Chapter 10

Logistics System

10. LOGISTICS SYSTEM

10.1 BACKGROUND

This report documents the findings on the logistics system for essential drugs and medical supplies. The general objectives of the study are fivefold:

1) to describe the GOK general logistics system for drugs and medical supplies;
2) to identify the problems, issues, gaps and concerns in the logistics system;
3) to analyse the causes and contributory factors;
4) to discuss the previous and on-going efforts in improving the system; and
5) to describe essential planning issues and directions.

The methodology employed for gathering data are as follows: interview with key informants in health facilities and institutions involved in the logistics system (Annex 1); focus group discussion with DHMTs; and review of records, reports and literature (Annex 2). Pre-testing of the data-collection instruments was done in Kericho District. In line with the overall goal of the development study, that is to strengthen the district health system, many of the facilities visited belong to the government. Nonetheless, private facilities were also included in the study for comparative analysis.

10.2 GENERAL LOGISTICS SYSTEM IN KENYA

10.2.1 Public Sector

The goal of the Kenya National Drug Policy is as follows:

> ***To use available resources to develop pharmaceutical services to meet the requirements of all Kenyans in the prevention, diagnosis and treatment of diseases using efficacious, high-quality, safe and cost-effective pharmaceutical products.***

Among its specific objectives are:

1) to ensure a constant availability of safe and effective drugs to all segments of the population;
2) to provide drugs through different sectors at affordable prices; and
3) to facilitate rational use of drugs through sound prescribing, dispensing, and usage.

Towards these objectives, the GOK established and maintains a logistics system for essential drugs and medical supplies (Fig. 1) based on the "push" principle that starts from the top of the organisational structure. Theoretically, the requirements are estimated

based on HIS data on population, number of health facilities, morbidity patterns, and health facility workload. Since 1995, drugs are procured centrally by either the MoH or the individual donors through procurement agents. Occasionally, some DHMB would buy directly from private chemists using the facility improvement fund.

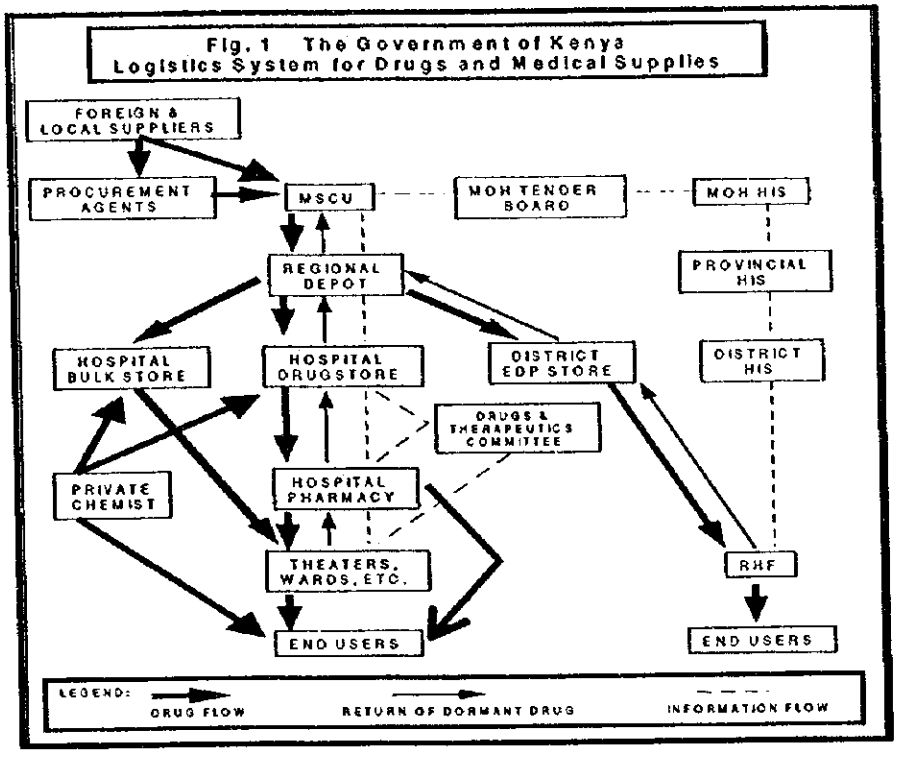
The Medical Supplies Co-ordination Unit (MSCU) and the regional depots are responsible for storage and distributing[1] kits to districts at levels pre-determined by the MoH. The stockholding capacity of the MSCU is 6 months and that of the regional depots is 3 months. There are at least five kinds of kits (Appendix 4):

1) dispensary kits, health centre kits, and dressing and lotion kits for rural health facilities under the Essential Drugs Programme;
2) inpatient kits, out-patient kits, and anti-malarial kits for provincial, district, and sub-district hospitals;
3) vaccination kits for the KEPI;
4) kits for family planning and sexually transmitted diseases; and
5) oral rehydration solutions for the Control of Diarrhoeal Diseases programme.

Aside from kits, loose drugs, family planning commodities, and medical supplies are also distributed through the system.

At the district level, medical supplies are stored in the hospital bulk store, hospital drugstore, pharmacy, or district EDP stores prior to their distribution to various end-users (e.g. hospital wards, theatres, RHF, or patients). The District Pharmacist has a central role in supervising drug use in RHF and in redistribution of slow-moving drugs. Drugs and Therapeutics Committees are organised to supervise drug management in the hospitals.

[1] Private contractor is responsible for the distribution of kits from MSCU to Mombasa only.



10.2.2 Private Sector

In contrast, the logistics system in the private sector is based on the "pull" principle where health facilities make their orders based on consumption. In general, there was no reported problem on availability. The lead-time for delivery is short because there are a number of distributors that are widely dispersed. Some large private health facilities (i.e. Brooke Bonds Hospital in Kericho and Aga Khan Hospital in Kisumu) can return excess drugs at no extra cost as long as the expiry date is longer than 6 months. Mission hospitals buy supplies from a central procurement organisation called the Mission Essential Drugs and Supplies (MEDS). MEDS also provides training on rational drug use.

10.3 PROBLEMS IN LOGISTICS SYSTEM IN THE STUDY AREAS

In general, the government logistics system for essential drugs and medical supplies is working as planned. However, it is bogged down by a number of operational problems in different key health facilities.

10.3.1 MSCU

Many of the present problems of the MSCU are chronic. They have been described before in the *Preliminary Report on the Essential Drugs Programme* (1991); the interim report on *Restructuring of Drugs and Other Medical Supplies Systems in Kenya* (1994); and in the interim report on *Restructuring and Streamlining of the Medical Supplies Co-ordinating Unit* (June 1997). The following is a brief summary of the major problems based on the last report.

The MSCU has neither a clear mandate nor organisational structure. It is heavily dependent on the MoH headquarters for its operation. The procurement, personnel, and accounts offices (Table 10.1) function only partially as many of their activities are actually performed by the MoH. In procurement, the MSCU is supposed to have a role in projecting the requirements. However, there seems to be a need for stronger co-ordination with MoH officials. Oftentimes, the MSCU will learn about a particular procurement only at the time of delivery.

Table 10.1 MSCU Departments

Administration	Technical	Supplies
Personnel	Pharmaceutical	Procurement
Transport	Non Pharmaceutical	Warehouse
Accounts	Essential Drugs Programme	- Receipt
Depots Management		- Dispatch
Tailoring		Stock Control
Security		- Computer
		- Kit section

The MSCU has a shortage of technical and management staff, and an excess of unskilled personnel (44 subordinate staff, 15 storemen, and 9 drivers out of 122 staff). It is estimated that 50% of the staff are routinely absent. In many of the MSCU offices, there is no effective chain of command because the supervisor is in the same job category as those supervised. In addition, many of MSCU staff have received almost no continuing education in their assigned responsibilities. This is particularly evident in the computer section that is manned by a subordinate staff.

As of March 1998, the MSCU physical facility has good supply of running water. Its roof is being replaced with a new one. However, it lacks good lighting and security arrangements. The use of warehouse space needs to be optimised as only 40% is being used for storage. The receiving and issuing areas for commodities are one and the same.

10.3.2 Regional Depots

The Nakuru depot serves the Kericho and Bomet districts. It is well maintained and 11 staff update records. It is headed by a pharmacist and has a pharmaceutical technologist, a store manager, and various subordinate staff. Its problems are as follows:

1) Its 8-year old lorry is being repaired with DANIDA funds. At times, district stores are asked to pick up their allocation.

2) It lacks storage space. This problem is aggravated occasionally by 6-month supply deliveries from MSCU when its capacity is only for 3 months, and persistently by the non-disposal of expired drugs. At the time of investigation, expired drugs occupied 10% of the already limited storage space. It seems the staff are afraid to be accused of misappropriation when they take the responsibility of disposing the drugs.

The Kisumu depot serves all three Kisii districts. Like the Nakuru depot, the Kisumu depot is also maintained properly and the records are updated. Its problems are:

1) Understaffing - It has no pharmaceutical technologist at the depot for more than one year. The officer-in-charge has only an administrative background. He has one assistant staff who had some short and unspecified medical training. For other duties such as loading and unloading, cleaning and maintaining the warehouse, and clearing the grounds, the night watchmen are asked to assist.

2) Transport Maintenance - Like the Nakuru Depot, the Kisumu Depot lacks to maintain the lorry and pay for its fuel requirements. District health facilities are often requested to collect their supplies by themselves.

10.3.3 District Stores

The rural health facilities in Bomet, Kericho, Central, and Nyamira are served by their respective District Stores. Those in Gucha are still under the responsibility of the Kisii District Store. All the four stores are located within the district hospital premises; only two are housed in a building separate from the hospital complex. In general, the District Stores share some common problems.

a. Maldistribution of a Few Pharmaceutical Staff

The number of pharmaceutical staff in Kenya is limited. The 1995 survey of the Development Solutions for Africa revealed that there were only 770 pharmacists and 1,140 pharmaceutical technologists. Many of them are deployed in the private sector (73%) as compared to only 22% being in the GOK, and the rest are in the mission/NGO sector. Furthermore, for every 41 pharmacy staff in the Kenya, only 1 works in the rural area while the rest are in the urban area.

In the study areas, the number on average, of pharmaceutical staff is veritably less than the national statistics (Table 10.2). While one pharmacist serves about 35 thousand people in Kenya, one pharmacist in the Study Area would serve almost 2.7 million people. When it comes to pharmaceutical technologist, the gap is smaller but still a significant amount. Furthermore, the limited number of staff in the study areas is also maldistributed. For example, despite the absence of inpatients, Bomet District Hospital has 3 pharmaceutical technologists. On the other hand, the fully functional Nyamira District Hospital has only one pharmaceutical technologist.

