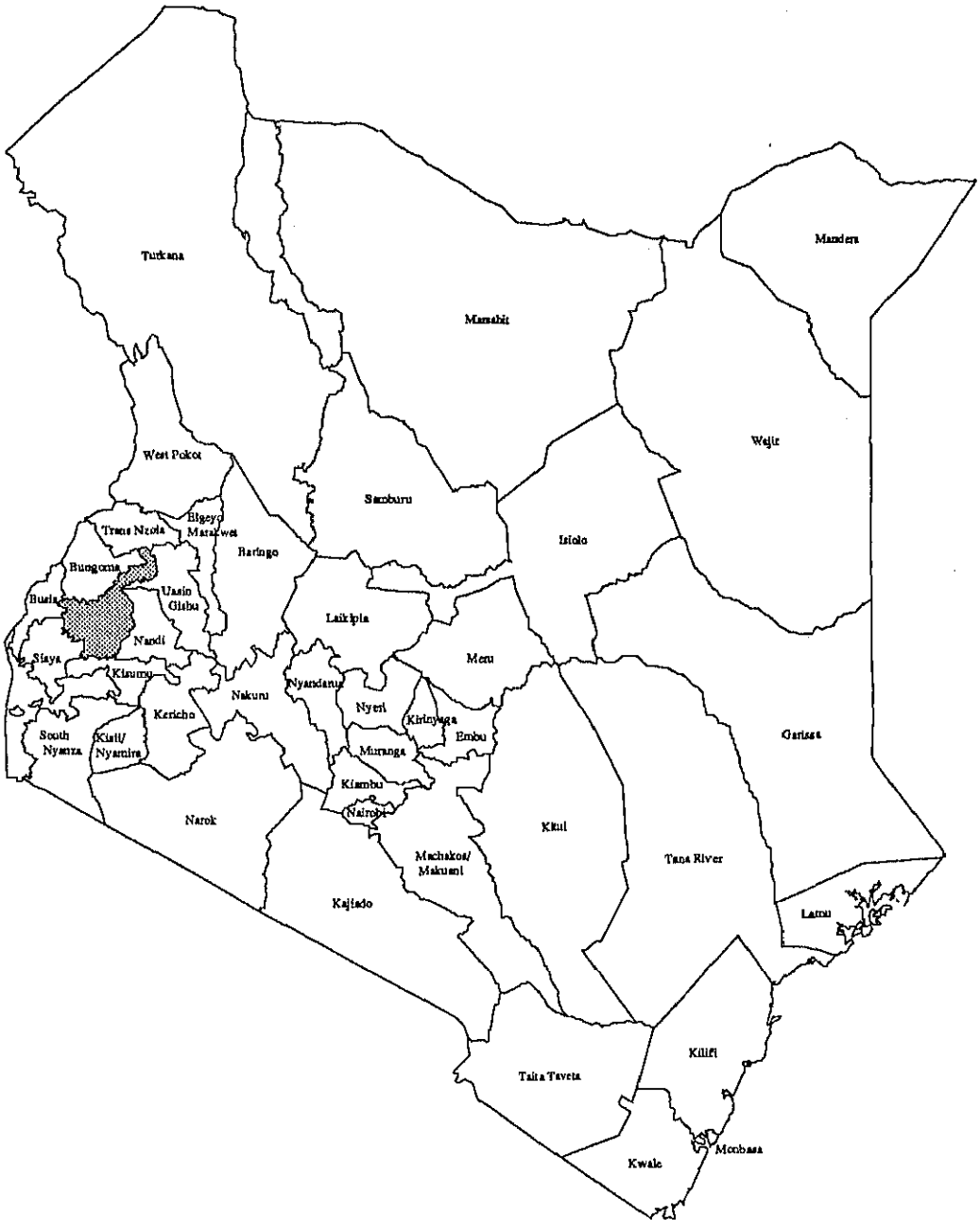
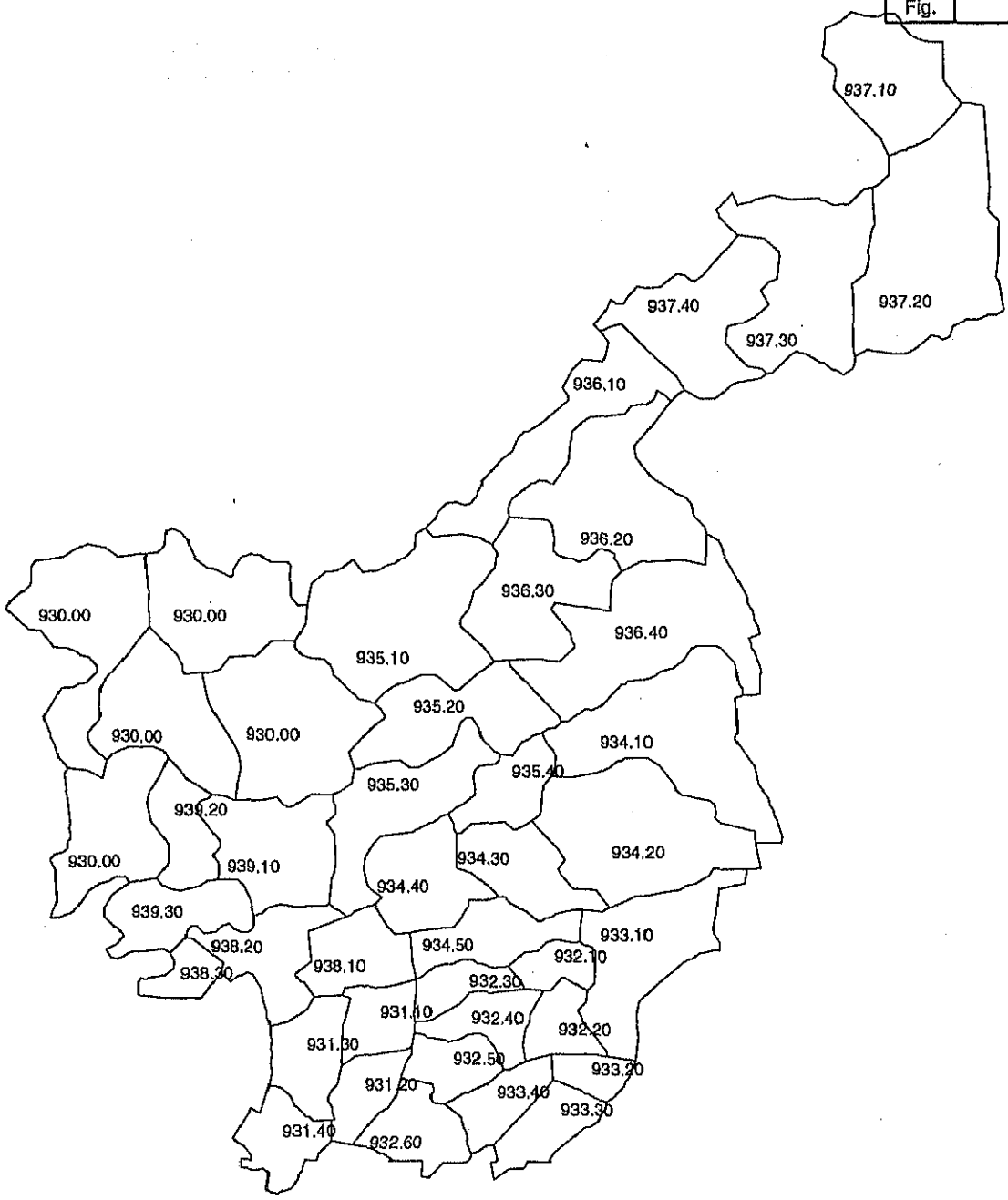
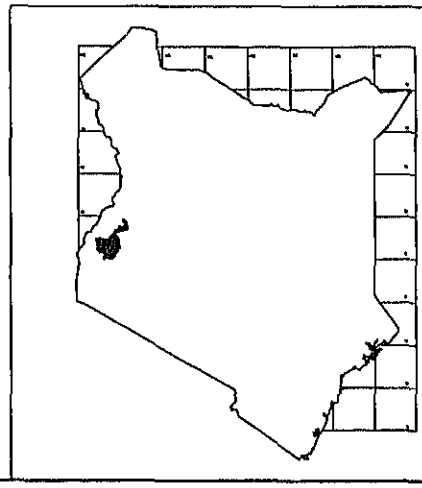


