

Situational Analysis and Resource Mapping

Consultancy Report

For

Rural Transport Services Project

Presented to

Kenya Network for Draught Animal Technology (KENDAT)

By

Dr. Legesse Kenneni



August 2002

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Abbreviations and Acronyms

DO	District Officer
GOK	Government of Kenya
IMTs	Intermediate Means of Transport Services
ITDG	Intermediate Technology Development Group
KARI	Kenya Agricultural Research Institute
KENDAT	Kenya Network for Draught Animal Technology
KIE	Kenya Institute of Education
KPCU	Kenya Planters Cooperative Union
KWS	Kenya Wildlife Services
NGO	Non-Governmental Organization
NIB	National Irrigation Board
RTS	Rural Transport Services
RTSP	Rural Transport Services Project
YP	Youth Polytechnic
ICIPE	International Centre for Insects Physiology and Ecology
KETRI	Kenya Trypanosomiasis Research Institute
SARDEP	Semi-Arid Rural Development Programme

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SITUATIONAL ANALYSIS AND RESOURCES MAPPING FOR PROJECT AREAS.

Introduction:

Currently, Kenya Network for Draught Animal Technology (KENDAT) is undertaking Rural Transport Services Project (RTSP) in rural and Peri-Urban Kenya. Within the main research framework and objectives, the main purpose of the situational analysis and resources mapping for study areas is to avail the background information and facilities relevant to rural transport services, respectively.

It is acknowledged that the availability of such information can ease, facilitate and be used as guiding tools in the RTSP research work. Accordingly, background information for major variables were compiled, different types of resources were surveyed and mapped for all study areas.

Methodology:

To map different types of resources in the study sites for Rural Transport Services Research, about 650 sample sites were used, for Mwea, Kalama, Magadi, Township/Matayos and Lari Divisions. The sample sites were recorded across major roads and routes in all locations and sublocations of the divisions.

For each sample site, data was collected for different variables like Altitude, Longitude, Latitude, Road network, Educational facilities, Health facilities, Market centers, Water supply, Energy supply systems, Communication networks, Administration centres, Forms of transportation, Land use systems and for other development facilities.

For three-dimensional geographic positioning of the sample sites, Global Positioning System Receiver was used. For recording other resource variables KENDAT field staff, local informants, Government officers, Public records and Researchers' own observations were used. For structuring and analysing the field data and converting the data into digital information, computer packages Arcinfo and Acrview were applied.

Accordingly, resource maps for the following variables were generated for all study sites:

- ◆ Locations
- ◆ Settlement Patterns
- ◆ Water Resources
- ◆ Energy Supply
- ◆ Agro-ecological Zones
- ◆ Road network & market centres
- ◆ Communication Systems
- ◆ Transport Systems
- ◆ Education Facilities
- ◆ Health Facilities and
- ◆ Administrative Centres

PART I

SITUATIONAL ANALYSIS AND RESOURCE MAPS

FOR

LARI DIVISION

SITUATIONAL ANALYSIS OF LARI DIVISION

Location and area:

Lari division is located in the northern part of Kiambu district, Central province. The division covers a total land area of 564.7km². According to the population projection of 2001, the divisions population density was 219 persons per km². (Fig.1.)

Topography:

Lari division covers the upper highland topographic feature of Kiambu district which is an extension of the Aberdare Ranges which lies above an altitude of 1800m above sea level. The division is dominated by highly dissected ranges with wet and steep upper parts. The steepness of Lari division is the major obstacle to road construction. Altitude is the single most important factor which influences the climate of the division.

Climate:

Rainfall is bimodal and is influenced by altitude. The long rains occur from April to May and the short rains from October to November. Temperature is also determined by altitude, with average temperature ranging from 20.1⁰C to 34⁰C.

Geological formation:

The division has two types of soils, highland soils developed from volcanic rocks, which are deep, dark, reddish and silty clay loams and soils on volcanic footridges which are well drained, deep, grey/red to dark brown friable clays. The highland soils are under forest or such crops as cabbages, carrots, potatoes and kales. The soils on volcanic footridges cover mainly crops like coffee, tea, pyrethrum and maize.

Population size:

Population distribution in Lari division is not even. It is sparsely populated and the pattern is on individual household form. According to population projection 2001 Lari division had a total population of 123,391 at the density of 219 persons per km². Market centres and towns attract people because they offer better job opportunity. (Fig. 2.).

Water resources:

The main water supply systems in the division are surface and sub-surface water sources. The surface water comprises many permanent rivers and springs all fairly well distributed all over the division. There are also boreholes sunk in the division. Generally, water is within easy access in most parts of the division. About 50% of the total population in the division does not have access to clean water. (Fig.3.).

Energy supply:

The divisional headquarter and the most of the major market centres are connected to electricity grid. Most of the rural communities, however, have no power supply. Fuelwood and charcoal are the most widely used source of energy among the rural low-income groups. Petroleum fuel is important in small scale industrial activities with a wider use of kerosene and gas. (Fig.4).

Agricultural activities:

Crop production is the economic mainstay of the rural communities in the division. Cash crops like tea, coffee, horticulture and cut flowers are grown for export. Food crops like maize, beans and other vegetables are also cultivated, mainly in the lower parts of the division. Production of most subsistence crops such as maize, beans, potatoes and bananas is intensive. There are distinctive agro-ecological zones in the division (Fig. 5).

Livestock production:

After agriculture, livestock production plays a major role in income generation in the division. Almost all livestock production is dairy farming based on zero-grazing due to land scarcity and population growth. Goats/sheep rearing, poultry and bee-keeping. Beef farming is confined to the dry parts of the division in Ndeiya and Karai. The main livestock products are milk, meat, hides, skin, eggs and honey.

Communication network:

In Lari division, roads are generally impassable during the rainy season. Moreover, the roads are unreliable due to the nature of the terrain which is very rugged and traversed by faulting and folding land masses. Areas like Ndeiya and Karai, which have high potential for horticultural production should be opened. There are different forms of roads in the division from bitumen to gravel and earth. Generally, the division is least served. Donkey carts and hauling dominate the rural transport services. Maintenance is mainly by the local authorities, post and telecommunications facilities are poor and vandalised in some areas. (Fig. 6,7 & 8).

Educational facilities:

Lari division is fairly well served with various educational facilities. According to the Ministry of Education, Kiambu, 1996, there were 50 primary and 17 secondary schools in the division. There also three youth polytechnics and private commercial institutes in urban centres. Secondary schools are inadequate in the division. (Fig.9).

Health facilities:

Health facilities, both government and non-governmental are found in the division. There is one hospital, 8 health centres, 13 dispensaries and 7 clinics in the division. (Fig. 10).

Forestry:

Forestry and agro-forestry are practiced in the division for fuelwood and charcoal production, for construction for soil and water conservation. More than 80% of the total household in the division, however, use forestry and agro-forestry as source of energy for cooking. Forest area in the division covers about 19,140 hectares.

Mining:

The natural gas at Kereita forest in Lari division is the only mineral being extracted by Carbacid Company. There are diatomite deposits at Ndeiya and Karai locations. Quarry stones are used in the construction industry although the activities have led to environmental degradation.

Administrative Centres:

Administrative centres refer to the distribution and location of divisional headquarter different, GOK departments, Processing plants, research institutes, police posts, chiefs and assistant chiefs' offices in the division. (Fig. 11).

Fig. 1 Location of Lari Division

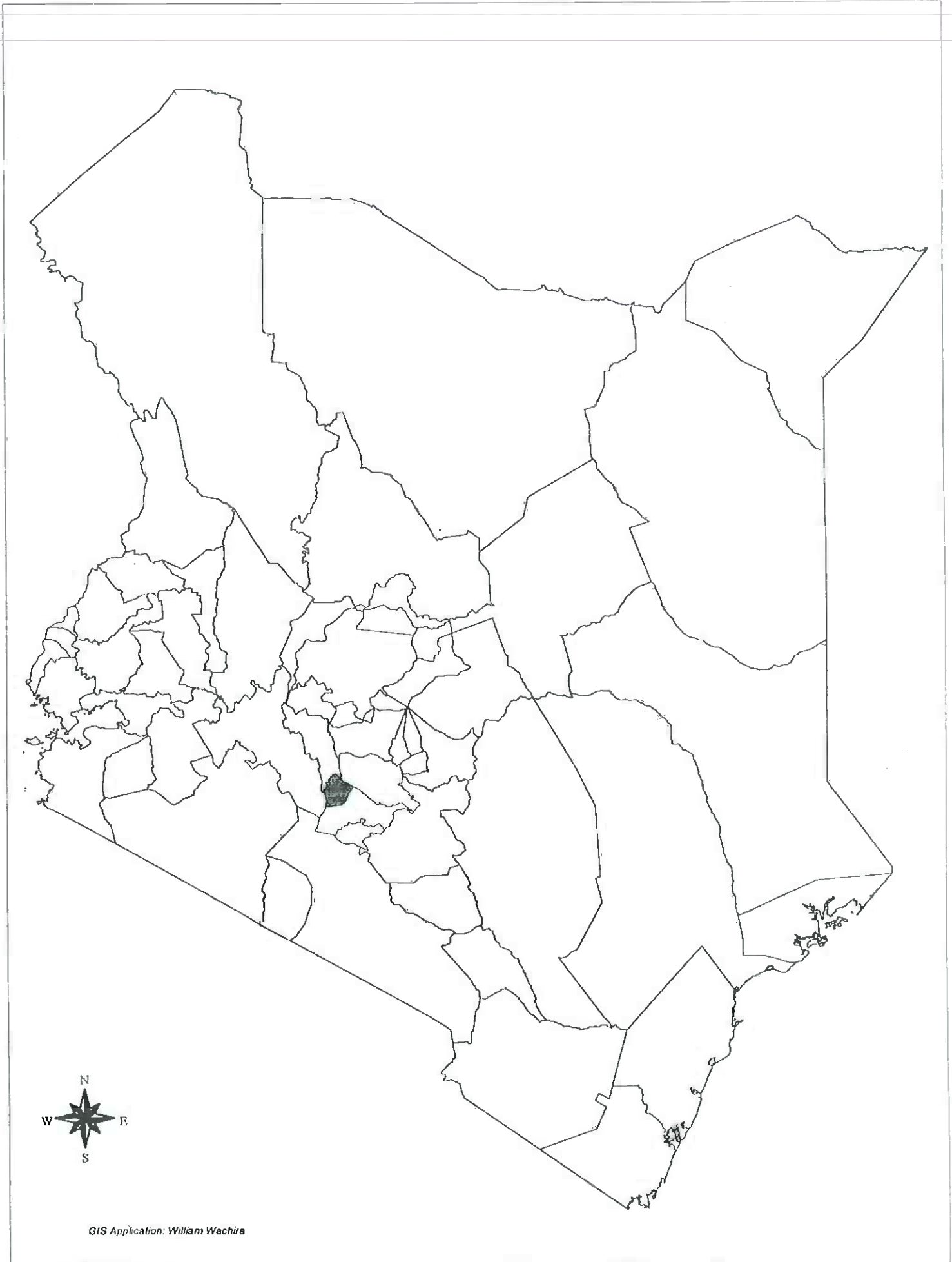
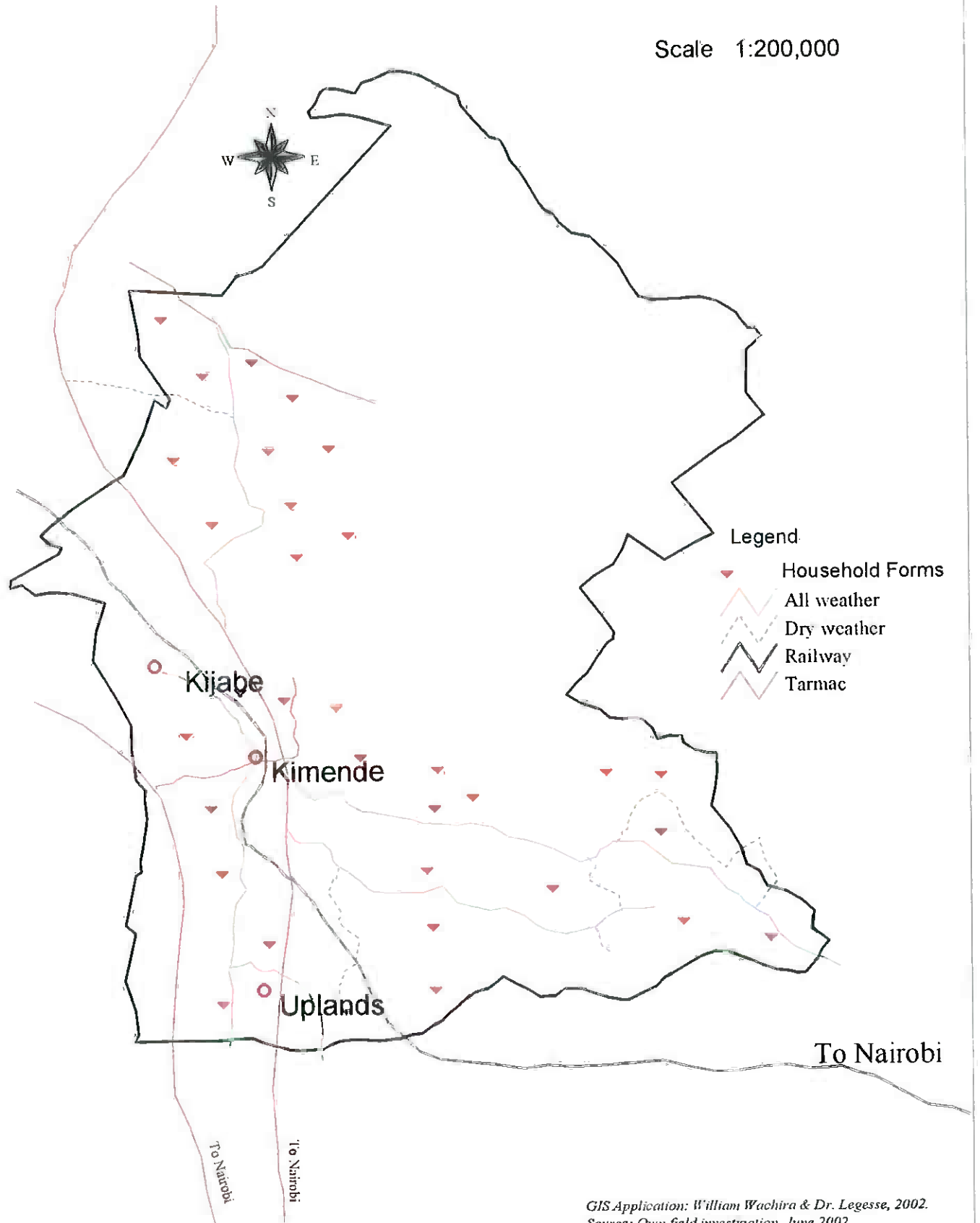


Fig. 2. Settlement Patterns In Lari Division

Scale 1:200,000



GIS Application: William Wachira & Dr. Legesse, 2002.
Source: Own field investigation. June 2002.