Table 10.2 Deployment of Pharmaceutical Staff in the Study Areas

District	Indicator	Pharmacist	Pharmaceutical Technologist	Total
Kericho	Number	1	1	2
	Population/Staff	597,698	597,698	298,849
Bomet	Number	0	3	3
	Population/Staff	0	194,593	194,593
Nyamira	Number	0	1	1
	Population/Staff	0	587,942	27,997
Kisii	Number	0	4	4
	Population/Staff	0	231,486	231,486
Gucha	Number	0	0	0
	Population/Staff	0	still under Kisii	still under Kisii
Study Area	Number	1	9	10
	Population/Staff	2,695,364	299,485	269,536
National	Population/Staff	34,316	23,179	13,834

Note: District population is based on District Development Plan estimate for 1997.

b. Transport

All the DHMTs reported the lack of a permanent solution to the problem of transport for their district stores. In the past, they have taken certain palliative measures such as the following:

1) sending an authorised official to the regional depot to pay for the fuel cost for delivery;
2) borrowing vehicles of private truck owners in the district to collect kits at the regional depot and paying only for the actual fuel consumed;
3) using the KEPI vehicle for the distribution of non-KEPI kits to rural health facilities;
4) using the district commissioner's vehicle as is the case in Nyamira;
5) asking the rural health facilities to collect their own kits from the District Stores.

c. Other Management Problems

In all of the facilities visited, storage space seems insufficient to keep significant volume of buffer.

Discrepancy between the number of kits dispatched by the district and the actual number received by rural health facilities was documented based on the questionnaire filled up by district store staff. Table 10.3 and 10.4 showed that the discrepancy is consistently highest in Nyamira. In general, there were more gaps observed when the kits were intended for distribution to dispensaries.

Table 10.3 Health Centre Kit Distribution

	Kericho	Nyamira	Kisii	Total
Kits received by facilities	49	32	102	183
Kits dispatched by district	60	40	117	217
Discrepancy (number of kits)	- 11	- 8	- 15	- 34
Discrepancy (% of dispatched)	18%	20%	13%	16%

Table 10.4 Dispensary Kit Distribution

	Kericho	Nyamira	Kisii	Total
Kits received by facilities	53	27	45	125
Kits dispatched by district	60	40	66	166
Discrepancy (number of kits)	- 7	- 13	- 11	- 41
Discrepancy (% of dispatched)	12%	33%	32%	25%

As perceived by district staff, the mushrooming of rural health facilities is starting to spread the limited logistics too thinly. For example, the district allocation for Kericho remained the same despite the opening of three new dispensaries in October this year.

Deliveries from the central level have started to become irregular.

10.3.4 Rural Health Facilities

The interviews and focus group discussions revealed a generally favourable impression on the present logistic system. Staff who have been working with the MoH for a long time opined that the kit system is working reasonably well. However, there remain at least four major problems at RHF level.

Table 10.5 Major Problems Reported in RHF Visited

Problems	% of RHF
Lack of transportation	60%
Irregular or delayed supply of drug kits	50%
Inadequate kit contents	47%
General shortage of drugs	30%

a. Transport

Although the problem of transport seems to be universal for all the facilities involved in the logistics system in the study area, the rural health facilities usually bear the brunt. For them to continue providing health services, they have to collect the kits at the district stores. Such a trip would take a day using public bus or "matatu". Occasionally, they would end up with their hands empty because they did not have the communication means to confirm availability of the kits. Since many facilities are seriously understaffed, a subordinate staff is sometimes responsible for collecting the kits. In some occasions, it was even reported that a "matatu" driver was asked to make the collection on behalf of the facility.

b. Irregular/delayed supply of kits

The time interval between delivery of kits was assessed using the records of receipt of kits, packing lists accompanying the kits or the bin cards (Annex 3). The MoH standard of delivery, that is either monthly or every two months, is observed in about 84% of 25 facilities surveyed with reliable data (Table 10.6). It seems the facilities within the districts served by Kisumu depot have shorter time interval between deliveries. Further investigation is required to shed light on the factors that can explain this trend.

Table 10.6 Interval between Deliveries in 25 Rural Health Facilities

District	< 1 month	1-2 months	> 2 months
Kericho	1	2	2
Bomet	1	2	2
Nyamira	0	6	0
Kisii	2	3	0
Gucha	1	3	0
Total (number)	5	16	4
Total (percentage)	20%	64%	16%

c. Non-availability of drugs

The problems of inadequacy of kit contents and general shortages of drugs as reported at the RHF were validated by analysing the stock-outs of 28 essential drugs and supplies between the last two deliveries of kits (Table 10.7).

Forty per cent of the facilities reported stock-outs of chloroquine during the study period. This may reflect the preference of the providers, patients, or both in the treatment of malaria or malaria-like symptoms. This shortage, however, should not be taken with alarm in as much as the tablet preparation was seen to be in oversupply in 70% of the facilities (Table 10.8).

Most of the drugs in the top 10 that are found to be out of stock are antibiotics. The penicillins, co-trimoxasole, and metronidazole are the drugs used as first- or second-line treatment for common infections. For intestinal parasitism, the field staff would use mebendazole. With 25 to 32% of facilities running short of these supplies, the impression of general shortage of drugs is understandable.

Table 10.7 Number of RHF Report Drugs Out of Stock (Total RHF = 28)

Drugs	Kericho	Bomet	Nyamira	Kisii	Gucha	Total	% of RHF
Chloroquine inj.	1	2	4	3	1	11	39
Phenobarbital inj.	4	1	2	1	1	9	36
Paracetamol tabs.	0	5	0	2	2	9	36
Penicillin V tabs	0	5	1	1	2	9	36
Tetracycline caps.	0	4	2	1	2	9	36
Triple Penicillin 6:3:3	0	4	1	2	1	8	29
Co-trimoxasole tabs.	0	3	3	0	1	7	25
Mebendazole tabs.	0	3	3	1	0	7	25
Metronidazole tabs.	0	3	1	1	2	7	25
Procaine Penicillin V G.4.8.	0	2	1	2	2	7	25
Chlorpheniramine inj.	0	2	2	1	1	6	21
Chlorpheniramine tabs.	0	1	3	1	1	6	21
Chlorpromazine inj.	3	1	1	0	1	6	21
Ergometrine maleate inj.	3	0	2	1	0	6	21
Vitamin B Complex tabs.	0	0	3	1	2	6	21
Acetylsalicylic Acid tabs.	0	2	2	1	1	6	21
Phenobarbital tabs.	0	2	1	2	0	5	18
Folic Acid tabs.	0	0	2	1	1	4	14
Tetracycline Eye ointment	0	1	1	1	1	4	14
Diazepam inj.	0	0	0	2	1	3	11
Benzyl Penicillin	0	1	0	1	1	3	11
Chloroquine tabs.	0	0	0	1	2	3	11
Chloroquine syrup	0	1	1	0	1	3	11
Chlorpromazine tabs.	0	0	0	0	2	2	7
Lignocaine inj.	0	0	0	2	0	2	7
Adrenaline inj.	0	1	0	0	0	1	4
Ferrous Sulphate tabs.	0	0	0	0	1	1	4
ORS 1/2 litre	0	1	0	0	0	1	4
Total	**10**	**43**	**32**	**26**	**29**	**151**	**19***

* Based on 784 possible combinations of 28 RHF and 28 drugs.
(Only minor variations were found between health centres and dispensaries. Data broken down by type of facility is therefore not included in the table but can be found in annex 4).

It is interesting to note that the report of stock-outs in Kericho district is the least (only 10) while that in Bomet is the most (43). The regional depot in Nakuru serves these two districts. On the other hand, the range of stock-outs among the districts served by the Kisumu depot is narrow: 26 for Kisii, 29 for Gucha, and 32 for Nyamira. Further investigation is required to fully appreciate the wide gap between Bomet and Kericho.

Table 10.8 Number of RHFs Reporting>2 Months Stock of Listed drugs (Total Number of RHF = 29)

Drugs	Kericho	Bomet	Nyamira	Kisii	Gucha	Total	% of RHF
Ferrous Sulphate tabs.	7	6	3	5	1	22	76
Chloroquine tabs.	7	6	3	3	1	20	69
Chlorpromazine tabs.	6	4	2	4	2	18	62
Adrenaline inj.	5	5	3	2	2	17	59
ORS 1/2 litre	5	5	2	4	1	17	59
Lignocaine inj.	5	5	2	2	2	16	55
Diazepam inj.	5	4	4	2	0	15	52
Chlorpromazine inj.	3	2	2	2	4	13	45
Folic Acid tabs.	6	4	1	2	0	13	45
Chlorpheniramine inj.	5	3	0	1	3	12	41
Tetracycline Eye ointment	4	2	0	4	2	12	41
Metronidazole tabs.	5	1	2	3	1	12	41
Mebendazole tabs.	5	2	0	4	0	11	38
Vitamin B Complex tabs.	6	3	0	2	0	11	38
Acetylsalicylic Acid tabs.	6	2	0	2	1	11	38
Benzyl Pen.	5	2	1	2	1	11	38
Chloroquine syrup	5	2	0	3	1	11	38
Penicillin V tabs	5	0	1	4	1	11	38
Phenobarbital tabs.	5	3	0	2	0	10	34
Chlorpheniramine tabs.	5	0	0	1	3	9	31
Procaine Penicillin V G.4.8.	5	2	1	1	0	9	31
Co-trimoxasole tabs.	5	0	0	3	0	8	28
Chloroquine inj.	5	2	0	1	0	8	28
Paracetamol tabs.	5	0	1	2	0	8	28
Tetracycline caps.	5	0	0	2	1	8	28
Triple Penicillin 6:3:3	5	0	1	1	1	8	28
Ergometrine maleate inj.	3	0	2	2	0	7	24
Phenobarbital inj.	2	2	1	1	0	6	21
Total	**133**	**61**	**29**	**62**	**27**	**334**	**41***

* Based on 812 possible combinations of 29 RHF and 28 drugs.
(Only minor variations were found between health centres and dispensaries. Data broken down by type of facility are therefore not included in the table but can be found in Annex 4).

Analysis of the problem of non-availability of drugs at the RHF would not be complete without looking at the phenomenon of over-stocking (Table 10.8). Two-month supply was arbitrarily chosen as the cut-off point based on the MoH standards of interval between deliveries.

The study demonstrated that a number of health facilities carried more inventories than required. At least one-third of the facilities had oversupply of 66% of the drugs in the list, two-fifths of the facilities had 50%, and half of the facilities had 25%.

Ferrous sulphate tablets seem to be the most common drug in abundance in 76% of the facilities. In addition, more than 40% of the facilities would be over-stocked with five types of medicines that are given by injection - adrenaline, lignocaine, diazepam, chlorpromazine, and chlorpheniramine maleate. Among the top 10, three drugs (i.e. chlorpromazine injection, chlorpromazine tablet and diazepam injection) are indicated for mental illness or sedation, conditions that are not so common.