Fig.



Code	Location	Population
931.1	North Bunyore	23,107
931.2	East Bunyore	37,845
931.3	West Bunyore	26,614
931.4	South Bunyore	25,165
932.1	East Maragoli	15,314
932.2	North Maragoli	16,747
932.3	West Maragoli	21,287
932.4	Esava	29,992
932.5	Central Maragoli	34,251
932.6	South Maragoli	25,618
933.1	Shamakhokho	41,345
933.2	Banja	16,146
933.3	Tambua	11,079
933.4	gisambai	26,962
934.1	East Isukha	10,292
934.2	Central Isukha	43,640
934.3	West Isukha	30,103
934.4	North Idakho	30,278
934.5	South Idakho	29,476
935.1	Bunyala	31,549
935.2	North Butsotso	23,563
935.3	South butsotso	20,808
935.4	Kakamega Municipal	32,025

Code	Location	Population
936.1	North Kabras	24,238
936.2	Central Kabras	24,995
936.3	West Kabras	21,567
936.4	South Kabras	31,316
937.1	Nzoia	17,155
937.2	Soy	19,643
937.3	Lumakanda	17,015
937.4	Chekalini	14,852
938.1	East Kasa	22,862
938.2	Mundeku	23,665
938.3	Isika	13,060
939.1	North Marama	26,650
939.2	Central Marama	15,559
939.3	South Marama	23,330
93A.1	North Wanga	20,201
93A.2	East Wanga	32,840
93A.3	West Wanga	24,100
93A.4	Central Wanga	21,310
93A.5	South Wanga	34,324



930 Kakamega/Vihiga

THE STUDY
ON
THE NATIONAL WATER MASTER PLAN

JAPAN INTERNATIONAL COOPERATION AGENCY

1. Socio-Economic Profile : 930 Kakamega/Vihiga District

1-1 Population Projection

(Unit:1000)