Fig. 3. Water Supply Systems In Lari Division

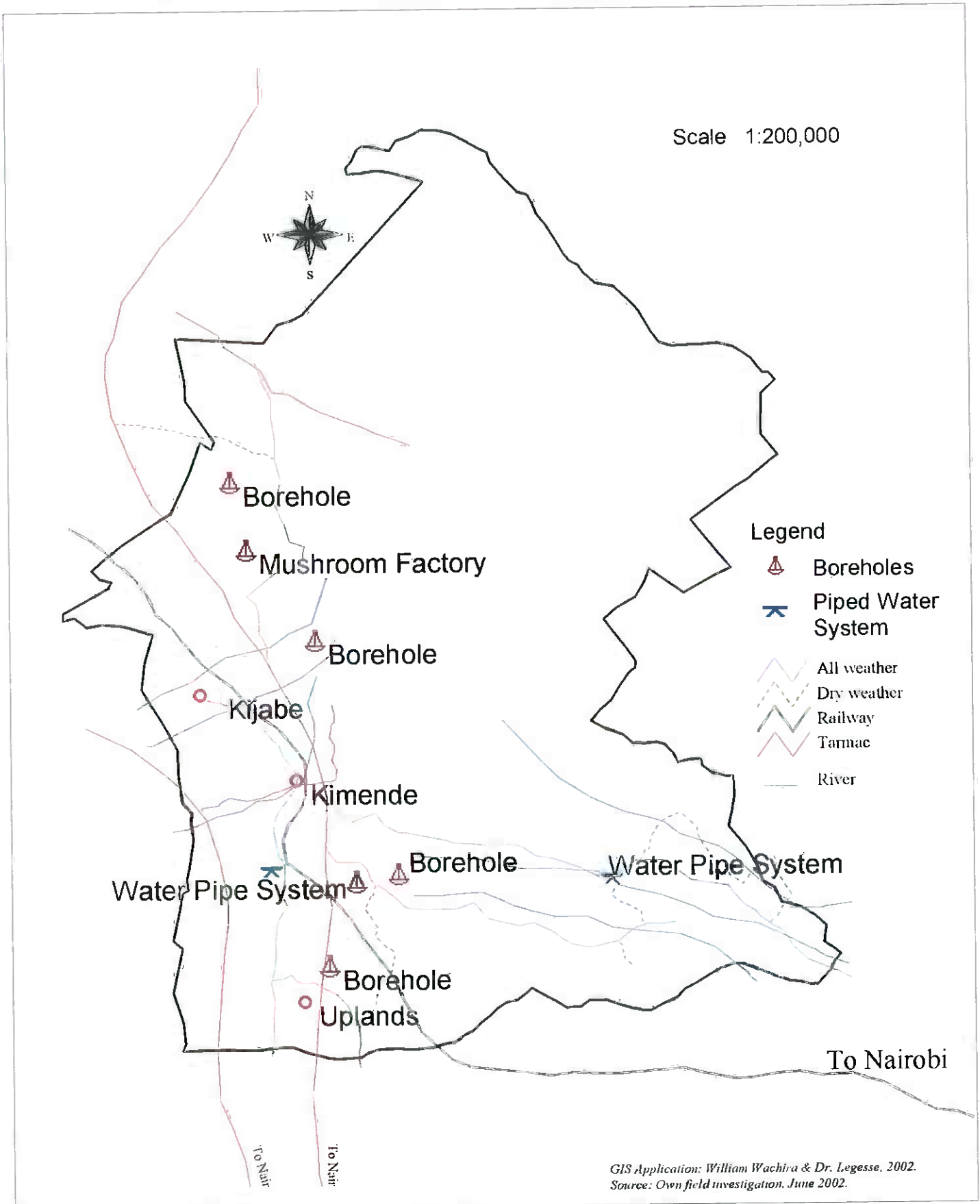


Fig. 4. Energy Supply Systems In Lari Division

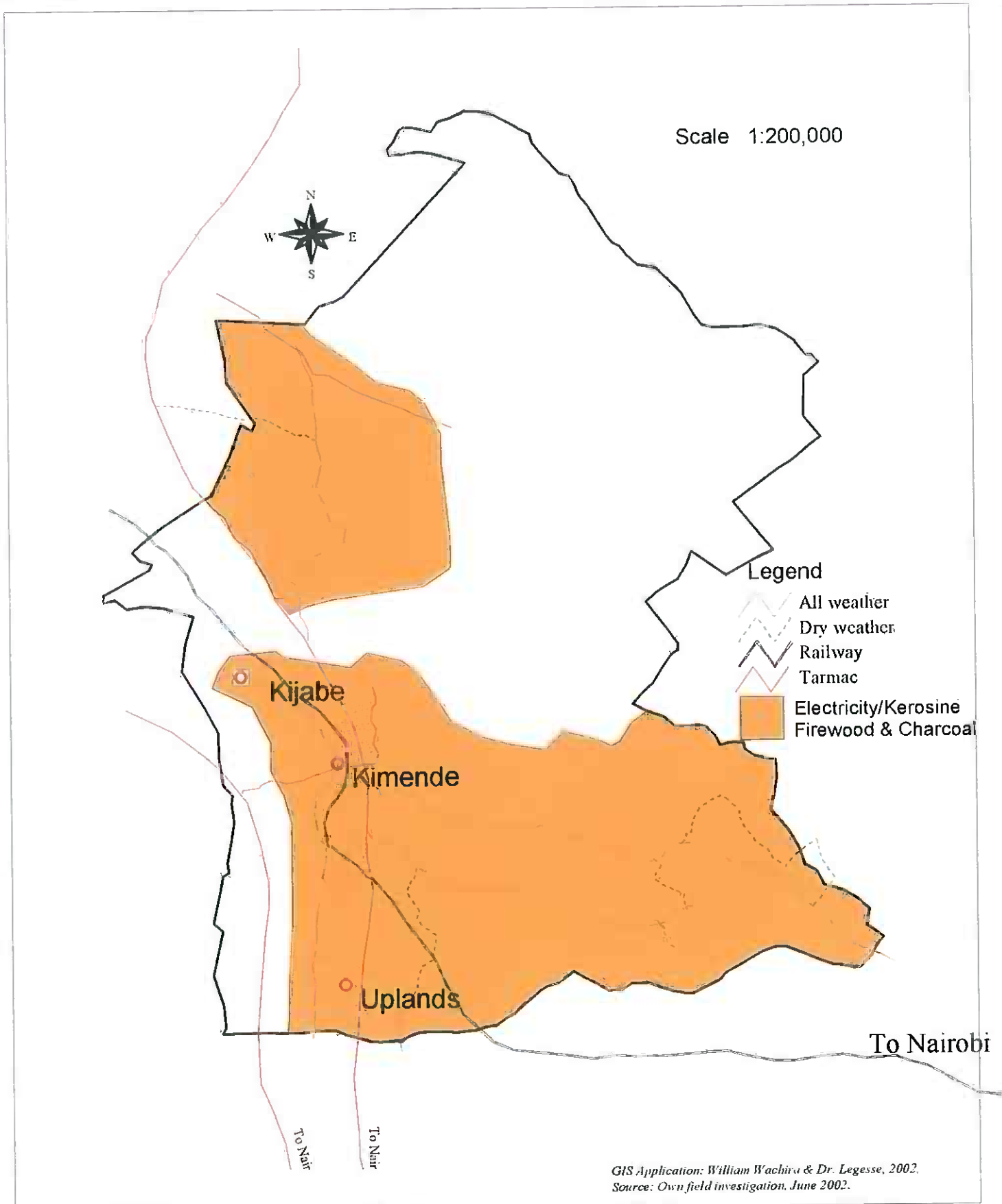


Fig. 5. Agro-Ecological Zones In Lari Division

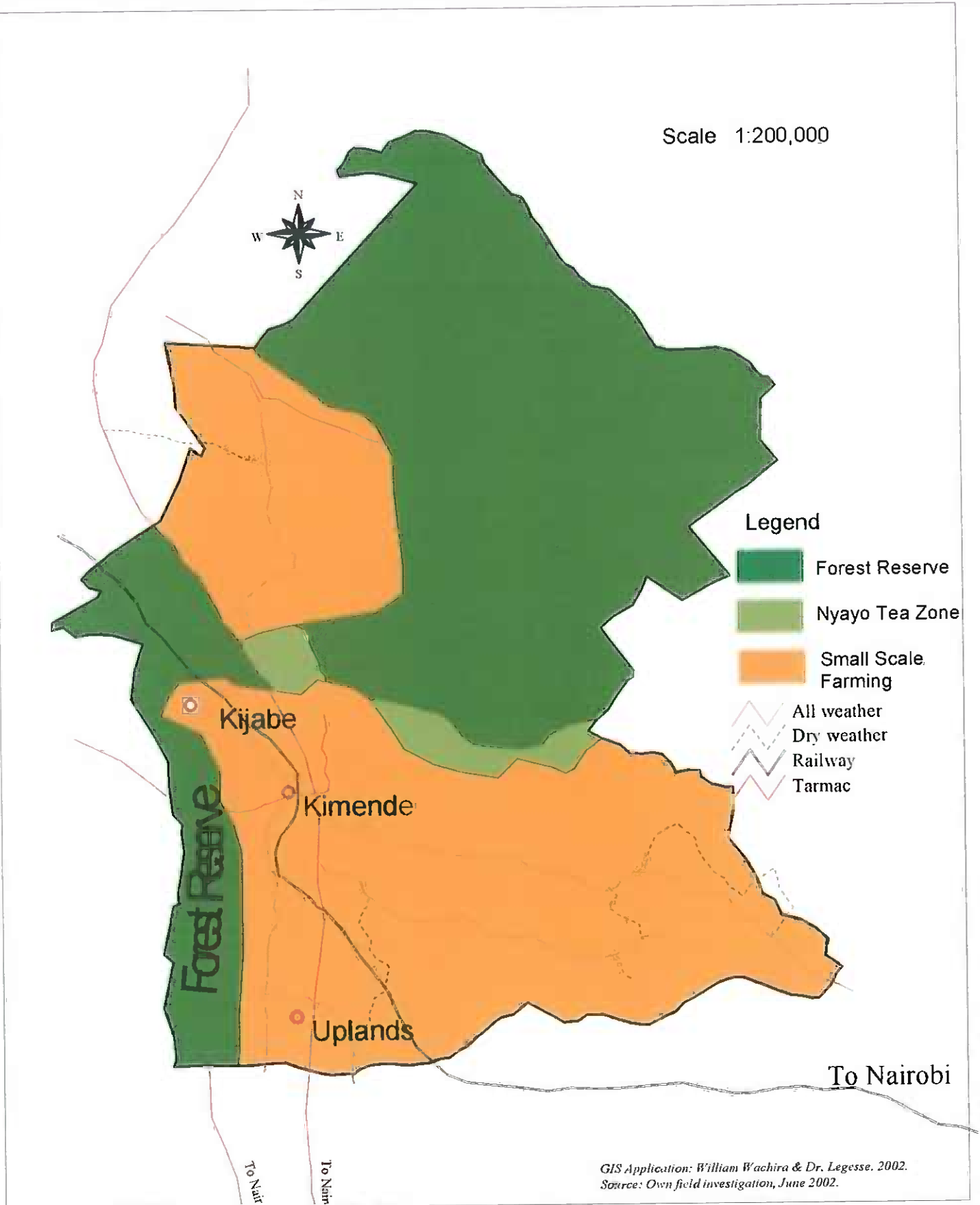


Fig. 6. Major Road Network And Market Centres In Lari Division

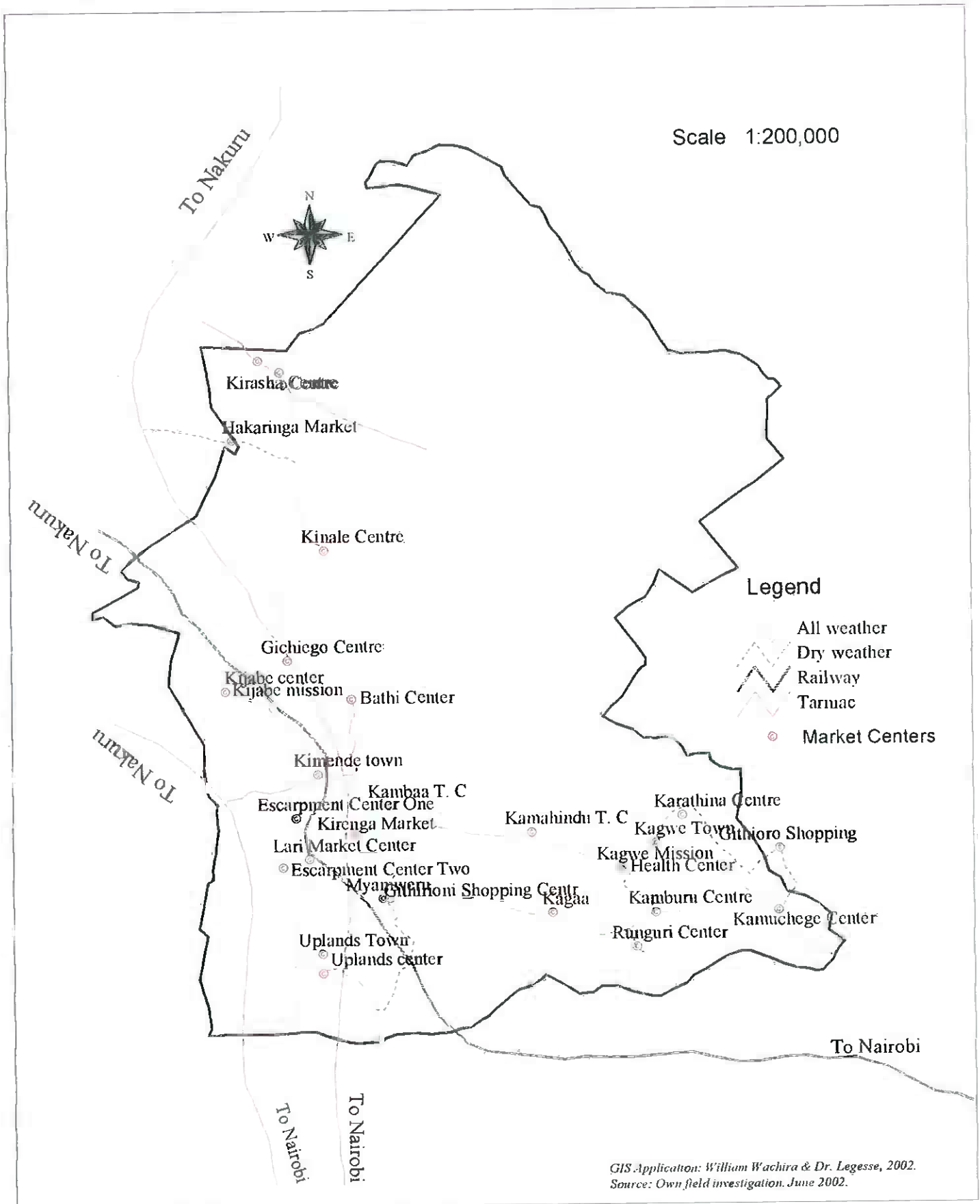


Fig. 7. Communication Systems In Lari Division

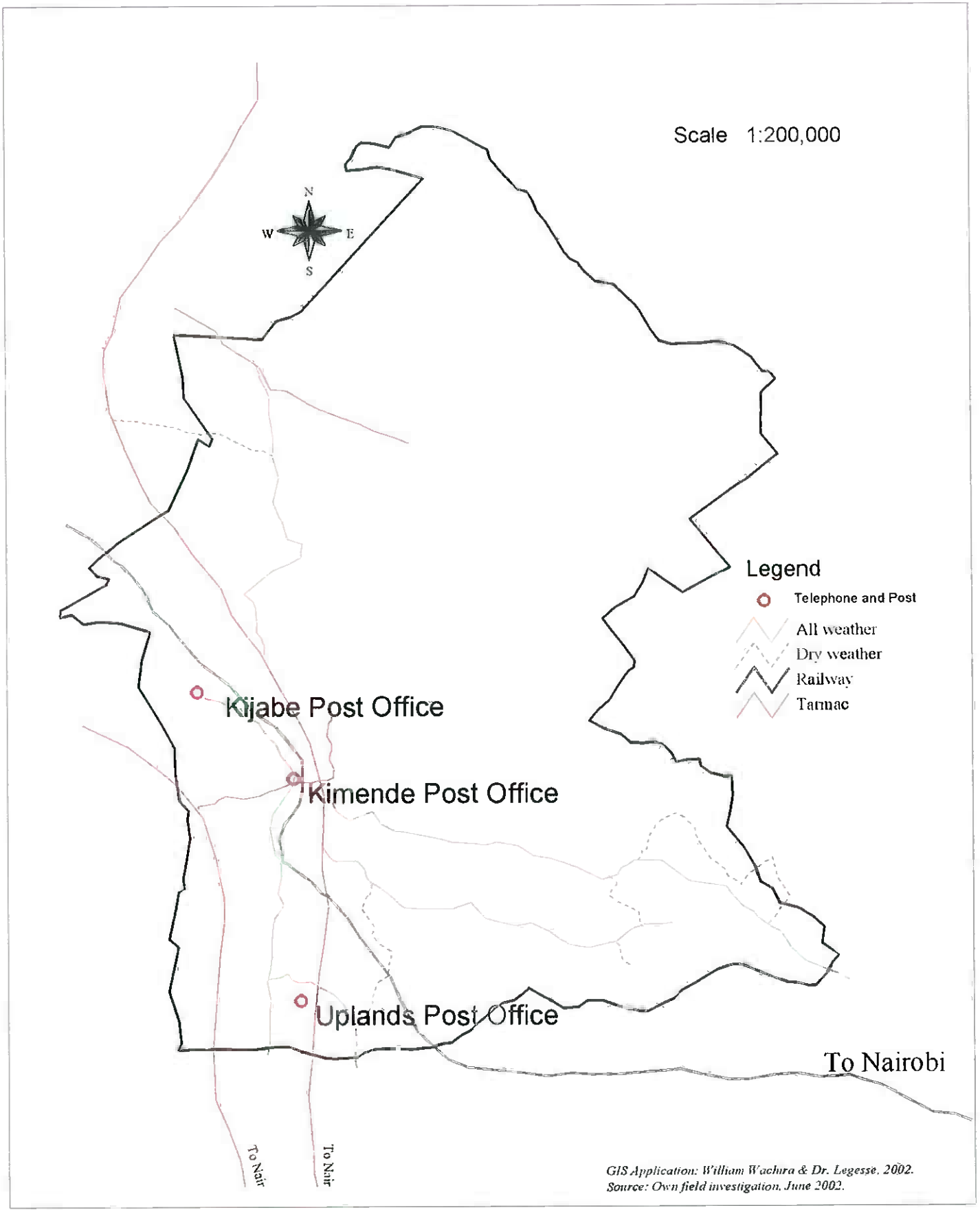


Fig. 8. Transport Systems in Lari Division

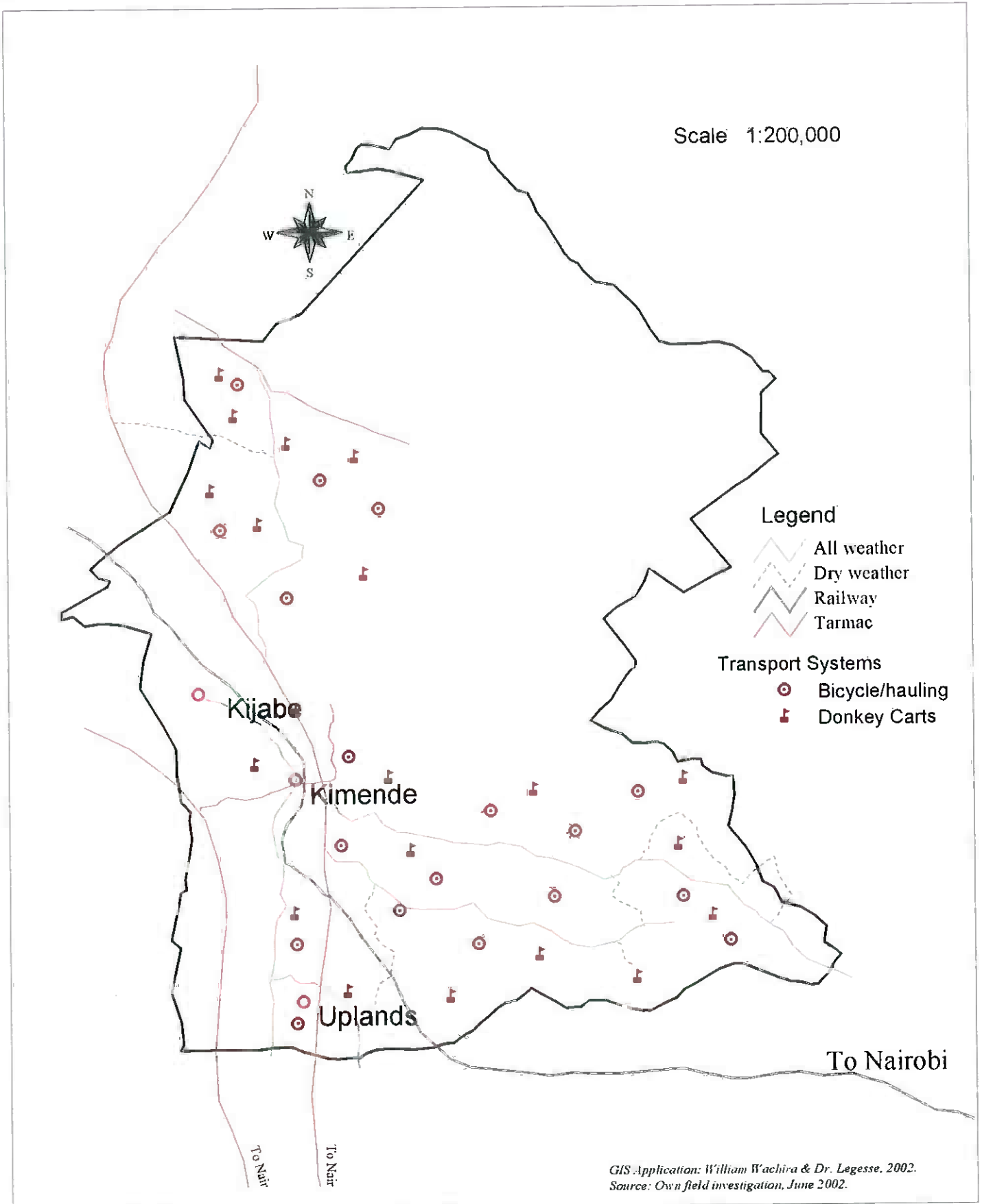
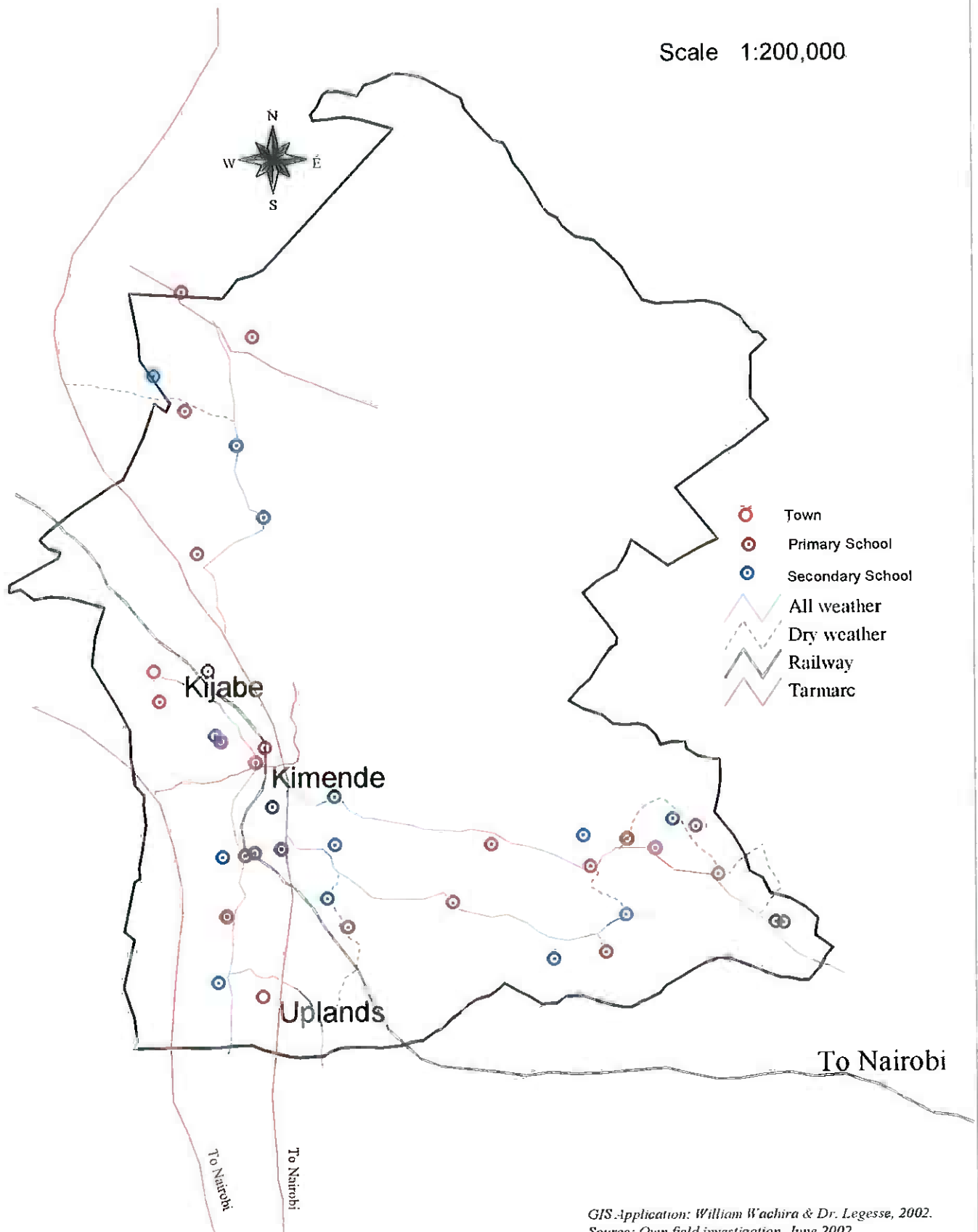