Again, Kericho District shows the biggest deviation with its 133 reports of more than 2 months stock of a drug compared to the other districts. Considering that the interval between deliveries is long in Kericho, the high number of incidents of over-stocking is surprising. This phenomenon requires further analysis; correlation with disease patterns is in order.

10.3.5 District Hospitals

The overall impression from the district hospitals is that there are general shortages of some drugs and most medical supplies in all hospitals. These are attributed to the same problems as those discussed in the previous sections.

a. Shortage of pharmaceutical staff

The 1995 *Health Sector in Kenya* study recommends that there should be 1 pharmaceutical staff for every 100 beds in a hospital. Table 10.9 shows the number of pharmaceutical staff and beds in the study areas. Bomet and Gucha are omitted since they do not have functional district hospitals. Only Kisii has a sufficient number of pharmaceutical staff, though none of these is pharmacists.

Table 10.9 Pharmaceutical staff and district hospital beds

	Kericho	Nyamira	Kisii
Pharmacists	1	0	0
Pharmaceutical technicians	1	1	4
Total	2	1	4
Hospital beds	276	191	289

b. Irregular Kit Delivery and The Problem of Transport

The highly irregular delivery of kits was confirmed as a major problem for the district hospitals. Reliable data were obtained from Kericho and Nyamira only (Table 10.10). Aggravating the problem is the fact that the kits delivered is sometimes less than the scheduled allocation. A full outpatient kit comprises seven boxes but sometimes only four to five of these are received. It has not been possible to determine the origin of this discrepancy.

Table 10.10 Hospital Kits Received (October 1996-September 1997)

District	Inpatient kits received	Outpatient kits received
Kericho	3	8 (4 incomplete)
Nyamira	4	31 (20 incomplete)

The irregularity in the schedule of delivery can be partly attributed to the problem of transport. This problem is very serious at the district hospital level because the kits intended for these facilities are extremely bulky. There is a need to use more than one lorry because several kits are usually issued at one time.

c. Non-availability of drugs and medical supplies

Reliable quantitative data on availability of drugs and medical supplies were obtained from Kericho and Nyamira Hospital (Annex 4). The data from the two facilities differ too much to draw any general conclusions. All district hospitals reported serious shortages of medical supplies, especially needles, syringes, gloves, and x-ray films.

d. Drugs and supplies management

According to the 1994 *Kenya National Drug Policy*, a Hospital Pharmacy and Therapeutics Committee (HPTC) is supposed to be established in each unit that "will be responsible for overseeing drug selection and formulary management, policies on prescription, drug utilisation review, and policies on dispensing and administration of drugs." However, such a committee exists only in Nyamira and is not functioning fully yet as intended.

Furthermore, there exists a manual on *Good Management of Hospital Drugs and Medical Supplies*. Though this was published in 1994, this manual is familiar only to the staff in Nyamira district hospital. The Nyamira district has the 1991 preliminary version of the manual that was used for field-testing.

More specifically, the problems directly related to management systems as expressed by key informants are the following:

1) no systematic process exists for estimating drugs and medical supplies requirements based on health priorities and budget realities;
2) record keeping and inventory control are inadequate in all hospital pharmacies and most hospital stores (except Nyamira);
3) no clear procedure for emergency procurement of drugs and medical supplies;
4) wards keep excessive stocks leading to preventable wastage due to expiration;
5) drugs are dispensed from hospital pharmacies by unqualified staff;
6) there is no collection of key indicators of outpatient and inpatient drug use patterns to strengthen rational drug use;
7) over-prescription of drugs is common; and
8) leakage of drugs from the hospitals.

The aforementioned problems may have stemmed from inadequate drugs and supplies management systems and procedures in the hospitals and inadequate training of staff at all levels. Nevertheless, there seems to be a need to conduct a more thorough study to understand the dynamics of these problems and, more importantly, to come up with appropriate intervention packages.

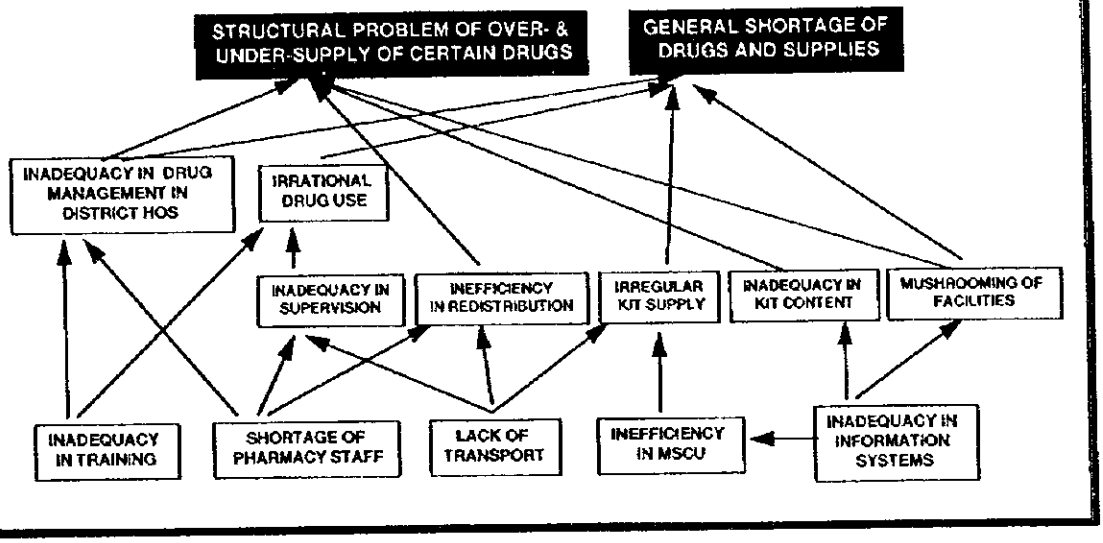
In comparison, private hospitals that were visited have daily physical stock control to determine reordering levels. They never experience out of stock situations and do not have problems with expiry of drugs since only appropriate levels are stocked in wards and drugs in danger of expiry are returned to the supplier. There are no problems with leakage or misappropriation of drugs. In fact, the only problem recorded in these institutions was some resistance by Medical Officers to prescribe generics wherever possible. All these

imply the possibility of introducing good drugs and supplies management practice in Government institutions.

10.4 CORE PROBLEMS AND THEIR DIRECT CAUSES

The many different problems identified at different levels of the drugs and medical supplies system as well as the issues and causes underlying these are all interrelated. These interrelationships are illustrated in Fig. 2.

Fig. 2 Core Problems and Contributory Factors



10.4.1 Core Problems

The analysis showed two core problems. First, there is general shortage of drugs and supplies. Second, there are structural problems in over- and under-stocking of some drugs.

10.4.2 Direct Causes

There are four major causes hypothesised.

First, the inadequate training of staff affects rational use at the RHF level and drug management practice at the district hospital level.

Second, the shortage of pharmaceutical staff affects drug management practice in district hospitals as well as the re-distribution of drugs and supervision of drug use in RHF.

Third, the inadequacy in transport facilities affects actual kit delivery at all levels, the re-distribution of drugs, and the supervision of drug use in RHF.

Fourth, the inadequate information system affects the suitability of kit contents, adequacy of kit delivery, and the efficiency of the entire logistics system starting from the MSCU.

10.5 PREVIOUS EXPERIENCES AND CURRENT TRENDS

10.5.1 Essential Drugs Programme and Decentralisation

The introduction of the Essential Drugs Programme (EDP) in 1981 was one of the major interventions of the GOK to address the problem of inadequate drugs and supplies. The EDP targeted the rural health facilities. It greatly improved the supply of drugs in the early 1980s. At present, the EDP has remained a fundamental structure within the public health care system.

In the middle of 1980s, decentralisation of procurement was also tried by the GOK. It was promoted in line with the so-called District Focus Policy. Together with decentralisation, a revolving fund was established at the Central Medical Stores. However, both strategies were not evaluated well such that they have been dropped by the MoH already.

In 1996, procurement agents were introduced into the logistics system. This seems to have a positive effect on the logistics system.

10.5.2 Family Planning Logistics Management

It is based on the "pull" principle where the District Health Management Teams (DHMT) determine their requirements. It has a computer system that guides the procurement and distribution of contraceptives and STD drugs. The critical link between reporting and re-supply is the quarterly report filled up by the DHMT. All RHF surveyed did not report any problem in the availability of the Family Planning kits.

10.5.3 Restructuring of MSCU

The restructuring of the MSCU and the entire MoH logistics system have been suggested in a number of reports such as the 1994 interim report *Restructuring of Drugs and Other Medical Supplies Systems in Kenya* and the June 1997 interim report *Restructuring and Streamlining of the Medical Supplies Co-ordinating Unit.*

The five major elements of the current trends in reforms are as follows:

1) replacement of the MSCU by a parastatal body that is autonomous from the daily supervision of the MoH;
2) this parastatal body would be responsible for procurement;

3) change of the present "push" system to "pull" system;
4) partial decentralisation by allowing the districts to buy commodities from the central level with the use of "paper currency"; and
5) at a later stage, full decentralisation that allows the districts to buy from their sources of choice.

10.6 PLANNING ISSUES AND DIRECTIONS

At this stage of the development study, at least six issues and directions could be considered for planning purposes.

10.6.1 Development of a Sustainable Solution to the Inadequacy in Transport Facilities

Considering that all facilities reported the problem of transport, there seems to be a need to address this problem urgently. One option is to provide a vehicle to the DHMT that would show their commitment and plan in providing for the running costs, in ensuring its repair and maintenance, and in mobilising resources to replace the donated vehicle once it exceeds its serviceability.

To optimise its utilisation, the donated vehicle may be used for multi-purpose. It can be used for delivery of drugs and supplies and redistribution of dormant ones. It may also be for the overall supervision activities of the DHMT as well as for transporting patients.

A full inventory of existing vehicles could be initiated that would include the spare parts requirement. An estimate could then be done on the cost of repairs.

A complementary training on transport management could also be done.

The cost and benefits of a regional or district vehicle repair and maintenance shop could be analysed and compared with an option of linking with private shops.

Two other issues in addressing the problem of transport of drugs could also be explored. One option is to fully privatise the distribution of essential drugs and medical supplies. The other one is to procure from drug companies that would also be responsible for the distribution of these commodities.

10.6.2 Training in Rational Drug Use

There is a need to conduct further study on several observations in RHF. Some of the staff do minimal taking of history and physical examination. Sometimes unqualified staff give the treatment. On the average, staff write 2-3 drugs per prescription with some having 4-5 even for a single diagnosis. Finally, prescriptions are poorly written such that dosages and duration of treatment are not indicated.

Although the problem of rational drug use was documented only in the RHF, the training might be appropriate also for the staff in the hospitals.

There is also a need to clarify the use of chloroquine injections, the drug that is most often reported to be out of stock. It seems both the providers and patients consider it as the drug of choice for many cases of malaria.

