

WFRMA Catchment	No.	Urban Centre	F/S Status	Capacity to be developed (m ³ /day)			Implementation Schedule																	
							Short Term					Medium Term					Long Term							
				Total	Initial Develop.	Ratio	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
							13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
LVN	1	Bondo	WSB, D/D	12,838	3,851	30%	■	■	■															
	2	Siaya	WSB, D/D	5,495	2,000	36%	■	■	■															
	3	Malaba	WSB, F/S	8,238	2,471	30%				■	■	■												
	4	Moi's Bridge	WSB, F/S, MTP	4,440	5,000	100%				■	■	■												
	5	Matunda	WSB, F/S, MTP	2,868	3,600	126%				■	■	■												
	6	Kapenguria	MTP	13,059	3,918	30%												■	■	■				
	7	Eldoret	-	79,439	23,832	30%												■	■	■				
	8	Vihiga	-	45,529	13,659	30%													■	■				
	9	Kitale	-	39,931	11,979	30%													■	■				
	10	Mumias	-	38,353	11,506	30%														■				
	11	Kimilili	-	36,412	10,924	30%														■				
	12	Kakamega	-	32,500	9,750	30%														■				
	13	Kapsabet	-	30,796	9,239	30%														■				
	14	Bungoma	-	16,929	16,929	100%														■				
	15	Busia	-	16,939	16,939	100%														■				
	16	Luanda	-	18,928	18,928	100%														■				
	17	Item/Tambach	-	16,230	16,230	100%														■				
	18	Webuye	-	13,159	13,159	100%														■				
	19	Malakisi	-	6,553	6,553	100%														■				
		Nambale	WSB, F/S																■					
		Rehabilitation Works for 7 Urban Centres																	■					
		Total		438,636	200,466	46%																		

Note: As for "Project Status", "WSB" means a project proposed by WSB, "MTP" means a flagship project proposed in the First Medium Term Plan (2008 – 2019) of Kenya Vision 2030, and "F/S" means a project proposed in completed F/S.

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.2 Implementation Schedule of Proposed Sewerage System Development Plan (1/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

WRMA Catchment	No.	Urban Centre	F/S Status	Capacity to be developed (m ³ /day)			Implementation Schedule																					
							Total	Initial Develop.	Ratio	Short Term					Medium Term					Long Term								
				2013	2014	2015				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
				13/14	14/15	15/16				16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31				
RV	1	Kabarnet	WSB, D/D (additional)	2,380	2,380	100%																						
	2	Nakuru	WSB, F/S	71,871	70,000	97%																						
	3	Eldama Ravine	WSB, F/S (additional)	6,855	6,855	100%																						
	4	Naivasha	WSB	63,946	12,000	19%																						
	5	Oi Kalou	WSB, MTP	25,322	7,000	28%																						
	6	Molo	WSB	14,333	4,300	30%																						
	7	Narok	WSB, MTP	14,826	3,220	22%																						
	8	Gilgil	-	13,538	4,061	30%																						
	9	Njoro	-	9,034	9,034	100%																						
	Rehabilitation Works for 3 Urban Centres																											
	Total			222,105	118,850	54%																						

Note: As for "Project Status", "WSB" means a project proposed by WSB, "MTP" means a flagship project proposed in the First Medium Term Plan (2008 – 2019) of Kenya Vision 2030, and "F/S" means a project proposed in completed F/S.

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.2 Implementation Schedule of Proposed Sewerage System Development Plan (3/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

WRMA Catchment	No.	Urban Centre	F/S Status	Capacity to be developed (m ³ /day)			Implementation Schedule															
							Short Term					Medium Term					Long Term					
				Total	Initial Develop.	Ratio	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
			13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31		
Aithi	1	Ruiru	WSB, MTP, D/D	79,868	40,000	50%	■										■					
	2	Juja										■										
	3	Kikuyu	WSB, D/D	66,693	20,000	30%	■										■					
	4	Nairobi	WSB, MTP, F/S	376,367	60,000	22%						■					■					
	5	Limuru	WSB, MTP, F/S	12,742	20,000	157%	■										■					
	6	Mombasa	WSB, MTP, F/S	229,905	55,325	30%						■					■					
	7	Mavoko	WSB, MTP, F/S	26,276	10,000	38%						■					■					
	8	Karuri	WSB, MTP	30,802	30,802	100%						■										
	9	Kiambu	WSB	14,064	24,064	100%						■										
	10	Ngong	WSB, F/S	36,131	7,500	24%						■					■					
	11	Kiserian										■										
	12	Kajiado	WSB, F/S	5,700	500	9%						■					■					
	13	Kangundd-Tala	WSB	62,497	62,497	100%						■										
	14	Machakos	WSB, MTP	55,552	57,552	100%						■										
	15	Ukunda	WSB	17,880	7,880	100%						■										
	16	Malindi	-	33,818	33,818	100%											■					
	17	Kitengela	-	16,633	16,633	100%											■					
	18	Wundanyi	-	14,107	14,107	100%											■					
	19	Kilifi	-	13,962	13,962	100%											■					
	20	Mtwapa	-	13,905	13,905	100%											■					
	21	Ongata Rongai	-	11,489	11,489	100%											■					
	22	Taveta	-	7,620	7,620	100%											■					
	23	Mariakani	-	6,879	6,879	100%											■					
	24	Voi	-	6,579	6,579	100%											■					
	25	Kwale	-	5,662	5,662	1											■					
		Kibwezi	WSB, F/S (additional)	0																		
		Makindu	WSB, F/S (additional)	0																		
		Mtito Andei	WSB, F/S (additional)	0																		
		Emali	WSB, F/S (additional)	0																		
		Sultan Hamud	WSB, F/S (additional)	0																		
		Loitokitok	WSB, F/S (additional)	0																		
		Wote	WSB, F/S (additional)	0																		
		Rehabilitation Works for 5 Urban Centres					■															
		Total		1,145,133	526,776	46%																

Note: As for "Project Status", "WSB" means a project proposed by WSB, "MTP" means a flagship project proposed in the First Medium Term Plan (2008 – 2019) of Kenya Vision 2030, and "F/S" means a project proposed in completed F/S.

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.2 Implementation Schedule of Proposed Sewerage System Development Plan (4/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

WRMA Catchment	No.	Urban Centre	F/S Status	Capacity to be developed (m ³ /day)			Implementation Schedule																	
							Short Term					Medium Term					Long Term							
				Total	Initial Develop.	Ratio	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
							13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Tana	1	Embu	WS, D/D	22,587	6,387	27%	■	■	■							■	■	■						
	2	Maua	WSB, MTP, D/D	6,608	1,982	30%		■	■	■						■	■	■						
	3	Kitui	WSB, MTP, F/S	42,028	5,000	23%				■	■	■					■	■	■					
	4	Meru	WSB, F/S	19,570	10,000	50%			■	■	■						■	■	■					
	5	Lamu	MTP	95,250	26,145	30%				■	■	■					■	■	■					
	7	Thika	WSB, F/S	19,152	40,000	153%			■	■	■													
	6	Chuka	WSB, MTP, F/S	16,674	3,000	18%			■	■	■							■	■	■				
	7	Garissa	WSB, F/S	9,923	1,561	17%					■	■	■					■	■	■				
	8	Chogoria	F/S*	10,899	3,270	30%			■	■	■							■	■	■				
	9	Runyenjes	WSB, F/S*	7,498	2,249	30%				■	■	■									■	■		
	10	Kerugoya/Kutus	WSB, F/S*	7,450	2,235	30%							■	■	■						■	■		
	11	Nyeri	WSB	37,681	5,000	11%							■	■	■						■	■		
	12	Maluu	MTP	19,467	19,467	100%											■	■	■					
	13	Makuyu	WSB	16,880	16,880	100%											■	■	■					
	14	Muranga	-	9,476	11,037	100%															■	■		
	15	Maragua	-	10,116	10,116	100%															■	■		
	16	Wanguru	-	9,199	9,199	100%															■	■		
17	Mwingi	-	6,126	6,126	100%															■	■			
Rehabilitation Works for 6 Urban Centres							■	■	■															
Total				366,585	179,655	49%																		

Note: As for "Project Status", "WSB" means a project proposed by WSB, "MTP" means a flagship project proposed in the First Medium Term Plan (2008 – 2019) of Kenya Vision 2030, and "F/S" means a project proposed in completed F/S.

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.2 Implementation Schedule of Proposed Sewerage System Development Plan (5/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

WRMA Catchment	No.	Urban Centre	F/S Status	Capacity to be developed (m ³ /day)			Implementation Schedule																		
							Short Term					Medium Term				Long Term									
				Total	Initial Develop.	Ratio	2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23	2023 23/24	2024 24/25	2025 25/26	2026 26/27	2027 27/28	2028 28/29	2029 29/30	2030 30/31	
ENN	1	Nyahururu	WSB, F/S	11,364	3,347	29%																			
	2	Mandera	WSB, D/D	8,235	4,000	49%																			
	3	Isiolo	MTP	15,640	4,692	30%																			
	4	Wajir	MTP	7,776	2,333	30%																			
	5	Nanyuki	-	14,652	4,396	30%																			
	Rehabilitation Works for 2 Urban Centres																								
	Total			57,667	18,767	33%																			





Note: As for "Project Status", "WSB" means a project proposed by WSB, "MTP" means a flagship project proposed in the First Medium Term Plan (2008 – 2019) of Kenya Vision 2030, and "F/S" means a project proposed in completed F/S.

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.2 Implementation Schedule of Proposed Sewerage System Development Plan (6/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

No	Name of Project	County	Irrigation Area (ha)	Multi-purpose Dam	Short Term					Medium Term					Long Term							
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
					13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
A. Large Scale Irrigation Project (New)																						
1	Lower Nzoia Irrigation	Busia/Siaya	10,470	Nzoia (42A)	[Construction of Multipurpose Dam]					[Construction of Multipurpose Dam]					[Construction of Multipurpose Dam]							
2	Lower Sio Irrigation	Busia	6,600	-	[Construction of Irrigation System]					[Construction of Irrigation System]					[Construction of Irrigation System]							
3	Yala Swamp Irrigation	Siaya	4,600	-	[Construction of Irrigation System]					[Construction of Irrigation System]					[Construction of Irrigation System]							
4	Upper Nzoia Irrigation	Bungoma	24,000	Nzoia (34B)	[Construction of Multipurpose Dam]					[Construction of Multipurpose Dam]					[Construction of Multipurpose Dam]							
5	Moi's Bridge Irrigation	Bungoma	19,800	Moi's Bridge	[Construction of Irrigation System]					[Construction of Irrigation System]					[Construction of Irrigation System]							
6	Kibolo Irrigation	Kakamega	11,500	Kibolo	[Construction of Irrigation System]					[Construction of Irrigation System]					[Construction of Irrigation System]							
	On-going Weir Irrigation		1,400		[Construction of Irrigation System]					[Construction of Irrigation System]					[Construction of Irrigation System]							
Total			78,370		14,282					8,788					55,300							
B. Small Scale Irrigation Project (New)																						
1	Weir Irrigation		41,638		8,328					12,491					20,819							
2	Dam Irrigation		0		0					0					0							
3	Small Dam/Pond/Water Pan Irrigation		3,700		740					1,110					1,850							
4	Groundwater Irrigation		1,784		357					535					892							
Total for B			47,122		9,425					14,136					23,561							
C. Private Irrigation Project (New)																						
1	Weir Irrigation		41,637		8,327					12,491					20,819							
2	Groundwater Irrigation		1,784		357					535					892							
Total for C			43,421		8,684					13,026					21,711							
Total for LVNCA			168,913		32,391					35,950					100,572							

Note:

-  F/S and/or D/D
-  Procurement
-  Construction of Irrigation System
-  Construction of Multipurpose Dam

Source: JICA Study Team





**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.3
Implementation Schedule of Proposed
Irrigation Development Plan (1/6)**

No	Name of Project	County	Irrigation Area (ha)	Multi-purpose Dam	Short Term					Medium Term					Long Term							
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
					13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
A. Large Scale Irrigation Project (New)																						
1	Kano Plain Irrigation	Nyamira/Kericho	15,000	Magwagwa																		
2a	Lower Kuja Irrigation (Stage-1)	Migori	7,800	-																		
2b	Lower Kuja Irrigation (Stage-2)	Migori	32,700	Katieno																		
3	Ahero and West Kano Irrigation	Kisumu	1,800	-																		
4	Nandi Forest Irrigation	Nyando, Kisumu	7,272	Nandi Forest																		
5	Nyando Irrigation	Kericho	3,000	Nyando (Koru)																		
6	Amala Irrigation	Bomet	5,000	Amala																		
7	Ilooiterra Irrigation	Narok	3,000	Ilooiterra																		
Total			75,572																			
					7,800					16,800					50,972							
B. Small Scale Irrigation Project (New)																						
1	Weir Irrigation		14,477																			
2	Dam Irrigation		0																			
3	Small Dam/Pond/Water Pan Irrigation		4,590																			
4	Groundwater Irrigation		3,434																			
Total for B			22,501																			
					4,500					6,750					11,251							
C. Private Irrigation Project (New)																						
1	Weir Irrigation		11,700																			
2	Groundwater Irrigation		3,433																			
Total for C			15,133																			
					3,027					4,540					7,566							
Total for LVSCA			113,206																			
					15,327					28,090					69,789							

Note:

-  F/S and/or D/D
-  Procurement
-  Construction of Irrigation System
-  Construction of Multipurpose Dam

Source: JICA Study Team

THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030

JAPAN INTERNATIONAL COOPERATION AGENCY





Figure 15.2.3
Implementation Schedule of Proposed
Irrigation Development Plan (2/6)

No	Name of Project	County	Irrigation Area (ha)	Multi-purpose Dam	Short Term					Medium Term					Long Term							
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
					13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
A. Large Scale Irrigation Project (New)																						
1	Perkera Irrigation Extension	Baringo	3,000	-		P																
2	Turkwel Irrigation	West Pokot	5,000	Turkwel																		
3	Arror Irrigation	Elgeyo Marakwet	10,850	Arror																		
4	Norera Irrigation	Narok	2,000	Upper Narok																		
5	Lower Ewaso Ng'iro Irrigation	Kajiado	15,000	Oldorko/Oletukat																		
6	Todonyang-Omo Irrigation	Turkana	35,000	Gibe 3 Ethiopia																		
7	Kimwarer Irrigation	Baringo	2,000	Kimwarer																		
8	Oldekesi Irrigation	Narok	2,000	-																		
9	Embobut Irrigation	Elgeyo Marakwet	2,000	Embobut																		
	On-going Weir Irrigation		2,000																			
Total			78,850		2,000					17,850					59,000							

B. Small Scale Irrigation Project (New)																			
1	Weir Irrigation		5,335																
					1,067					1,601					2,667				
2	Dam Irrigation		0		0					0					0				
3	Small Dam/Pond/Water Pan Irrigation		2,890		578					867					1,445				
4	Groundwater Irrigation		1,046		209					314					523				
Total for B			9,271		1,854					2,782					4,635				

C. Private Irrigation Project (New)																			
1	Weir Irrigation		3,000																
					600					900					1,500				
2	Groundwater Irrigation		1,045		209					314					522				
Total for C			4,045		809					1,214					2,022				
Total for RVCA			92,166		4,663					21,846					65,657				

Note:





-  F/S and/or D/D
-  Procurement
-  Construction of Irrigation System
-  Construction of Multipurpose Dam

Source: JICA Study Team

<p>THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>Figure 15.2.3 Implementation Schedule of Proposed Irrigation Development Plan (3/6)</p>
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No	Name of Project	County	Irrigation Area (ha)	Multi-purpose Dam	Short Term					Medium Term					Long Term									
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
					13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31		
A. Large Scale Irrigation Project (New)																								
1	Taita Taveta Irrigation Extension	Taita Taveta	3,780	-																				
2	Mt. Kilimanjaro Spring Irrigation	Kajiado	1,500	-																				
3	Kibwezi Irrigation Extension	Makueni	17,000	Thwake																				
4	Kanzal Irrigation Extension	Makueni	15,000	Munyu																				
Total			37,280																					
B. Small Scale Irrigation Project (New)																								
1	Weir Irrigation		35																					
2	Dam Irrigation		0																					
3	Small Dam/Pond/Water Pan Irrigation		4,140																					
4	Groundwater Irrigation		2,309																					
Total for B			6,484																					
C. Private Irrigation Project (New)																								
1	Weir Irrigation		35																					
2	Groundwater Irrigation		2,309																					
Total for C			2,344																					
Total for ACA			46,108																					