Fig. 9. Education Facilities In Lari Division

Scale 1:200,000



GIS Application: William Wachira & Dr. Legesse, 2002.
Source: Own field investigation, June 2002.

APPENDIX 1
GPS REFERENCE POINTS FOR MAJOR FACILITIES IN LARI DIVISION

ID	FACILITY	X__ COORD	Y__ COORD	ALT (M)
	1 Bridge	253984	9887220	1893
	2 Bridge	249356	9890244	2014
	3 Gatamaiyu Bridge	235486	9902889	2645
	4 Bathi bridge	236398	9891878	2427
	5 Bridge (kimaiti river)	248235	9886271	2055
	6 Bathi River Bridge	247342	9888168	2076

ID	FACILITY	X__ COORD	Y__ COORD	ALT
	1 Kamuchege Centre	253406	9886624	1946
	2 Gichioro Shopping Centre	253468	9888967	1976
	3 Karstina Centre	249804	9890244	2060
	4 Kamahindu Centre	244150	9889642	2208
	5 Kambaa Centre	238784	9890682	2375
	6 Gichiego Centre	234979	9896218	2576
	7 Kinare Centre	236397	9900384	2622
	8 Hakaringa Market	232976	9904593	2693
	9 Shopping Centre	234898	9906701	2663
	10 Kirasha Centre	234767	9907188	2661
	11 Kirenaga Market	237018	9889472	2394
	12 Bathi Centre	237366	9894730	2540
	13 Kimende town	236084	9891878	2427
	14 Kijabe mission	232599	9895050	2162
	15 Kijabe centre	232599	9895050	2162
	16 Lari Market Centre	235717	9888653	2435
	17 Escarpment Centre	235248	9890223	2272
	18 Escarpment Centre	234733	9888336	2278
	19 Uplands centre	236211	9884329	2396
	20 Uplands Town	236200	9885065	2396
	21 Myamweru	238506	9887154	2424
	22 Githirioni Shopping	238783	9887167	2431
	23 Kagaa Centre	244887	9886580	2211
	24 Runguri Centre	248081	9885265	2083
	25 Kamburu Centre	248778	9886567	2089
	26 Kagwe Mission	247551	9888245	2121
	27 Health Centre	247551	9888245	2121
	28 Kagwe Town	248829	9889199	2091

ID	FACILITY	X__ COORD	Y__ COORD	ALT
	1 Cattle dip	252638	9887067	1967
	2 Cattle dip	2533468	9888967	1967
	3 Kinale Cattle dip	236108	9901133	2619
	4 Bathi cattle dip	236108	9901133	2619
	5 Escarpment Cattle Dip	234733	9889489	2276
	6 Githimoni Cattle Dip	239413	9887170	2424
	7 Munado Cattle dip	247150	9885765	2120

ID	FACILITY	X__ COORD	Y__ COORD	ALT
	1 Kambaa Hospital	238784	9890682	2375
	2 Kinale Dispensary	236397	9900384	2622

3	Kamae Clinic	236049	9906646	26760
4	Kimende health	236084	9891878	2427
5	Kimende health Centre	236084	9891878	2427
6	Kijabe hospital	232599	9895050	2162
7	Lari Dispensary	235717	9888653	2435
8	Dispensary	236200	9885065	2396
9	Kagaa Medical Centre	244887	9886580	2211
10	Dispensary	248778	9886567	2089
11	Health Centre	248829	9886567	2089

ID	FACILITY	X___ COORD	Y__ COORD	ALT
1	Kijabe Sawmill	234481	9897431	2617
2	Sulmac Farm	233306	9908493	2677
3	Kimende petrol x2	236084	9891878	2427
4	Bank x2	236084	9891878	2427
5	Poster	236084	9891878	2427
6	Metthiaw rail station	235259	9891969	2314
7	Kijabe poster	232599	9895050	2162
8	Petrol Station	232599	9895050	2162
9	Abandoned railwat station	234733	9888336	2278
10	Uplands Petrl Station	234733	988336	2278
11	Uplands Post Office	236306	9883754	2403
12	Uplands Railway Station	234457	9885483	2369
13	Myamweru forest Poir	240782	9886876	2381
14	Point to the Kmbaa	244084	9886400	2226
15	Petrol Station	248829	9889199	2091
16	Timber Yard	248829	9889166	2091
17	Non-operational Saw Mill	248829	9889199	2091

ID	FACILITY	X___ COORD	Y__ COORD	ALT
1	Kamuchege Coffee Factory	254100	9886000	1936
2	Gichongo Coffee Factory	253992	98871109	1911
3	Kamungu Tea Buying Centre	251859	9889374	2010
4	Kinale Forest Office	234115	9899124	2640
5	Mushroom Factory	234115	9899124	2640
6	Milk Processing Plant	234756	9899231	2638
7	Kinale Chief's Camp	236107	9901100	2622
8	Mugiko Chief's Camp	232649	9905321	2702
9	Kirenga Chief's Camp	236943	9888866	2401
10	D.O's office	237448	9891704	2490
11	Carbacid company	237489	9892399	2527
12	Police post	236084	9891878	2427
13	Police post	232599	9895050	2162
14	Farmers Choice Factory	237457	985483	2369
15	Kagaa Tea Centre	246294	9885037	2101
16	Tea Centre	247150	9885765	2120
17	Kamburu Tea Buying Centre	248778	9886567	2089
18	Chiefs Office	248778	9886567	2089
19	Tea Centre	247551	9888245	2121
20	Kagwe Tea Factory	246844	9889196	2144
21	Tea Buying Centre	246844	9889196	2144
22	Chief's Office	248183	9889193	2111
23	Police Post	248829	9889199	2091
24	Tea Centre	248829	989199	2091

ID	FACILITY	X__	COORD	Y__	COORD	ALT
1	Kiruri Primary School		251959		9887978	1995
2	Muthandi Primary		254198		9886286	1915
3	Karatina Primary School		251185		9889629	2025
4	Gakenge Primary School		250391		9889866	2042
5	Kamahindu Primary School		244150		9889013	2208
6	Kiambogo P. School		234450		9895061	2442
7	Miragi P. School		234115		9899124	
8	Kinale P. School		236397		9900384	2622
9	Utugi P. School		235485		9902889	2645
10	Benga Academy		233719		9904086	2690
11	Mugiko P. School		2322649		9905321	2702
12	Kamae P. School		236049		9906646	2660
13	Sulmac P. School		233612		990233	2672
14	Kirenga P. School		236033		9888743	2431
15	Bathi pry school		236398		9892399	2427
16	Kimende pry		236084		989178	2275
17	Banini pry		234894		9892622	2275
18	Kijabe Pry		232790		9894000	2198
19	Rift alley Academy		232599		9895050	2160
20	Lari Hills Acdemy		235717		9888653	2435
21	Escarpment Pry School		234918		9888603	2278
22	Lari Pry School		325067		9886547	2330
23	Gitithia Primary School		234755		9884255	2359
24	Gitau Primary School		239209		9886166	2369
25	Kwaregi Primary School		242827		9887002	2263
26	Kagaa Primary School		246294		9885037	2101
27	Kabathithi Primary		248081		9885265	2083
28	Kamburu Primary		248778		9886567	2089
29	Kagwe Primary		247551		9888245	2121
30	Kiarugo Primary		248829		9889199	2091
31	Hillside Primary School		249781		9888870	2058

ID	FACILITY	X__	COORD	Y__	COORD	ALT
1	Ndagiki Quarry					
2	Banini Quarry					
3	Maingi Quarry					

ID	FACILITY	X__	COORD	Y__	COORD	ALT
1	Kamuchege Secondary		253921		9886320	1943
2	Karatina Polytechnique		250391		9889866	2042
3	Kambua Girls School		238784		9889013	2375
4	Lari High School		238784		9890682	2375
5	Kinale S. School		236397		9900384	2622
6	Utugi S. school		235486		9902889	2645
7	Mugiko Secondary School		232649		9905321	2702
8	Lari S. School		236943		9890341	2404
9	Kirenga G.S. School		236943		9888866	2401
10	Kirenga YP		236943		9888866	2401
11	Kimende Sec School		236084		9891878	2427
12	Kijabe Sec Sch.x2		234701		9892813	2275
13	Moffat Bible School		232599		9895050	2162
14	Escarpment Secondary		234918		9888603	2278
15	Gitithia Sec School		234755		9884255	2359
16	Mjamweru Sec School		238506		9887154	2424

17	Kagaa High School	246294	9885037	2401
18	Kamburu High School	248778	9886567	2089
19	Gatamaiyu High School	247303	9889322	2126

ID	FACILITY	X__	COORD	Y__	COORD	ALT
1	Water Pipe System	235116	9888603	2278		
2	Borehole	237199	9885064	2396		
3	Water Pipe System	247551	98888245	2121		

PART II

SITUATIONAL ANALYSIS AND RESOURCE MAPS

FOR

KALAMA DIVISION

SITUATIONAL ANALYSIS OF KALAMA DIVISION

Location and area:

Kalama Division is located in the southern part of Machakos District, Eastern Province. Kalama Division has a total land area of 180sq km. It is the 9th largest division in area in the district. (Fig. 1).

Topography:

The topography of Kalama division is largely a plateau and rises from 700m to 1700m above sea level. The landscape is interrupted by an escarpment and hilly land masses.

Climate:

Kalama division has a semi-arid environment and receives very little and erratic precipitation. There are two distinct rainy seasons. Long rains of March to May and the short rains of October to December. The average rainfall varies from 500 – 1300mm on low land and high altitude areas, respectively. Rainfall is sporadic and irregular which makes very difficult for farmers to plan and execute their farming activities. Temperatures also vary with altitude usually hot and dry and varies between 18^o c and 25^o c.

Geological formations:

Kalama division has variety of soils which determine the agricultural potential of the division. There are poorly drained vertisols, boulders and stone out crops. There are Acrisols, friable and excessively well drained. There are as well sand clay loam to sandy clay. All these soil types have significant impact on the nature and maintenance of road networks in the division.

Population size:

According to population projection 2002, Kalama division has a population of 42,500. Population density in the division is 130 persons/km². It is the 7th densely populated division in the district. Kalama is one of the three most affected divisions by poverty in Machakos District.

Settlement patterns are influenced by soil fertility and rainfall and is usually on individual household basis which is scattered all over the division. (Fig. 2)

Natural Vegetation:

Vegetation in the division varies with altitude. The plains are characterized by open grassland with scattered acacia trees. Few patches of dense vegetation are scattered over high altitude and reserved areas.

Water Resources:

Rivers and streams, dams, springs and to smaller extent roof catchments are the main sources of water supply system in the division. Borehole yields are very small. High yields are found mainly in Kangundo and Mua hills. (Fig.3).

Energy Supply:

Fuel wood is the largest source of Kalama division's energy requirements. Almost the entire population of the division depend on wood energy for cooking and heating. This has gradually led to depletion of forests and woodlands in the division. Charcoal burning is quite widespread. (Fig.4.)

Petroleum fuels like kerosene and gas are also found as important sources of energy for domestic use in lighting and cooking. Muumandu is the only market centre served with electricity.

Agricultural Activities:

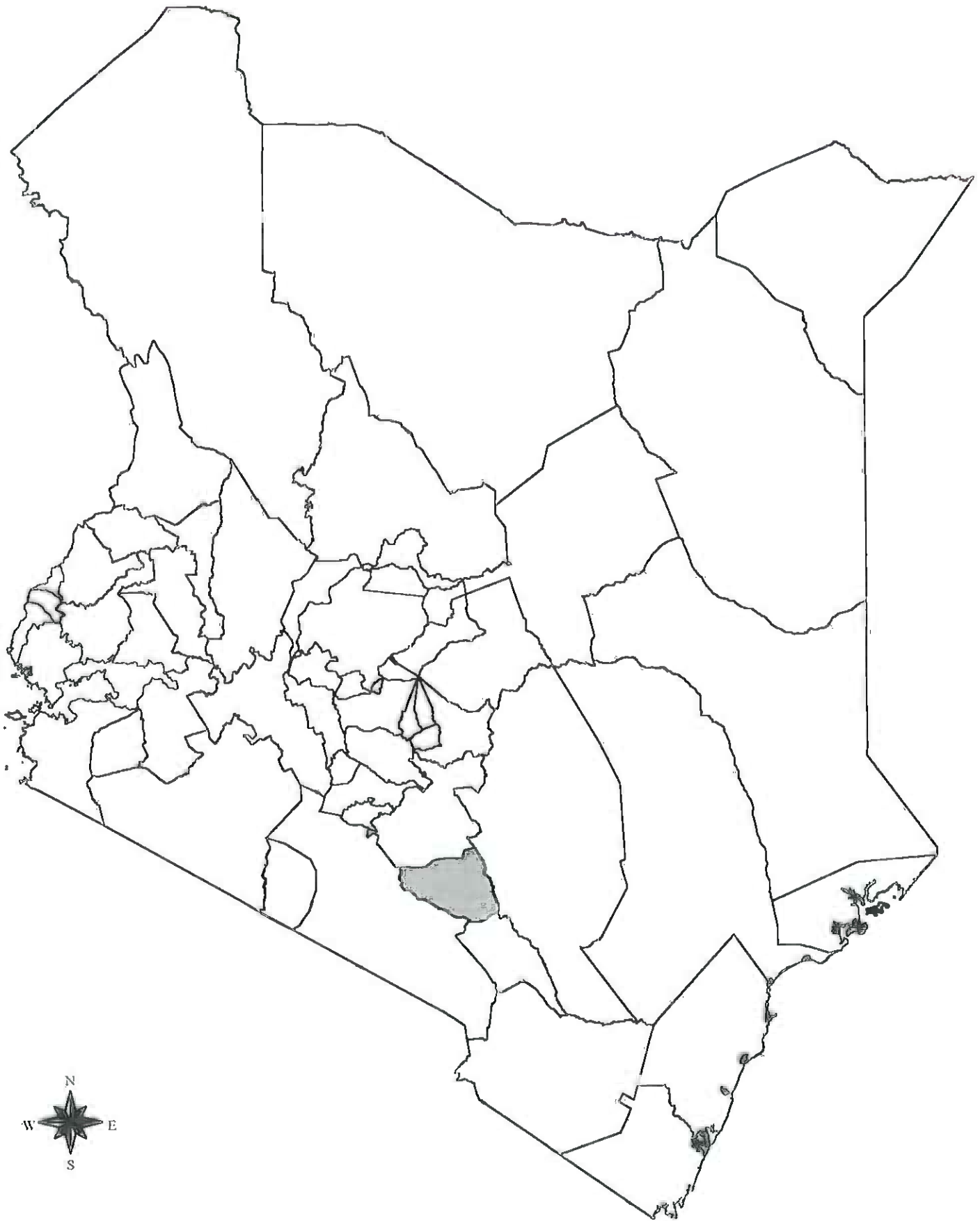
Land use is based on the agro-ecological zones which is influenced mainly by rainfall and soil type. Small scale acreage farm size is 1 to 10 hectares per household. Crop production in the division is diversified.

Main food crops grown in the division are maize, beans, cowpeas, sorghum, pigeon peas and cassava. Main cash crops include mangoes, citrus, cotton and coffee. (Fig.5.)

Administrative Centres:

Administration centres refer to the location and distribution of the divisional headquarter, GOK departments Research institutes, Processing Plants, Police Posts, chiefs' and assistant chiefs' Offices in the division. (Fig.11.).