There is also a need to further analyse the apparent contradiction of ferrous sulphate tablets being overstock (having more than 2 months supply) in 75% of the RHF when in fact anaemia has been reported to be a major cause of morbidity and mortality.

This study documented the main reasons for poor compliance to the National Drug Policy: inadequate training and information, and insufficient supervision from the district.

The campaign on rational drug use could also be extended to the public. As long as the patients are not adequately informed, the monopoly to information by the health providers could continue to be misused.

The training programme on rational drug use may be integrated to the general continuing education programme for health care providers. As such, it might be necessary to conduct training of trainers at the Rural Health Training Centre in Chulaimbo. The programme may include the following topics: concept of essential drugs; contents and usage of the RHF kits; clinical guidelines for diagnosis and treatment; good dispensing practices; educating patients on drug uses; and self-assessment on rational drug use.

It might also be appropriate to assist the GOK in updating the Handbook for Rural Health Workers and its complementary wall chart.

10.6.3 Development of Adequate Information System

It is argued that the logistics systems can be further enhanced if the information system is improved particularly in gathering data on the following: population; morbidity and mortality patterns; workload in facilities; and actual use of drugs and supplies in facilities. Compilation of all these data at the district level can be facilitated with the use of computers and user-friendly reporting forms. This would require in-depth analysis of existing record-keeping materials and considerable input from health care providers.

To ensure sustainability, extensive training in the use of the logistics management information system could be planned.

However, it might also be necessary to first analyse the factors that influence the use of data and information in estimating drug requirements. For as long as the field staff feel that the information system is just an exercise and not linked to planning, then the success of the logistics management information system would remain dubious.

It is advisable to learn from the experience of the Family Planning Logistics Management System and to closely co-ordinate with the MSCU.

10.6.4 Implementation of Good Drug and Supplies Management

Since a manual already exists, the first step would be to review the manual vis-à-vis the realities in the districts. Revisions may be recommended with respect to the systems, procedures, and roles and responsibilities of all types of staff. An assessment of training needs and actual training programme can then be developed and organised for different groups such as the pharmaceutical technologists.

Recommendation for further study: what are the determinants of compliance to standard systems and procedures; what are the reasons for people to disregard and, in worse case, to disobey certain rules?

10.6.5 Monitoring and/or Facilitating the Process of Reform

Although many of the aforementioned planning issues are relatively generic, it would still be more prudent to monitor the progress of proposed reforms in MSCU, in particular, and in the logistics system, in general. On the other hand, facilitating or supporting the process of reform would even be a more strategic option.

10.6.6 Co-ordination of Planning Issues of All Related Investigations

To address other contributory factors, there is a need to co-ordinate the findings of other investigations. For example, the shortage of pharmacy staff and the inadequacy in supervision could be studied within the overall strategy of human resources development while the issue of mushrooming of rural health facilities within the access and general facility improvement programme. The appropriateness of kit contents could be compared with the results of the study on disease trends.

ANNEX 1: FACILITIES VISITED AND PERSONS MET (1/2)

DISTRICT	FACILITY	KEY INFORMANT	POSITION
Nakuru	MSCU Depot	Mr. Chesire	Pharm. Tech.
Kisumu	MSCU Depot	Mr. Ojwang	Supplies Officer I/C
	Aga Khan Hospital	Ms. Jaffer	Executive Officer
Kericho	District Hospital	Dr. Tungus	Pharmacist
	DHMT	Entire Team	
	Bahati Pharmacy	Mr. Shah	Pharmacist
	Brook Bond Hospital	Ms. Awan Mr. Koskei	Matron Pharmacist
	Kabianga sub health centre	Sitonic	ECN I/C
	Kibeneti dispensary	Sargoi	ECN
	Kibeneti SDA		ECN I/C
	Kiptere sub health centre	Tegere	Supporting Staff
	Lemotit health centre	Langata Beatrice	Chief Supporting Staff
	Sigowet health centre	Achola	KRCHN
	Sosiot Rural Centre	Buyon	ECN
Nyamira	District Hospital	Dr. Bruno Mr. Nelson	Med. Supt. Store Officer
	DHMT	Entire Team	
	Ametierio Dispensary	Nyaguoka	Clerk
	Chepng'ombe sub health centre	Ondiek	ECN
	Etono Dispensary		ECN I/C
	Keroka health centre	Mageto	CO
	Kijauri Dispensary	Omwange	ECN
	Magombo Dispensary	Kerandi	ECN
	Nyansiongo Hosp.	Sr. Margaret	CO
Kisii	District Hospital	Dr. Nyamwera Mr. Nyabako	MoH Store Officer
	DHMT	Entire Team	
	Ibacho Dispensary	Cheya	ECN
	Marani health centre	Onsongo	KRCHN
	Masimba health centre	Ogot	ECN
	Ramasha Dispensary	Kerubo	
	Riana health centre	Ochieng	ECN
Gucha	DHMT	Entire Team	
	Itago Dispensary	Ounda	ECN
	Kenyenya Dispensary	Sabina	ECN
	Nduku RHDC health centre	Momanyi	ECN
	Nyamache health centre	Alouch	CO
	Ogembo health centre		
	Sieka Dispensary		
Bomet	Longisa Hospital		MoH DPHN
	DHMT	Entire Team	
	Kapkesosio Dispensary	Chumo	ECN
	Kapkoros health centre		
	Makimeny Dispensary	Chepkoros	ECN
	Sigor health centre	Rotich	CO
	Silibwet Dispensary	Koskei	ECN

ANNEX 1: FACILITIES VISITED AND PERSONS MET (2/2)

	Siongoroi health centre	Sigei	ECN
Nairobi	MSCU	Dr. Charles Kiplangat Kandia	Pharmacist-in-Charge
		Nyachio	Supplies Officer In Charge
	John Snow, Inc.	Mr. John Wilson	Logistics Specialist
		Mr. Gideon Nzoka	Management Information Systems Specialist
	Health Sector Support Programme	Larsson	Health Planning and Management Advisor

ANNEX 2: LITERATURE REVIEWED

A Study of the Utilisation of Essential Drugs in Rural Health Facilities in three Districts in Kenya, Havemann, 1990

Good Management of Hospital Drugs and Supplies, Ministry of Health, December 1994

Health Sector Reforms - Implementation Guide for Policy Makers and Health Managers, Ministry of Health, 1996

Implementation of Kenya National Drug Policy - Plan of Operation (revised), Ministry of Health, July 1996

Kenya's Health Policy Framework, Ministry of Health, November 1994

Planning Pharmaceuticals for Primary Health Care: The Supply and Utilisation of Drugs in the Third World, Gish/Feller, 1979

Preliminary Report on the Kenya Essential Drugs Programme, DANIDA, 1991

Preventive and Primary Health Care Resource Gap Study, Ministry of Health, 1991

Restructuring and Streamlining of the Medical Supplies Co-ordination Unit, John Snow, June 1997

Restructuring of Drugs and Other Medical Supplies Systems in Kenya (interim report), Ministry of Health, 1994

The Health Sector in Kenya, Development Solutions for Africa, 1996

The Kenya National Drug Policy, Ministry of Health, July 1994

ANNEX 3: NUMBER OF DAYS BETWEEN LAST TWO KIT DELIVERIES

DISTRICT	FACILITY	DAYS
KERICHO	Ft. Tenon Health Centre	23
	Kabianga Dispensary	52
	Kibeneti Dispensary	96
	Kiptere Dispensary	82
	Lemotit Health Centre	-
	Makyolok Health Centre*	-
	Sigowet Health Centre	36
	Sosiot Health Centre	-
	Average	***58***
BOMET	Kapkesosio Dispensary	32
	Kapkoros Health Centre	26
	Makimeny Dispensary	32
	Sigor Health Centre	94
	Silibwet Dispensary	70
	Siongorio Health Centre	-
	Average	***51***
NYAMIRA	Amatierio Dispensary	59
	Chepng'ombe Health Centre	56
	Etono Health Centre	53
	Keroka Health Centre	37
	Kijauri Dispensary	56
	Magombo Dispensary	38
	Average	***50***
KISII	Kionyo Dispensary	44
	Ibacho Dispensary	-
	Ibeno Health Centre	-
	Marani Health Centre	42
	Masimba Health Centre	30
	Ramasha Dispensary	30
	Riana Health Centre	46
	Riotachi Health Centre	-
	Average	***34***
GUCHA	Etago Dispensary	-
	Kenyenya Dispensary	55
	Nduru Health Centre	60
	Nyamache Health Centre	60
	Ogembo Health Centre	-
	Sieka Dispensary	23
	Average	***50***
	Total Average	48

* The data for this Health Centre was reported but the validity is questionable and it has therefore not been included

Chapter 11

Health Facilities and Equipment

11. HEALTH FACILITIES AND EQUIPMENT

11.1 INTRODUCTION

This chapter focuses on the health facilities and medical equipment in the Study Area. It is based on a survey conducted by the Study Team with government 4 district hospitals (DH), 28 health centres (HC), 27 dispensaries (DSP) and 6 mission hospitals (MH) out of 327 health sample facilities in the Study Area. The distribution of facilities by district is as follows:

	District Hospital	Health Centre	Dispensary	Mission Hospital	Total
Kericho	1	7	6	1	15
Bomet	1	7	5	1	14
Nyamira	1	5	5	1	12
Kisii	1	5	6	2	14
Gucha	0	3	5	2	10
Total	4	27	27	7	65

The investigation covered the following aspects:

1) existing conditions of each facility and its medical equipment;
2) the ability of the hospitals to maintain their facilities and medical equipment; and
3) repair, rehabilitation, expansion or replacement of health facilities and medical equipment.

To evaluate the health facilities, a few relevant standards were used. The "Definition and Categorisation of Health Facilities in Kenya", which was drawn up by the Ministry of Health in 1991 in order to provide uniformity to all health facilities in the country, describes the functions, standard services, required staff and facilities for each type of facility (Appendix 5).

In addition, the standard "Health Centre, August 1973", a World Bank Scheme published by the Ministry of Works in August 1973, shows designs of some individual small standard units that can be assembled in a variety of forms to build a health centre. The units can be developed into larger ones, called sub-health centre, when the need arises (Appendix 6).

The standard plans for health centres and dispensaries of the Ministry of Public Works were also reviewed. However, only a few facilities in the Study Area have been built based on these standards.

11.2 CURRENT STATE OF HEALTH FACILITIES

11.2.1 Distribution of Health Facilities

The Study Area, with a population of about 2.7 million persons in 1997, has a total of 327 health facilities that are owned either by the government, private sector, NGOs, or missions. There are 29 hospitals, 72 health centres, and 226 dispensaries (Table 11.2.1).