Note:

-  F/S and/or D/D
-  Procurement
-  Construction of Irrigation System
-  Construction of Multipurpose Dam





Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.3 Implementation Schedule of Proposed Irrigation Development Plan (4/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

No	Name of Project	County	Irrigation Area (ha)	Multi-purpose Dam	Short Term					Medium Term					Long Term							
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
					13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
A. Large Scale Irrigation Project (New)																						
1	Hola Irrigation	Tana River	800	-																		
2	Hola Irrigation Extension	Tana River	4,161	-																		
3	High Grand Falls Irrigation	Garissa/Tana R.	106,000	High Grand Falls																		
4	Kora Irrigation	Tana River	25,000	Kora																		
Total			135,961							40,294					95,667							
B. Small Scale Irrigation Project (New)																						
1	Weir Irrigation		0		0					0					0							
2	Dam Irrigation		0		0					0					0							
3	Small Dam/Pond/Water Pan Irrigation		5,730		1,146					1,719					2,865							
4	Groundwater Irrigation		10,054		2,011					3,016					5,027							
Total for B			15,784		3,157					4,735					7,892							
C. Private Irrigation Project (New)																						
1	Weir Irrigation		0		0					0					0							
2	Groundwater Irrigation		10,054		2,011					3,016					5,027							
Total for C			10,054		2,011					3,016					5,027							
Total for TCA			161,799		5,168					48,045					108,586							
<p>Note:</p> <p>F/S and/or D/D Procurement Construction of Irrigation System Construction of Multipurpose Dam</p>																						
<p>Note: * = incorporate into the High Grand Falls irrigation area by 2030 (Bula, Hola and Tana delta schemes, 20,600 ha in total) Source: JICA Study Team</p>																						
<p>THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030</p>										<p>Figure 15.2.3 Implementation Schedule of Proposed Irrigation Development Plan (5/6)</p>												
<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>																						

No	Name of Project	County	Irrigation Area (ha)	Multi-purpose Dam	Short Term					Medium Term					Long Term							
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
					13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
A. Large Scale Irrigation Project (New)																						
1	Kieni Irrigation	Nyeri	4,202	-																		
2	Kom (Wajir) Irrigation	Isiolo, Samburu	4,000	Archer's Post																		
3	Kihoto Irrigation	Laikipia	18,000	Kihoto																		
Total			26,202		0					4,202					22,000							
B. Small Scale Irrigation Project (New)																						
1	Weir Irrigation		0		0					0					0							
2	Dam Irrigation		0		0					0					0							
3	Small Dam/Pond/Water Pan Irrigation		950		190					285					475							
4	Groundwater Irrigation		7,166		1,433					2,150					3,583							
Total for B			8,116		1,623					2,435					4,058							
C. Private Irrigation Project (New)																						
1	Weir Irrigation		0		0					0					0							
2	Groundwater Irrigation		7,165		1,433					2,150					3,582							
Total for C			7,165		1,433					2,150					3,582							
Total for ENNCA			41,483		3,056					8,787					29,640							

Note:

-  F/S and/or D/D
-  Procurement
-  Construction of Irrigation System
-  Construction of Multipurpose Dam




Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.3
Implementation Schedule of Proposed
Irrigation Development Plan (6/6)**

WRMA Catchment	No	Name of Project	Purpose	Installed Capacity (MW)	Project Status	Implementation Schedule																	
						Short Term					Medium Term					Long Term							
						2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
						13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
LVN	1	Nandi Forest Dam	W, I, P	50	D/D done		P																
	2	Nzoia (34B) Dam	W, I, P, F	16	Flagship D/D ongoing					P													
	3	Nzoia (42A) Dam	W, P, F	25	Flagship D/D ongoing						P												
LVS	4	Magwagwa Dam	W, I, P, F	115	D/D done																		
RV	5	Arror Dam	W, I, P, F	80	D/D done		P																
	6	Oletukat Dam	W, P	36	D/D ongoing				P														
	7	Leshota Dam	W, P	54	D/D ongoing					P													
	8	Oldorko Dam	W, I, P	90	D/D ongoing						P												
	9	Kimwarer Dam	W, I, P	20	F/S done																		
	10	Embobut Dam	W, I, P	45	Pre-F/S done																		
Athi	11	Thwake Dam	W, I, P	20	Flagship D/D done		P																
	12	Munyu Dam	I, P	40	Flagship F/S done																		
Tana	13	High Grand Falls	W, I, P, F	Stage 1: 500 Stage 2: +200	Flagship D/D done																		
	14	Karura	P	90																			

 F/S and/or D/D
 Procurement
 Construction
 W=Domestic and industrial water supply, I=Irrigation, P=Hydropower, F=Flood control
 D/D=Detailed Design, F/S=Feasibility Study, Pre-F/S=Pre-Feasibility Study

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.4
Implementation Schedule of Proposed
Hydropower Development Plan**

WRMA Catchment	No.	Name of Project	Purpose	Effective Storage Volume (MCM)	Project Status	Implementation Schedule																									
						Short Term					Medium Term					Long Term															
						2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23	2023 23/24	2024 24/25	2025 25/26	2026 26/27	2027 27/28	2028 28/29	2029 29/30	2030 30/31								
LVN	1	Nandi Forest Dam	W, I, P	220	D/D done			P																							
	2	Siyoi Dam	W	4	Flagship			P																							
	3	Nzola (34B) Dam	I, P, F	204	Flagship					P																					
	4	Nzola (42A) Dam	I, P, F	395	Flagship						P																				
	5	Moi's Bridge Dam	W, I	214	D/D ongoing																										
	6	Kibolo Dam	W, I	40																											
	7	Teremi Dam	W	3																											
LVS	1	Magwaga Dam	W, I, P, F	445	D/D done																										
	2	Itare Dam	W	20	Flagship																										
	3	Nyando (Koru) Dam	W, I, F	87	Flagship																										
	4	Bunyonyu Dam	W	6	P/D ongoing																										
	5	Katiemo Dam	I	201	Flagship																										
	6	Londiani Dam	W	25	Pre-F/S done																										
	7	Kibos Dam	W, F	26	Flagship																										
	8	Amala Dam	W, I	175	Pre-F/S done																										
	9	Sand River (Naikara) Dam	W	1																											
	10	Ilooterre Dam	W, I	14																											
RV	1	Upper Narok Dam	W, I, F	29	Flagship																										
	2	Aror Dam	W, I, P, F	62	D/D done																										
	3	Oletukat Dam	W, P	300	D/D ongoing																										
	4	Leshola Dam	W, P	33	D/D ongoing																										
	5	Oldorko Dam	W, I, P	20	D/D ongoing																										
	6	Kimwarer Dam	W, I, P	107	Pre-F/S done																										
	7	Embobut Dam	W, I, P	30	Pre-F/S done																										
	8	Malewa Dam	W	34																											
	9	Waseges Dam	W	4																											
	10	Murung-Sebit Dam	I, F	40																											

W-Domestic and industrial water supply, I-Irrigation, P-Hydropower, F-Flood control

 D/D-Detailed Design, F/S-Feasibility Study, Pre-F/S-Pre-Feasibility Study

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.5
Implementation Schedule of Proposed
Water Resources Development Plan (1/2)**

WRMA Catchment	No.	Name of Project	Purpose	Effective Storage Volume (MCM)	Project Status	Implementation Schedule																									
						Short Term					Medium Term						Long Term														
						2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23	2023 23/24	2024 24/25	2025 25/26	2026 26/27	2027 27/28	2028 28/29	2029 29/30	2030 30/31								
Athi	1	Ruiru-A (Ruiru 2) Dam	W	18	Flagship F/S ongoing			P																							
	2	Kamili 1	W	16	F/S ongoing			P																							
	3	Stony Athi	W	23	F/S ongoing			P																							
	4	Thwake Dam	W, I, P	594	Flagship D/D done	P																									
	5	Kikuyu Dam	W	31				P																							
	6	Ruaka (Kiambaa) Dam	W	4	D/D done					P																					
	7	Rare Dam	W	36	Flagship D/D ongoing					P																					
	8	Mwachi Dam	W	16	Flagship P/D done						P																				
	9	Upper Athi (Mbagathi) Dam	W	24								P																			
	10	Lake Chala Dam	W, F	6	D/D ongoing						P																				
	11	Munyu Dam	I, P	575	Flagship F/S done								P																		
	12	Kileta Dam	W	16	Pre-F/S done									P																	
	13	Pemba Dam	W	19											P																
	14	Mbuuni Dam	W	10												P															
	15	Olkishunki Dam	W	1	Pre-F/S done													P													
	16	Ndarugu (Ndarugu 1) Dam	W	300	Flagship F/S ongoing														P												
Tana	1	High Grand Falls Dam	W, I, P, F	5,000	Flagship D/D done																										
	2	Thiba Dam	I	11	Flagship D/D done	P																									
	3	Karimenu 2	W	14	F/S ongoing			P																							
	4	Maragua 4 Dam	W	33	F/S ongoing			P																							
	5	Chania-B Dam	W	49					P																						
	6	Yatta Dam	W	35	D/D done						P																				
	7	Thika 3A	W	13	F/S ongoing						P																				
	8	Ndiara Dam	W	12								P																			
	9	Kora Dam	I	537	Flagship								P																		
	10	Mutuni Dam	W	17										P																	
	11	Kitimul Dam	W	8												P															
ENN	1	Isiolo Dam	W	21	F/S ongoing Flagship		P																								
	2	Nyahururu Dam	W	11	Flagship				P																						
	3	Archers' Post Dam	W, I	100	Flagship						P																				
	4	Rumuruti Dam	W	1	Flagship									P																	
	5	Kihoto Dam	I	389													P														

F/S and/or D/D
 Procurement
 Construction
 W-Domestic and Industrial water supply, I-Irrigation, P-Hydropower, F-Flood control
 D/D-Detailed Design, F/S-Feasibility Study, Pre-F/S-Pre-Feasibility Study

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.5
Implementation Schedule of Proposed
Water Resources Development Plan (2/2)**

No.	Description	Implementation Schedule																	
		Short Term					Medium Term					Long Term							
		2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23	2023 23/24	2024 24/25	2025 25/26	2026 26/27	2027 27/28	2028 28/29	2029 29/30	2030 30/31
Development Activities																			
(1)	Monitoring																		
M1	Replacement of iron post for river gauge to concrete post																		
M2	Upgrade manual gauge to automatic (surface water level)																		
M3	Upgrade manual gauge to automatic (groundwater level)																		
M4	Upgrade manual gauge to automatic (rainfall)																		
M5	Installation of Dedicated Boreholes for Groundwater Monitoring																		
M6	Installation/Rehabilitation of River Gauging Stations																		
M7	Installation/Rehabilitation of Rainfall Gauging Stations																		
M8	Flood Discharge Measurement Equipment (Each SRO)																		
(2)	Evaluation																		
E1	Hydromet DB Upgrade (Software + Hardware)																		
(3)	Permitting																		
P1	PDB Upgrade (Software + Hardware)																		
(4)	Watershed Conservation																		
W1	Forestation (Gazetted Forest Area)																		
W2	Forestation (Non-gazetted Forest Area)																		
Recurrent Activities																			
(1)	Monitoring																		
M1	Surface Water Level Monitoring																		
M2	River Discharge Measurement																		
M3	Groundwaer Level Monitoring																		
M4	Rainfall Monitoring																		
M5	Flood Discharge Measurement																		
M6	Surface Water Quality Monitoring																		
M7	Groundwater Quality Monitoring																		
(2)	Others																		
O1	Catchment Forum Operation (Venue and Allownce to WURAs)																		

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.6
Implementation Schedule of Proposed
Water Resources Management Plan (1/6)**

No.	Description	Implementation Schedule																			
		Short Term					Medium Term					Long Term									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
		13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31		
Development Activities																					
(1)	Monitoring																				
M1	Replacement of iron post for river gauge to concrete post	■	■	■																	
M2	Upgrade manual gauge to automatic (surface water level)			■	■	■	■	■	■												
M3	Upgrade manual gauge to automatic (groundwater level)			■	■	■	■	■	■												
M4	Upgrade manual gauge to automatic (rainfall)			■	■	■	■	■	■												
M5	Installation of Dedicated Boreholes for Groundwater Monitoring	■	■	■																	
M6	Installation/Rehabilitation of River Gauging Stations	■	■				■	■	■				■	■							
M7	Installation/Rehabilitation of Rainfall Gauging Stations	■	■				■	■	■				■	■							
M8	Flood Discharge Measurement Equipment (Each SRO)		■	■	■								■	■	■						
(2)	Evaluation																				
E1	Hydromet DB Upgrade (Software + Hardware)			■	■				■	■			■	■							
(3)	Permitting																				
P1	PDB Upgrade (Software + Hardware)			■	■				■	■			■	■							
(4)	Watershed Conservation																				
W1	Forestation (Gazetted Forest Area)	■	■	■	■	■															
W2	Forestation (Non-gazetted Forest Area)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Recurrent Activities																					
(1)	Monitoring																				
M1	Surface Water Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M2	River Discharge Measurement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M3	Groundwaer Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M4	Rainfall Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M5	Flood Discharge Measurement			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M6	Surface Water Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M7	Groundwater Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(2)	Others																				
O1	Catchment Forum Operation (Venue and Allownce to WURAs)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.6
Implementation Schedule of Proposed
Water Resources Management Plan (2/6)**

No.	Description	Implementation Schedule																			
		Short Term					Medium Term					Long Term									
		2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23	2023 23/24	2024 24/25	2025 25/26	2026 26/27	2027 27/28	2028 28/29	2029 29/30	2030 30/31		
Development Activities																					
(1)	Monitoring																				
M1	Replacement of iron post for river gauge to concrete post	■	■	■																	
M2	Upgrade manual gauge to automatic (surface water level)			■	■	■	■	■	■												
M3	Upgrade manual gauge to automatic (groundwater level)			■	■	■	■	■	■												
M4	Upgrade manual gauge to automatic (rainfall)			■	■	■	■	■	■												
M5	Installation of Dedicated Boreholes for Groundwater Monitoring	■	■	■																	
M6	Installation/Rehabilitation of River Gauging Stations	■	■				■	■	■				■	■							
M7	Installation/Rehabilitation of Rainfall Gauging Stations	■	■				■	■	■				■	■							
M8	Flood Discharge Measurement Equipment (Each SRO)		■	■	■	■							■	■	■						
(2)	Evaluation																				
E1	Hydromet DB Upgrade (Software + Hardware)			■	■	■				■	■			■	■						
E2	Establishment of additional Water Quality Test Laboratory in Lodwar and Kapenguria	■	■																		
(3)	Permitting																				
P1	PDB Upgrade (Software + Hardware)			■	■	■				■	■			■	■						
(4)	Watershed Conservation																				
W1	Forestation (Gazetted Forest Area)	■	■	■	■	■															
W2	Forestation (Non-gazetted Forest Area)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Recurrent Activities																					
(1)	Monitoring																				
M1	Surface Water Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M2	River Discharge Measurement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M3	Groundwaer Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M4	Rainfall Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M5	Flood Discharge Measurement			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M6	Surface Water Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M7	Groundwater Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(2)	Others																				
O1	Catchment Forum Operation (Venue and Allownce to WURAs)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.6 Implementation Schedule of Proposed Water Resources Management Plan (3/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