Fig. 1 Location of Kalama Division



GIS Application: William Wachira

Fig. 2. Settlement Patterns In Kalama Division

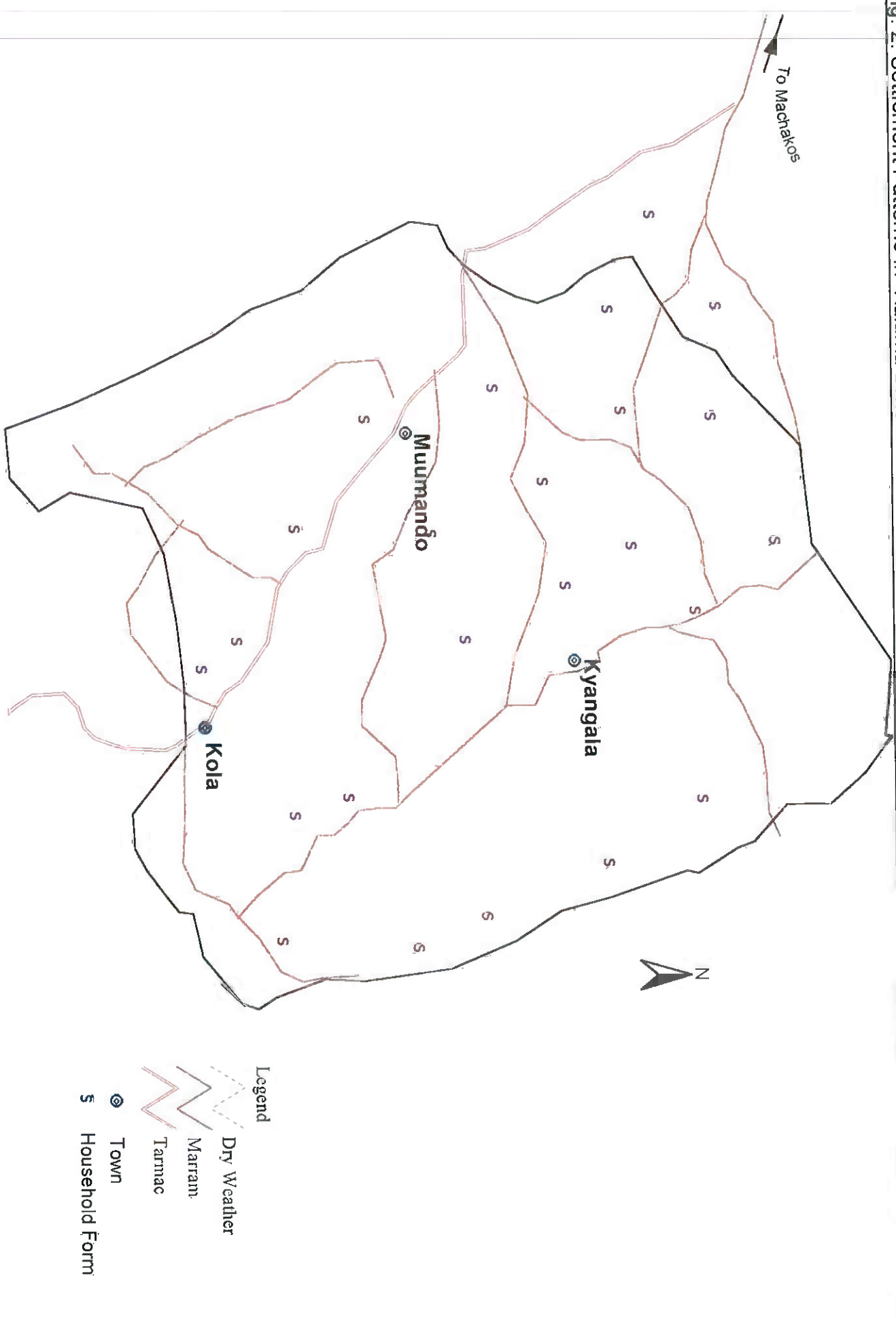


Fig. 3. Water Supply Systems In Kalama Division

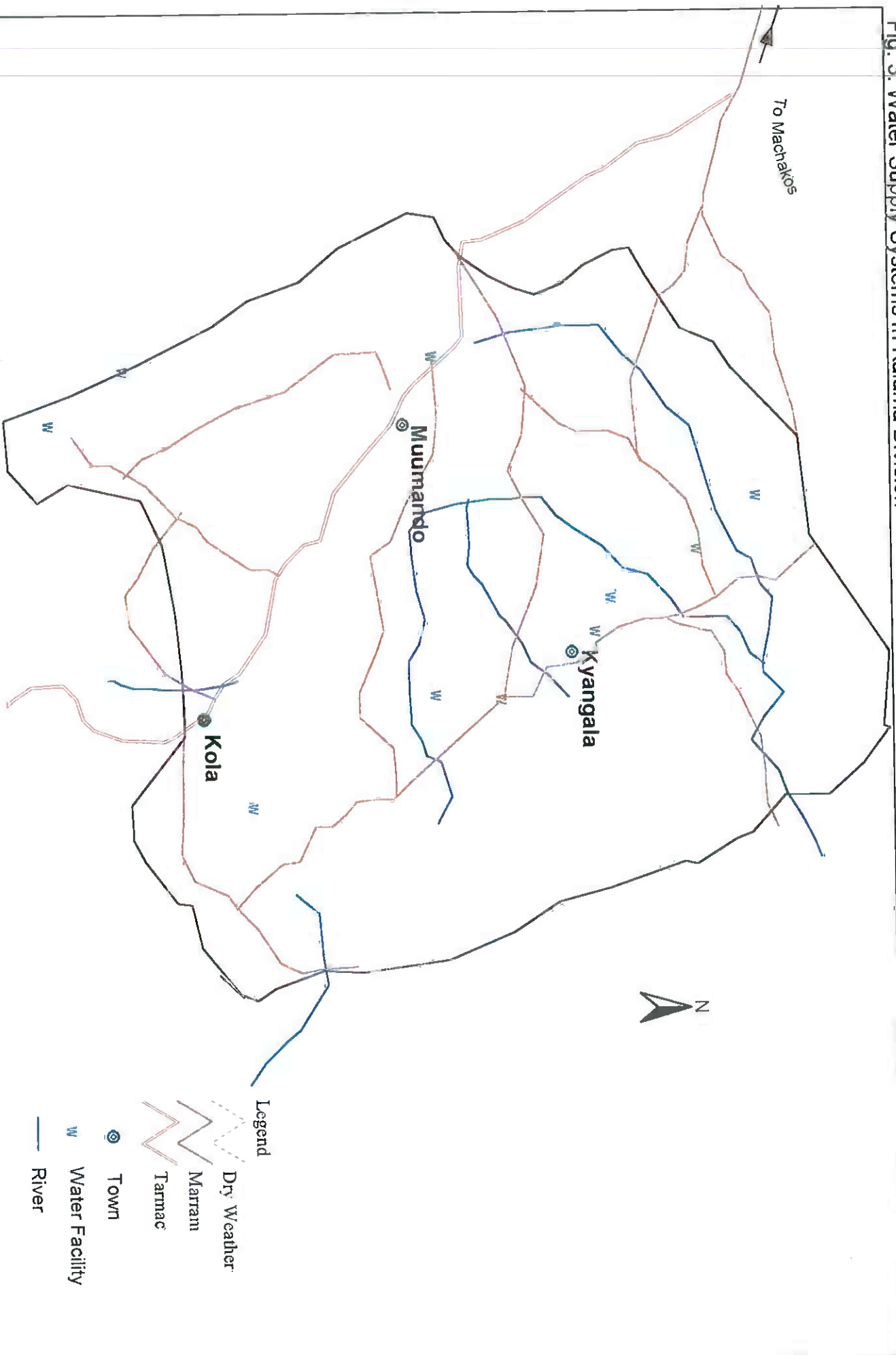


Fig. 4. Energy Supply Systems in Kalamia Division

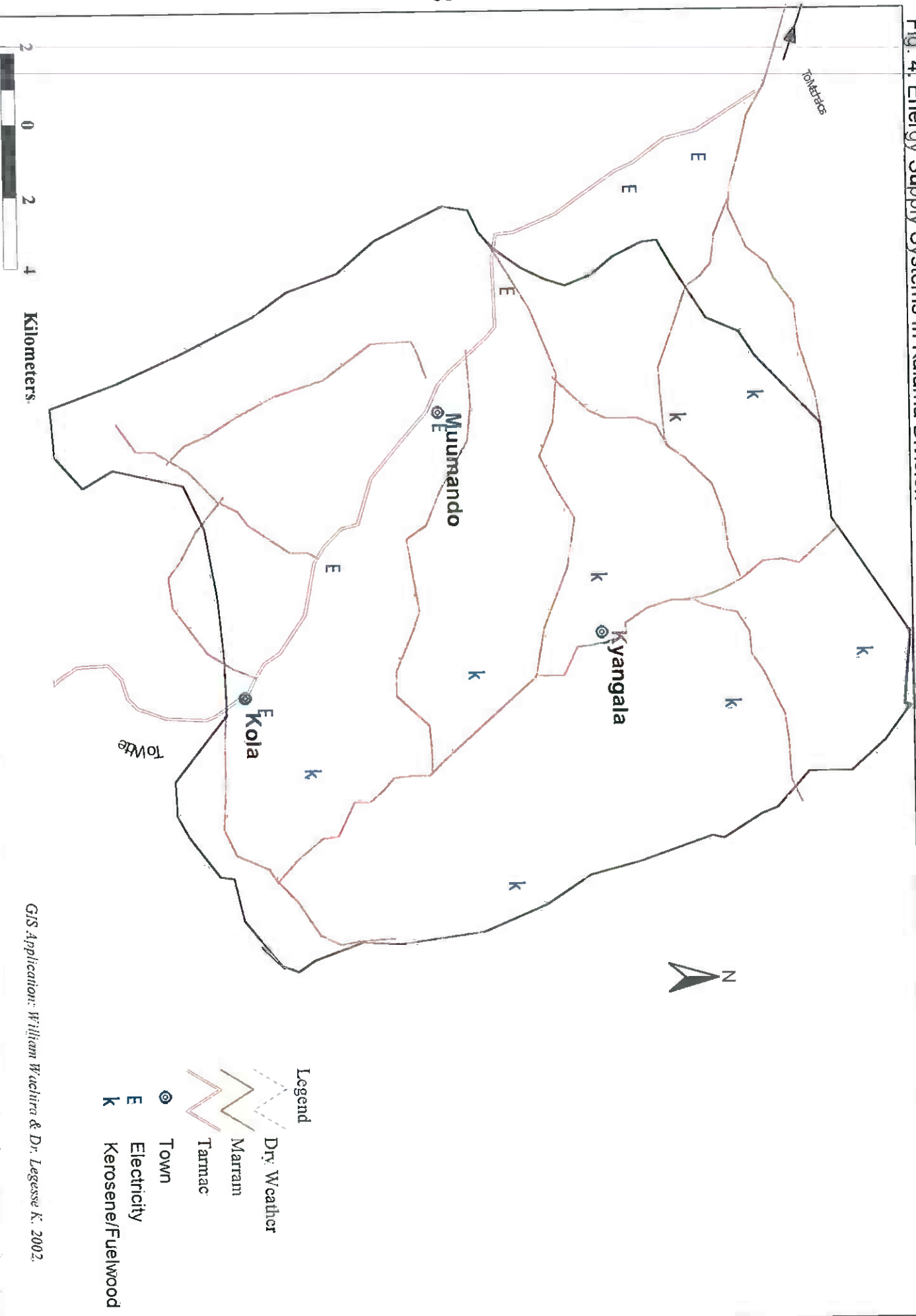


Fig. 5 Agro-Ecological Zones In Kalama Division

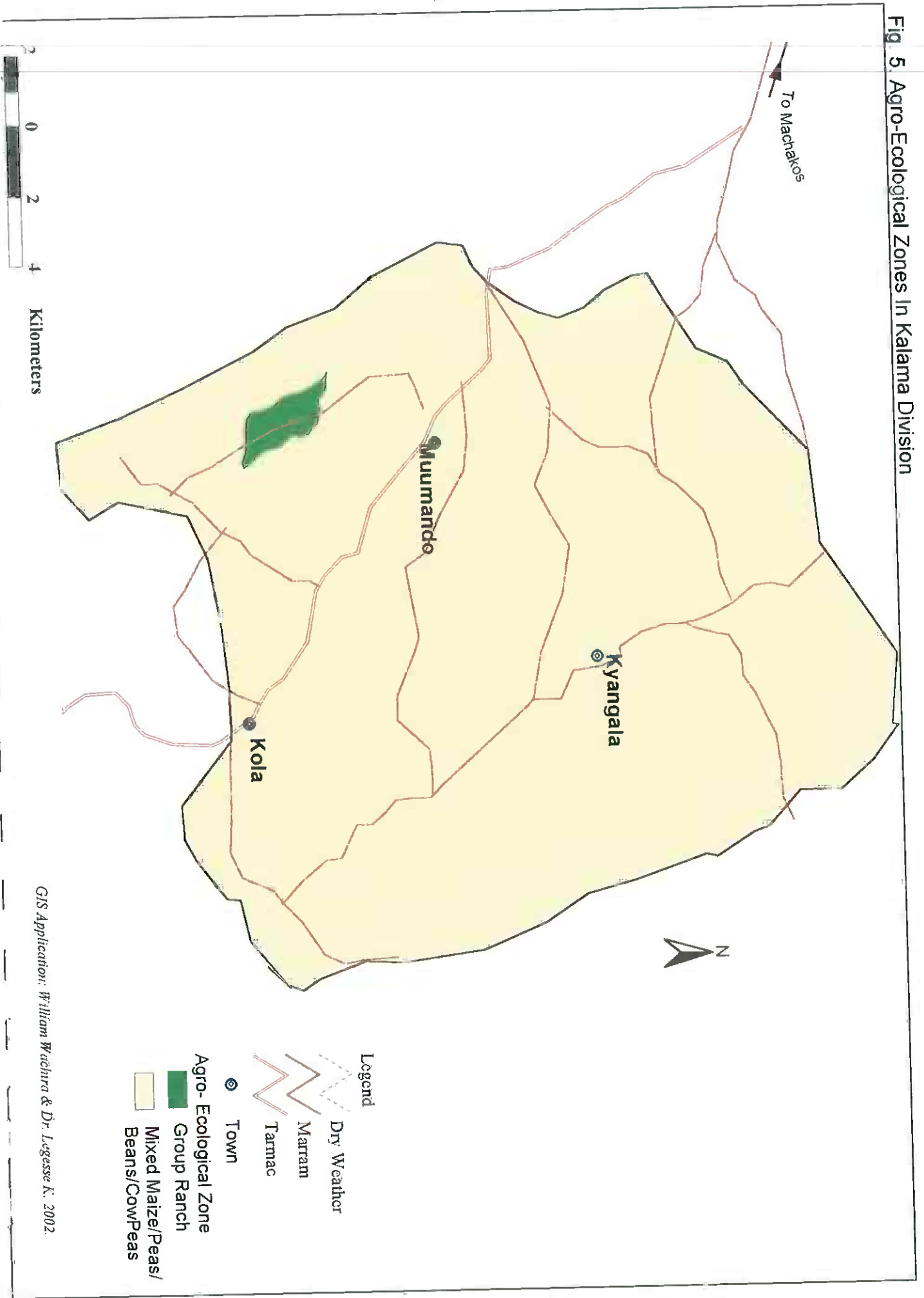


Fig. 6. Major Road Network And Market Centres In Kalamia Division

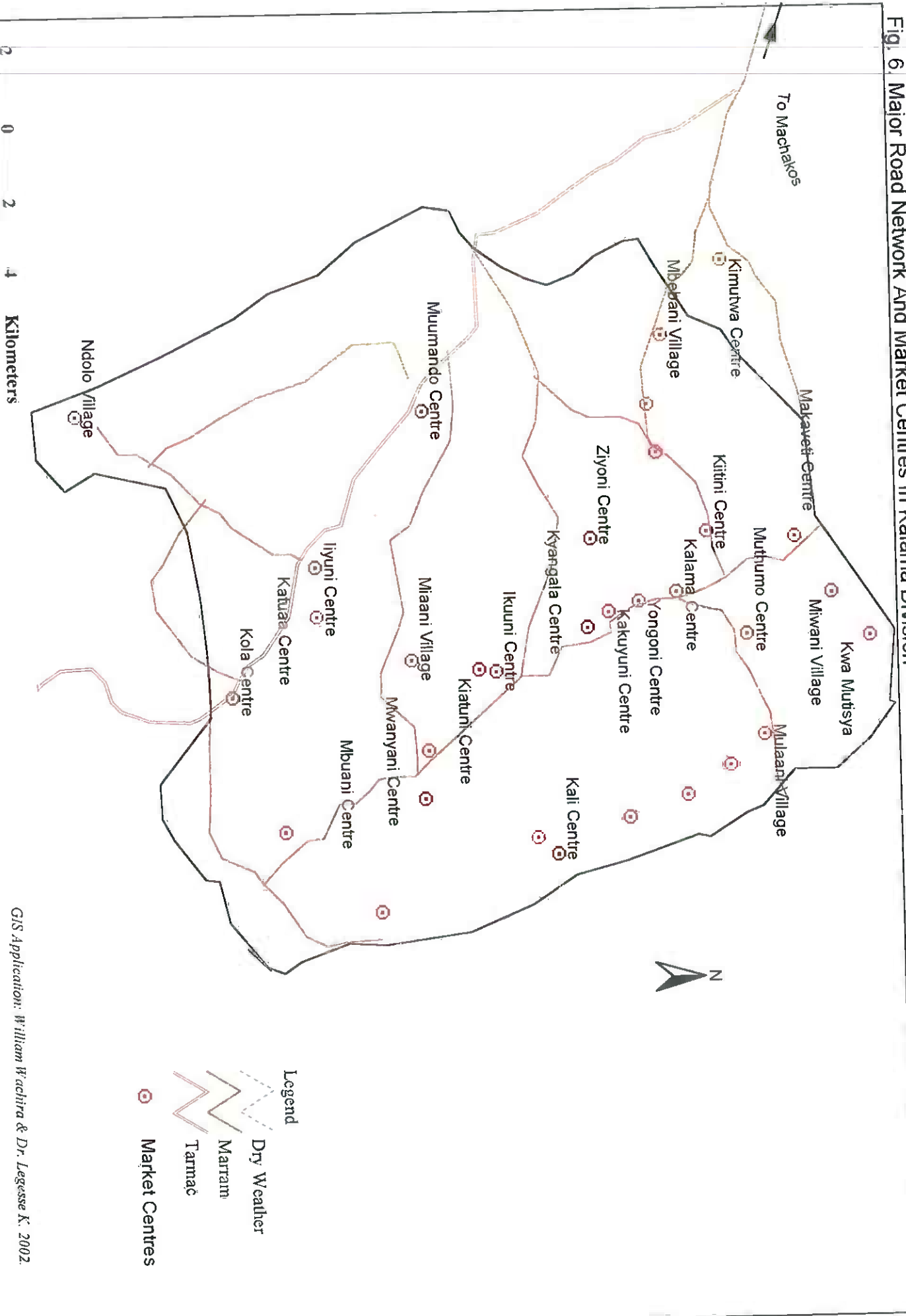


Fig. 7. Communication Systems In Kalama Division

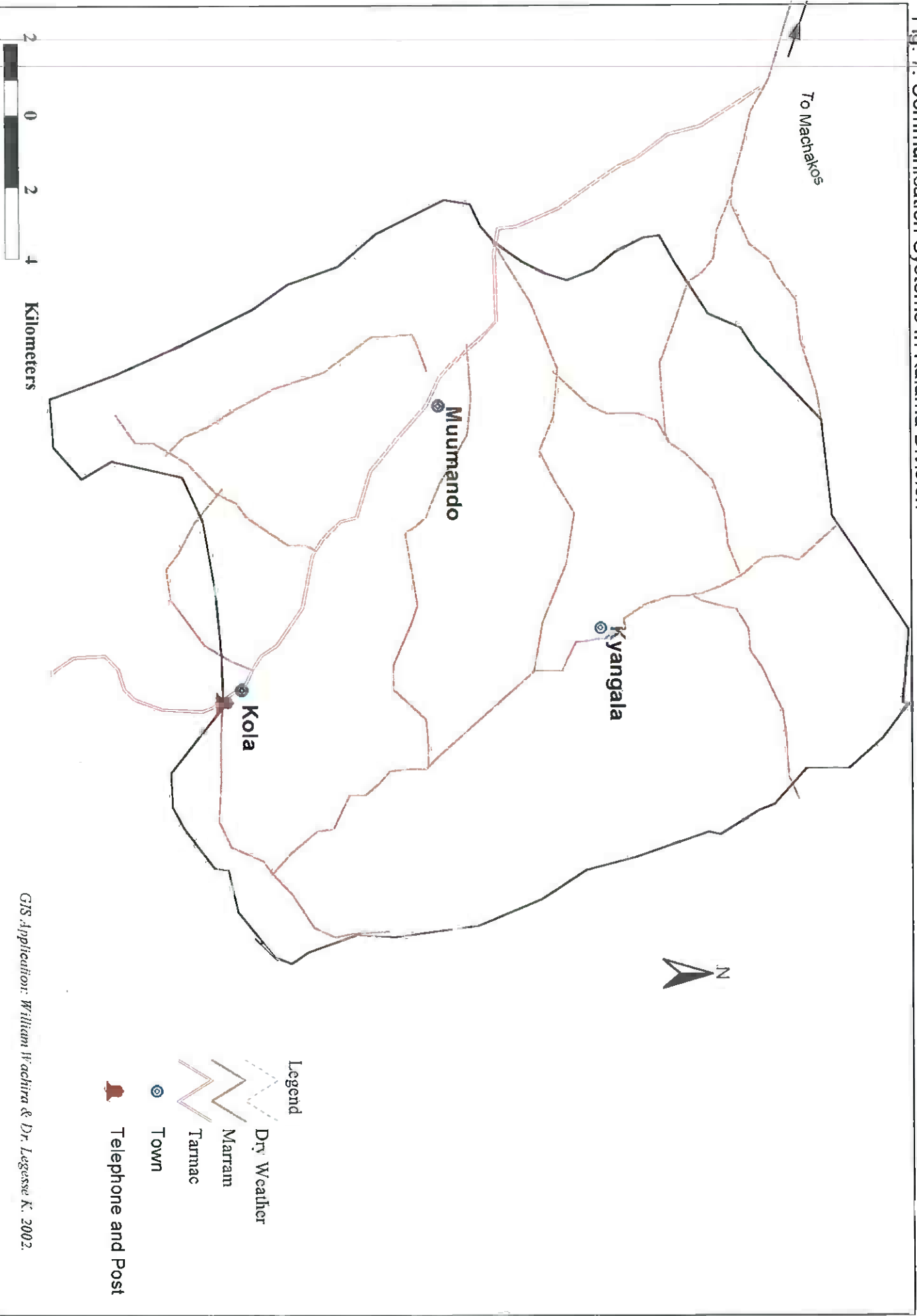


Fig. 8. Transport Systems In Kalamā Division

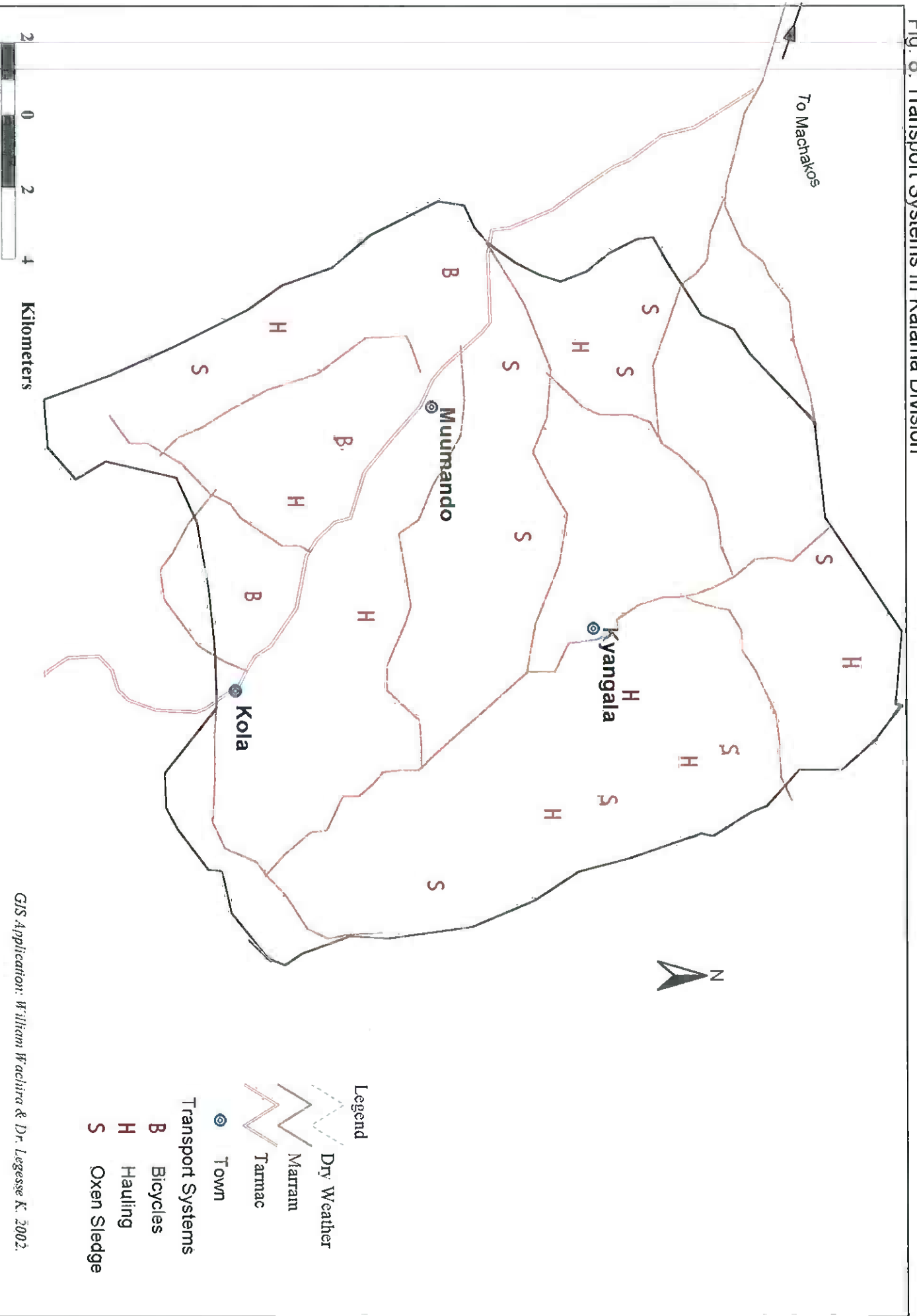


Fig. 9. Education Facilities In Kalamia Division

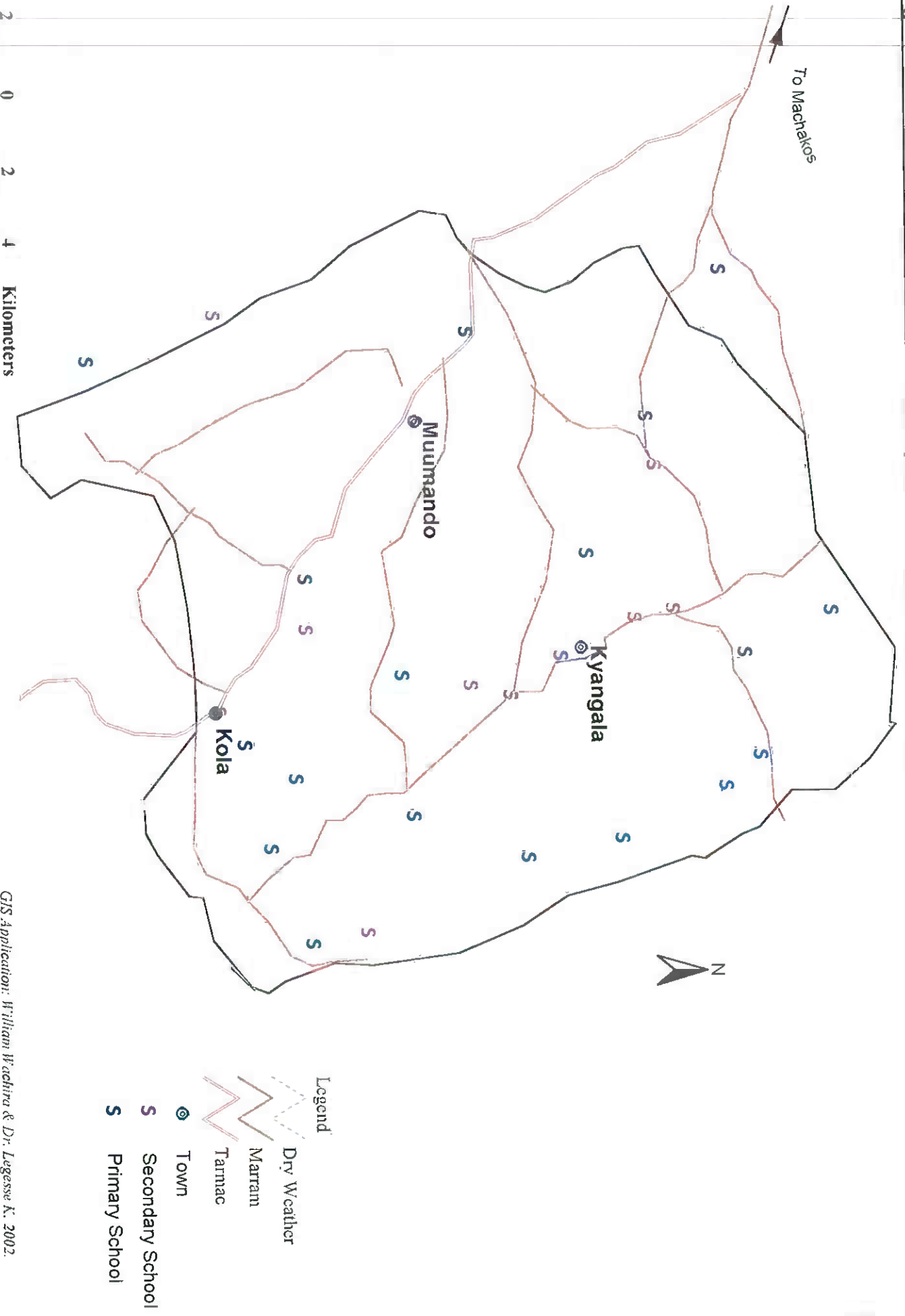
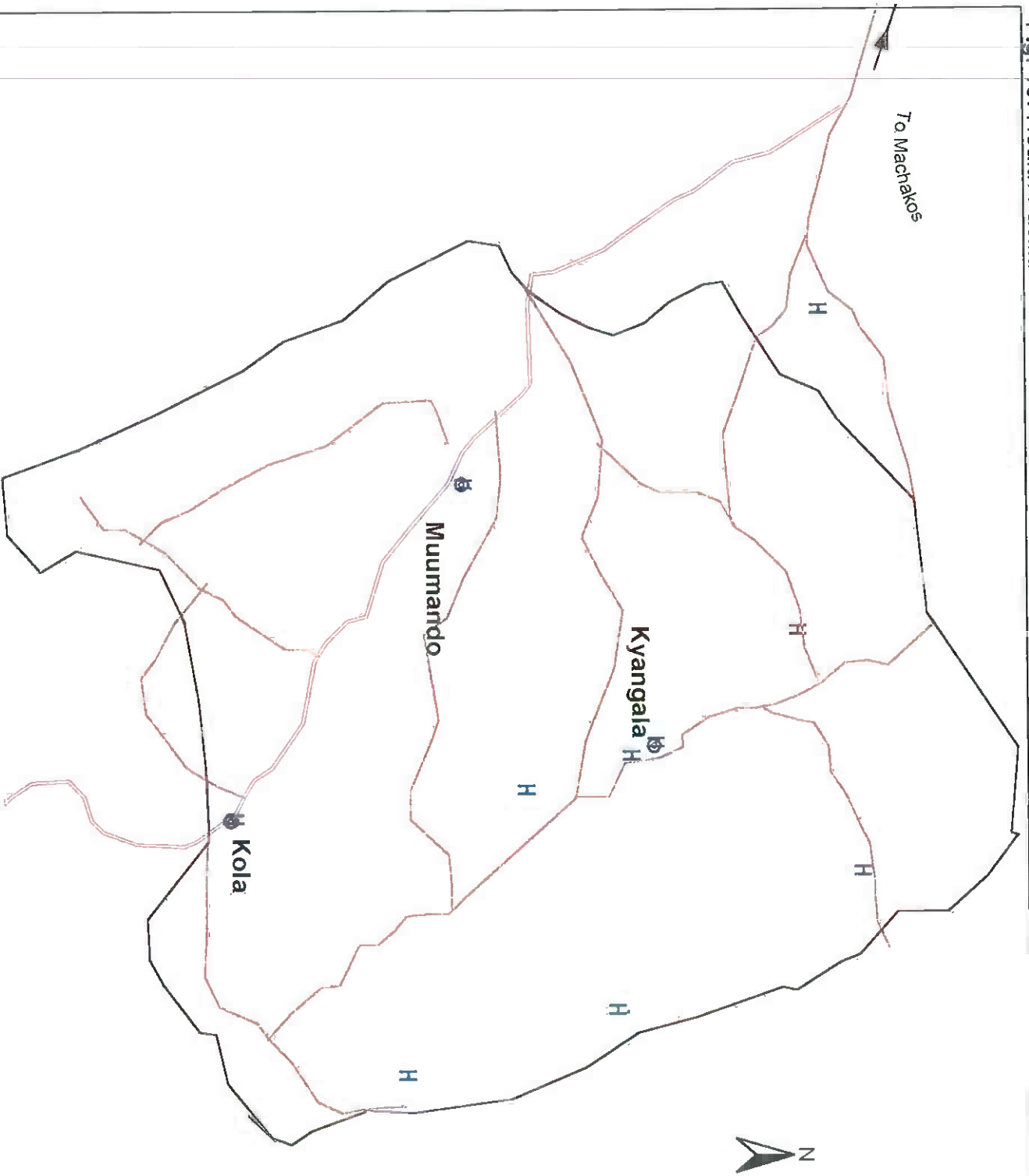
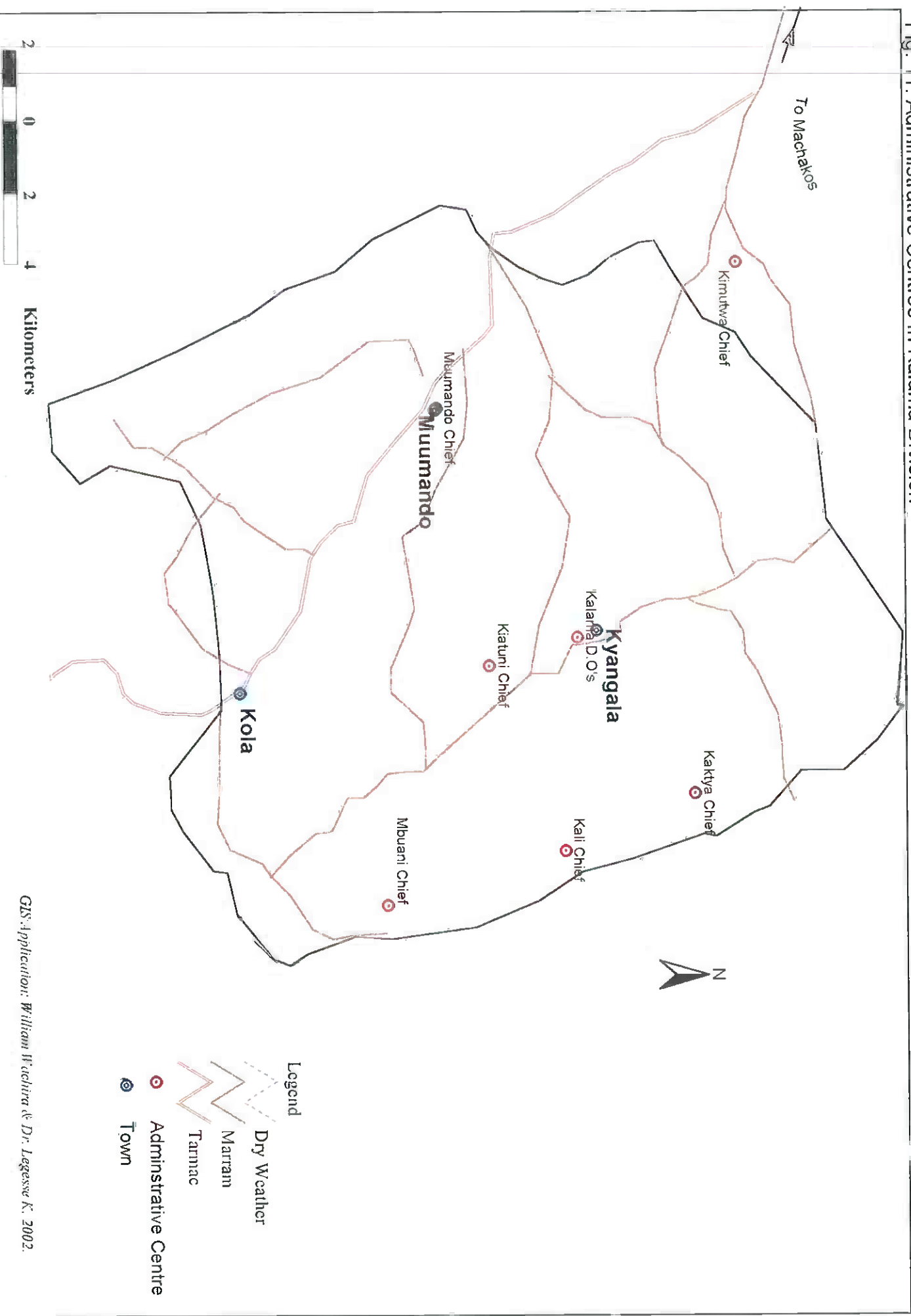


Fig. 10. Health Facilities In Kalama Division



- Legend
- Dry Weather
 - Marrani
 - Tarnnac
 - Town
 - Health Facility

Fig. 11. Administrative Centres In Kalama Division