Code	Location	Land Area (sq.km)	Town Name	1990			2000			2010		
				Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
930	Kakamega/Vihiga	3,521		1,479.2	85.3	1,393.9	1,886.4	199.7	1,686.7	2,310.4	309.1	2,001.3
931.1	North Bunyore	37	Ebusiratsi	32.4	-	32.4	39.7	0.5	39.2	47.1	0.7	46.5
931.2	East Bunyore	36		53.0	-	53.0	64.1	-	64.1	76.1	-	76.1
931.3	West Bunyore	53	Luanda	35.5	3.3	32.2	46.8	7.8	39.0	58.9	12.6	46.3
931.4	South Bunyore	45		35.2	-	35.2	42.6	-	42.6	50.6	-	50.6
932.1	East Maragoli	24		21.4	-	21.4	26.0	-	26.0	30.8	-	30.8
932.2	North Maragoli	32	Hamisi	22.1	-	22.1	27.2	0.6	26.7	32.4	0.7	31.7
932.3	West Maragoli	29		29.8	-	29.8	36.1	-	36.1	42.8	-	42.8
932.4	Esava	40	Mbale+Chavakali	42.0	-	42.0	52.0	1.1	50.8	61.8	1.5	60.3
932.5	Central Maragoli	36	Vihiga+Majengo	52.5	4.5	48.0	67.9	9.9	58.0	83.2	14.4	68.9
932.6	South Maragoli	50		35.9	-	35.9	43.4	-	43.4	51.5	-	51.5
933.1	Shamakhokho	110	Kaimosi	57.9	-	57.9	71.0	0.9	70.1	84.3	1.2	83.1
933.2	Banja	21		22.6	-	22.6	27.4	-	27.4	32.5	-	32.5
933.3	Tambua	42		15.5	-	15.5	18.8	-	18.8	22.3	-	22.3
933.4	gisambai	39		37.8	-	37.8	45.7	-	45.7	54.2	-	54.2
934.1	East Isukha	164		14.4	-	14.4	17.4	-	17.4	20.7	-	20.7
934.2	Central Isukha	163		61.1	-	61.1	74.0	-	74.0	87.8	-	87.8
934.3	West Isukha	63	Khayega	42.2	-	42.2	52.0	1.0	51.0	61.8	1.3	60.5
934.4	North Idakho	74		42.4	-	42.4	51.3	-	51.3	60.9	-	60.9
934.5	South Idakho	58		41.3	-	41.3	50.0	-	50.0	59.3	-	59.3
935.1	Bunyala	171	Navakholo	44.2	-	44.2	54.1	0.7	53.5	64.3	0.9	63.4
935.2	North Butsotso	98		33.0	-	33.0	39.9	-	39.9	47.4	-	47.4
935.3	South Butsotso	99		29.1	-	29.1	35.3	-	35.3	41.8	-	41.8
935.4	Kakamega Municipality	46	Kakamega	49.2	49.2	0.0	116.6	116.6	0.0	187.5	187.5	0.0
936.1	North Kabras	105		33.9	-	33.9	41.1	-	41.1	48.7	-	48.7
936.2	Central Kabras	139	Malava	35.0	-	35.0	43.7	1.4	42.4	52.1	1.8	50.3
936.3	West Kabras	106		30.2	-	30.2	36.5	-	36.5	43.4	-	43.4
936.4	South Kabras	167		43.9	-	43.9	53.1	-	53.1	63.0	-	63.0
937.1	Nzoia	95		24.0	-	24.0	29.1	-	29.1	34.5	-	34.5
937.2	Soy	200		27.5	-	27.5	33.3	-	33.3	39.5	-	39.5
937.3	Lumakanda	145	Lumakanda	23.8	-	23.8	29.9	1.1	28.8	35.6	1.4	34.2
937.4	Chekalini	114		20.8	-	20.8	25.2	-	25.2	29.9	-	29.9
938.1	East Kisa	55		32.0	-	32.0	38.7	-	38.7	46.0	-	46.0
938.2	Mundeku	64	Khwisero	33.1	-	33.1	40.9	0.8	40.1	48.6	1.0	47.6
938.3	Isika	22		18.3	-	18.3	22.1	-	22.1	26.3	-	26.3
939.1	North Marama	93		37.3	-	37.3	45.2	-	45.2	53.6	-	53.6
939.2	Central Marama	46	Butere	24.3	2.5	21.8	31.4	5.0	26.4	38.6	7.3	31.3
939.3	South Marama	61	Shianda	32.7	-	32.7	40.2	0.7	39.5	47.8	0.9	46.9
93A.1	North Wanga	111		28.3	-	28.3	34.2	-	34.2	40.6	-	40.6
93A.2	East Wanga	144	East Wanga	46.0	-	46.0	55.7	-	55.7	66.0	-	66.0
93A.3	West Wanga	123		33.8	-	33.8	40.8	-	40.8	48.5	-	48.5
93A.4	Central Wanga	103	Mumias	55.6	25.8	29.8	87.9	51.8	36.1	118.7	75.8	42.8
93A.5	South Wanga	98		48.1	-	48.1	58.2	-	58.2	69.0	-	69.0

1-2 GRDP Projection

Item	1990	2000	2010
1) GRDP (K.Pound million)	208.0	350.7	504.6
Percentage to GDP	2.7%	2.5%	2.5%
2) GRDP per Capita (K.Pound)	140.6	185.9	218.4
Ratio to GDP per capita	0.41	0.41	0.43
Urban (K.Pound)	687.7	555.3	549.5
Rural (K.Pound)	107.1	142.1	167.3

1-3 Present District Profile (1990)

1) Agricultural Production (1989)

Product	Production	Unit
Maize	1,241	tons
Sorghum/Millet	-	tons
Potato	10,620	tons
Rice	800	tons
Wheat/Barley	145	tons
Coffee	570	tons
Tea	6,400	tons
Milk	58,221	tons
Meat	4,835	tons

2) Number of Manufacturing Establishments (1986)

Type of Industry	Number
Food	24
Textile	2
Wood	7
Paper	2
Chemical	0
Non-metal	2
Metal	0
Machinery	0
Others	0
Total	37