No.	Description	Implementation Schedule																			
		Short Term					Medium Term					Long Term									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
		13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31		
Development Activities																					
(1)	Monitoring																				
M1	Replacement of iron post for river gauge to concrete post	■	■	■																	
M2	Upgrade manual gauge to automatic (surface water level)			■	■	■	■	■	■												
M3	Upgrade manual gauge to automatic (groundwater level)			■	■	■	■	■	■												
M4	Upgrade manual gauge to automatic (rainfall)			■	■	■	■	■	■												
M5	Installation of Dedicated Boreholes for Groundwater Monitoring	■	■	■																	
M6	Installation/Rehabilitation of River Gauging Stations	■	■				■	■	■				■	■							
M7	Installation/Rehabilitation of Rainfall Gauging Stations	■	■				■	■	■				■	■							
M8	Flood Discharge Measurement Equipment (Each SRO)		■	■	■								■	■	■						
(2)	Evaluation																				
E1	Hydromet DB Upgrade (Software + Hardware)			■	■				■	■				■	■						
E2	Establishment of additional Water Quality Test Laboratory in Mombasa	■	■																		
(3)	Permitting																				
P1	PDB Upgrade (Software + Hardware)			■	■				■	■				■	■						
(4)	Watershed Conservation						■	■	■	■											
W1	Forestation (Gazetted Forest Area)	■	■	■	■	■															
W2	Forestation (Non-gazetted Forest Area)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Recurrent Activities																					
(1)	Monitoring																				
M1	Surface Water Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M2	River Discharge Measurement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M3	Groundwater Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M4	Rainfall Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M5	Flood Discharge Measurement		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M6	Surface Water Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M7	Groundwater Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(2)	Others																				
O1	Catchment Forum Operation (Venue and Allowance to WURAs)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.6 Implementation Schedule of Proposed Water Resources Management Plan (4/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

No.	Description	Implementation Schedule																			
		Short Term					Medium Term					Long Term									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
		13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31		
Development Activities																					
(1)	Monitoring																				
M1	Replacement of iron post for river gauge to concrete post	■	■	■																	
M2	Upgrade manual gauge to automatic (surface water level)			■	■	■	■	■	■												
M3	Upgrade manual gauge to automatic (groundwater level)			■	■	■	■	■	■												
M4	Upgrade manual gauge to automatic (rainfall)			■	■	■	■	■	■												
M5	Installation of Dedicated Boreholes for Groundwater Monitoring	■	■	■																	
M6	Installation/Rehabilitation of River Gauging Stations	■	■				■	■	■				■	■							
M7	Installation/Rehabilitation of Rainfall Gauging Stations	■	■				■	■	■				■	■							
M8	Flood Discharge Measurement Equipment (Each SRO)		■	■	■	■							■	■	■						
(2)	Evaluation																				
E1	Hydromet DB Upgrade (Software + Hardware)			■	■	■			■	■				■	■						
E2	Establishment of additional Water Quality Test Laboratory in Garissa	■	■																		
(3)	Permitting																				
P1	PDB Upgrade (Software + Hardware)			■	■	■			■	■				■	■						
(4)	Watershed Conservation						■	■	■	■											
W1	Forestation (Gazetted Forest Area)	■	■	■	■	■															
W2	Forestation (Non-gazetted Forest Area)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Recurrent Activities																					
(1)	Monitoring																				
M1	Surface Water Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M2	River Discharge Measurement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M3	Groundwater Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M4	Rainfall Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M5	Flood Discharge Measurement		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M6	Surface Water Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M7	Groundwater Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(2)	Others																				
O1	Catchment Forum Operation (Venue and Allowance to WURAs)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.6 Implementation Schedule of Proposed Water Resources Management Plan (5/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

No.	Description	Implementation Schedule																			
		Short Term					Medium Term					Long Term									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
		13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31		
Development Activities																					
(1)	Monitoring																				
M1	Replacement of iron post for river gauge to concrete post	■	■	■																	
M2	Upgrade manual gauge to automatic (surface water level)			■	■	■	■	■	■												
M3	Upgrade manual gauge to automatic (groundwater level)			■	■	■	■	■	■												
M4	Upgrade manual gauge to automatic (rainfall)			■	■	■	■	■	■												
M5	Installation of Dedicated Boreholes for Groundwater Monitoring	■	■	■																	
M6	Installation/Rehabilitation of River Gauging Stations	■	■				■	■	■				■	■							
M7	Installation/Rehabilitation of Rainfall Gauging Stations	■	■				■	■	■				■	■							
M8	Flood Discharge Measurement Equipment (Each SRO)		■	■	■								■	■	■						
(2)	Evaluation																				
E1	Hydromet DB Upgrade (Software + Hardware)			■	■				■	■				■	■						
E2	Establishment of additional Water Quality Test Laboratory in Marsabit and Wajir	■	■																		
(3)	Permitting																				
P1	PDB Upgrade (Software + Hardware)			■	■				■	■				■	■						
(4)	Watershed Conservation						■	■	■	■											
W1	Forestation (Gazetted Forest Area)	■	■	■	■	■															
W2	Forestation (Non-gazetted Forest Area)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Recurrent Activities																					
(1)	Monitoring																				
M1	Surface Water Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M2	River Discharge Measurement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M3	Groundwater Level Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M4	Rainfall Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M5	Flood Discharge Measurement		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M6	Surface Water Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
M7	Groundwater Quality Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(2)	Others																				
O1	Catchment Forum Operation (Venue and Allowance to WURAs)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Source: JICA Study Team

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030	Figure 15.2.6 Implementation Schedule of Proposed Water Resources Management Plan (6/6)
JAPAN INTERNATIONAL COOPERATION AGENCY	

Drought Disaster Management Plan

No.	Description	Implementation Schedule																			
		Short Term					Medium Term					Long Term									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31				
1	Preparation of Water Use Restriction Rule for Reservoirs	█	█	█	█	█															
2	Establishment of Basin Drought Conciliation Councils	█	█	█	█	█															
3	Development of Drought Early Forecast System		█	█	█	█															

Legend: █ Establishment █ Update / Expansion



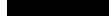
Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.7
Implementation Schedule of Proposed
Flood and Drought Disaster Management
Plan (2/2)**

WRMA Catchment No.	Name of Project	Target	Related Project (Dams and Inigation)	Implementation Schedule																		
				Short Term					Medium Term					Long Term								
				2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23	2023 23/24	2024 24/25	2025 25/26	2026 26/27	2027 27/28	2028 28/29	2029 29/30	2030 30/31	
LVN	1 Setting of Environmental Flow	Nzoia River	Nandi Forest Dam	Set																		
		Yala River	Siyoi, Nzoia (34B), Nzoia (42B), Moi's Bridge, Kibolo, and Teremi Dams		Set																	
	2 Environmental Monitoring	Nzoia River	Nandi Forest Dam																			
		Yala River	Siyoi, Nzoia (34B), Nzoia (42B), Moi's Bridge, Kibolo, and Teremi Dams																			
		L. Victoria	-																			
	LVS	1 Setting of Environmental Flow	Nyando River	Nyando and Londiani Dams		Set																
Sondu River			Magwagwa and Itare Dams	Set																		
Gucha River			Bunyonyu and Katieno Dams		Set																	
Migori River			Ilooterre Dam			Set																
Mara River			Amala Dam	Set	(Confirmation of current status only)																	
2 Environmental Monitoring		Nyando River	Nyando and Londiani Dams																			
		Sondu River	Magwagwa and Itare Dams																			
		Gucha River	Bunyonyu and Katieno Dams																			
		Migori River	Ilooterre Dam																			
		Mara River	Amala Dam																			
		L. Victoria	-																			
		Kisumu Town	-																			
		Homa Bay Town	-																			
		RV	1 Setting of Environmental Flow	Kerio River	Aror and Kimwarer Dams	Set																
Turkwel River	Embobut Dam					Set																
Ewaso Ng'iro South River	Upper Narok, Oletukat, Leshota, and Oldorko Dams				Set																	
L. Turkana	-			Set																		
L. Baringo	Waseges Dam					Set																
L. Bogoria	Ratala Dam					Set																
L. Nakuru	-			Set																		
L. Elementaita	-					Set																
L. Naivasha	-			Set	(Confirmation of current status only)																	
L. Magadi	-					Set																

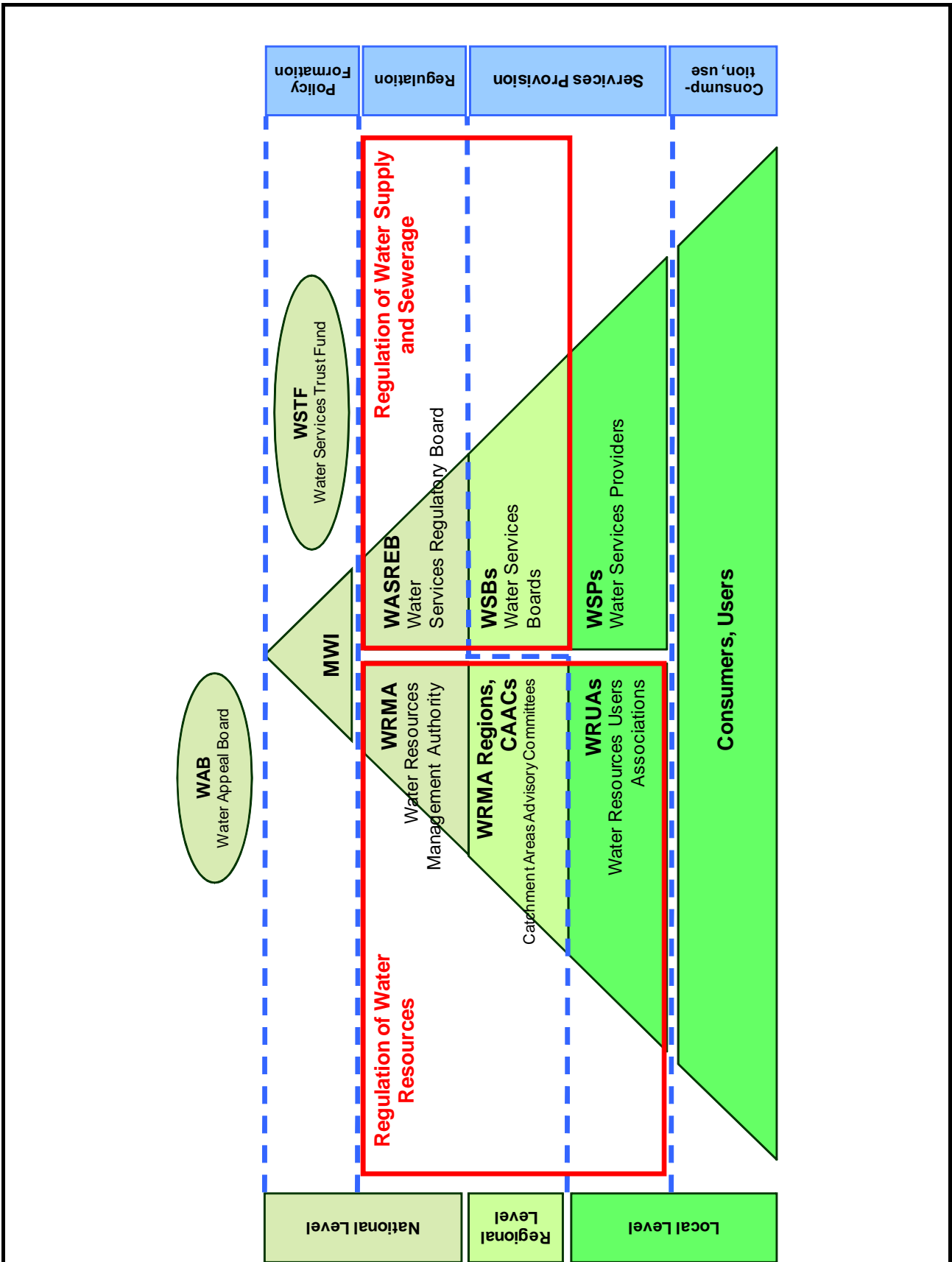
 Environmental Survey for Setting Environmental Flow
 Setting of Environmental Flow (including Key Stakeholder Meeting)
 Environmental Monitoring (including Planning)

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 15.2.8
Implementation Schedule of Proposed
Environmental Management Plan (1/2)**



Source: WRMA with notes by JICA Study Team (as of November 2012)

<p align="center">THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030</p>	<p>Figure 17.1.1 Existing Representation of Institutional Framework of Water under MWI</p>
<p align="center">JAPAN INTERNATIONAL COOPERATION AGENCY</p>	

No.	Description	Implementation Schedule									
		Short Term					Medium Term				
		2013 13/14	2014 14/15	2015 15/16	2016 16/17	2017 17/18	2018 18/19	2019 19/20	2020 20/21	2021 21/22	2022 22/23
(1)	Actions for establishment and operation of catchment forum for strengthening of river basin governance										
a)	Establishment of a "Catchment Forum" in six regional offices of WRMA with legal status	■	■								
b)	Continuous operation of "Catchment Forum"		■	■	■	■	■	■	■	■	■
c)	Promotion of establishment of WRUAs and promotion of participation of WRUAs to "Catchment Forum"	■	■	■	■	■	■	■	■	■	■
(2)	Actions for strengthening of hydro-meteorological information management										
a)	Improvement of operation of monitoring stations										
i)	Replacement of present iron post for river gauging by concrete post against vandalism	■	■	■							
ii)	Upgrade of existing manual gauging into automatic gauging (surface and groundwater level, and rainfall).		■	■	■	■	■	■	■	■	■
iii)	Periodical patrol of gauging stations	■	■	■	■	■	■	■	■	■	■
iv)	Introduction of flood discharge measurement equipment for preparation of accurate rating curve		■	■	■						
v)	Involvement of members of WRUAs as gauge readers for more responsible gauging	■	■	■	■	■	■	■	■	■	■
vi)	Installation of dedicated boreholes for groundwater monitoring	■	■	■							
b)	Improvement of water quality monitoring and pollution control system										
i)	Publishing a guideline for water quality	■	■								
ii)	Enforce preparation of Effluent Discharge Control Plan (EDCP) by industries for pollution control.	■	■	■	■	■	■	■	■	■	■
iii)	Establishment of water resources quality objectives for major water bodies	■	■	■							
c)	Hydro-meteorological database management										
i)	Enhancement of system resources (computers and related equipment) based on assessment of the current situation			■	■			■	■		
ii)	Renewal/update Hydro-meteorological Database System (every five year)			■	■			■	■		
d)	Establishment of training courses										
i)	Training course on discharge measurement	■	■								
ii)	Training course on water quality analysis in the laboratory for both surface and groundwater	■	■								
iii)	Training course on operation of Hydro-meteorological Database	■	■								
(3)	Actions for improvement of water Permit Database (PDB) management										
a)	Improvement of permit control										
i)	Enhancement of system resources (computers and related equipment)			■	■			■	■		
ii)	Enhancement of data communication environment (internet/intranet environment)			■	■			■	■		
iii)	Establish a map-based permit information management system using GPS			■	■						
iv)	Renewal/update of PDB (every five year).			■	■			■	■		
(4)	Actions for improvement of flood and drought disaster management										
a)	Improvement of Flood Information Management										
i)	Establish a flood information sharing system among related organizations	■	■								
ii)	Preparation of flood hazard maps based on numerical analysis for major urban centres	■	■								
iii)	Preparation of flood damage database to accumulate past flood damages	■	■	■							
iv)	Installation of color-coded staff gauges for flood risk indications	■	■								
v)	Guidance to WRUAs to include flood aspects to Sub-catchment Management Plan (SCMP)	■	■	■	■	■	■	■	■	■	■
vi)	Flood survey and analysis for flood prone areas	■	■	■	■	■	■	■	■	■	■
b)	Improvement of Drought Information Management										
i)	Establishment of a basin drought conciliation council	■	■								
ii)	Establishment of water use restriction rules of reservoirs	■	■								
iii)	Preparation of drought damage database to accumulate past drought records	■	■	■							
iv)	Guidance to WRUAs to include drought aspects to Sub-catchment Management Plan (SCMP)	■	■	■	■	■	■	■	■	■	■

Source: JICA Study Team

**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 18.2.1
Implementation Schedule of Proposed
Action Plans**

Proposed Development Plans

Water Supply Development Plan

- ⊙ Urban Water Supply Development (32 Urban Centers)
 - 1) Rehabilitation (20 UC) 135,000 m³/day
 - 2) Expansion (20 UC) 556,000 m³/day
 - 3) New Construction (12 UC) 91,000 m³/day
 - 4) Service Population 6.57 million
- Rural Water Supply (11 Counties)
 - 1) Large Scale 184,000 m³/day
 - 2) Small Scale 220,000 m³/day
 - 3) Target Population 5.79 million

Sanitation Development Plan

- Sewerage Development (19 Urban Centers)
 - 1) Rehabilitation (7 UC) 21,000 m³/day
 - 2) Expansion (7 UC) 230,000 m³/day
 - 3) New Construction (12 UC) 209,000 m³/day
 - 4) Service Population 6.03 million
- On-site Sanitation (11 Counties)
 - 1) Installation of Proper On-site Sanitation Facilities by Individual or Communities
 - 2) Target Population 6.33 million