APPENDIX II

GPS REF: POINTS FOR MAJOR FACILITIES IN KALAMA DIVISION

ID	FACILITY	X_COORD	Y_COORD	ALT(M)
1	Kimutwa Pry	305366	9823852	1634
2	Kalama Pry	313638	9822666	1555
3	Kyangala Pry	314780	9819918	1593
4	Kisyani Pry	315744	9818683	1623
5	Kiatuni Pry	315502	9817705	1621
6	Miaani Pry	315245	9816026	1644
7	Iiyuni Pry	314122	9813680	1652
8	Kola Pry	316110	9811550	1588
9	Kinoi Pry	318711	9816303	1677
10	Mbuani Pry	321534	9815146	1455
11	Kyaviti Pry	319725	9819081	1505
12	Kyadili Pry	319262	9821390	1438
13	Kisueni Pry	317993	9823936	1418
14	Mulaani Pry	317234	9824791	1420
15	Miwani Pry	313709	9826543	1502
16	Masaani Pry	308942	9822034	1619
17	Kamuthini Pry	310152	9822230	1599
18	Muthumo Pry	314725	9824411	1491
19	Muumando Pry	309025	9816410	1817
20	Kalanzoni Pry	306429	9811478	1709
21	Kikongooni Pry	307544	9808374	1662
22	Nzaini Pry	312891	9813670	1672
23	Mikono Pry	316937	9812182	1641
24	Kombuni Pry	317776	9813422	1635
25	Katanga Pry	319489	9812793	1519
26	Mbusyani Pry	321821	9813807	1452
27	Ziyoni Pry	312285	9820547	1575
28	Kyamuthinza .Pry	306860	9817659	1836