3) Water Supply Schemes in Service Centre

Piped system	28
Communal water points	3
Other sources	44

4) Educational Facilities

Primary school	892
Secondary school	172
Institute	87

5) Medical Facilities

Hospital	7
Health Centre	33
Dispensary	17
Others	11

6) Out-patient of Infective Diseases in Relation to Water Supplies (1985-89 Average)

Diarrhoeal Diseases	67,093
Leprosy	44
Infectious Hepatitis	245
Bilharzia	301
Eye Infections	18,808

2. Land and resources

2.1 Present Land Use

Unit : km2

Total Area	Land Area	Water Area	Forest & Park	Swamp	Town	Barrenland	Agriculture Land	Other Land
3,520	3,520	0	332	1	542	0	2,548	97

2.2 Rain fall

Unit : mm

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
66	90	155	255	232	149	143	169	143	136	137	72	1,755

2.3 River Flow

Unit : m3/sec

Gauge Code	Catchment Area (km2)	Mean Flow	Low Flow Frequency			
			80%	90%	95%	Min.
1BD02	3825	13.9	8.9	8.9	8.9	8.9
1DA02	8417	49.4	16.8	11.8	9.9	6.4
1EB02	359	6.7	2.5	1.9	1.6	1.3
1ED01	1207	19.4	3.7	2.7	2.1	1.4
1FF02	47	0.7	0.2	0.1	0.1	0.1

2.4 Groundwater

Aquifer Characteristics

Elevation (m)	Total Depth (m)	Water Struck (m)	Level Rest (m)	Yield (m3/hr)	Draw Down (m)
1424.01	48.37	32.08	10.71	4.05	17.23