Irrigation Development Plan

- ▨ Large Scale Irrigation Area
 - 1) Large Scale Irrigation 78,370 ha (6 Projects)
 - 2) Small Scale Irrigation 47,122 ha (11 Counties)
 - 3) Private Sector Irrigation 43,421 ha (11 Counties)

Hydropower Development Plan

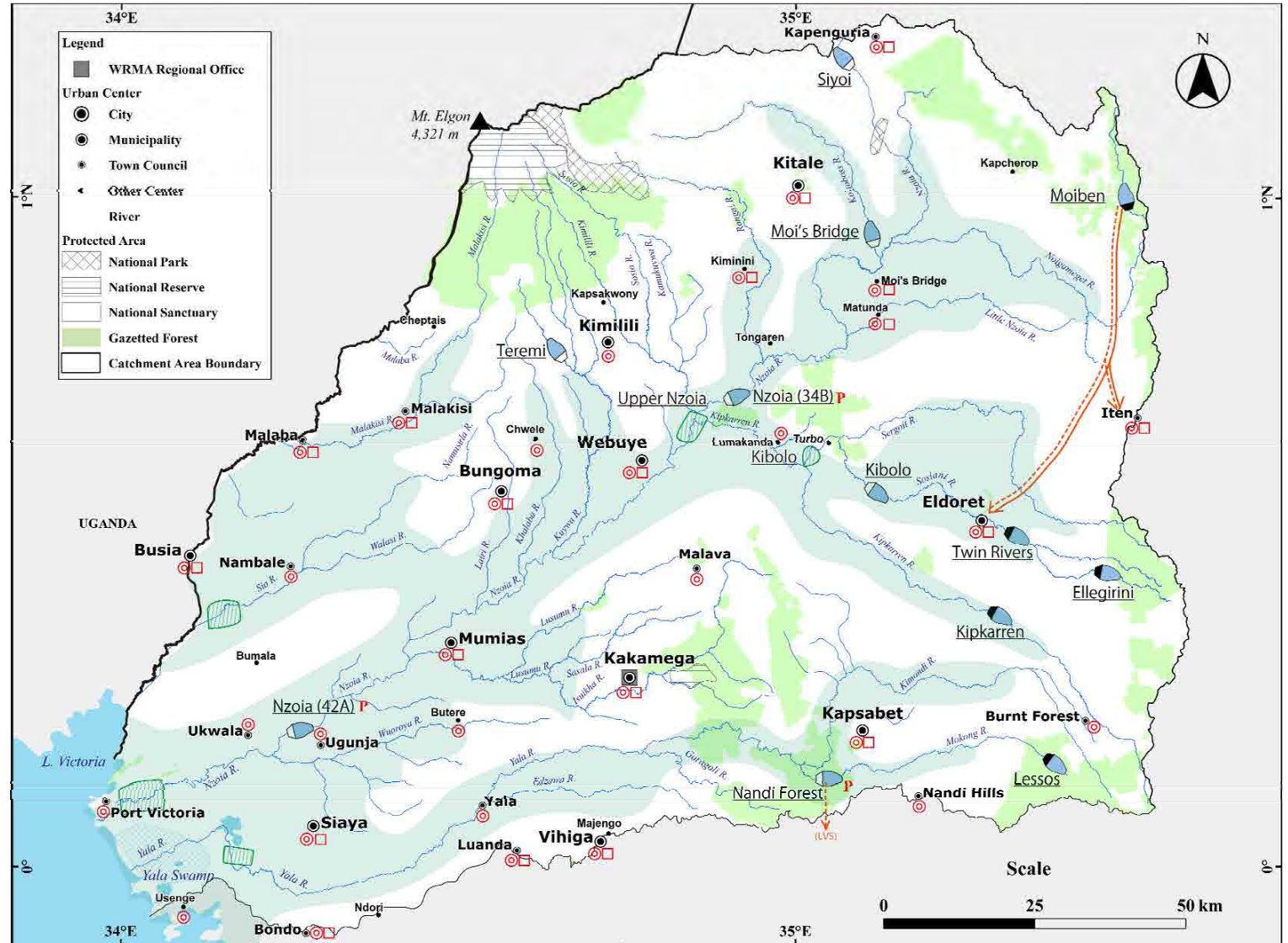
- P Hydropower Development
 - 1) Nzoia(34B) Multipurpose Dam 16 MW Project
 - 2) Nzoia(42A) Multipurpose Dam 25 MW Project
 - 3) Nandi Forest Multipurpose Dam 50 MW Project

Water Resources Development Plan

- ☒ 1) Storage Dams 7 nos. (1,080 MCM)
- ☒ 2) Small Storage Dams and Pans 3,620 nos. (181 MCM)
- ☒ 3) Boreholes: 560 nos. (56 MCM/year)
- ⋯ 4) Inter-basin Transfer (from Nandi Forest Dam to LVS CA) 189 MCM/year
- ⋯ 5) Intra-basin Transfer (from Moiben Dam to Eldoret, Ext.) 5 MCM/year

LEGEND OF PLANS

- ☒ Dam(Existing)
- Water Transfer (Existing)
- ▨ Irrigation Potential Area



THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030 JAPAN INTERNATIONAL COOPERATION AGENCY	Figure 19.1.1 Proposed Development Plans for Lake Victoria North Catchment Area
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Source: JICA Study Team

Proposed Management Plans

Water Resources Management Plan

- 1) Monitoring Networks
 - ▲▲ Surface Water Monitoring Station 24 locations
 - Rainfall Monitoring Station 42 locations
 - Groundwater Monitoring Station 19 locations
 - ★ Reference Point 2 locations
- 2) Evaluation of Water Resources
- 3) Improvement of Water Permit Issue and Management System
- 4) Watershed Conservation (Forestation and Soil Erosion Control)

Flood and Drought Disaster Management Plan

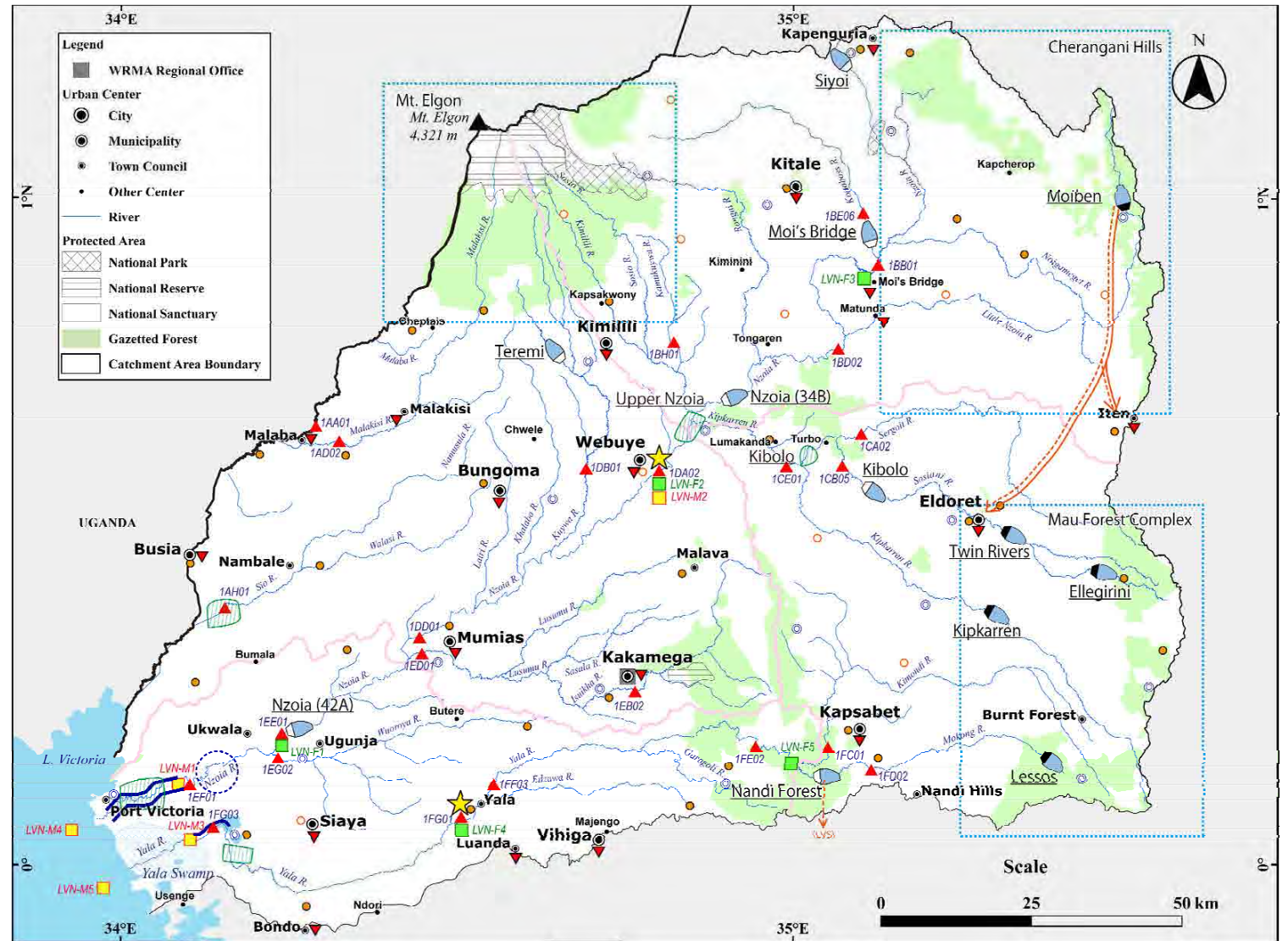
- 1) Flood Management
 - a) Nzoia R. Basin: flood control by dams, dikes and river improvement
 - b) Nzoia R. Basin: operation of early flood forecasting and warning system
 - c) Nzoia and Yala R. Basins: preparation of flood fighting plans for dikes
- 2) Drought Management
 - a) Establishment of Basin Drought Conciliation Councils
 - b) Early Drought Forecasting based on long-term rainfall prediction
 - c) Water Use Restriction Rule for Reservoirs (Existing 5 dams and proposed 7 dams)

Environmental Management Plan

- 1) Setting of Environmental Flow Rate 5 locations
- 2) Environmental Monitoring 5 locations

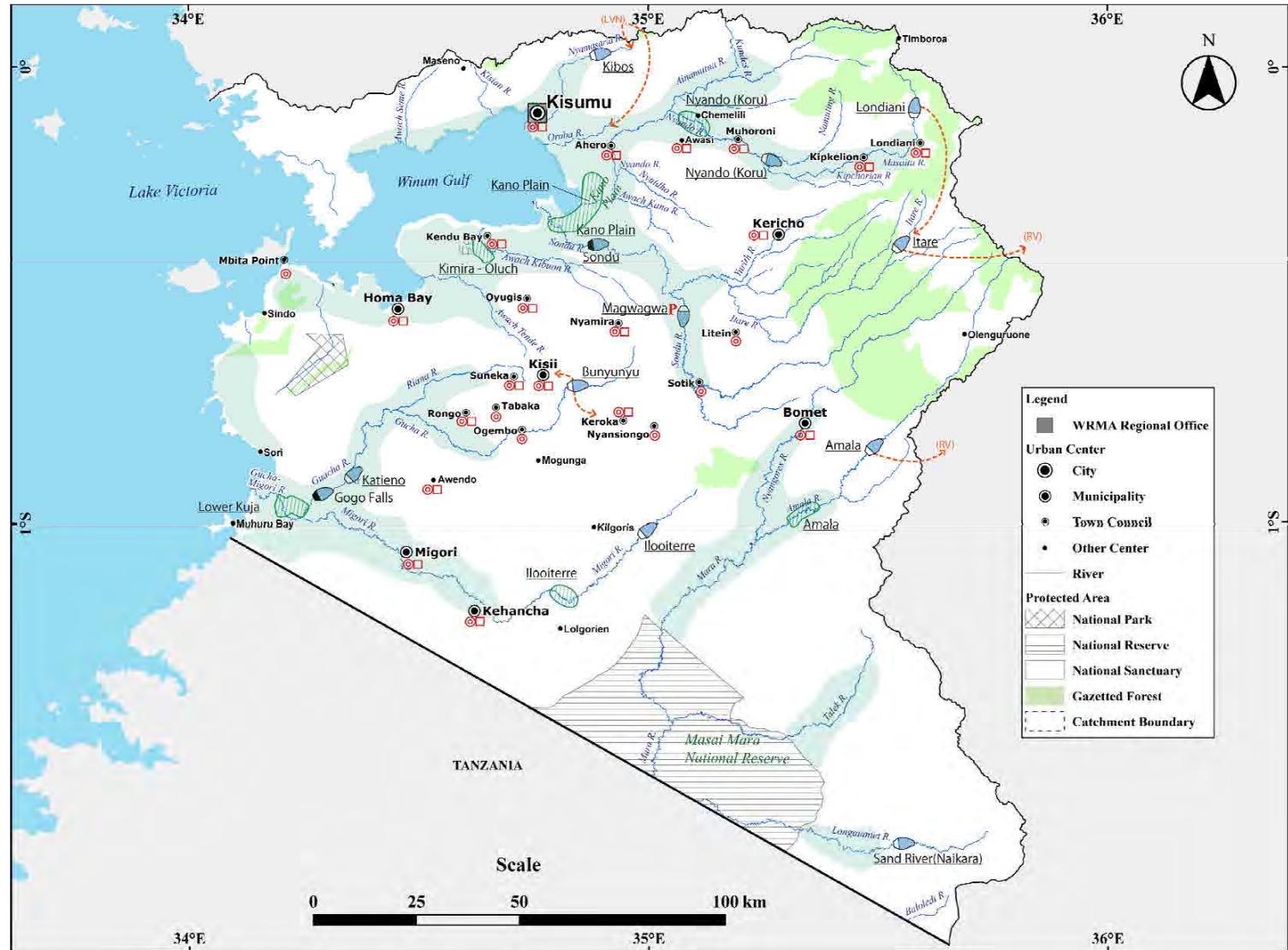
LEGEND OF PLANS

- ☐ Dam (Existing)
- ☐ Dam (Proposed)
- Water Transfer (Existing)
- Water Transfer (Proposed)
- ☐ Sub-regional Boundary



Proposed Development Plans

Water Supply Development Plan	
Urban Water Supply Development (25 Urban Centers)	
1) Rehabilitation (21 UC)	120,000 m ³ /day
2) Expansion (21 UC)	570,000 m ³ /day
3) New Construction (4 UC)	94,000 m ³ /day
4) Service Population	6.26 million
Rural Water Supply (14 Counties)	
1) Large Scale (14 Counties)	277,000 m ³ /day
2) Small Scale (14 Counties)	208,000 m ³ /day
3) Target Population	6.46 million
Sanitation Development Plan	
Sewerage Development (19 Urban Centers)	
1) Rehabilitation (3 UC)	22,000 m ³ /day
2) Expansion (3 UC)	171,000 m ³ /day
3) New Construction (16 UC)	291,000 m ³ /day
4) Service Population	6.02 million
On-site Sanitation (14 Counties)	
1) Installation of Proper On-site Sanitation Facilities by Individual or Communities	
2) Target Population	6.70 million
Irrigation Development Plan	
Large Scale Irrigation Area	
1) Large Scale Irrigation	75,572 ha (7 Projects)
2) Small Scale Irrigation	22,501 ha (12 Counties)
3) Private Sector Irrigation	15,133 ha (12 Counties)
Hydropower Development Plan	
Hydropower Development	
1) Magwagwa Multipurpose Dam Project	115 MW
Water Resources Development Plan	
1) Storage Dams: 10 nos. (1,000 MCM)	
2) Small Storage Dams and Pans: 3,880 nos. (194 MCM)	
3) Boreholes: 1,250 nos. (125 MCM/year)	
4) Inter-basin Transfer (from Itare and Londiani Dams to Nakuru): 41 MCM/year	
5) Inter-basin Transfer (from Amala Dam to Ewaso Ng'iro South River): 82 MCM/year	
6) Inter-basin Transfer (from Nandi Forest Dam (LVNCA)): 189 MCM/year	
LEGEND OF PLANS	
	Dam(Existing)
	Water Transfer (Existing)
	Irrigation Potential Area