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Kalama Sec. Sch	313638	9822666	1555
2	Yongono Village Poly	313865	9821729	1581
3	Kyangala Sec. School	314780	9819918	1593
4	Kiatuni Y. Poly	315502	9817705	1621
5	Iiyuni Sec. School	314122	9813680	1652
6	Kola Sec. School	316110	9811550	1588
7	Kola V. Poly	316110	9811550	1588
8	Mbuani Sec. School	321534	9815146	1455
9	Muumando Sec. School	309025	9816410	1817
10	Lumbwa V. Poly	309025	9816410	1817
11	Kalanzoni College	306429	9811478	1709

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Kakuyuni Shallow wells	314116	9820960	1598
2	Tuluni water point	315744	9818683	1623
3	Subsurface dam	315637	9817092	1563
4	Kiitini dam	312138	9823451	1530

5	Borehole	307726	9809574	1618
6	Ndolo Dam	309029	9807766	1644
7	Utooni subdam	318359	9812633	1523
8	Utooni Hand pump	318359	9812633	1523
9	Syaoni subdam	313297	9821354	1504
10	Dam	310854	9824894	1503
11	Pump house	307409	9817092	1783

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Gypsum harvesting	314507	9820441	1581
2	Sand scooping	315637	9817092	1563
3	Gypsum harvesting	314122	9813681	1656
4	Mbehani Quarry	307220	9822420	1612
5	Sand harvesting	307914	9821648	1592

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Kimutwa Centre	305356	9823952	1634
2	Makaveti Centre	312292	9825658	1510
3	Kalama Centre	313638	9822666	1555
4	Yongoni Centre	313865	9821729	1581
5	Kakuyuni Centre	314116	9820960	1598
6	Kyangala Centre	314507	9820441	1581
7	Ikuuni Centre	315550	9818124	1633
8	Kiatuni Centre	315502	9817705	1621
9	Miaani Village	315245	9816026	1644
10	Iiyuni Centre	314122	9813680	1652
11	Kola Centre	316110	9811550	1588
12	Kikumbatu Centre	317503	9816401	1638
13	Mwanyani Centre	318711	9816303	1677
14	Mbuani Centre	321534	9815146	1455
15	Kyaviti Village	319725	9819081	1505
16	Kali Centre	320158	9819585	1491
17	Kyadili Village	319262	9821390	1438
18	Kakatya Centre	318717	9822847	1417
19	Kisueni Village	317993	9823936	1418
20	Mulaani Village	317234	9824791	1420
21	Kwa Mutisya	314800	9827472	1470
22	Miwani Village	313709	9826543	1502
23	Mbehani Village	307220	9822420	1612
24	Masaani Centre	308942	9822034	1619
25	Kamuthini Village	310152	9822230	1599
26	Kiitini Centre	312138	9823451	1530
27	Muthumo Centre	314725	9824411	1491
28	Muumando Centre	309025	9816410	1817
29	Ndolo Village	309029	9807766	1644
30	Katuaa Centre	312891	9813670	1672
31	Katanga Centre	319489	9812793	1519
32	Ziyoni Centre	312285	9820547	1575

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Kyangala Posho mill	314507	9820441	1581
2	River gauging point	315637	9817092	1563
3	Kola Posta	316110	9811550	1588

4	Muumando posta	309025	9816410	1817
5	Konza ranch	309025	9816410	1817
6	Konza dam	309025	9816410	1815
7	Kalanzoni tank	306429	9811478	1709

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Kimutwa Clinic	305356	9823952	1634
2	Kyangala Clinic	314507	9820441	1581
3	Kyangala Health	314780	9819918	1593
4	Kiatuni Clinic	315502	9817705	1621
5	Kola Clinic	316110	9811550	1588
6	Mbuani Clinic	321534	9815146	1455
7	Kali Clinic	320158	9819585	1491
8	Mulaani Clinic	317234	9824791	1420
9	Kiitini Health	312138	9823451	1530
10	Muumando Disp.	309025	9816410	1817

ID	FACILITY	X-COORD	Y-COORD	ALT
1	Gypsum harvesting	314507	9820441	1581
2	Sand scooping	315637	9817092	1563
3	Gypsum harvesting	314122	9813681	1656
4	Mbebani Quarry	307220	9822420	1612
5	Sand harvesting	307914	9821648	1592

ID	FACILITY	X-COORD	Y-COORD	ALT
1	Kyangala Posho mill	314507	9820441	1581
2	River gauging	315637	9817092	1563
3	Kola Posta	316110	9811550	1588
4	Muumando posta	309025	9816410	1817
5	Konza ranch	309025	9816410	1817
6	Konza dam	309025	9816410	1815
7	Kalanzoni tank	306429	9811478	1709

ID	FACILITY	X-COORD	Y-COORD	ALT
1	Kiatuni dip	315502	9817705	1621
2	Mbuani dip	321534	9815146	1455
3	Cattle dip	307712	9807245	1686
4	Utooni dip	319070	9812932	1501

ID	FACILITY	X-COORD	Y-COORD	ALT
1	Makili river bridge	312800	9824847	1446
2	Makaviu bridge	314780	9819918	1593
3	Methambaa bridge	315744	9818683	1623
4	Kyetololo bridge	315637	9817092	1563
5	Syuni bridge	315730	9824607	1421
6	Minyalala bridge	307914	9821648	1592
7	Kyawalia bridge	305415	9819499	1752
8	Syaoni bridge	321658	9814646	1391

ID	FACILITY	X_COORD	Y_COORD	ALT
1	Kimutwa Chief's Office	305356	9823952	1634
2	Kalama D.O's Office	314780	9819918	1593
3	Kiatuni Chief's Office	315502	9817705	1621

4	Mbuani Chief's Office	321534	9815146	1455
5	Kali Chief's Office	320158	9819585	1491
6	Kaktya Chief's Office	318717	9822847	1417
7	Muumando Chief's Office	309025	9816410	1817

PART III

SITUATIONAL ANALYSIS AND RESOURCE MAPS

FOR

MAGADI DIVISION

SITUATIONAL ANALYSIS OF MAGADI DIVISION

Location and area:

Magadi division is located in the North Western part of Kajiado district, Rift Valley Province. It is bordering Tanzania to the South West. It has the total area of 2,749km². (Fig. 1).

Topography:

The division has a general topographic pattern like other adjacent divisions characterized by volcanic hills intercepted by plains that are dissected by valleys. Most of the area lies between 500 and 800 metres above sea level except the far Western Nguruman Escarpment which has higher altitude.

Climate:

Magadi division experiences two rainfall patterns:

The short rainfall between October and December and the long rainfall between March and May. It receives about 500mm average annual rainfall influenced mainly by altitude.

Nguruman Escarpment receive heavy rains. Apart from several dry season riverbeds Ewaso Nyiro is the only permanent river crossing the division.

Temperature varies between the highest recorded around Lake Magadi and the lowest recorded at the Eastern slopes of Mt. Kilimanjaro.

Population size:

According to the Population Projection of 2001, Magadi division has a total population of 28,244. It is the least populated of all the divisions in the district but forth in terms of land area. About 3,990 or 14% of the population are urban and about 24,254 or 86% are rural. The population of the division is unevenly distributed at a density of 10 persons/km² (Fig 2).

Geological formation:

The division is characterized by three broad soil categories: The volcanic soils, the ploistocene soils and the basement rock soils. The greater part of Magadi division is covered by basement rock soils intercepted by alluvial soils along river valleys and on some parts of the plains. These soils support the growth of food crops like beans, maize and other horticultural crops mainly Asian vegetables for export.

Water Resources:

Magadi division, like other divisions in the district is faced with severe shortage of surface water. This is due to relatively low precipitation received in the division and the recurrent drought experienced. The major source of surface water is Ewaso Ngiro river which is permanently flowing throughout the year traversing the South-Western part of the division. There are few boreholes and shallow wells here and there used for household and livestock consumption.

The water supply system is therefore varied from place to place (Fig 3).

Energy Supply:

In Magadi Town major facilities like schools, hospital, magadi soda factor some residential and development institutions have electricity connections which is owned by the company. Rest of the division depends mainly on firewood and charcoal and on paraffin and gas to some extent. (Fig. 4).

Agricultural Activities:

Magadi division has about 3,900 rural households engaged in agricultural activities. They farm over a farm area 5 sq. km. Main agricultural products include bananas, pawspaws, oranges, water melons, mangoes, tomatoes and varieties of Asian vegetables. Asian vegetables are mainly for exports and are grown in various irrigation schemes and along the river valleys. In Ngurumani, there is a good potential for cotton farming. Rainfed agriculture is hardly practiced as the amount of rainfall is not enough. For agro-ecological zones in Magadi division. (See Fig. 5).

Livestock Production:

The main livestock reared in the division are cattle, goats and sheep. Currently, a lot of diversification is being practised with the introduction of camels and poultry. Magadi area is overstocked with a carrying capacity of 6.14 per Livestock Unit (LU) per hectare due to bare and rocky nature of the land. Total livestock population in the division is more than 44,000, according to District Livestock Production Office estimation, Kajiado 1996.

At 1995, it was estimated that about 52,000 donkeys were in the district with a good proportion of it in Magadi division. This makes rural transport system in the division mainly done by donkeys.

Communication Network:

The major roads in the division follow along the North - South axis. The road network is inadequate posing difficulties in internal communication in the division. Generally, road construction and maintenance is an expensive exercise.

In Magadi division there are 92 km of unclassified and 105km of classified roads. General the condition of roads in the division is poor with very few access roads. During the rainy season, it is difficult for the farmers to get their products to collection points and markets (Fig. 6,7&8).

Educational Facilities:

Magadi division has over 30 schools, which is the least relative to the number of schools in other divisions in the district.

According to District Education Office, Kajiado 1996, enrolment for boys and girls was 1036 and 779, respectively. The number of teachers as at 1996 was 65. For the distribution of education facility in the division (See Fig. 9).

Health Facilities:

The division has one hospital, few dispensaries and health centres. There is lack of medical specialists and consultants in some specific fields for the distribution of health facilities. (See Fig.10).

Forestry:

There are patches of bush/shrub lands scattered along river and water catchment areas which are not for any commercial exploitation but used mainly for firewood charcoal and construction material. Over 93% of the household energy comes from firewood and charcoal.

Minerals:

Generally, Kajiado district is endowed with rich commercial minerals like asbestos, limestone, colombite, diatomite, graphite, garnet, kaoline, soda ash, feldspar and quartzite. These minerals are of great importance to communities in Magadi division directly and indirectly.

The development of small scale industries is possible by utilizing these minerals which can assist to create employment and micro income generation opportunities.

Tourist attraction:

Magadi division has a potential for development of tourism. The Nguruman Escarpment has high potential for tourist attraction both for local and international if developed.

Administrative Centres:

Administrative centres refer to the location and distribution of divisional headquarter, different GOK departments, research institutes, processing plants, police posts, chiefs' and assistant chiefs' offices in the division. (Fig. 11).