District Hospital

Based on the MoH standards, at least a district hospital should be located in every district. However, there is no district hospital yet in Gucha. The District Hospital in Bomet has not provided inpatient services. At present, there are three functioning DH in the Study Area. Considering other hospitals that are operating, the number of hospitals per 100,000 people is almost 1.1.

Comparing Kisii DH from Kericho DH (Fig. 11.2.3), the former has a wider potential catchment population that goes beyond its geo-political boundaries. Some of the patients consulting at the Kisii DH came from other districts (e.g. Nyamira, Gucha, Transmara) where curative services are on restriction. With this finding, then the estimated facility-population ratio for Kisii may be overstated.

If people from other districts come to use medical services at Kisii, it means that Kisii hospitals service more patients (than recorded). The facility-population raio in reality will be higher. So, the existing figure must be understated.

Health Centres

HCs are unevenly distributed in the Study Area. Considering the service level in terms of the number of HCs per 100,000 people, the highest ratio of 5.14 is the one for Nyamira, while the lowest rates of 0.73 and 1.00 are for Bomet and Kisii, respectively. The average for the Study Area is 2.21 HCs per 100,000 people.

Dispensaries

If those owned by the private sector are excluded, then the dispensaries seem to be more evenly distributed than the HCs. The highest facility-population ratio of 8.4 is for Kericho while the lowest rate of 3.2 is for Gucha. The average for the Study Area is 5.3 dispensaries per 100,000 people.

According to the "Definition and Categorisation of Health Facilities in Kenya", one dispensary should be served for each community with a population of 10,000 - 15,000 persons. Based on this standard, the Study Area should have 190 - 280 dispensaries, compared to the present number of 220 (inclusive of non-public sectors).

Table 11.2.1 Health Facilities and Service Levels in the Study Area

		KERICHO	BOMET	NYAMIRA	KISII	GUCHA	TOTAL
Area	Km^2	2,524	2,611	879	645	657	6,231
Population	1997	597,698	583,799	587,942	489,481	436,464	2,695,384
No. of H/H	1996	98,769	106,855	67,557	94,640	68,261	436,082
Avg. H/H size	1996	6.5	6.4	7.2	6.4	6.4	6.5
Pop. Density	Prs/Km^2	237	224	669	759	664	433
Population	2005	771,021	770,195	733,222	606,702	540,988	3,422,128
Pop. Density	Prs/Km^2(2005)	305	295	834	941	823	549
No. of Health Facilities							
Hospital	GOK	3	1	1	1	0	6
	NGO/Mission	1	2	0	2	1	6
	Private	5	2	0	0	0	7
	Others	1		4	3	2	10
	Sub-total	**10**	**5**	**5**	**6**	**3**	**29**
Health Center	GOK	9	7	9	7	7	39
	NGO/Mission	2	1	7	1	4	15
	Private	0	0	0	1	1	2
	Others	7	0	9	0	0	16
	Sub-total	**18**	**8**	**25**	**9**	**12**	**72**
Dispensary	GOK	49	37	15	19	13	133
	NGO/Mission	5	3	7	5	4	24
	Private	42	0	6	5	2	55
	Others	2	0	12	0	0	14
	Sub-total	**98**	**40**	**40**	**29**	**19**	**226**
Total	GOK	61	45	25	27	20	178
	NGO/Mission	8	6	14	8	9	45
	Private	47	2	6	6	3	64
	Others	10	0	25	3	2	40
	Total	**126**	**53**	**70**	**44**	**34**	**327**
Health Facility Service Level Per 100 thousand People							
	Hospital	1.7	0.9	0.9	1.2	0.7	1.1
	H/C	3.0	1.4	4.3	1.8	2.7	2.7
	Dispensary	16.4	6.9	6.8	5.9	4.4	8.4
(Dispensary Excp. priv. & N/M c		8.5	6.3	4.6	3.9	3.0	5.5
Population Per No. of Health Facilities							
	Hospital(GOK)	199,232.7	583,799.0	587,942.0	489,481.0	-	449,230.7
	H/C(GOK)	66,410.9	83,399.9	65,326.9	69,925.9	62,352.0	69,112.4
	Dispensary(GO	12,197.9	15,778.4	39,196.1	25,762.2	33,574.2	20,266.0
	Total(GOK)	9,798.3	12,973.3	23,517.7	18,128.9	21,823.2	15,142.6
Inaccessible Areas							
	No. of Places	3	3	3	2	5	16
	Area (km2)	158	120	78	29	77	462
	Population	26,755	25,032	23,935	20,980	60,424	157,126
	% of TL Pop.	4.1%	3.7%	4.9%	3.5%	13.9%	5.5%
	% of Area	6.3%	7.8%	9.1%	4.5%	11.7%	7.4%

Source:MOH and JICA Study Team / KEIPET Field Survey

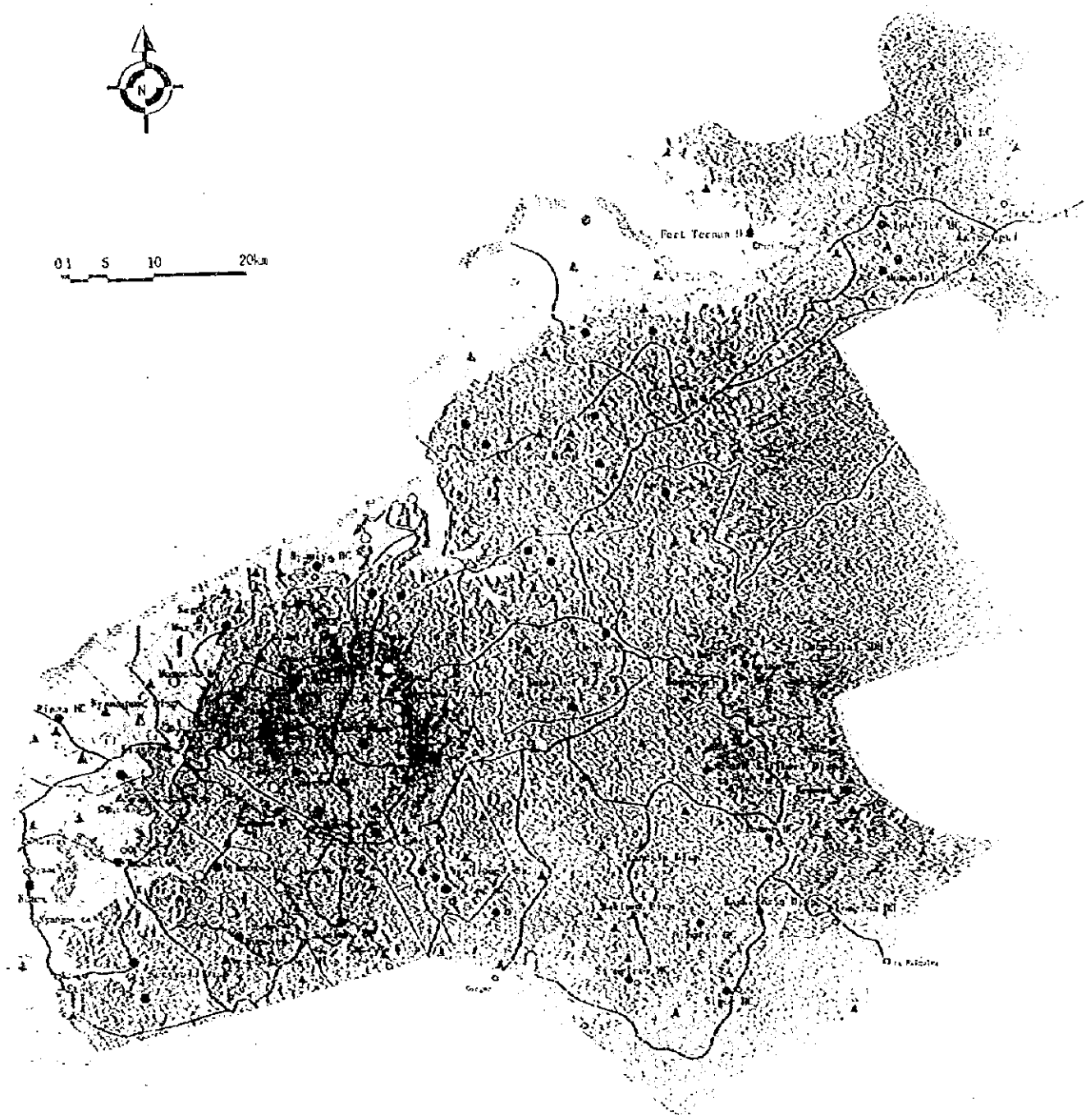


Fig. 11.2.1 Distribution of Health Facilities in the Study Area

Source: *1. Name of Divisions, Area of Divisions, Population of each division: District Development Plan 1997-2001 of each District.
*2. Number of Health Facilities: MoH and the JICA Study Team/KEIPET Field Survey.
*3. Contour line: Maps printed by Survey of Kenya.