Source: JICA Study Team

<p>THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>Figure 19.1.3 Proposed Development Plans for Lake Victoria South Catchment Area</p>
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Proposed Management Plans

Water Resources Management Plan

- 1) Monitoring Networks
 - ▲ Surface Water Monitoring Station 23 locations
 - Rainfall Monitoring Station 50 locations
 - Groundwater Monitoring Station 19 locations
 - ★ Reference Point 5 locations
- 2) Evaluation of Water Resources
- 3) Improvement of Water Permit Issue and Management System
- 4) Watershed Conservation (Forestation, Small Water Sources Conservation and Soil Erosion Control)

Flood and Drought Disaster Management Plan

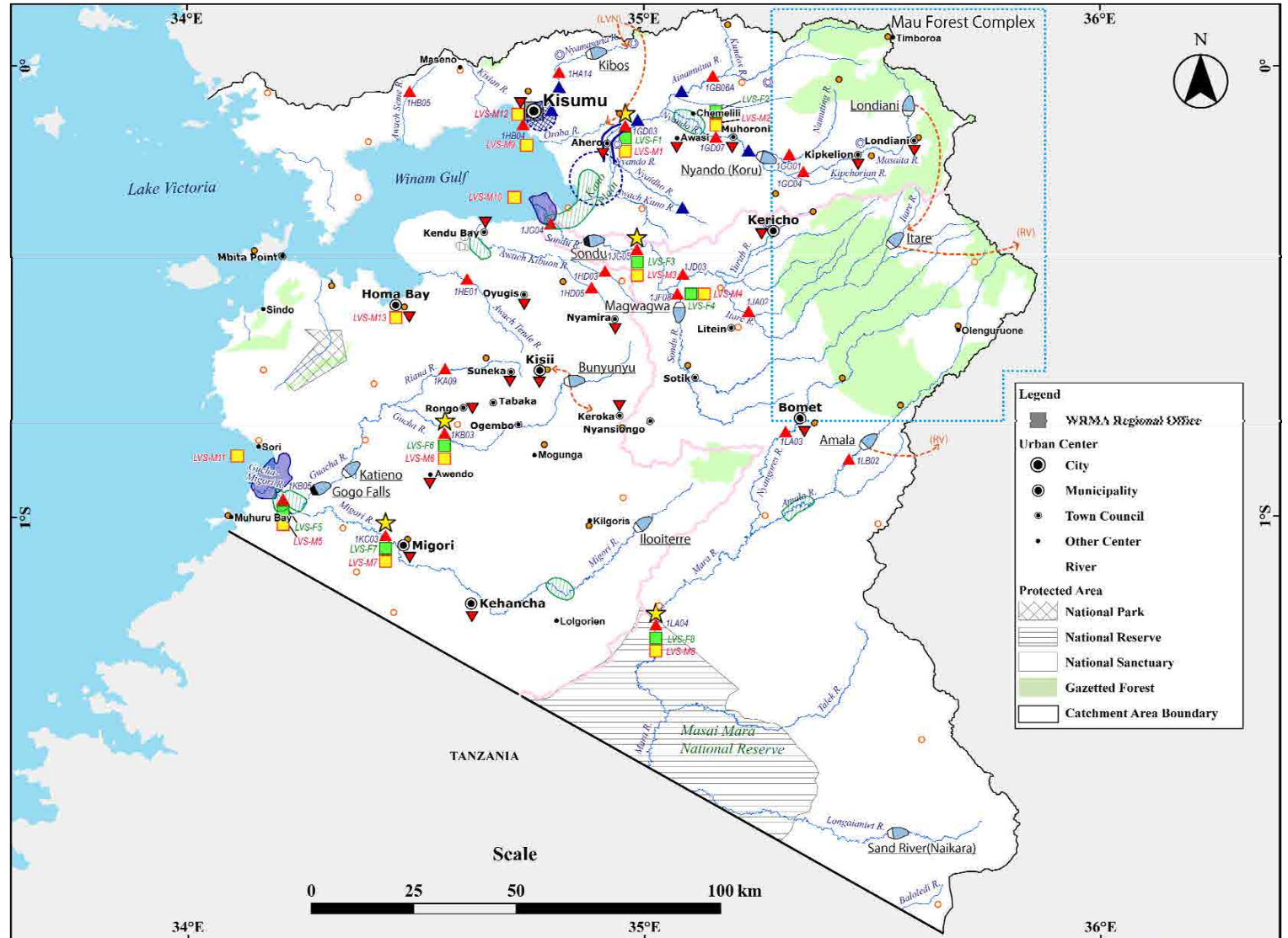
- 1) Flood Management
 - a) Kano Plain: flood control by dams, dikes and river improvement
 - b) Kano Plain: establishment of early flood forecasting and warning system
 - c) Nyando R.: preparation of flood fighting plan for dikes
 - d) Mouth areas of Sondu and Kuja Rivers : community-based disaster management
 - e) Kisumu City: provision of urban drainage measures
- 2) Drought Management
 - a) Establishment of Basin Drought Conciliation Councils
 - b) Early Drought Forecasting based on long-term rainfall prediction
 - c) Water Use Restriction Rule for Reservoirs (Existing 2 dams and proposed 10 dams)

Environmental Management Plan

- 1) Setting of Environmental Flow Rate 8 locations
- 2) Environmental Monitoring 13 locations

LEGEND OF PLANS

- ▬ Dam(Existing)
- ▬ Dam (Proposed)
- Water Transfer (Existing)
- Water Transfer (Proposed)
- ▭ Sub-regional Boundary



Legend

- WRMA Regional Office
- Urban Center
 - City
 - Municipality
 - Town Council
 - Other Center
- River
- Protected Area
 - ▨ National Park
 - ▨ National Reserve
 - ▨ National Sanctuary
 - ▨ Gazetted Forest
 - ▭ Catchment Area Boundary

THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 19.1.4
Proposed Management Plans for Lake Victoria South Catchment Area

Source: JICA Study Team

Proposed Development Plans

Water Supply Development Plan

- Urban Water Supply Development (13 Urban Centers)
 - 1) Rehabilitation (10 UC) 129,000 m³/day
 - 2) Expansion (10 UC) 254,000 m³/day
 - 3) New Construction (3 UC) 15,000 m³/day
 - 4) Service Population 3.34 million
- Rural Water Supply (18 Counties)
 - 1) Large Scale 178,000 m³/day
 - 2) Small Scale 120,000 m³/day
 - 3) Target Population 4.11 million

Sanitation Development Plan

- Sewerage Development (9 Urban Centers)
 - 1) Rehabilitation (3 UC) 18,000 m³/day
 - 2) Expansion (3 UC) 150,000 m³/day
 - 3) New Construction (6 UC) 72,000 m³/day
 - 4) Service Population 3.16 million
- On-site Sanitation (18 Counties)
 - 1) Installation of Proper On-site Sanitation Facilities by Individual or Communities
 - 2) Target Population 4.29 million

Irrigation Development Plan

- Large Scale Irrigation Area
 - 1) Large Scale Irrigation 78,850 ha (9 Projects)
 - 2) Small Scale Irrigation 9,271 ha (14 Counties)
 - 3) Private Sector Irrigation 4,045 ha (14 Counties)

Hydropower Development Plan

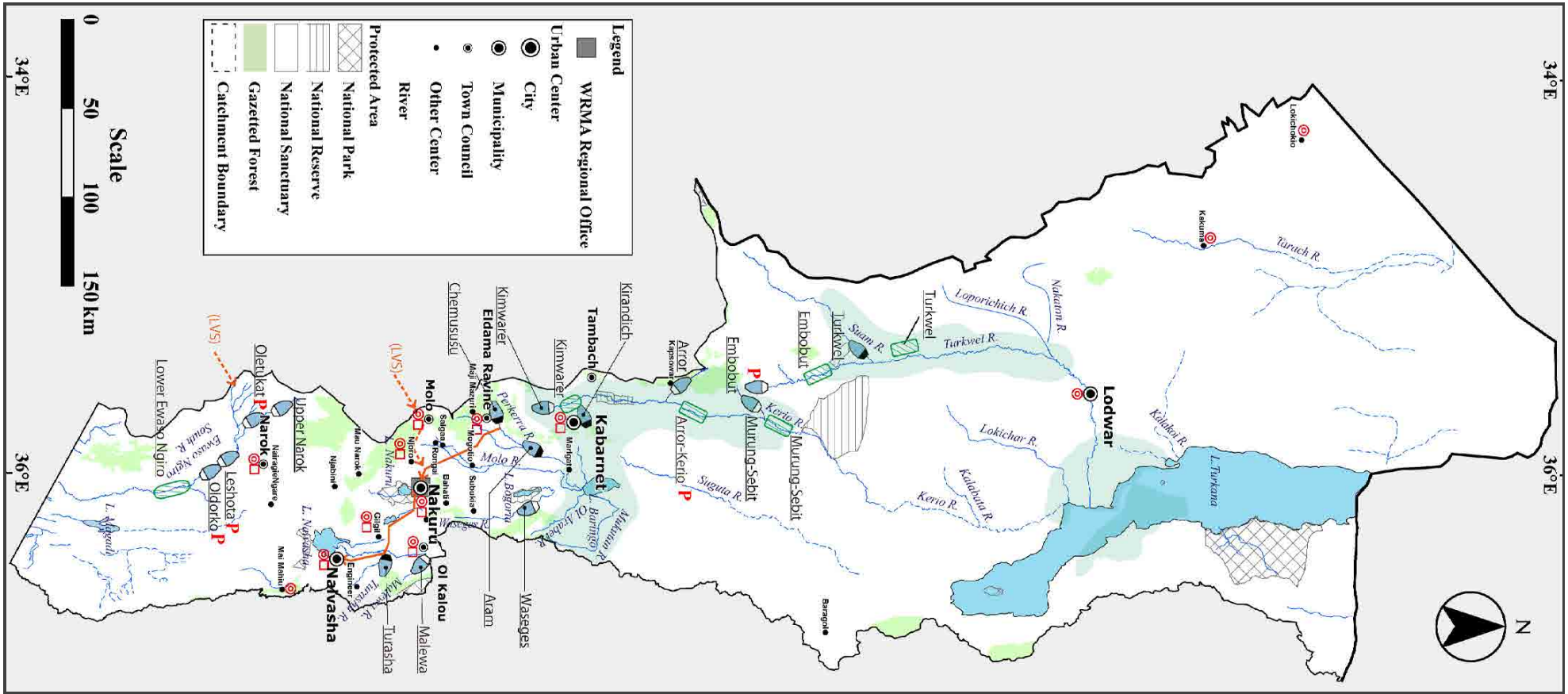
- Hydropower Development
 - 1) Arrot Multipurpose Dam Project 80 MW
 - 2) Embobut Multipurpose Dam Project 45 MW
 - 3) Kimwarer Multipurpose Dam Project 20 MW
 - 4) Oletukat Multipurpose Dam Project 36 MW
 - 5) Leshota Multipurpose Dam Project 54 MW
 - 6) Oldorko Multipurpose Dam Project 90 MW

Water Resources Development Plan

- 1) Storage Dams 10 nos. (659 MCM)
- 2) Small Storage Dams and Pans 3,640 nos. (182 MCM)
- 3) Boreholes: 160 nos. (16 MCM/year)
- 4) Inter-basin Transfer (from Itare and Londiani Dams to Nakuru) 41 MCM/year
- 5) Inter-basin Transfer (from Amala Dam to Ewaso Ng'iro South River) 82 MCM/year

LEGEND OF PLANS

- Irrigation Potential Area
- Water Transfer (Existing)
- Dam (Existing)



THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030
 JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 19.1.5
Proposed Development Plans for Rift Valley Catchment Area

Note: See a close-up view shown in Figure 19.1.13.
 Source: JICA Study Team

Proposed Management Plans

Water Resources Management Plan

- 1) Monitoring Networks
 - ▲▲ Surface Water Monitoring Station 23 locations
 - Rainfall Monitoring Station 47 locations
 - Groundwater Monitoring Station 10 locations
 - ★ Reference Point 4 locations
- 2) Evaluation of Water Resources
- 3) Improvement of Water Permit Issue and Management System
- 4) Watershed Conservation (Forestation and Small Water Sources Conservation)

Flood and Drought Disaster Management Plan

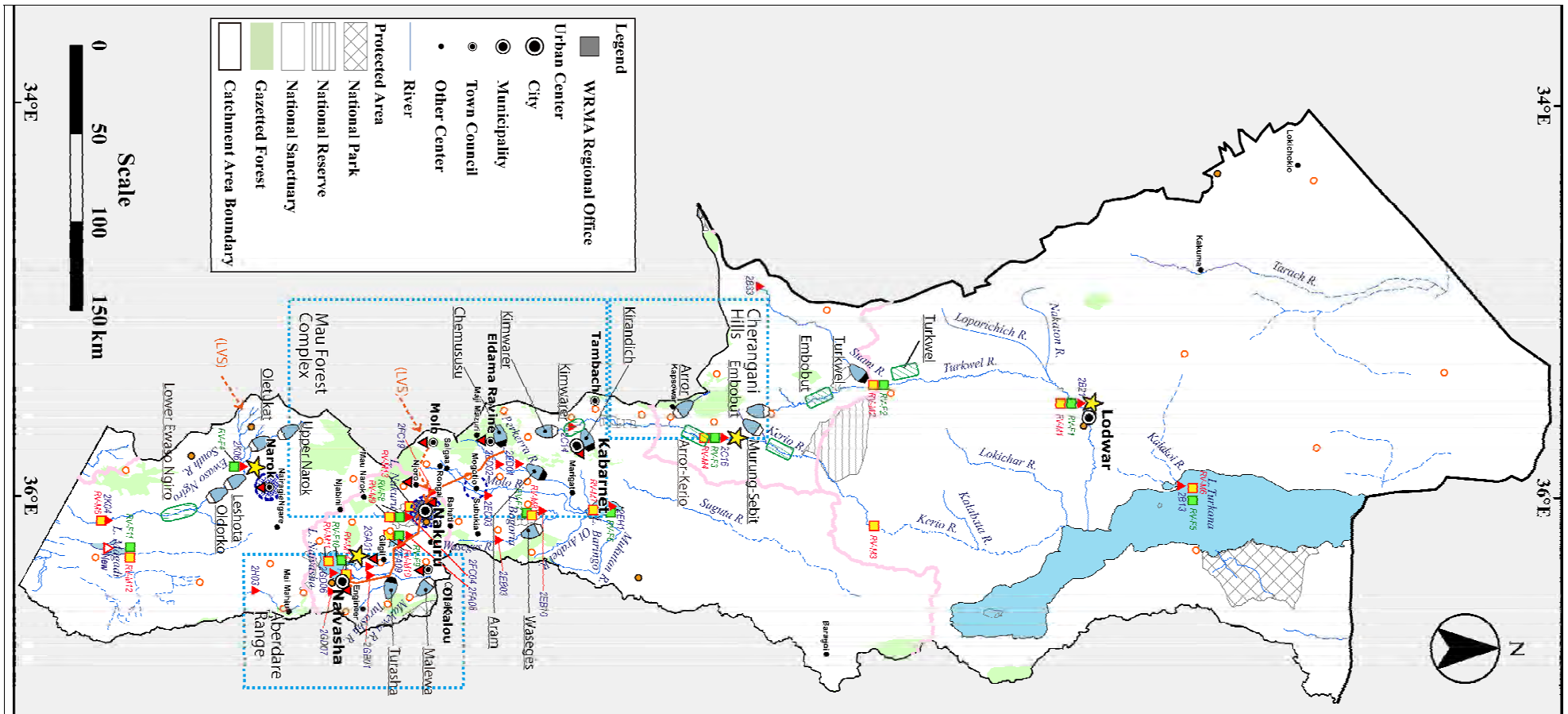
- 1) Flood Management
 - a) Narok: flood control by river improvement and dam, and preparation of flood hazard map and evacuation plan
 - b) Mogotio: flood control by river improvement and preparation of hazard map
 - c) Narok: provision of urban drainage measures
 - d) Nakuru: provision of urban drainage measures
- 2) Drought Management
 - a) Establishment of Basin Drought Conciliation Councils
 - b) Early Drought Forecasting based on long-term rainfall prediction
 - c) Water Use Restriction Rule for Reservoirs (Existing 5 dams and proposed 10 dams)