Fig. 1 Location of Magadi Division

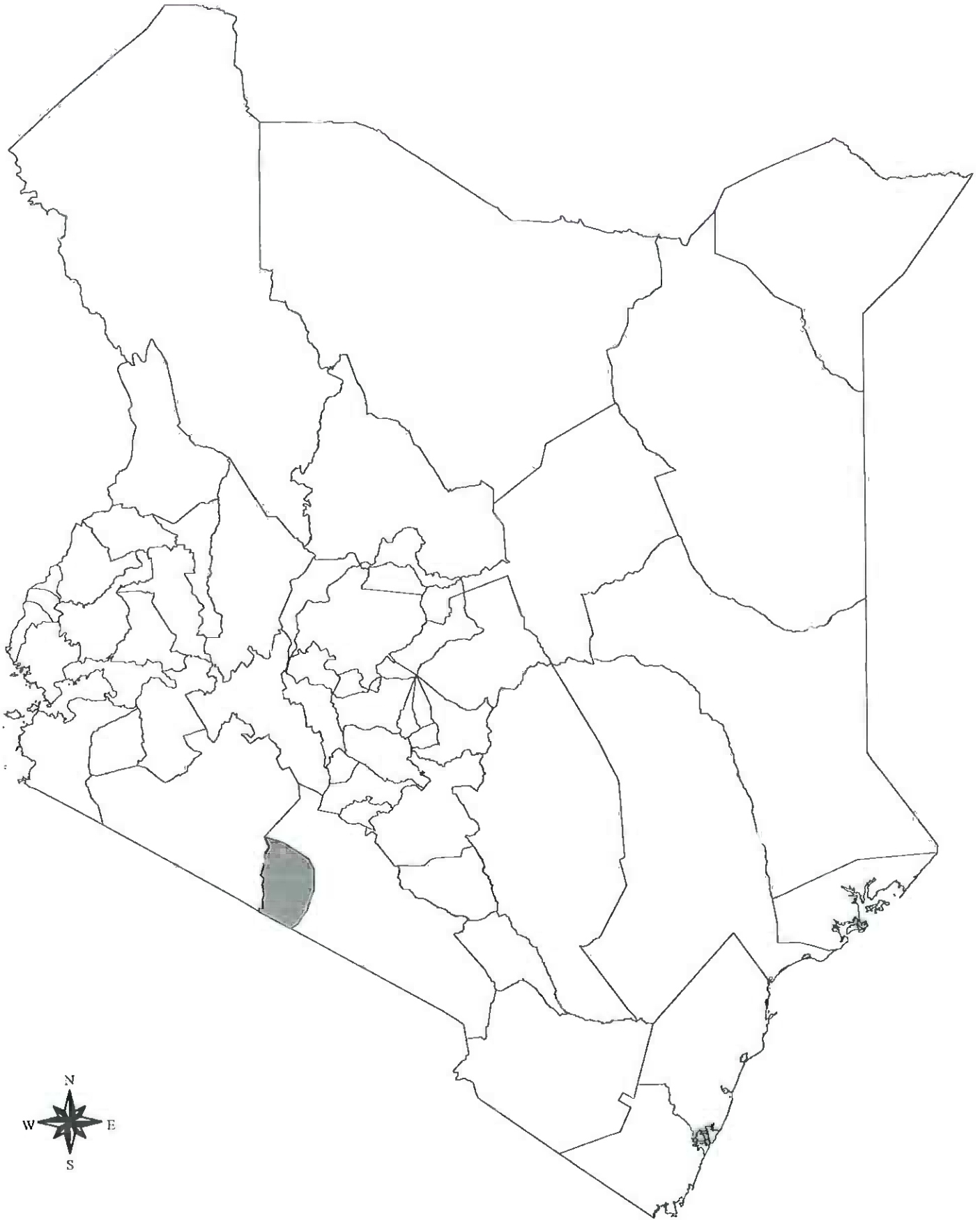


Fig. 2. Human settlement Patterns in Magadi Division

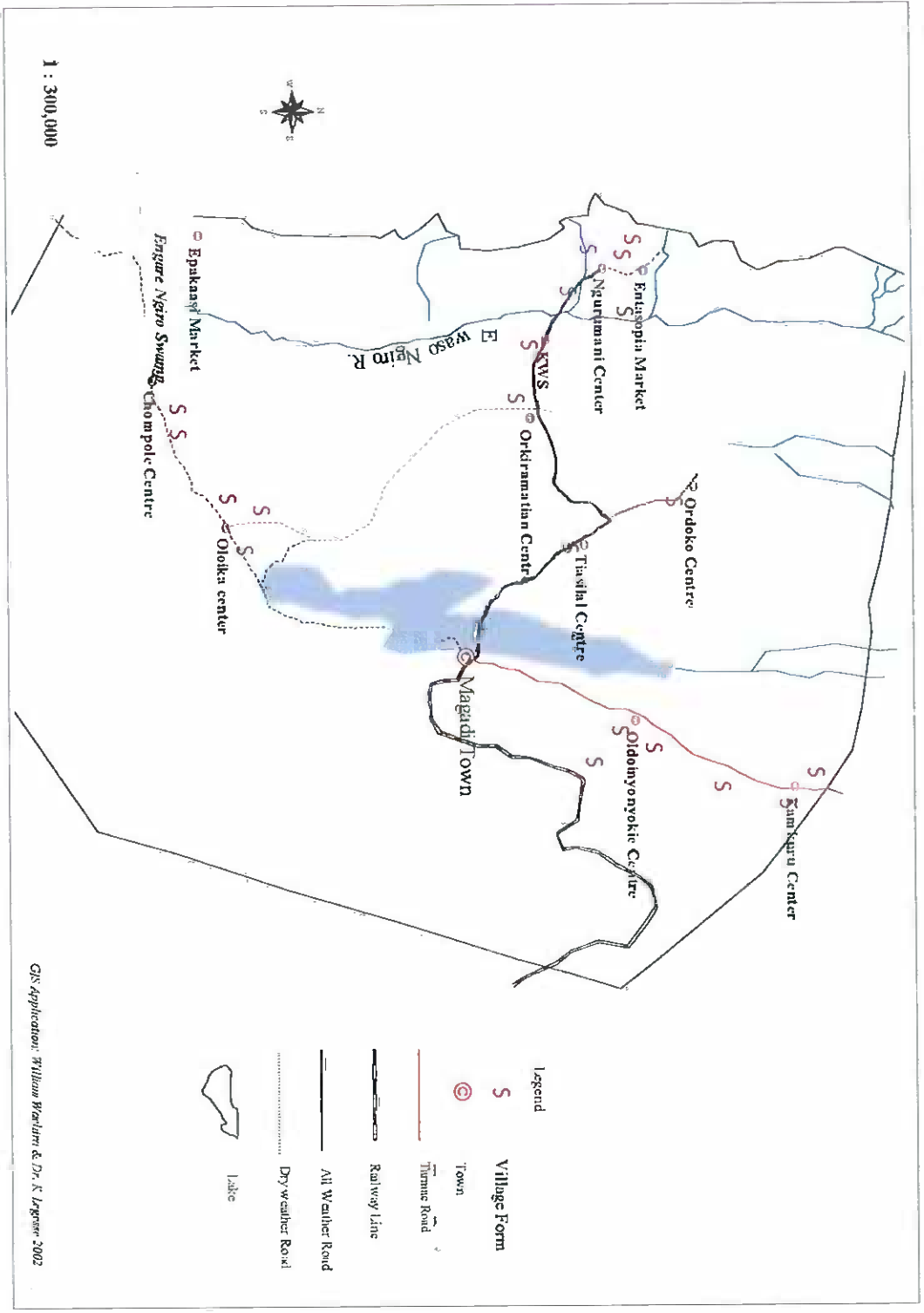


Fig. 3. Water Supply Systems in Magadi Division

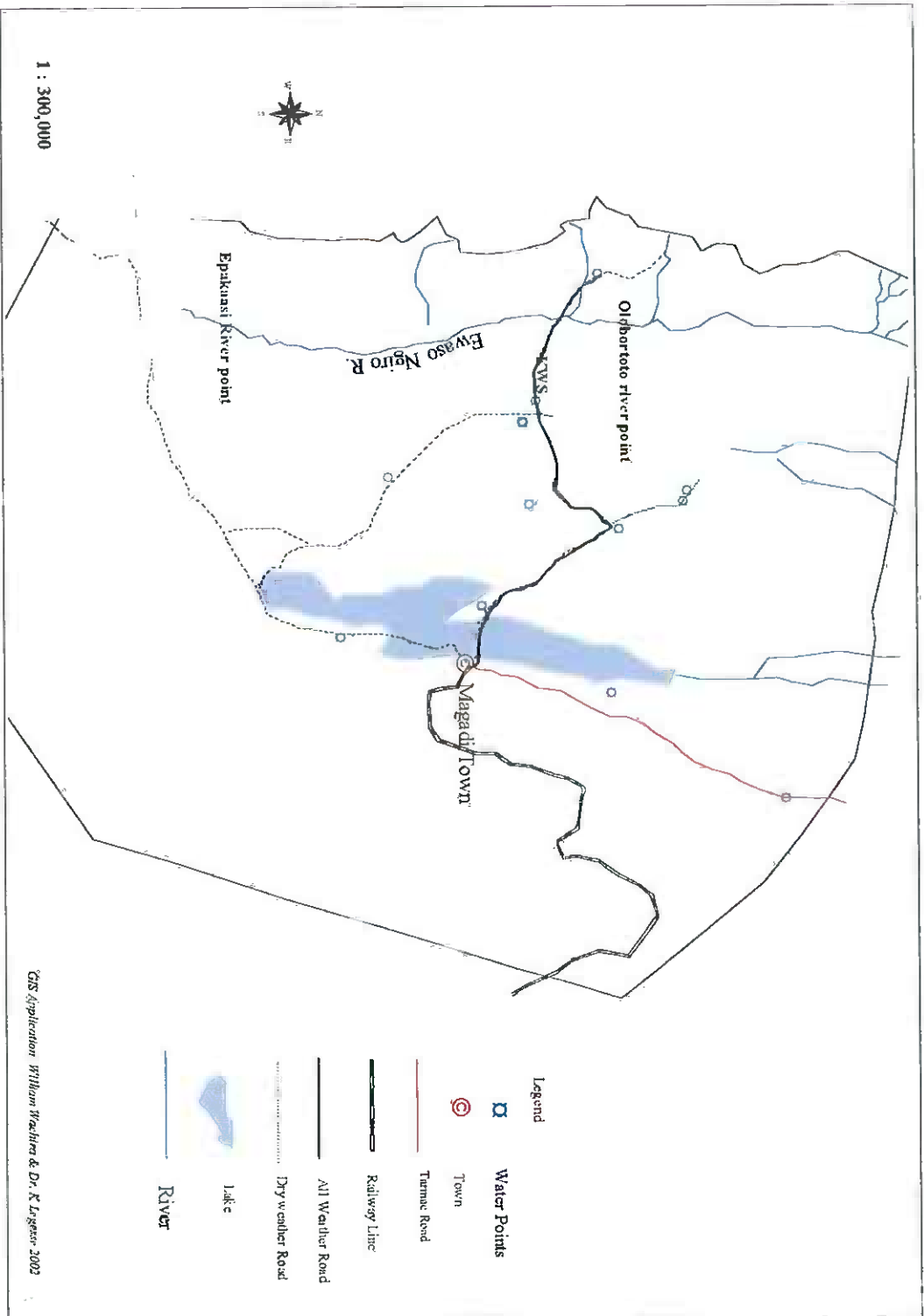


Fig. 4. Energy Supply Systems in Magadi Division

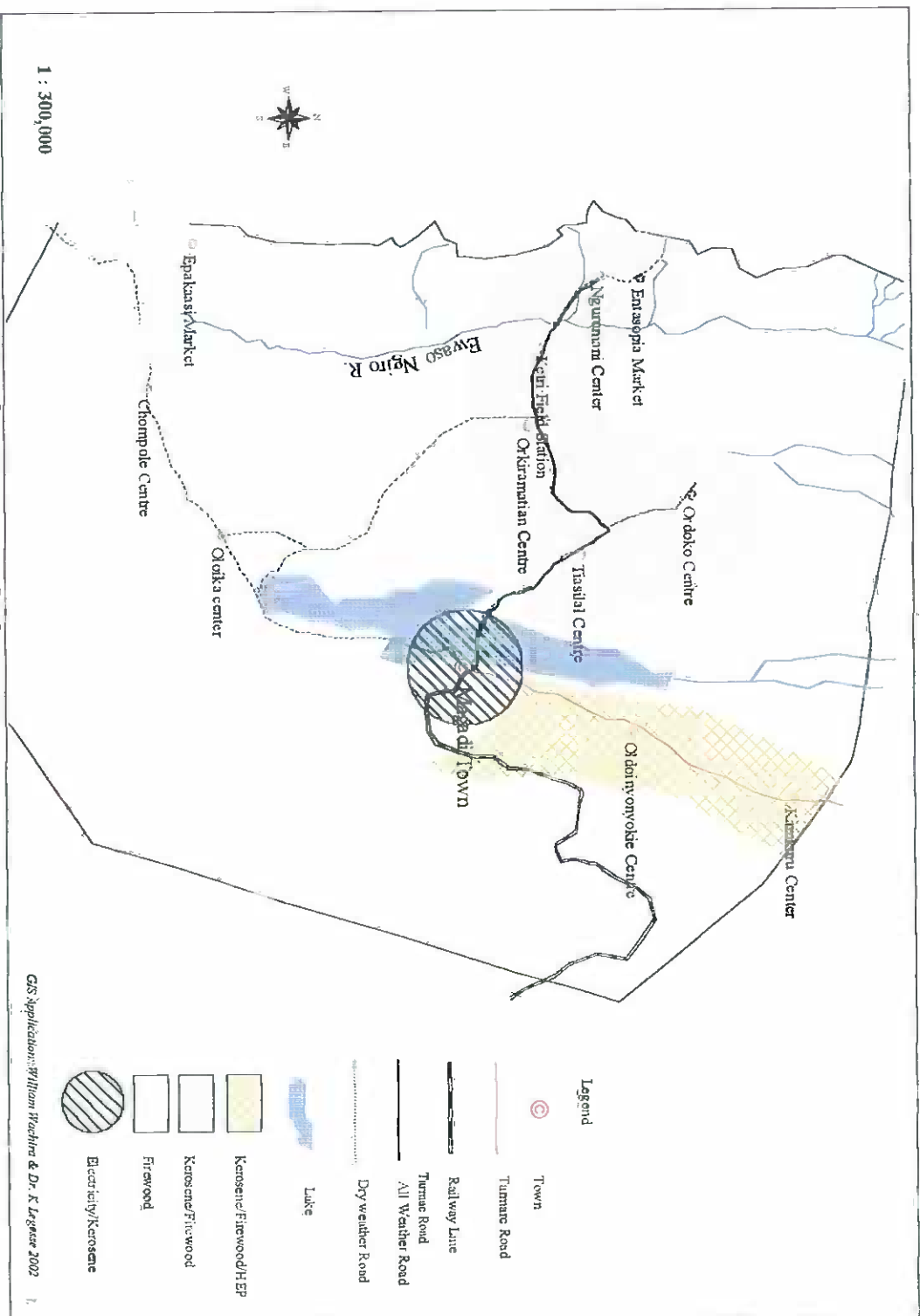


Fig. 5. Agro-ecological Zones in Magadi Division

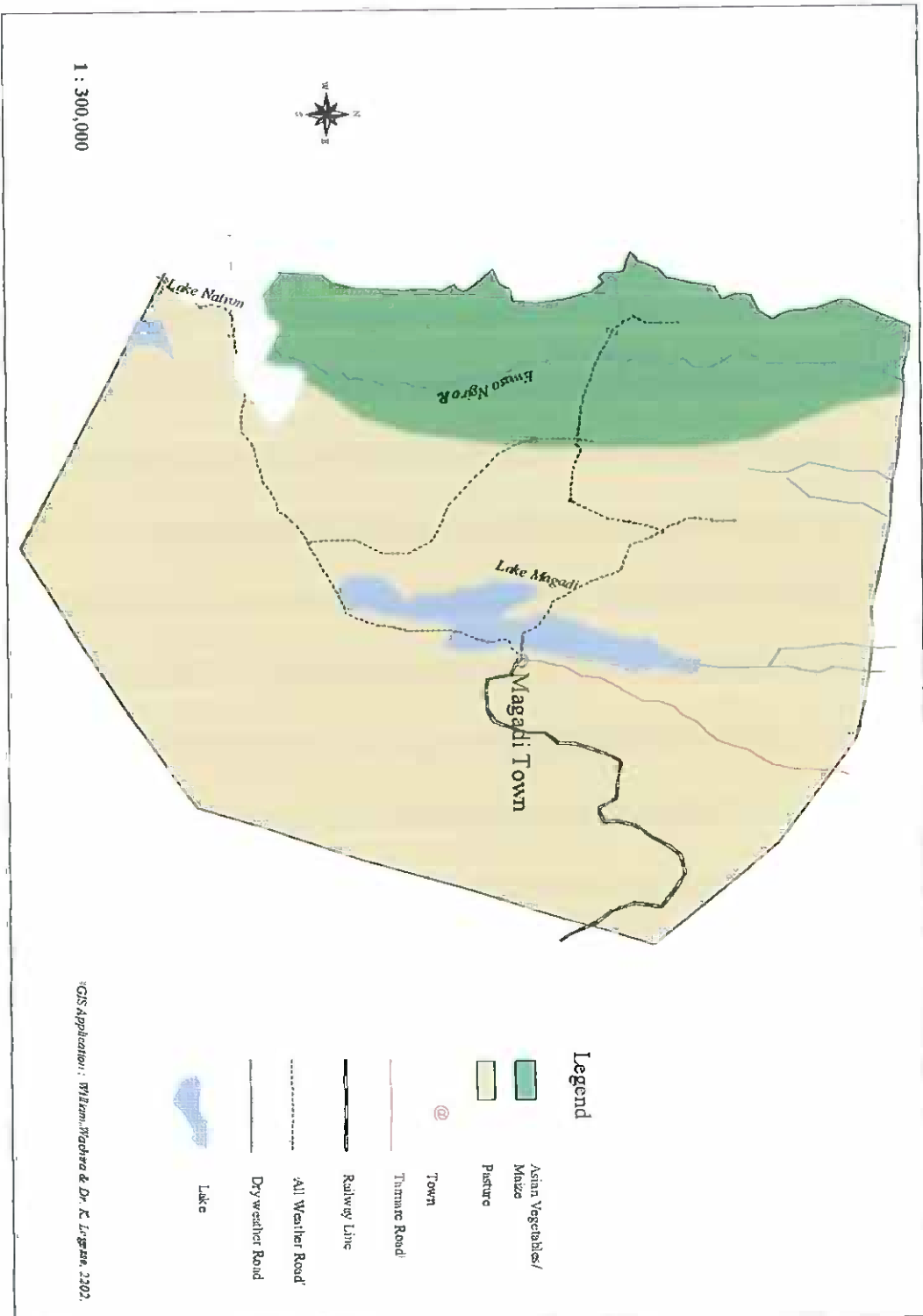


Fig. 6. Major Road Network and Market Centres in Magadi Division

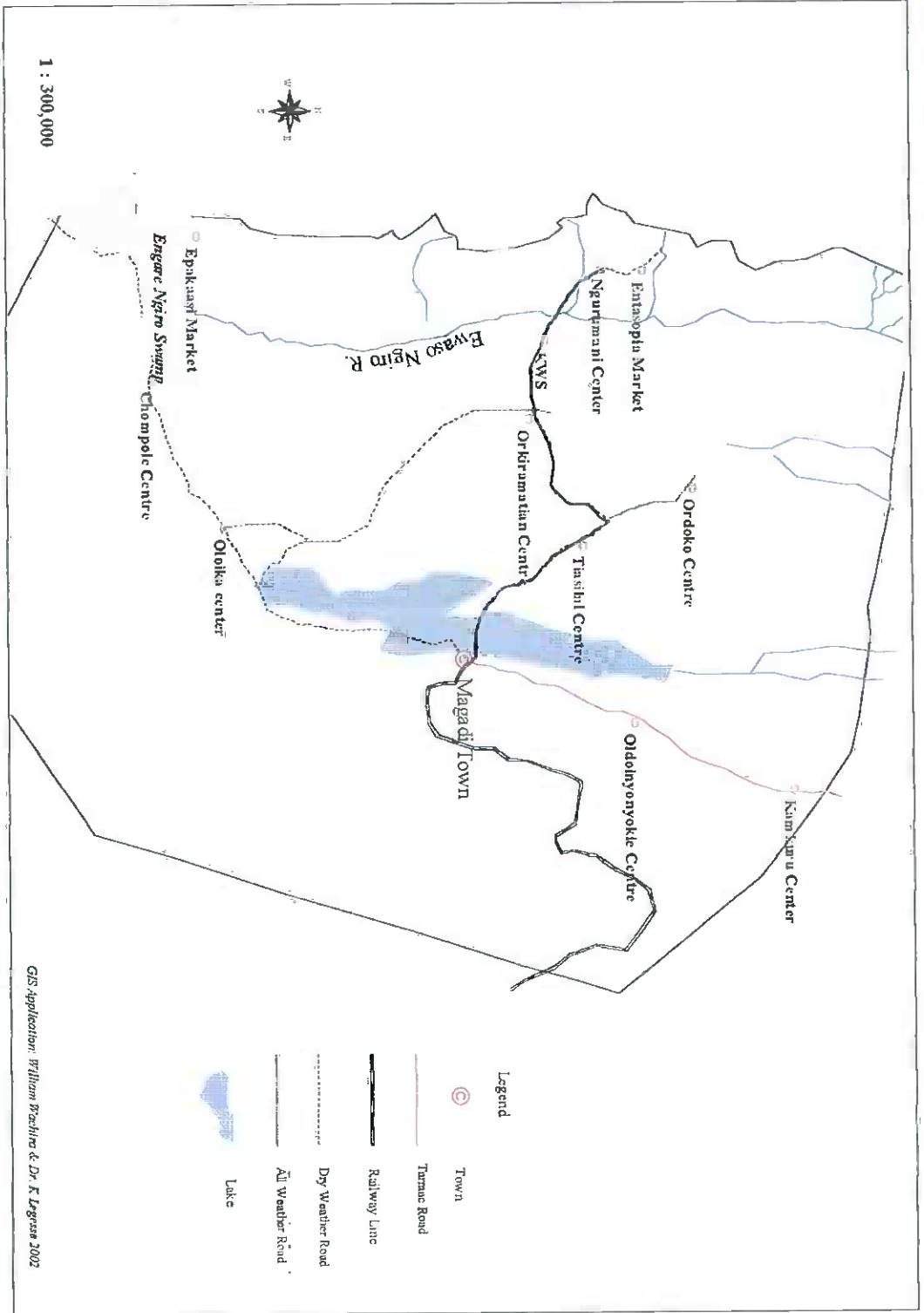


Fig. 7. Communication Systems in Magadi Division

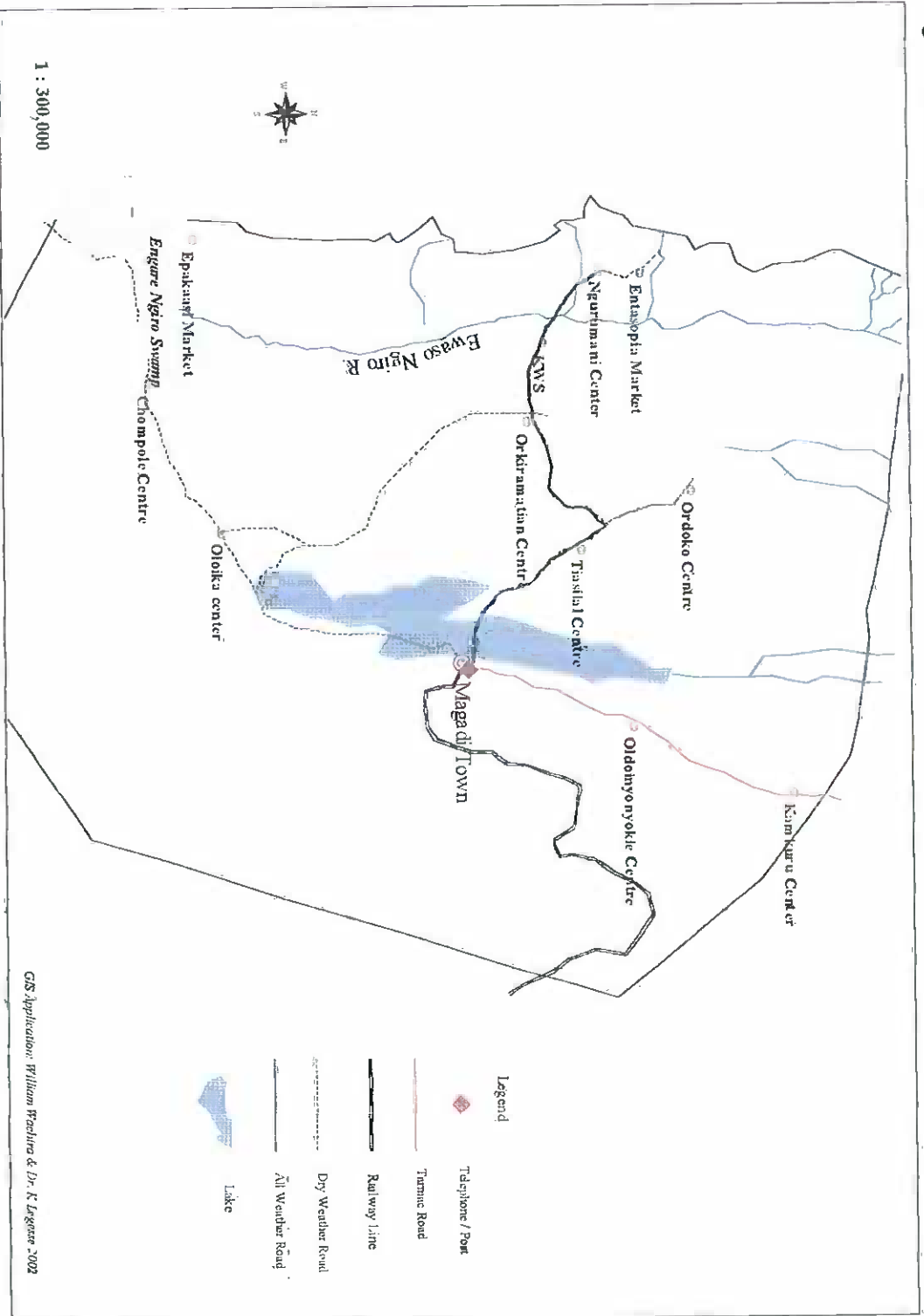


Fig. 8. Transport Systems in Magadi Division

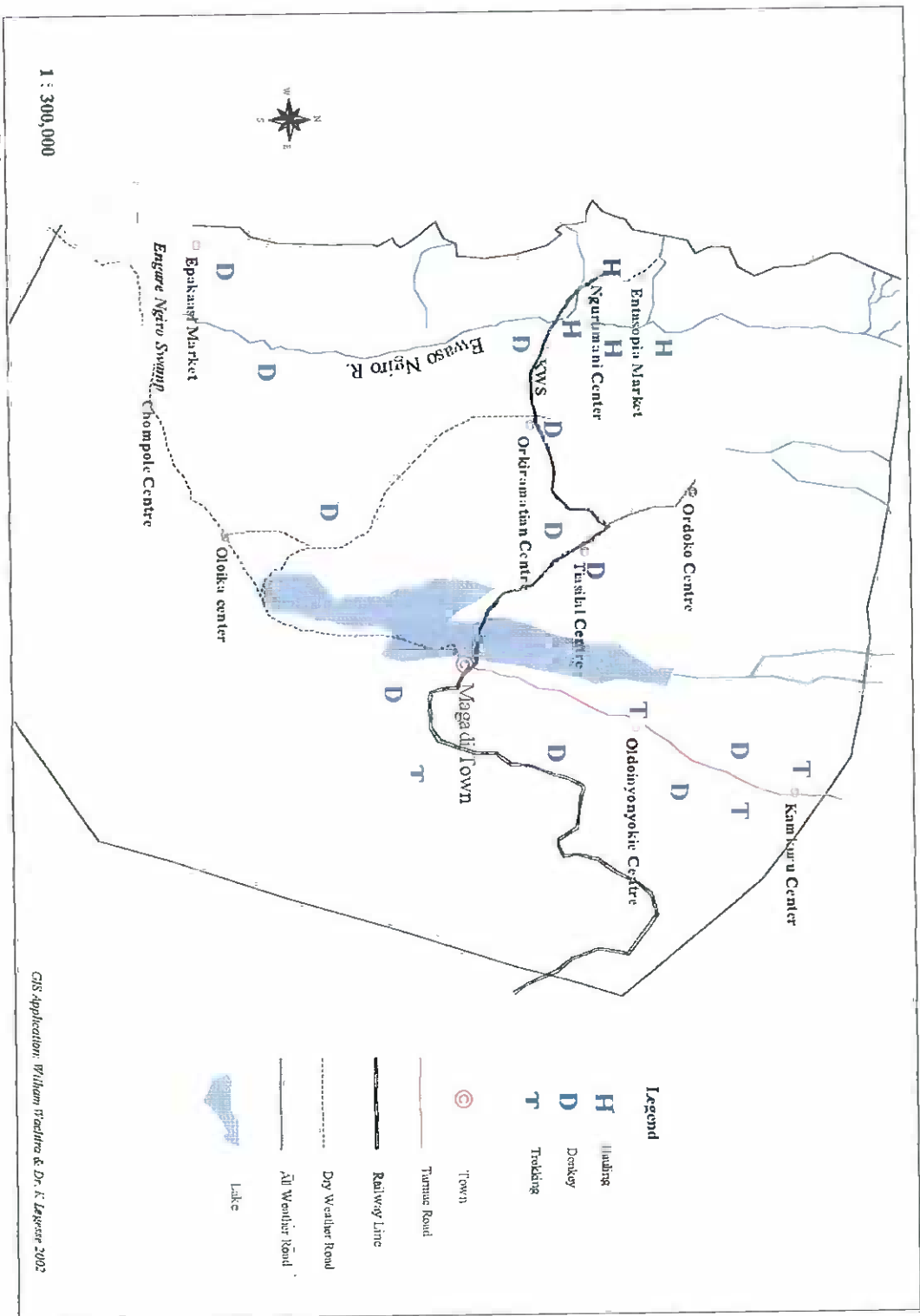
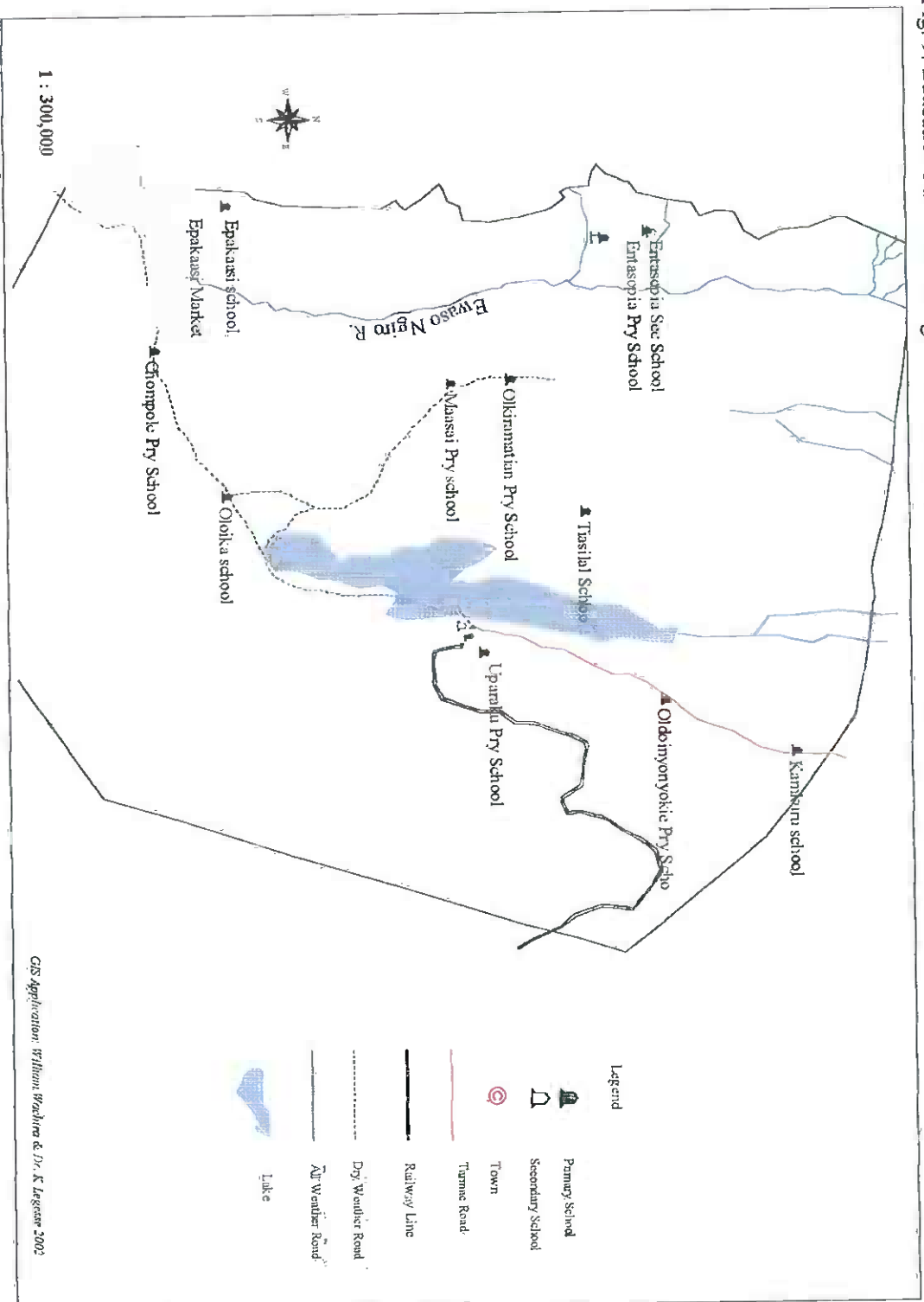


Fig. 9. Education Facilities in Magadi Division



GIS Application: William Wachira & Dr. K. Legesse 2002

Fig. 10. Health Facilities in Magadi Division

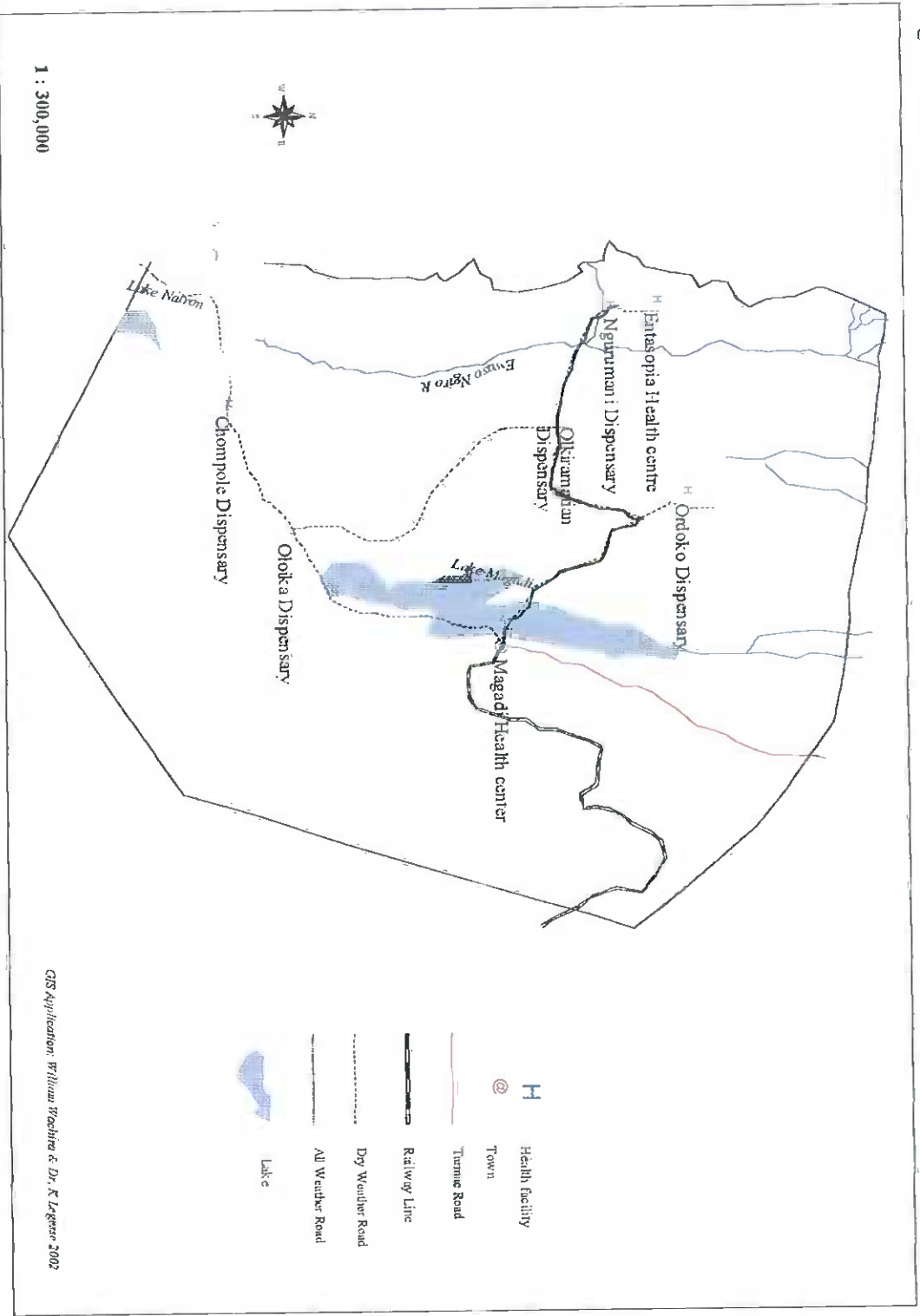
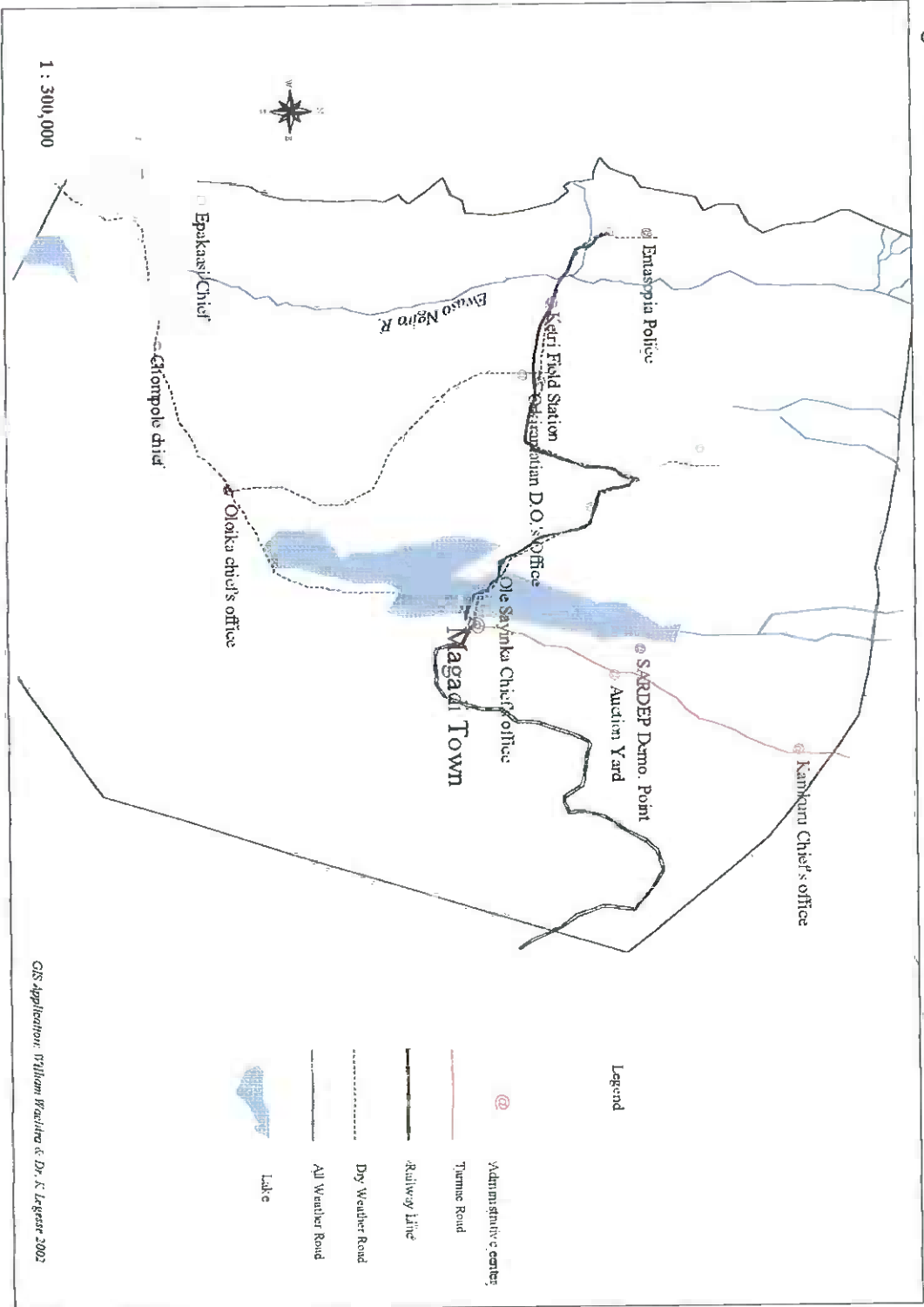


Fig. 11. Administrative Centres in Magadi Division



Appendix III

GPS: REFERENCE POINTS FOR MAJOR FACILITIES IN MAGADI DIVISION

ID	FACILITY	X-COORD	Y-COORD	ALT(M)
1	Magadi Town	198056	9790363	630
2	Magadi Sec School	198056	9790363	630
3	Maasai Pri School	198056	9790363	630
4	Hospital	198056	9790363	630
5	Post Office	198056	9790363	630
6	Water Point	197915	9787528	648
7	Oloika Centre	190063	9773776	654
8	Oloika Primary	190063	9773776	654
9	Oloika Dispensary	190063	9773776	654
10	Chompole Primary School	179940	9768907	663
11	Ewasonyiro Bridge	176541	9768608	653
12	Chompole Trading Centre	179940	9768907	663
13	Chompole Dispensary	179940	9768907	663
14	Water Tank	197109	9781626	654
15	Ole Sayianka	195192	9792330	633
16	Entaposia Health Centre	172048	9802836	879
17	Entaposia Pry School	172048	9802836	879
18	Entaposia Polytechnic	172044	9802559	782
19	Entaposia Pry School	172604	9802343	795
20	Entaposia Market	172604	9802343	795
21	Entaposia Police Post	172604	9802343	795
22	Chiefs Office	172604	9802343	795