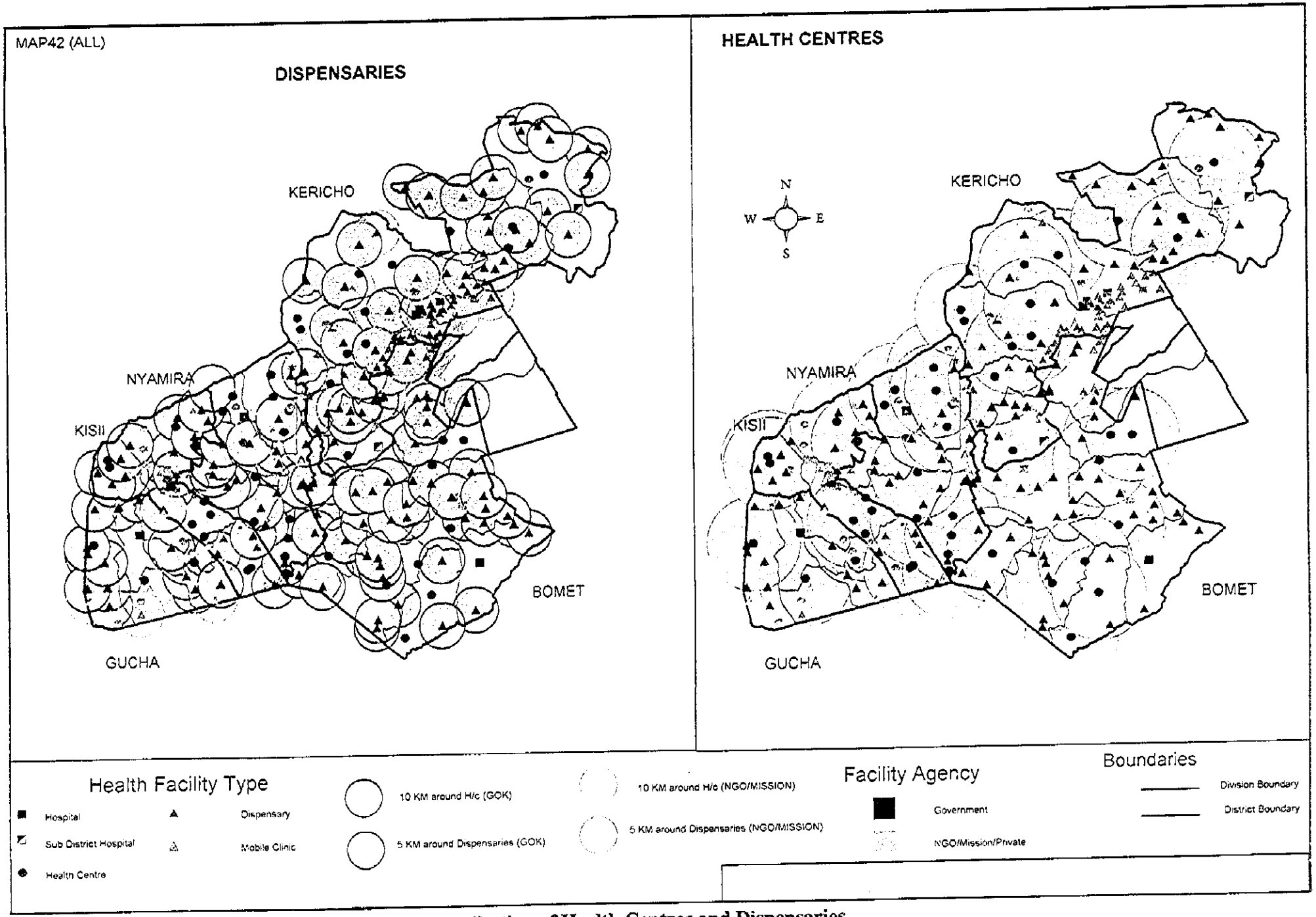


Fig. 11.2.2 Distribution of Health Centres and Dispensaries

Fig. 11.2.3 Distribution and Coverage of Health Facility

Fig. 11.2.4 Distribution of Health Facilities and Road Transport Network in Kericho

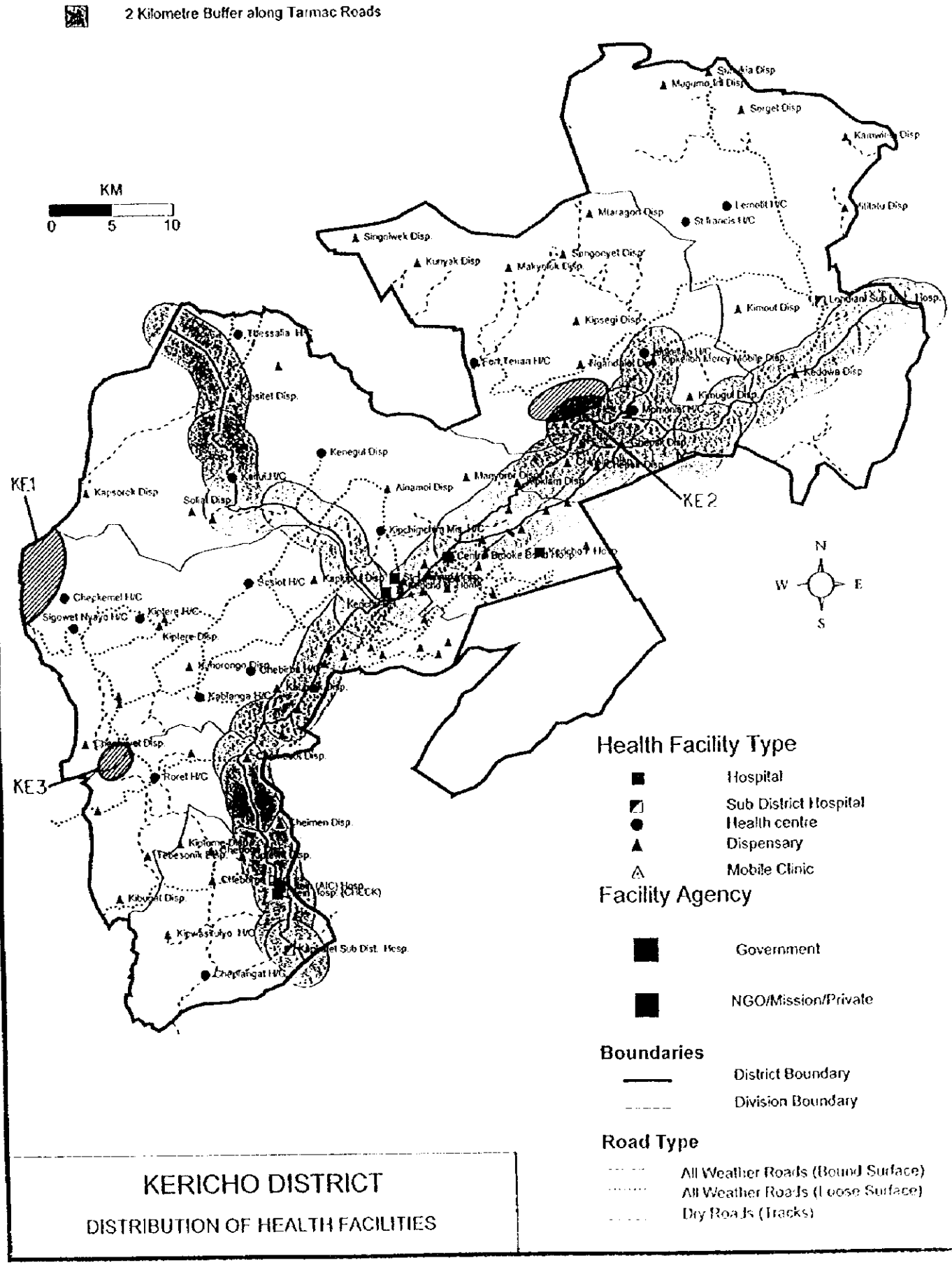
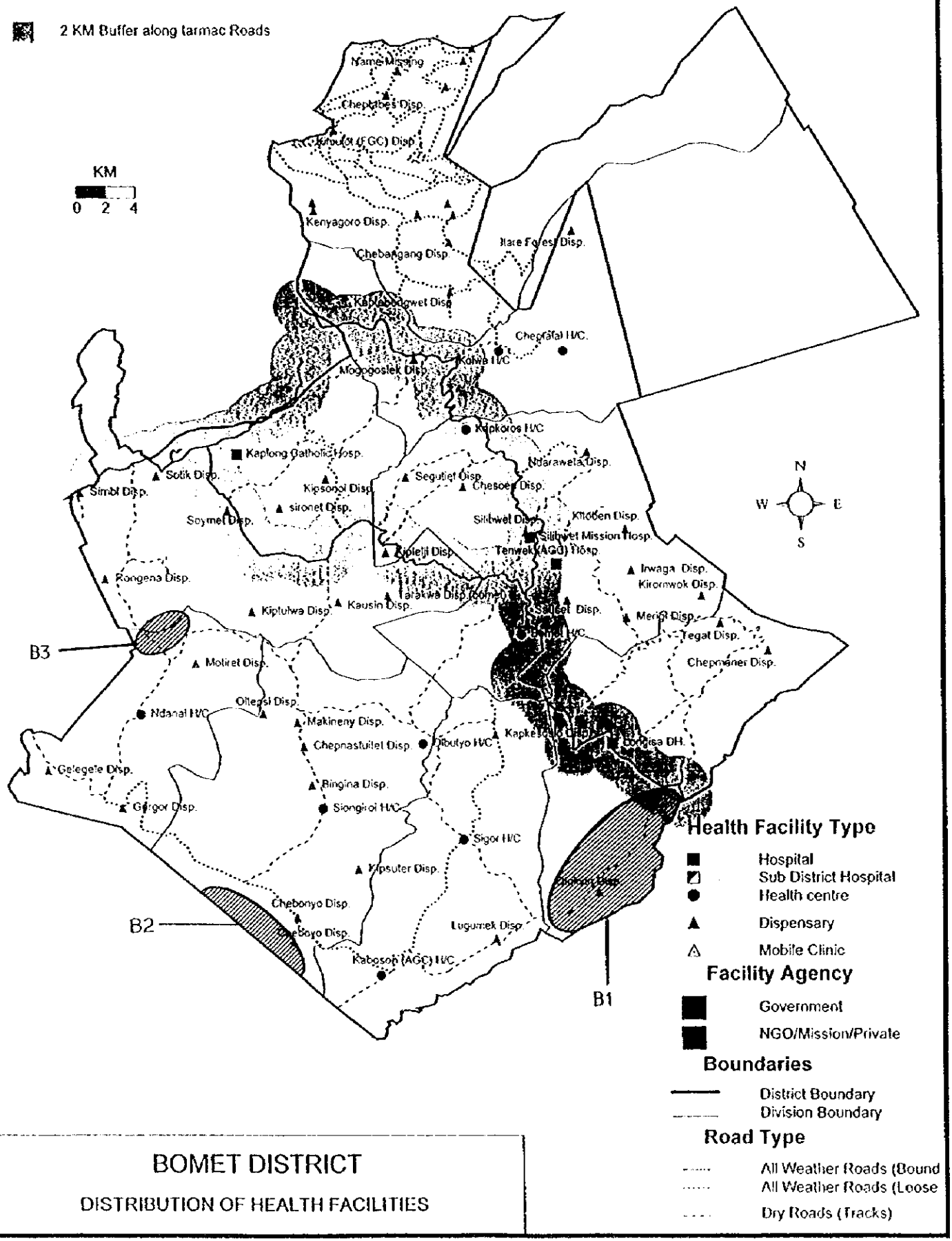


Fig. 11.2.5 Distribution of Health Facilities and Road Transport Network in Bomet



BOMET DISTRICT

DISTRIBUTION OF HEALTH FACILITIES

Fig. 11.2.6 Distribution of Health Facilities and Road Transport Network in Nyamira