Environmental Management Plan

- 1) Setting of Environmental Flow Rate 12 locations
- 2) Environmental Monitoring 14 locations

LEGEND OF PLANS

- Dam (Existing)
- Dam (Proposed)
- Water Transfer (Existing)
- Water Transfer (Proposed)
- Sub-regional Boundary



EX - F - 70

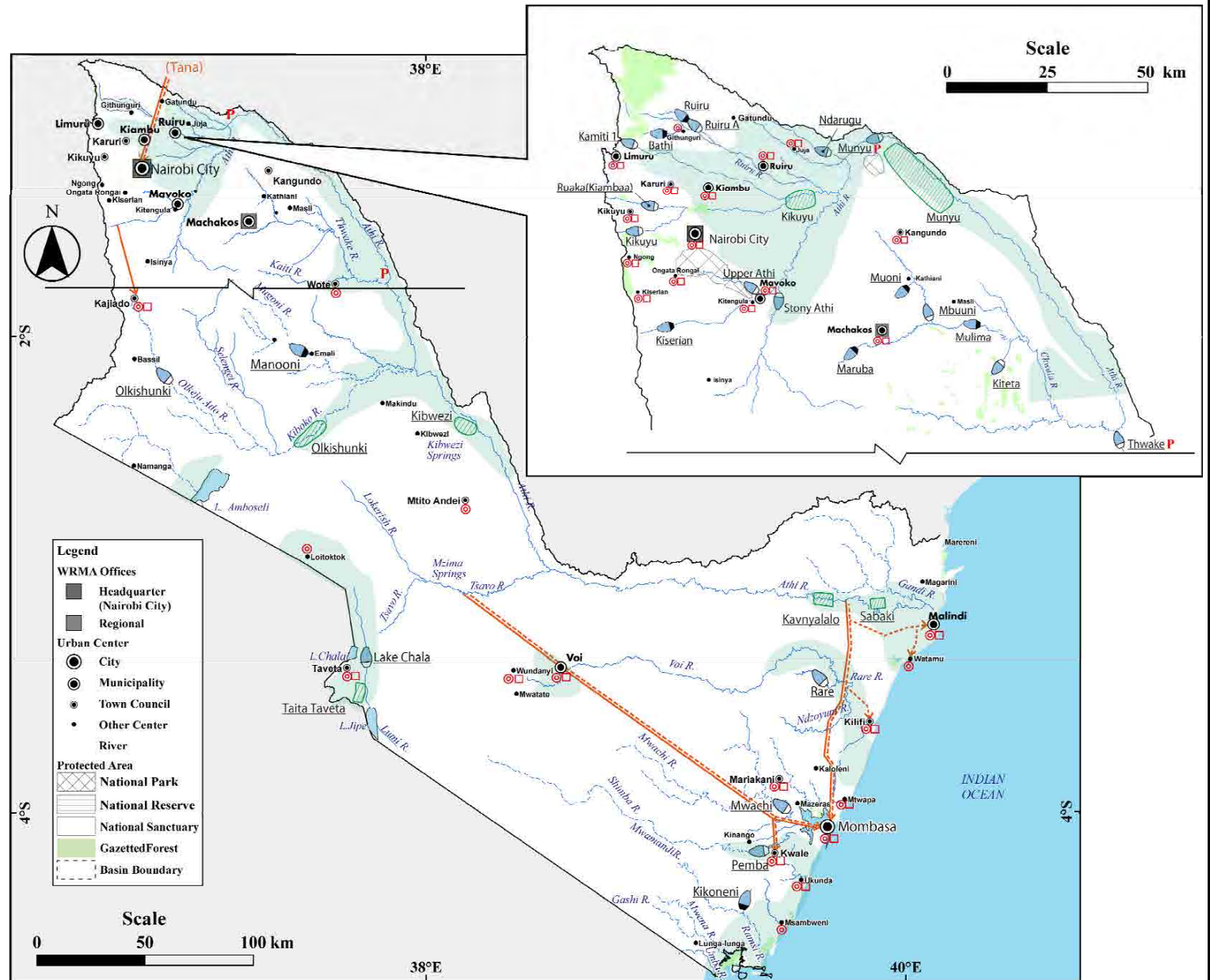
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THE NATIONAL WATER MASTER PLAN 2030
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 19.1.6
Proposed Management Plans for
Rift Valley Catchment Area

Note: See a close-up view shown in Figure 19.1.13
Source: JICA Study Team

Proposed Development Plans

Water Supply Development Plan	
Urban Water Supply Development (32 Urban Centers)	
1) Rehabilitation (30 UC)	699,000 m ³ /day
2) Expansion (29 UC)	1,542,000 m ³ /day
3) New Construction (2 UC)	19,000 m ³ /day
4) Service Population	17.01 million
Rural Water Supply (10 Counties)	
1) Large Scale	209,000 m ³ /day
2) Small Scale	110,000 m ³ /day
3) Target Population	4.04 million
Sanitation Development Plan	
Sewerage Development (25 Urban Centers)	
1) Rehabilitation (6 UC)	244,000 m ³ /day
2) Expansion (6 UC)	715,000 m ³ /day
3) New Construction (19 UC)	430,000 m ³ /day
4) Service Population	16.26 million
On-site Sanitation (10 Counties)	
1) Installation of Proper On-site Sanitation Facilities by Individual or Communities	
2) Target Population	4.28 million
Irrigation Development Plan	
Large Scale Irrigation Area	
1) Large Scale Irrigation	37,280 ha (4 Projects)
2) Small Scale Irrigation	6,484 ha (10 Counties)
3) Private Sector Irrigation	2,344 ha (10 Counties)
Hydropower Development Plan	
1) Muniyu Multipurpose Dam Project	40MW
2) Thwake Multipurpose Dam Project	20MW
Water Resources Development Plan	
1) Storage Dams	
1) Storage Dams	16 nos. (1,689 MCM)
2) Small Storage Dams and Pans	1,880 nos. (94 MCM)
3) Boreholes	350 nos. (35 MCM/year)
4) Inter-basin Transfer (from Tana CA to Nairobi, Ext.)	168 MCM/year
5) Intra-basin Transfer (from Mzima Spring to Mombasa/Kwale/Ukunda, Ext.)	37 MCM/year
6) Intra-basin Transfer (from Athi R. to Mombasa/Malindi/Kilifi/Mtwapa, Ext.)	31 MCM/year
7) Desalination for Mombasa	93 MCM/year
LEGEND OF PLANS	
	Dam(Existing)
	Water Transfer (Existing)
	Irrigation Potential Area



THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 19.1.7
Proposed Development Plans for
Athi Catchment Area

Source: JICA Study Team

Proposed Management Plans

Water Resources Management Plan

- 1) Monitoring Networks
 - ▲▲ Surface Water Monitoring Station 26 locations
 - Rainfall Monitoring Station 38 locations
 - ▼▲ Groundwater Monitoring Station 24 locations
 - ★ Reference Point 2 locations
- 2) Evaluation of Water Resources
- 3) Improvement of Water Permit Issue and Management System
- 4) Watershed Conservation (Forestation and Small Water Sources Conservation)

Flood and Drought Disaster Management Plan

- 1) Flood Management
 - a) Kilifi (Downmost Athi): community-based disaster management
 - b) Taveta (Lumi Rivermouth): community-based disaster management
 - c) Kwale (Vanga): flood control by river training and preparation of hazard map
 - d) Nairobi: provision of urban drainage measures
 - e) Mombasa: provision of urban drainage measures
- 2) Drought Management
 - a) Establishment of Basin Drought Conciliation Councils
 - b) Early Drought Forecasting based on long-term rainfall prediction
 - c) Water Use Restriction Rule for Reservoirs (Existing 8 dams and proposed 16 dams)

Environmental Management Plan

- 1) Setting of Environmental Flow Rate 5 locations
- 2) Environmental Monitoring 10 locations

LEGEND OF PLANS

- Dam (Existing)
- Dam (Proposed)
- Water Transfer (Existing)
- Water Transfer (Proposed)
- Sub-regional Boundary

Legend

WRMA Offices

- Headquarter (Nairobi City)
- Regional

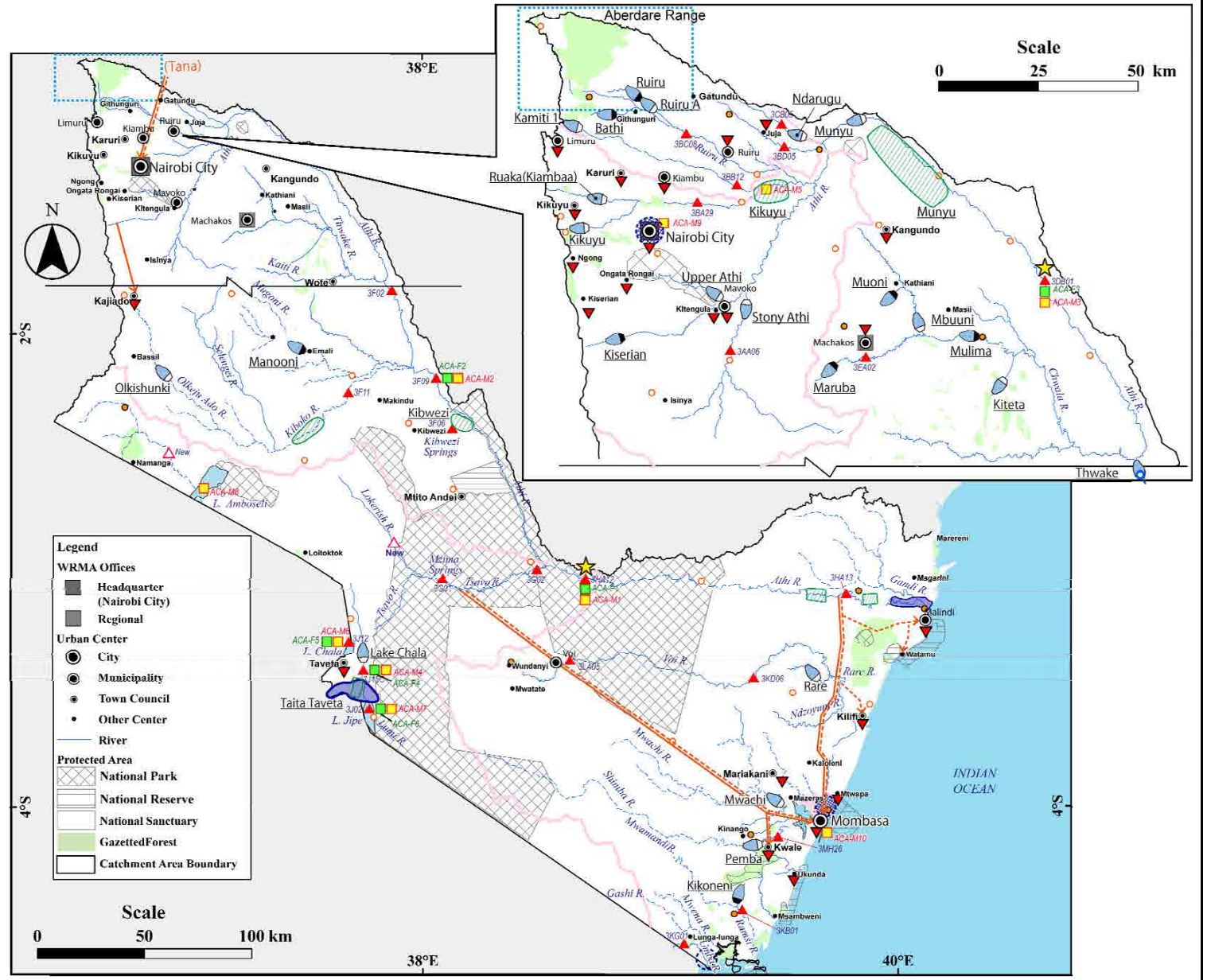
Urban Center

- City
- Municipality
- Town Council
- Other Center

River

Protected Area

- ▨ National Park
- ▨ National Reserve
- ▨ National Sanctuary
- ▨ Gazetted Forest
- ▨ Catchment Area Boundary



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JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 19.1.8
Proposed Management Plans for Athi Catchment Area

Source: JICA Study Team

Proposed Development Plans

Water Supply Development Plan

- Urban Water Supply Development (23 Urban Centers)
 - 1) Rehabilitation (15 UC) 106,000 m³/day
 - 2) Expansion (14 UC) 349,000 m³/day
 - 3) New Construction (8 UC) 88,000 m³/day
 - 4) Service Population 4.90 million
- Rural Water Supply (16 Counties)
 - 1) Large Scale 211,000 m³/day
 - 2) Small Scale 145,000 m³/day
 - 3) Target Population 4.96 million

Sanitation Development Plan

- Sewerage Development (18 Urban Centers)
 - 1) Rehabilitation (6 UC) 32,000 m³/day
 - 2) Expansion (6 UC) 118,000 m³/day
 - 3) New Construction (12 UC) 248,000 m³/day
 - 4) Service Population 5.24 million
- On-site Sanitation (16 Counties)
 - 1) Installation of Proper On-site Sanitation Facilities by Individual or Communities
 - 2) Target Population 6.13 million

Irrigation Development Plan

- Large Scale Irrigation Area
 - 1) Large Scale Irrigation 135,961 ha (4 Projects)
 - 2) Small Scale Irrigation 15,784 ha (15 Counties)
 - 3) Private Sector Irrigation 10,054 ha (15 Counties)

Hydropower Development Plan

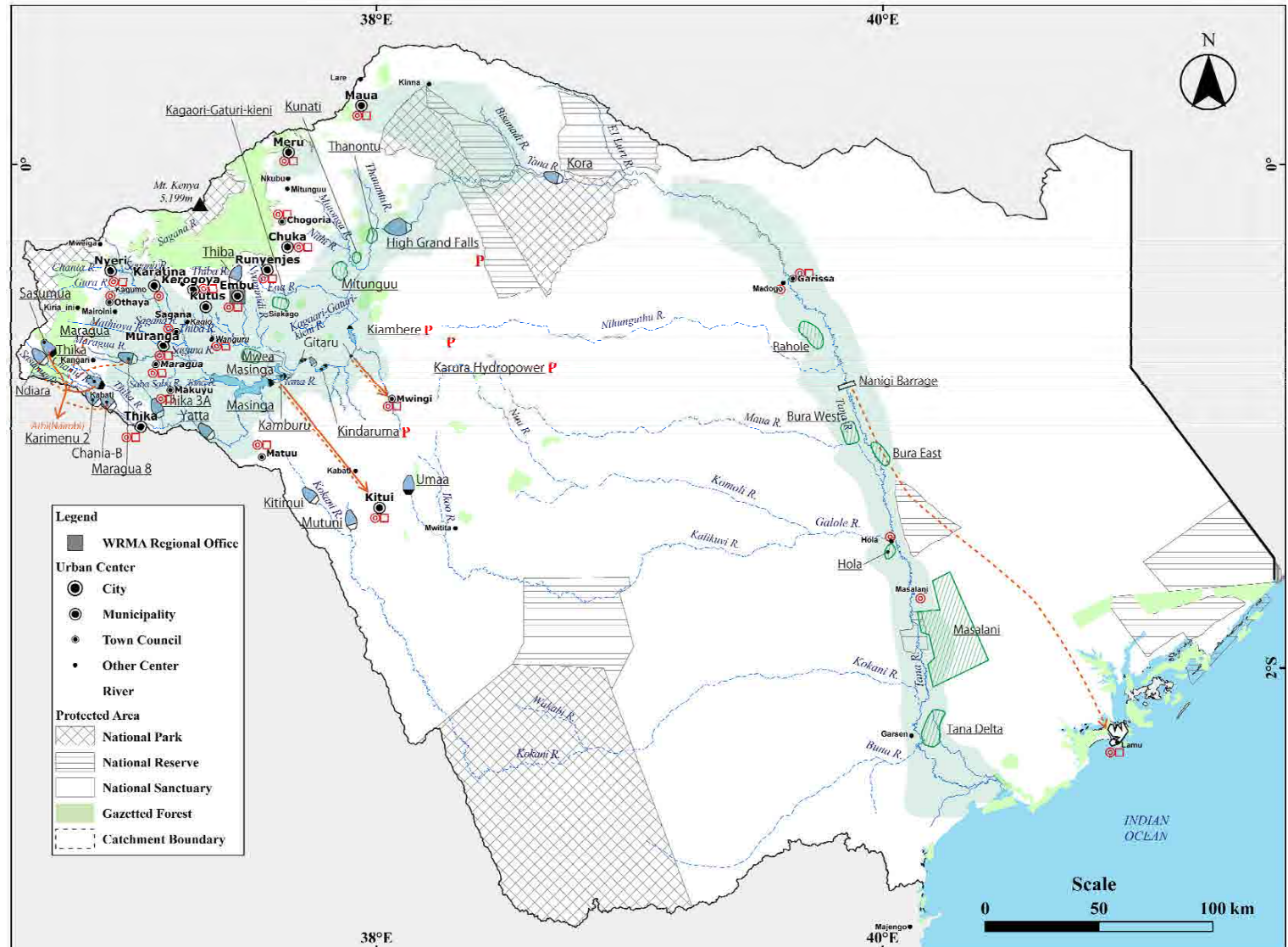
- Hydropower Development
 - 1) Kindaruma Hydropower Upgrade 0+32 MW
 - 2) High Grand Falls Stage 1: 500 MW
 - Multipurpose Dam Stage 2: +200 MW Project
 - 3) Karura Hydropower Project 090 MW