Safe Abstruction Yield

Unit : m3/year

Borehole	Shallow	Total
1,148,220	3,115,832	4,264,052

2.5 Agriculture

Suitable Area for Major Crops

Unit: km2

Maize	Wheat	Rice	Sorghum	Potato	Coffee	Tea
3,034	17	1,339	2,935	96	1,032	1,760

Area of Irrigation Potential

Unit : ha

Surfce Water		Groundwater	
Upland	Lowland	Upland	Lowland
28,409	27,372	36.4	10.6

Livestock Population

Unit: 1,000

Cattle	Sheep/Goats	Camels	Donkeys
443.65	55.61	-	-

3 Water Demand Projection

Unit: cu.m/day

Location	1990				2000				2010			
	Rural	Urban	Livestock	Industry	Rural	Urban	Livestock	Industry	Rural	Urban	Livestock	Industry
Kakamega/Vihiga District	47,763	12,335	8,992	1,767	69,908	29,433	10,770	3,258	111,696	46,396	13,115	4,663
North Bunyore	1,175	0	206	0	1,735	74	244	0	2,802	101	294	0
East Bunyore	1,924	0	337	0	2,841	0	398	0	4,589	0	480	0
West Bunyore	1,171	477	210	208	1,728	1,152	254	389	2,791	1,888	312	567
South Bunyore	1,280	0	224	0	1,889	0	265	0	3,051	0	319	0
East Maragoli	779	0	136	0	1,149	0	161	0	1,857	0	194	0
North Maragoli	800	0	140	0	1,182	81	166	0	1,909	110	201	0
West Maragoli	1,082	0	189	0	1,598	0	224	0	2,581	0	270	0
Esava	1,525	0	267	0	2,252	168	317	0	3,637	227	383	0
Central Maragoli	1,741	650	312	69	2,572	1,456	375	117	4,153	2,156	457	148
South Maragoli	1,303	0	228	0	1,923	0	269	0	3,107	0	325	0
Shamakhokho	2,051	0	368	114	3,012	133	436	211	4,834	181	526	303
Banja	821	0	144	0	1,212	0	170	0	1,957	0	205	0
Tambua	563	0	99	171	832	0	116	316	1,343	0	141	455
gisambai	1,370	0	240	0	2,024	0	283	0	3,269	0	342	0
East Isukha	491	0	92	0	715	0	108	0	1,135	0	131	0
Central Isukha	2,160	0	388	1	3,172	0	459	2	5,088	0	554	3
West Isukha	1,530	0	268	114	2,260	144	318	211	3,650	196	384	303
North Idakho	1,539	0	269	0	2,273	0	318	0	3,671	0	384	0
South Idakho	1,499	0	262	0	2,213	0	310	0	3,574	0	374	0
Bunyala	1,559	0	281	0	2,294	100	333	0	3,685	136	402	0
North Butsotso	1,198	0	210	0	1,769	0	248	0	2,857	0	299	0
South butsotso	1,058	0	185	0	1,563	0	219	0	2,523	0	264	0
Kakamega Municipality	0	7,115	78	691	0	17,182	181	1,273	0	28,139	296	1,820
North Kabras	672	0	216	0	875	0	255	0	1,185	0	308	0
Central Kabras	837	0	222	228	1,142	200	265	423	1,661	271	320	609
West Kabras	1,046	0	192	0	1,533	0	227	0	2,456	0	274	0
South Kabras	1,539	0	279	0	2,257	0	329	0	3,614	0	397	0
Nzoia	475	0	153	0	619	0	180	0	838	0	218	0
Soy	578	0	175	0	762	0	206	0	1,051	0	249	0
Lumakanda	472	0	151	0	614	157	181	0	831	214	218	0
Chekalini	412	0	132	0	536	0	156	0	726	0	188	0
East Kasa	1,163	0	203	0	1,717	0	240	0	2,772	0	290	0
Mundeku	1,203	0	211	0	1,777	114	250	0	2,869	155	302	0
Isika	664	0	116	0	981	0	137	0	1,584	0	166	0
North Marama	1,355	0	237	0	2,001	0	280	0	3,232	0	338	0
Central Marama	791	362	142	0	1,168	739	171	0	1,887	1,102	209	0
South Marama	1,186	0	208	57	1,751	104	246	105	2,828	140	297	152
North Wanga	1,027	0	180	0	1,516	0	212	0	2,449	0	256	0
East Wanga	1,670	0	292	0	2,465	0	345	0	3,982	0	417	0
West Wanga	1,225	0	214	0	1,809	0	253	0	2,922	0	306	0
Central Wanga	1,084	3,731	231	114	1,600	7,627	304	211	2,584	11,379	390	303
South Wanga	1,745	0	305	0	2,577	0	361	0	4,162	0	435	0

4 Action Plan

4.1 Urban Water Supply

Urban Name	Population	Present Raw Water Source	Future Raw Water Source	G/P	Pipe line (km)	Pump lift (m)	Cost 1000 US$
Luanda	12,600	Edzawa river	Edzawa river	p	9	170	1,759
Vihiga+Majengo	14,400	Spring	Edzawa River (Kimondi River)	p	7.7	170	5,086
Kaimosi	1,300	Dam	Galagoli river	g	3.5	0	0
Khayega	1,400		Yala river	p	4.2	170	1,774
Kakamega	187,500	Isiukhu River	Isiukhu River, Mukulusi Dam	p	7.7	100	29,166
Butere	7,400	Boreholes	Viratsi River	p	1.3	80	2,196
Mumias	75,900	Lusumu River	Nzoia River	p	5.1	80	13,496

g: gravity p: pump

4.2 Small Scale Irrigation Scheme

Scheme Name	Area (ha)	Farmers No (Nos)	Division	Location	Type of Project	Imp. Agency	Cost million Kshs	Basin
Bukura Inst.	2.5	0	Lurambi	Bukura	Irrigation	MWD	0.1025	1EB
Drainage Proj.	20	?	?	?	Drainage	?	0.82	1EB
Mumias Drain	80	0	Mumias	Lureko	Drainage	MOA	12	1EB

4.3 Large Scale Irrigation Project

Project	Area (ha)	Water Source	Water Demand (MCM)	Cost (million) US$	Cost (million) K£	Major Crops
-	-	-	-	-	-	-

4.4 Hydropower Development

Project	Description	Executing Agency	Cost(million) US$	Cost(million) K£	Implementation Schedule 93 94 95 96 97 98 99 20 01 02 03 04 05 06 07 08 09 10
-	-	-	-	-	