23	Agri. Office	173076	9801367	742
24	Oloibortoto River Crossing Point	172479	9799607	774
25	Ngaramani Centre	172479	9799607	774
26	Nursery School	172479	9799607	774
27	Jeena Education (Pry) Institute	172479	9799607	774
28	Ngaramani Clinic	172479	9799607	774
29	Piped Water	177158	9795829	675
30	Ketri Field Station	177158	9795829	675
31	ICIPE Field Station	177158	9795829	675
32	KWS	177158	9795829	675
33	Market	198352	9790835	630
34	Magadi Petrol Station	198400	9791050	630
35	Magadi Police Post	198352	9790835	630
36	Magadi Factory (Soda Ash)	177566	9795627	582
37	Ewaso Ngiro Bridge	180472	9795021	623
38	Olkiramatian Centre.	181111	9794856	673
39	LorkiuPan	182698	9794529	659
40	D.O.'s Office	182700	9795030	659
41	Olkiramatian Dip	182481	9794000	659
42	Olkiramatian Tank	182600	9793800	659
43	Cattle Cush	182200	9793196	659
44	Olkiramatian Pry School	182143	9793114	659
45	Olkimartian Dispensary	182525	9789200	664
46	Maasai Rural Training Centre	188148	9794346	709
47	Embirika Pan	188148	9794346	709
48	Community Water Point	189755	9800395	679
49	Lieinyamuk Pan	189755	9800395	679
50	Naborlepoi Pan	189236	9801516	683
51	Oldorko Cattle Dip	187948	9804781	668
52	Doinyo Olkinei Pan	187203	9805042	666

53 Olorko Dispensary	187203	9805042	666
54 Community Water Point	187406	9805679	680
55 Oldorko Centre	199305	9798176	618
56 Tiasilal Centre	191305	9798176	618
57 Nursery School	191305	9791138	644
58 Oloserian Community Water Point	194954	9791138	644
59 Oloserian Pan	194954	9791138	622
60 Uparaku Pry School	200937	9791138	622
61 Community Water Point	200937	9799838	622
62 SARDEP demo site	202753	9801631	787
63 Oloinyonyoike Auction Yard	203405	9803511	792
64 Oloinyonyoike Centre	204349	9801631	856
65 Oloinyonyoike Pry School	208103	9803511	897
66 Kamkuru Town	207946	9811584	877
67 Eloret Pry School	207946	9812419	877
68 Chiefs Office	207946	9812419	877
69 Shompole Eco-lodge	169357	9812419	700
70 Pakaase crossing point	169622	9775689	646
71 Pakaase Market	170111	9774410	643
72 Pakaase Pry School	169937	9772048	646
73 Lengobei Water Point	186216	9773908	665