Water Resources Development Plan

- 1) Storage Dams 11 nos. (5,729 MCM)
- 2) Small Storage Dams and Pans 3,020 nos. (151 MCM)
- 3) Boreholes: 1,440 nos. (144 MCM/year)
- 4) Inter-basin Transfer 168 MCM/year (from Tana CA to Nairobi, Ext.)
- 5) Intra-basin Transfer 23 MCM/year (from Masinga Dam to Kitui, Ext.)
- 6) Intra-basin Transfer 2 MCM/year (from Kiambere Dam to Mwingi, Ext.)
- 7) Intra-basin Transfer 69 MCM/year (from Tana R. to Lamu)

LEGEND OF PLANS

- Dam(Existing)
- Water Transfer (Existing)
- Irrigation Potential Area



Note: See a close-up view shown in Figure 19.1.14.
Source: JICA Study Team

Proposed Management Plans

Water Resources Management Plan

- 1) Monitoring Networks
 - ▲▲ Surface Water Monitoring Station 26 locations
 - Rainfall Monitoring Station 47 locations
 - Groundwater Monitoring Station 18 locations
 - ★ Reference Point 3 locations
- 2) Evaluation of Water Resources
- 3) Improvement of Water Permit Issue and Management System
- 4) Watershed Conservation (Forestation and Soil Erosion Control)

Flood and Drought Disaster Management Plan

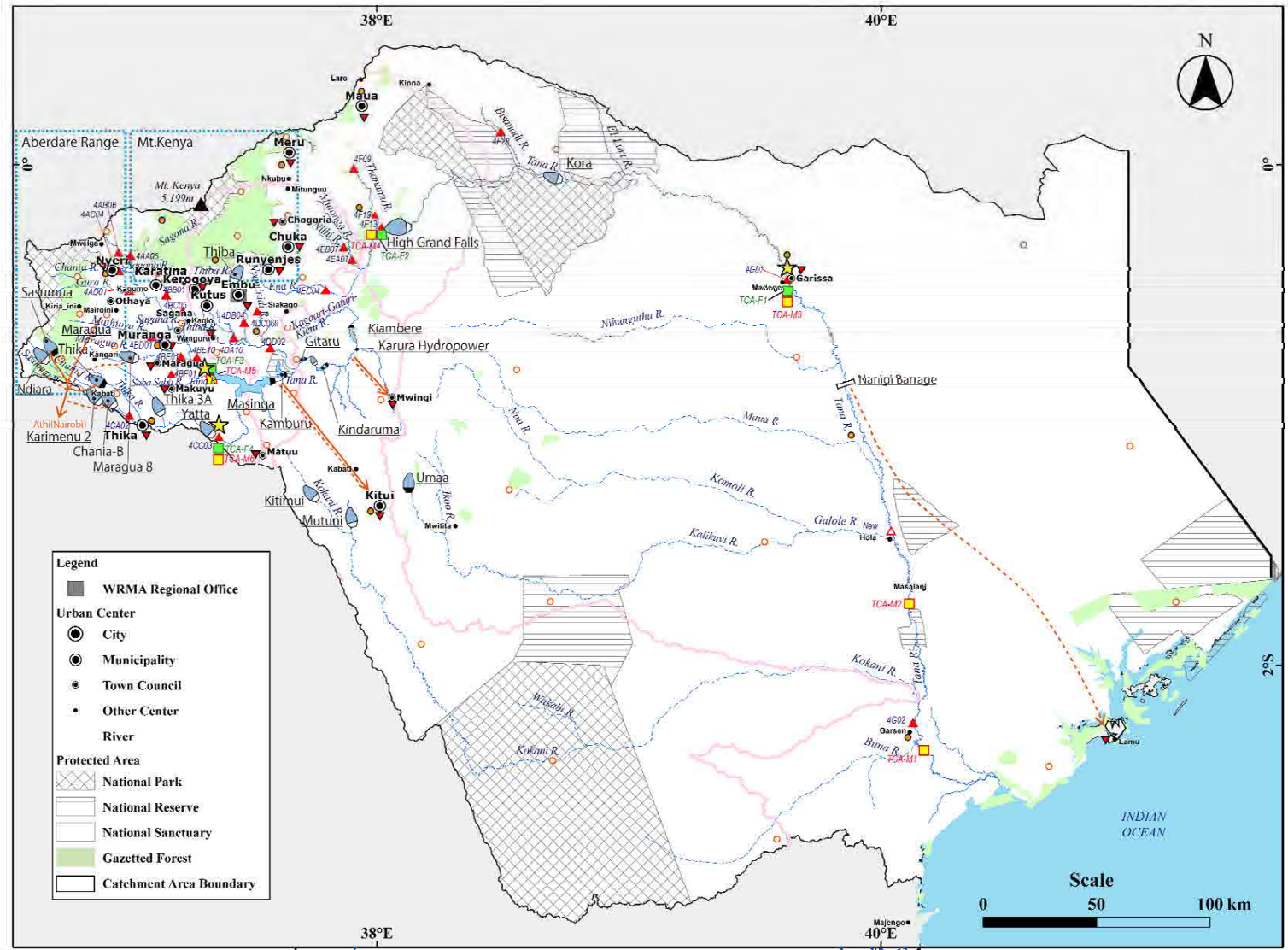
- 1) Flood Management
 - a) Garissa: flood control by river structure and dam, and preparation of flood hazard map and evacuation plan
 - b) Lower Tana: community-based disaster management
 - c) Kiambere Dam: Improvement of discharge warning system
- 2) Drought Management
 - a) Establishment of Basin Drought Conciliation Councils
 - b) Early Drought Forecasting based on long-term rainfall prediction
 - c) Water Use Restriction Rule for Reservoirs (Existing 8 dams and proposed 11 dams)

Environmental Management Plan

- 1) Setting of Environmental Flow Rate 4 locations
- 2) Environmental Monitoring 6 locations

LEGEND OF PLANS

- Dam (Existing)
- Dam (Proposed)
- Water Transfer (Existing)
- Water Transfer (Proposed)
- Sub-regional Boundary



Note: See a close-up view shown in Figure 19.1.14
Source: JICA Study Team

<p>THE DEVELOPMENT OF THE NATIONAL WATER MASTER PLAN 2030</p>	<p>Figure 19.1.10 Proposed Management Plans for Tana Catchment Area</p>
<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	

Proposed Development Plans

Water Supply Development Plan

- Urban Water Supply Development (12 Urban Centers)
 - 1) Rehabilitation (6 UC) 32,000 m³/day
 - 2) Expansion (6 UC) 61,000 m³/day
 - 3) New Construction (6 UC) 31,000 m³/day
 - 4) Service Population 1.04 million
- Rural Water Supply (14 Counties)
 - 1) Large Scale 119,000 m³/day
 - 2) Small Scale 101,000 m³/day
 - 3) Target Population 3.36 million

Sanitation Development Plan

- Sewerage Development (5 Urban Centers)
 - 1) Rehabilitation (2 UC) 5,000 m³/day
 - 2) Expansion (2 UC) 27,000 m³/day
 - 3) New Construction (3 UC) 30,000 m³/day
 - 4) Service Population 0.82 million
- On-site Sanitation (14 Counties)
 - 1) Installation of Proper On-site Sanitation Facilities by Individual or Communities
 - 2) Target Population 3.58 million

Irrigation Development Plan

- Large Scale Irrigation Area
 - 1) Large Scale Irrigation 26,202 ha (3 Projects)
 - 2) Small Scale Irrigation 8,116 ha (10 Counties)
 - 3) Private Sector Irrigation 7,165 ha (10 Counties)

Hydropower Development Plan

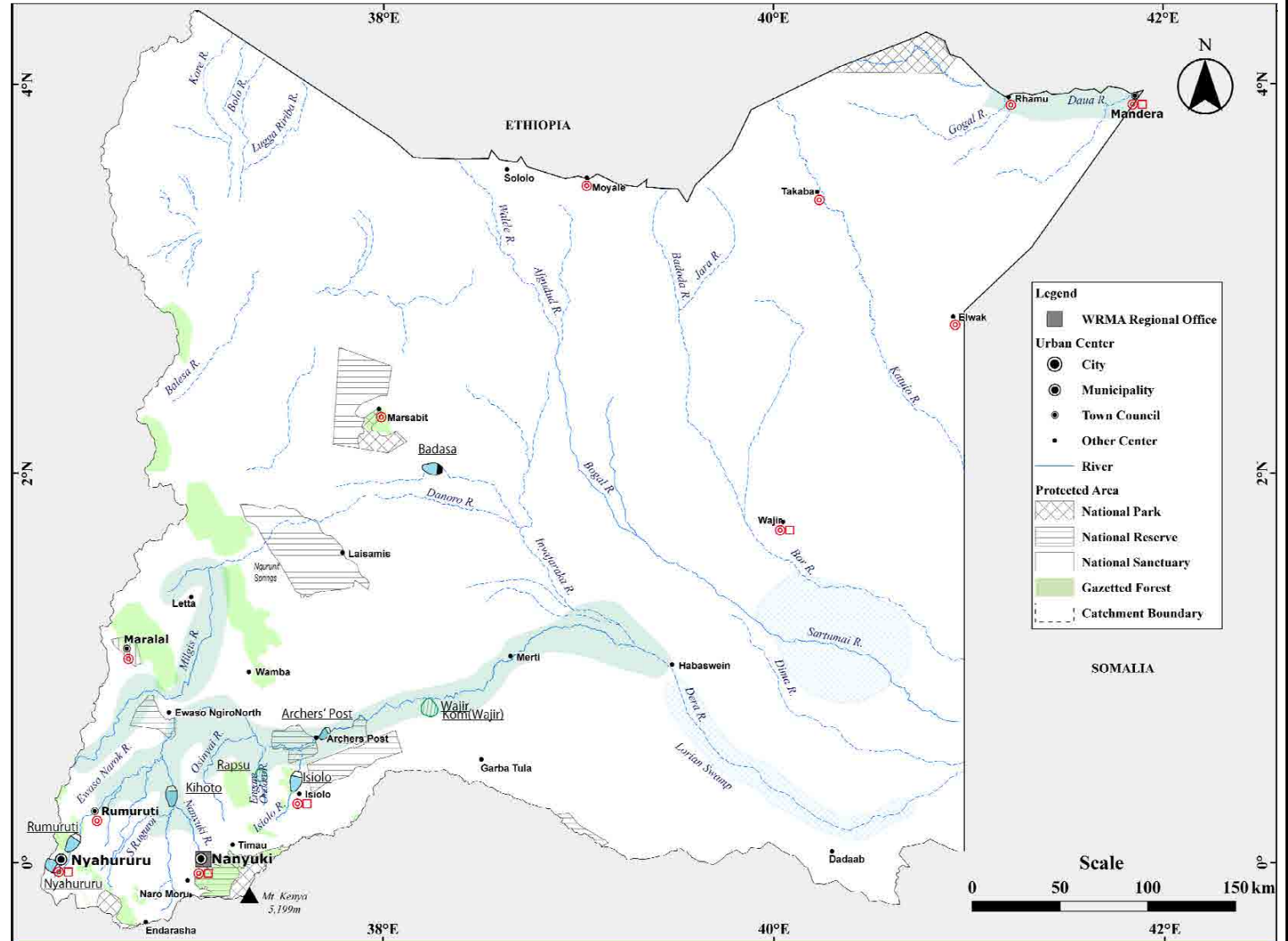
(No Plan)

Water Resources Development Plan

- 1) Storage Dams 5 nos. (522 MCM)
- 2) Small Storage Dams and Pans 1,820 nos. (91 MCM)
- 3) Boreholes: 1,560 nos. (156 MCM/year)

LEGEND OF PLANS

- Dam(Existing)
- Water Transfer (Existing)
- Irrigation Potential Area



**THE DEVELOPMENT OF
THE NATIONAL WATER MASTER PLAN 2030**

JAPAN INTERNATIONAL COOPERATION AGENCY

**Figure 19.1.11
Proposed Development Plans for
Ewaso Ng'iro North Catchment Area**

Source: JICA Study Team

Proposed Management Plans

Water Resources Management Plan

- 1) Monitoring Networks
 - ▲▲ Surface Water Monitoring Station 13 locations
 - Rainfall Monitoring Station 34 locations
 - Groundwater Monitoring Station 5 locations
 - ★ Reference Point 1 location
- 2) Evaluation of Water Resources
- 3) Improvement of Water Permit Issue and Management System
- 4) Watershed Conservation (Forestation, Small Water Sources Conservation and Soil Erosion Control)

Flood and Drought Disaster Management Plan

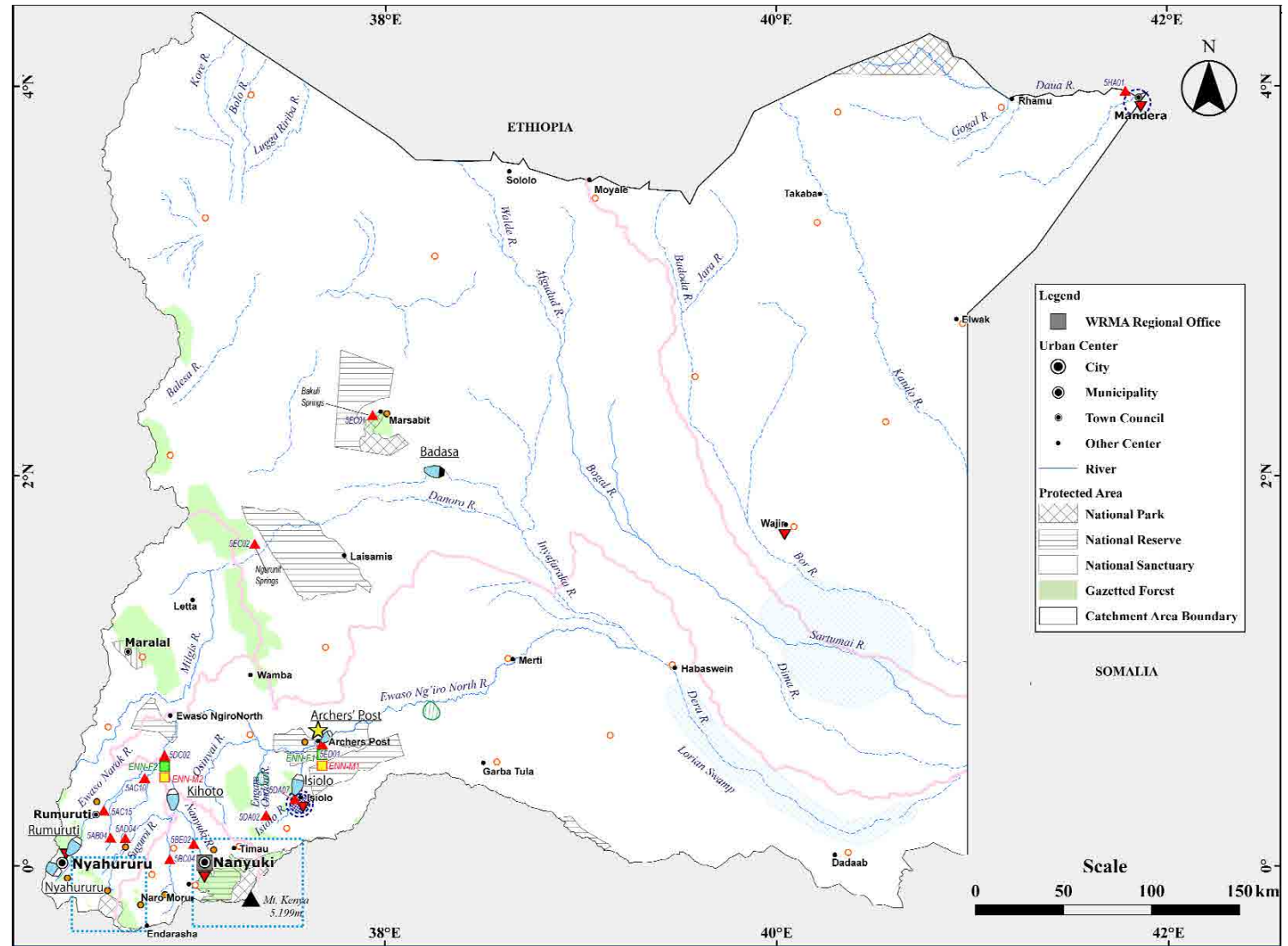
- 1) Flood Management
 - a) Mandera: flood control by river structures, and preparation of flood hazard map and evacuation plan
 - b) Isiolo: flood control by river structures and preparation of flood hazard map
 - c) Isiolo: provision of urban drainage measures
- 2) Drought Management
 - a) Establishment of Basin Drought Conciliation Councils
 - b) Early Drought Forecasting based on long-term rainfall prediction
 - c) Water Use Restriction Rule for Reservoirs (Existing 1 dam and proposed 5 dams)