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4.5 Flood Mitigation Project

Project	Description	Executing Agency	Cost(million) US$	Cost(million) K£	Implementation Schedule 93 94 95 96 97 98 99 20 01 02 03 04 05 06 07 08 09 10
-	-	-	-	-	

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4.6 Urban Drainage and Ad-hoc River Improvement Projects

Project	Population	Area (Km2)	Executing Agency	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10
Kakamega	49,200	2.1	MOLG	16.6	20.9	☆ ☆ ☆ ● ● ●

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4.7 Dam Development Plan

Damsites	C.A. (km2)	Purpose	FSL (El. m)	Storage (MCM)	Yield (m3/s)	Height (m)	Cost (1,000US$)
Mukulusi	341	W	1510	17.0	1.10	8	964

W:Water Supply I:Irrigation P: Power

4.8 Groundwater Development Projects

Proposed Numbers: Drinking (B/H+D)	Proposed Numbers: Drinking (S/W+H)	Proposed Numbers: Livestock (B/H+D)	Proposed Numbers: Livestock (S/W+H)	Executing Agency	Cost (million) US$	Cost (million) K£	Implementation Schedule 93 94 95 96 97 98 99 20 01 02 03 04 05 06 07 08 09 10	Remarks
122	1514	0	0	MOCSS	26.5	33.4	☆ ● ● ● ● ● ●	Small communication supply

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4.9 Source Development Plan for Rural Water Supply

District	Source Development Plan									Total	Implementation Program (%)	
	Surface Water	Borehole	Shallow Well	Roof Catch	Small Dam	Subsur-face Dam	Sand Dam	Rock Catch	Existing Pipeline		Up to 2000	2001-2010
- Quantity (m3/d)	96,625	3,166	7,478	0	3,462	0	0	0	891	111,622	34.6	65.4
- No. of Facilities	0	122	1,514	0	41	0	0	0	0	1,677		
- Cost (mill.US$)	0	11.24	9.42	0	1.47	0	0	0	0	22.12		
(mill.K£)	0	14.17	11.87	0	1.85	0	0	0	0	27.89		

4.10 Source Development Plan for Livestock Water Supply

District	Source Development Plan							Total	Implementation Program (%)	
	Surface Water	Borehole	Shallow Well	Small Dam	Subsur-face Dam	Sand Dam	Existing Pipeline		Up to 2000	2001-2010
- Quantity (m3/d)	12,226	0	0	365	0	0	0	12,591	43.1	56.9
- No. of Facilities	0	0	0	41	0	0	0	41		
- Cost (mill.US$)	0	0	0	0.14	0	0	0	0.14		
(mill.K£)	0	0	0	0.17	0	0	0	0.17		

4.11 Watering Points in Nomadic Pasturage Area

Assumed Nomadic Pasturage Area (km2)	No. of Watering Points (Nos.)	Executing Agency	Cost (million)		Implementation of Watering Points (No.)	
			US$	K£	Up to 2000	2000-2010
-	-	-			-	-

5 Future Water Resources Developmet Potential and Study Proposal

5.1 Potential Water Source for Future Development

Potential Water Source for Future Development	Purpose	Schemes		
		Water Supply	Irrigation	Hydropower
Mushangumbo Dam	P	-	-	Mushangumbo
Hemsted Bridge Dam	W+I+P	Kerio Valley	Upper Nzoia	Hemsted Bridge
Webuye Falls Dam	P	-	-	Webuye Falls

W:Water Supply I:Irrigation P: Power

5.2 River Basin Developmetn Study

Description	Executing Agency	Cost (million)		Implementation Schedule																
		US$	K£	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Nzoia/Yala River Basin Study	LBDA	3.0	3.8		☆	☆	☆														

★ Design ☆ Study ● Construction

5.3 District Water Resource Study

Related Basin Study Proposed	Remarks	Executing Agency	Cost (million)		Implementation Schedule																
			US$	K£	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Nzoia		MOWD	2.0	2.5		o	o	o	☆	☆												

☆ Study

o River Basin Study (proposed under separate programme)