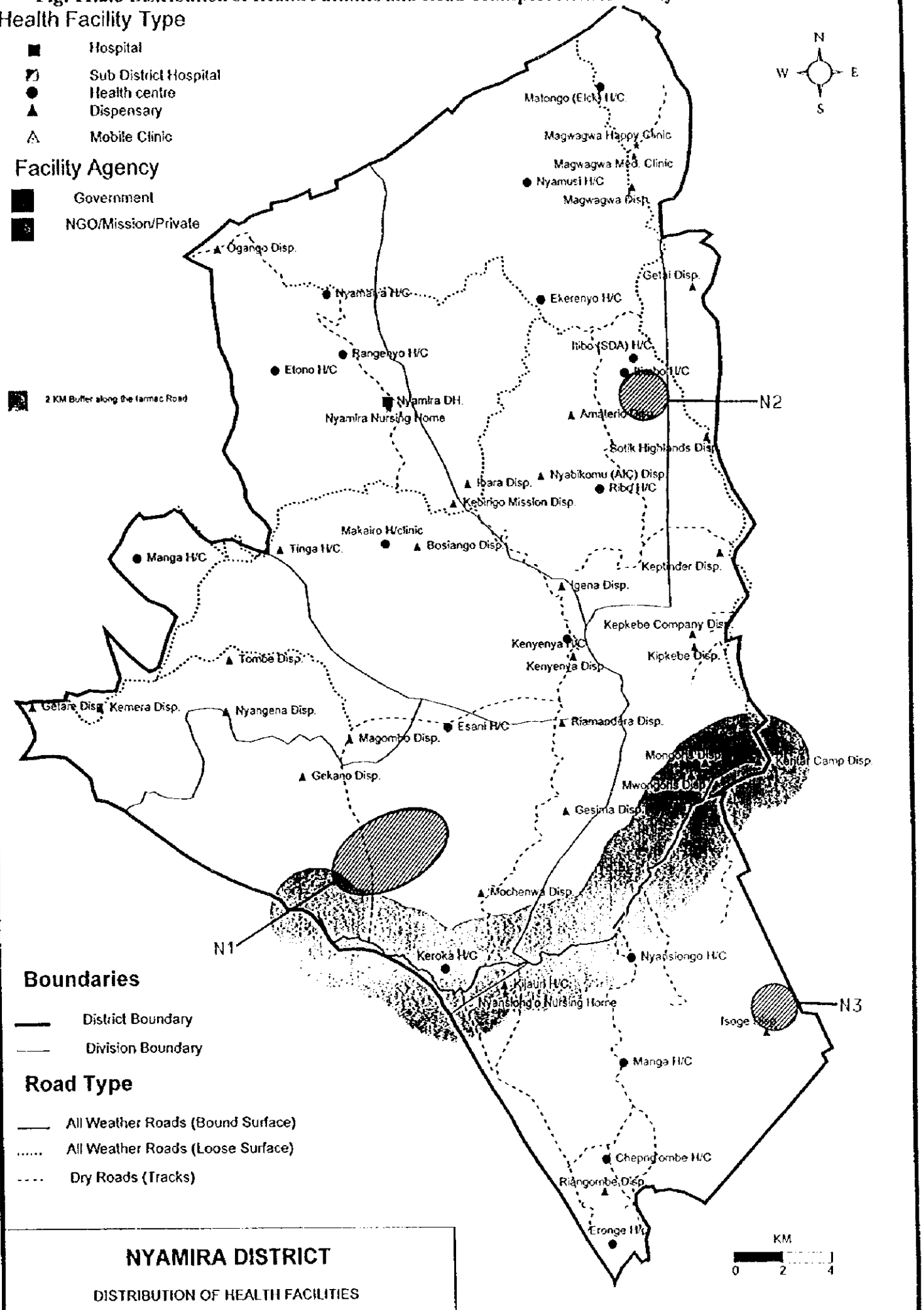


Fig. 11.2.7 Distribution of Health Facilities and Road Transport Network in Kisii

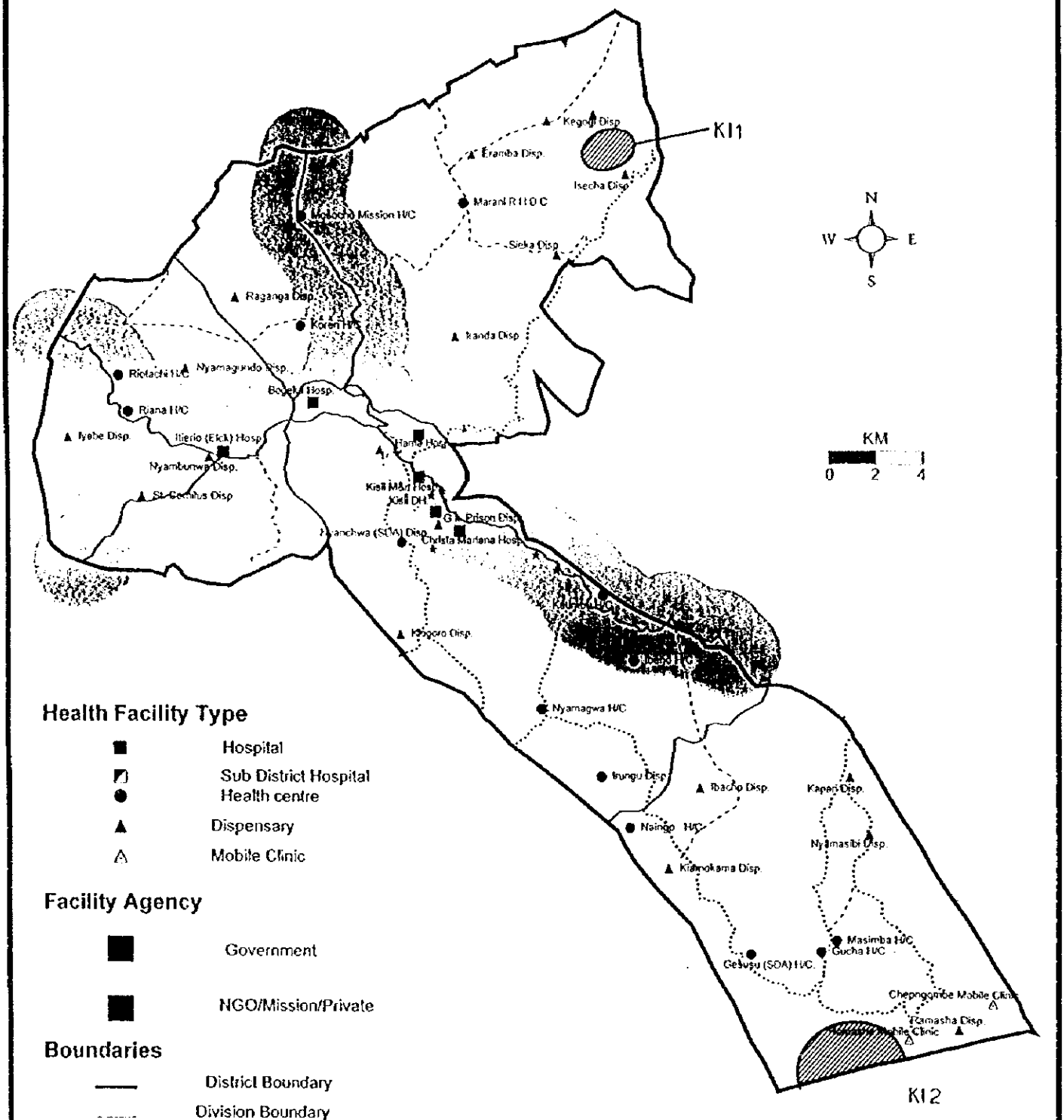


Fig. 11.2.7 Distribution of Health Facilities and Road Transport Network in Kisii

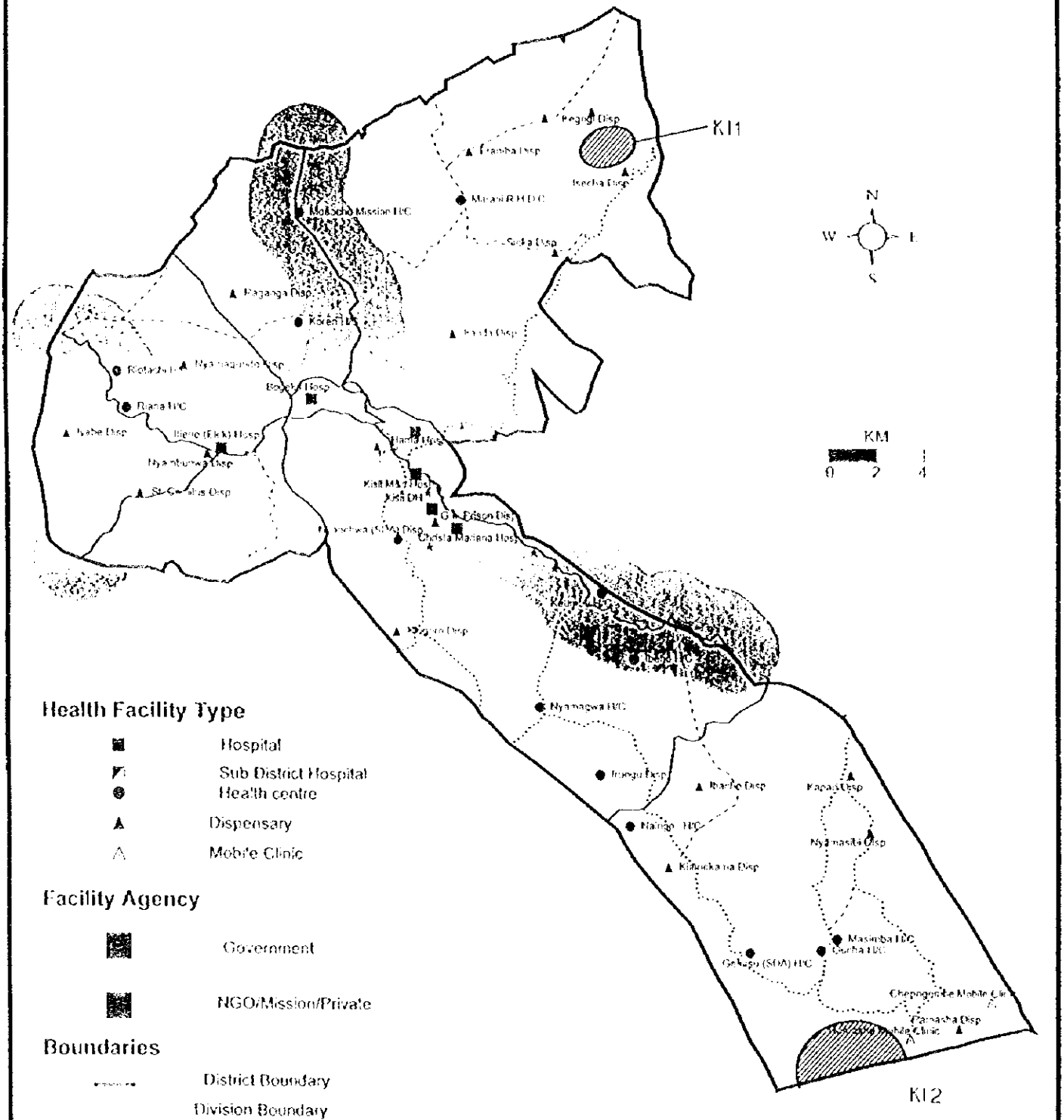
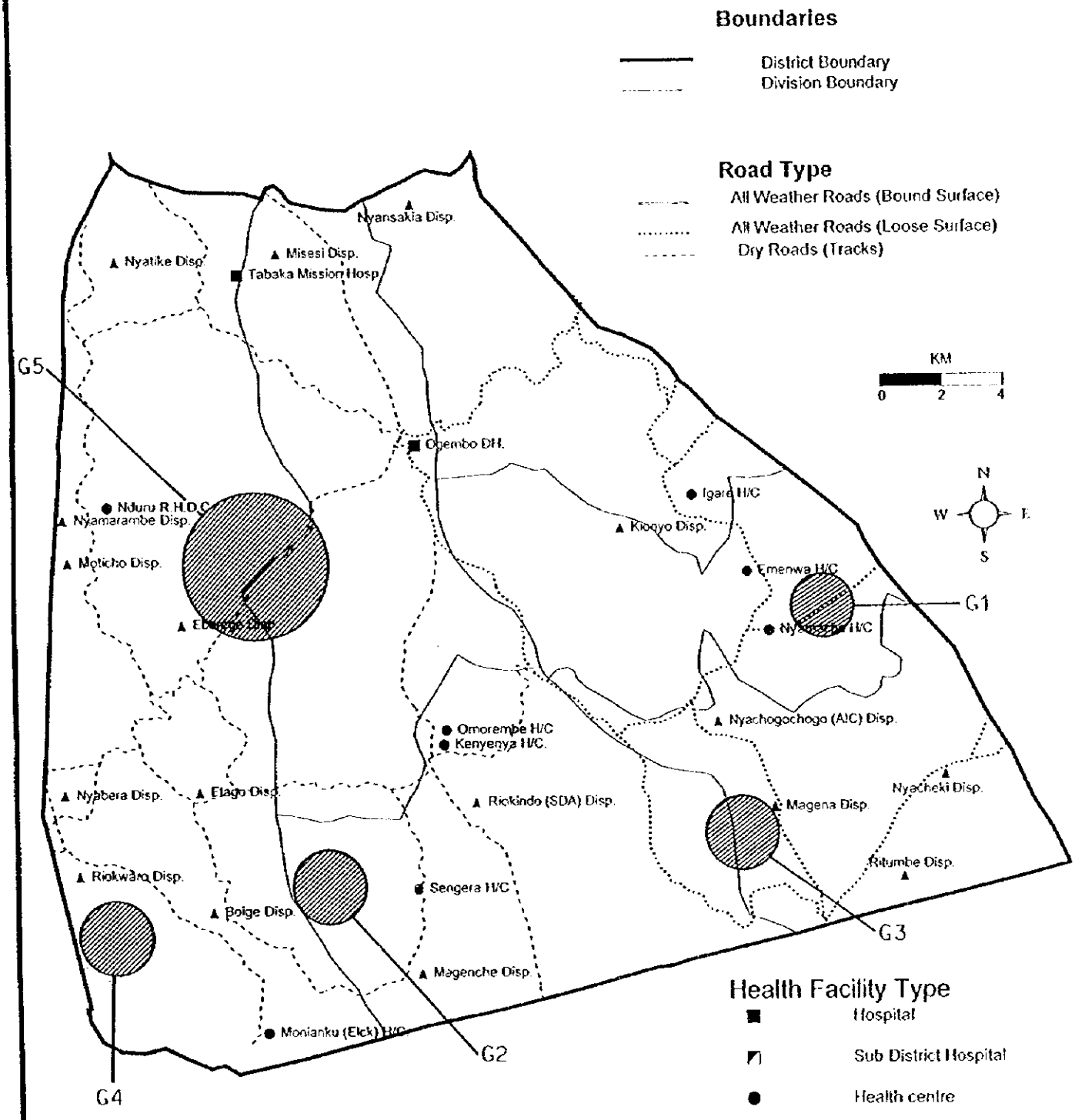