Environmental Management Plan

- 1) Setting of Environmental Flow Rate 2 locations
- 2) Environmental Monitoring 2 locations

LEGEND OF PLANS

- Dam(Existing)
- Dam (Proposed)
- Water Transfer (Existing)
- Water Transfer (Proposed)
- Sub-regional Boundary

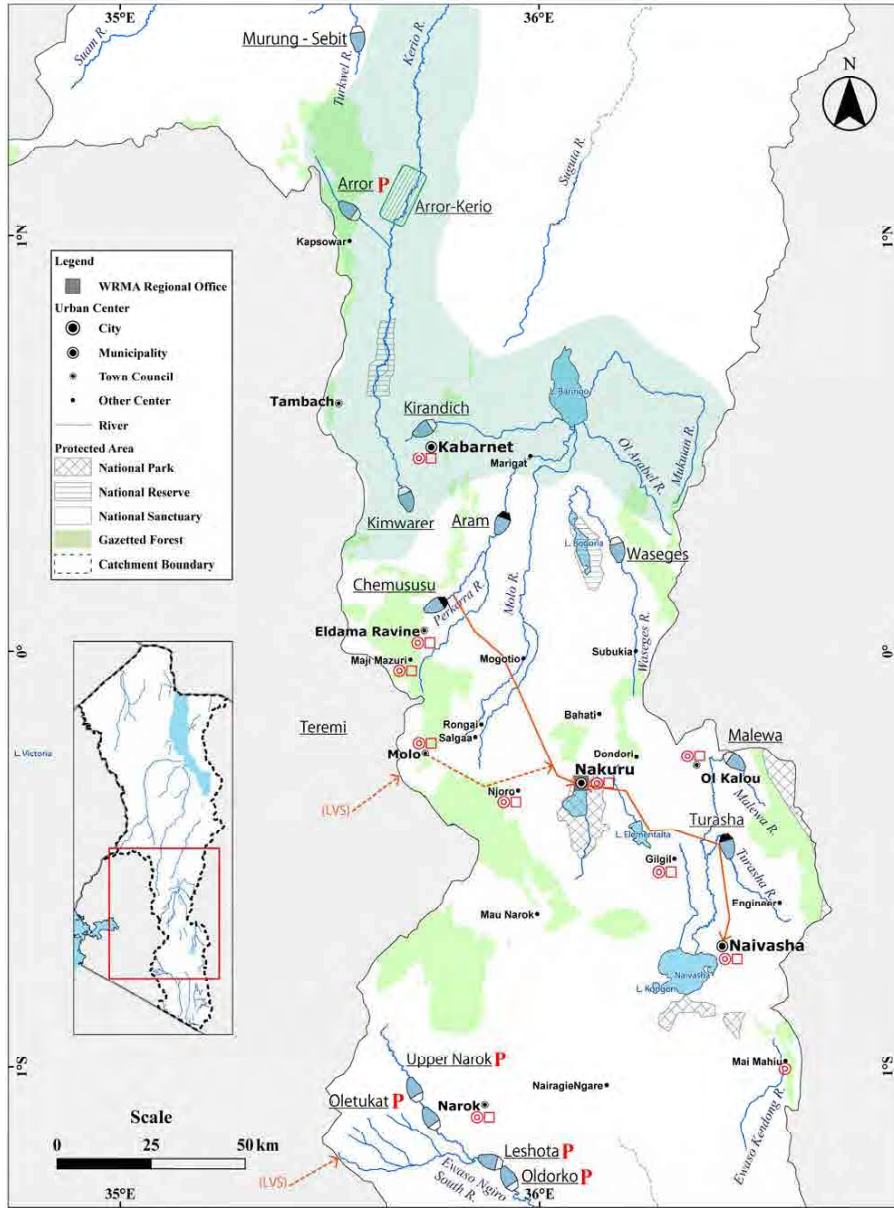


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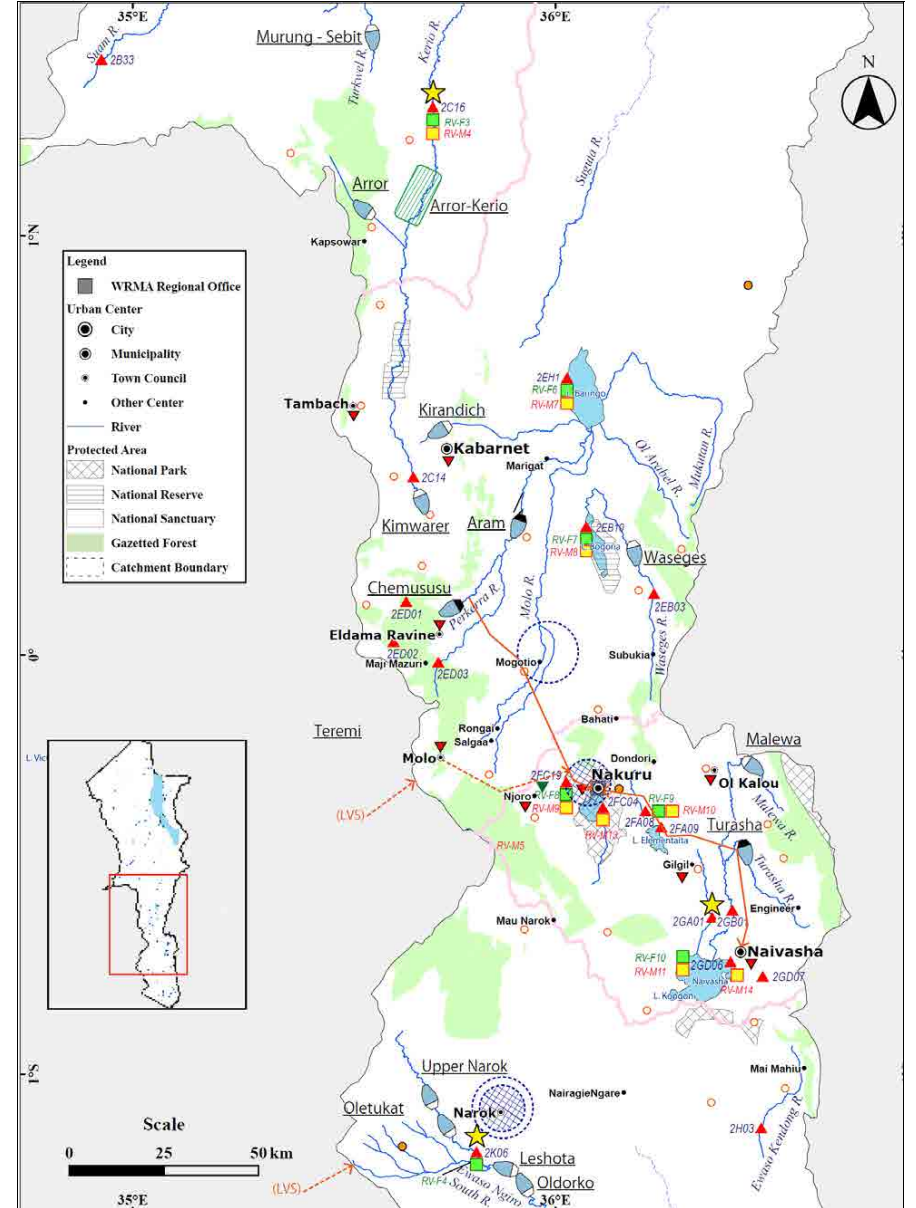
**Figure 19.1.12
Proposed Management Plans for
Ewaso Ng'iro North Catchment Area**

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Development Plans



Management Plans

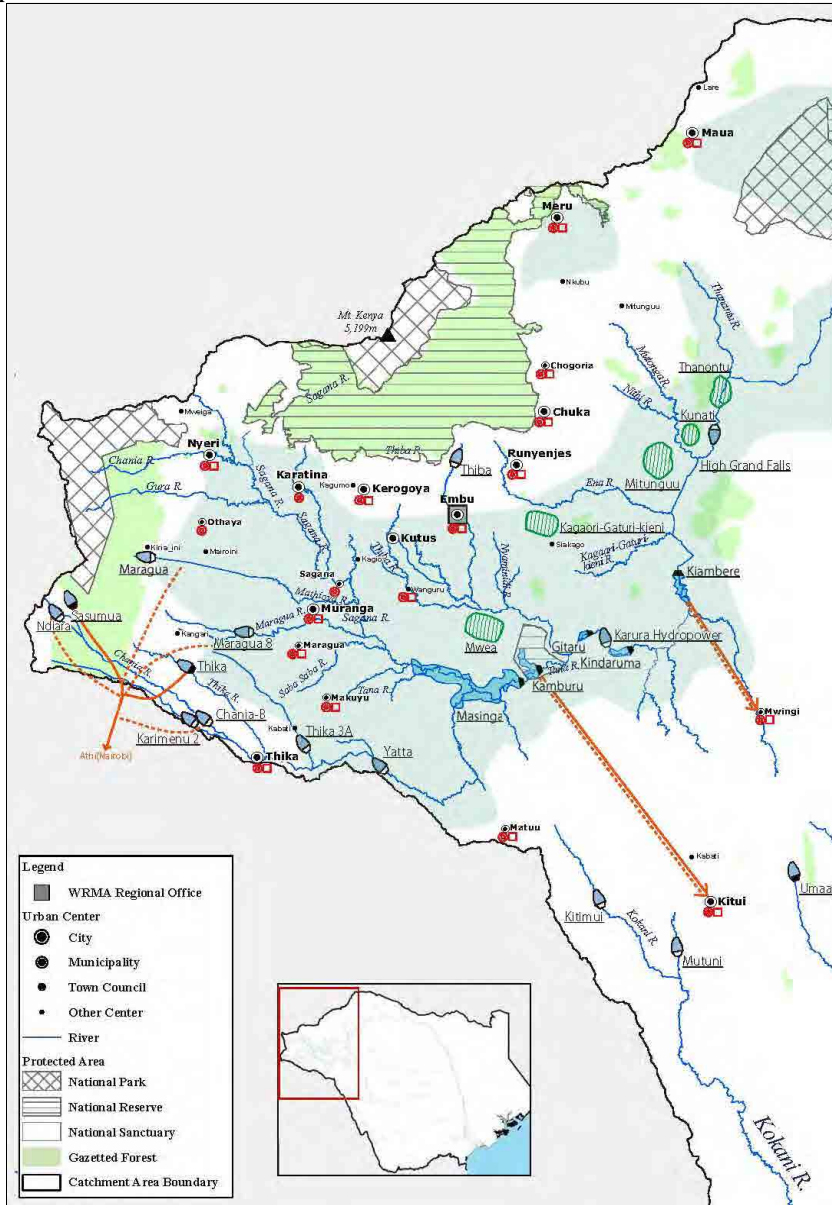


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JAPAN INTERNATIONAL COOPERATION AGENCY

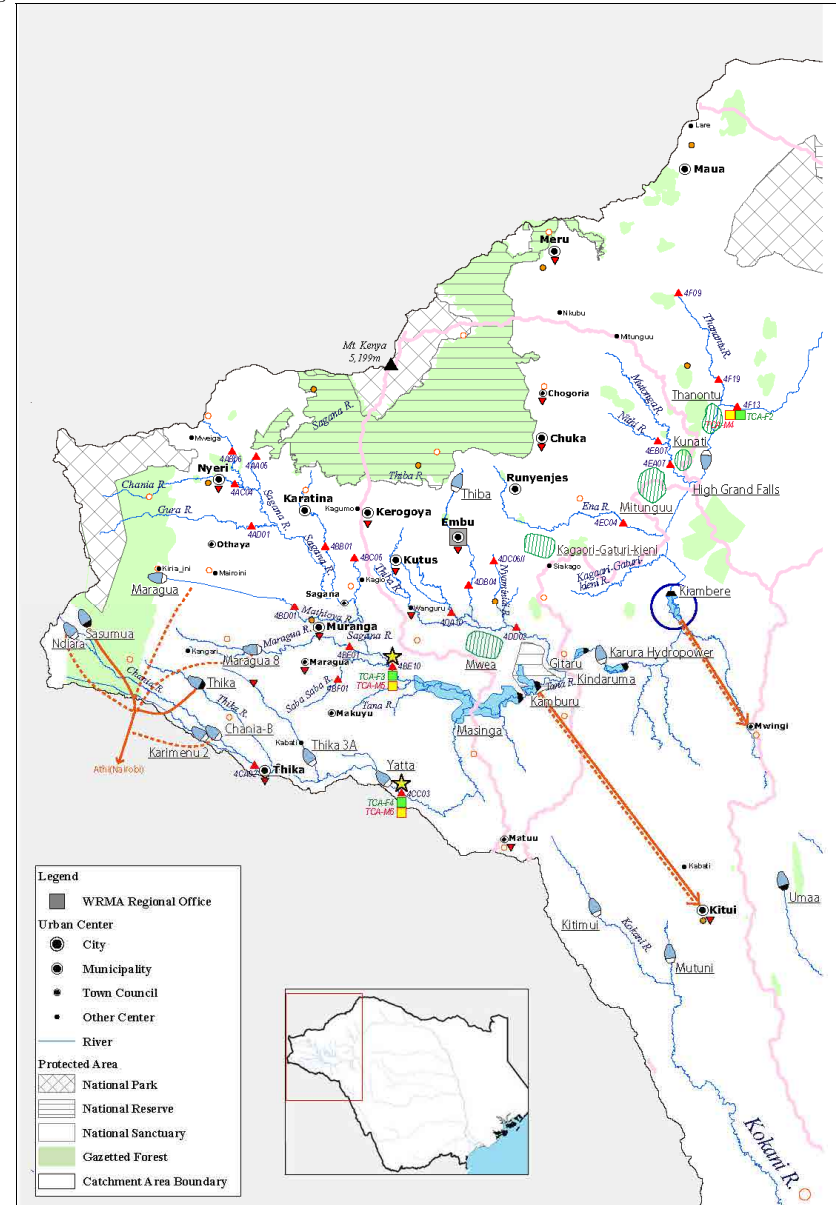
Figure 19.1.13
Close-up View of Proposed Plans for
Central-Southern Part of Rift Valley Catchment Area

Source: JICA Study Team

Development Plans



Management Plans



EX - F - 78

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Figure 19.1.14
 Close-up View of Proposed Plans for Western Part of Tana Catchment Area

Source: JICA Study Team