Fig. 11.2.8 Distribution of Health Facilities and Road Transport Network in Gucha



GUCHA DISTRICT

DISTRIBUTION OF HEALTH FACILITIES

Although the actual number of dispensaries in the Study Area is in accordance with the requirements, the distribution pattern seems to be uneven (Figs. 11.2.3 to 11.2.7). This might have occurred because most RHFs were constructed by the community need base.

Although the present number of dispensaries is assessed to be sufficient, the additional population of 720,000 for the year 2005 would require construction of 60 additional dispensaries.

11.2.2 Condition of Buildings at Health Facilities

District Hospital

Both of the wards and OPD in the **District Hospitals** are always crowded with patients. The actual conditions of the hospital buildings differ from each other. The following are brief description of the government district hospital. The summary is shown in Table 11.2.2.

Kericho DH: This hospital commenced operation in 1920's during the colonial period. It has been expanded several times. As a result of expansion, this hospital now consists of 26 independent buildings that are disorderly laid out. The flow of activities of patients, visitors, and staff is not smooth. The actual condition of the buildings differs from one another. It is common to see water leakage, broken windows, damaged walls, ceilings and locks. Protection from soil being carried into the buildings is poor. A comprehensive renovation and/or rehabilitation of the buildings are necessary.

Bomet DH: The Longisa Hospital, built in 1992 with support from the Italian Government, is relatively in good physical condition. However, it does not function as a referral hospital because of lack of water supply system. As of March 1998, this problem is being rectified already with the construction of a water reservoir and piping system.

More than fifty per cent of the building facilities have not been used. Before commencing full operation, it might be necessary to rehabilitate some areas and to establish a building operation and maintenance system.

Nyamira DH: This was built in 1973. Its conditions are better than other hospitals in the Study Area. However, water leaks from roof when it rains. Some pipes are clogged while others leak. A more workable building maintenance system is required for this hospital.

Kisii DH: Since this hospital commenced operation in 1916, its function has expanded several occasions. Some operational difficulties have developed as a result of a disordered growth. The flow of patients, doctors, and nurses is hardly smooth. With the disordered layout plan and unclosed fence, it is very difficult to control and manage visitors. The OPD and most of the wards are often congested. Patients sometimes share beds. During a malaria outbreak, some patients slept on the floor and under the beds.

The catchment population that goes beyond its district geographical borders compounds the problem of congestion.

There are some ongoing projects at this hospital, such as the construction of new facilities supported by World Bank and relocation of the administration department. However, in order to upgrade its services, a comprehensive renovation and/or rehabilitation of the buildings would seem to be urgently needed.

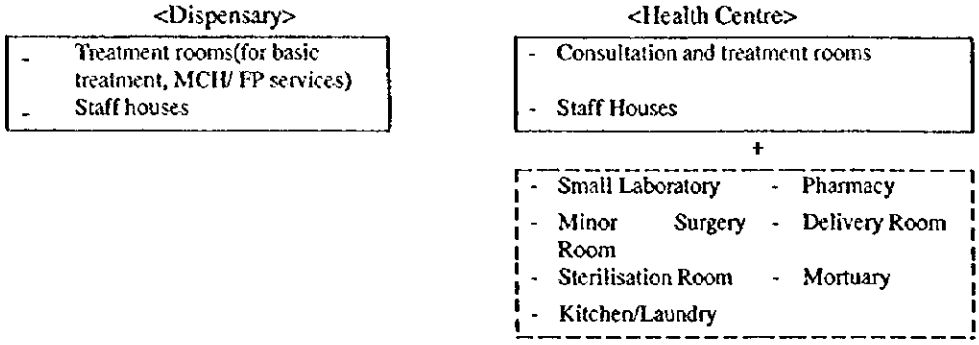
Table 11.2.2 Problems in District Hospitals

	Kericho DH	Longisa DH (Bomet)
Construction		
Functional Problem	- Repeated expansion without planning has resulted in a layout which is inconvenient for operation of the hospital. - Inadequate space: Due to conversion of use of buildings, there are some conflicts in space use. - Lack of a casualty department	- Inpatient services not available - Only OPD services, MCH/FP, Laboratories and therapy departments are in operation. - Relationship among different activities are not efficient: operating theatre, laboratories and X-rays are in lower ground, OPD/MCH are in ground level, and in-patient departments are in first and second floors.
Scale of bldg.		
-No. of patients at OPD	Approximately 350p/day	Approximately 100p/day, (20p/day for MCH/FP)
-No. of beds	180	none
-Area of Hospital /bed	33.6 square metre/bed	N/A
-Area of Ward /bed	8.75 square metre/bed	N/A
-Area of Ward/Patient Admitted	7.24 square metre/patient	N/A
-Bed occupancy rate (BOR)	80 (Ordinary season) (Gaps)Eye ward BOR 500% MCH/FP 2.48 square metre/bed	0 %
Condition of Buildings		
(Architectural)	- Most of the buildings are old. - The condition of the older buildings is better than the condition of new buildings. - Damages include broken windows/doors/ceilings; water pipes are either clogged or leaking. These are generally left unrepaired.	- Multi-story type building. - The hospital has all the facilities. - In-patient department has not been used
(M/E, Plumbing)		
-Water supply	Water demand: 220,000 litres/day Inadequate supply is due to a limited tank capacity and a tank leakage. No system for rainwater collection	Water demand: 100,000 litres/day once it is fully operational Pumping and treatment plant is not yet functional. Construction of treatment plant has been stalled because of lack of funds. Rainwater harvesting system from roof is installed only for the corridor.
-Sanitation	- Sewage: System is in poor state due to broken manholes and blocked sewer line. - Disposal: Garbage is dumped in the parking yard of staff's quarters.	- Sewage: Sewage system is not working because of lack of water. - Disposal: Lack of an incinerator or pits for solid waste disposal
New project	- There is a project to expand an eye ward and construct a new one. - The Ministry of Public Works has previously condemned Buildings for isolation (ward 3).	- Staff apartment blocks, bungalows, driveway, parking, landscaping works by contractor have been still in the process. - Staff houses are under construction. - Water supply system is under construction.

	Nyamira DH	Kisii DH
Functional Problem	- Over-utilisation of the OPD/casualty, ward and the offices. - Back flow of the FP clinic's patients in MCH/FP section. -Theatre is under-utilised, due to absence of a surgeon in the hospital. - Security: Fencing protects only 50% of the hospital perimeter.	- Repeated expansion without planning has resulted in a layout which is inconvenient for operation of the hospital. - Lack of security: A back gate and poor building facility layout makes control of visitors difficult.
Scale of bldg. -No. of OP -No. of IP -Area of Hospital/bed -Area of Ward /bed -Area of Ward/IP -BOR	 Approximately 190p/day 145p 27.1m2/b 9.5m2/b 13.9m2/p 70% (Ordinary season) 300	 Approximately 500-600p/day 303-480p 23.0m2/b 6.5m2/b 5.4-3.4m2/p 204%(Ordinary season) -For the Male and Female Medical ward, Male surgical ward, Paediatric ward, and Isolation ward, BOR is over 250%.(Medical ward: Male, 2.5m2/p, Female 2.2m2/p - 90 operations/m in 2 theatres.
Condition of Buildings		
(Architectural)	-Most of the roof is flat reinforced concrete with felt water proofing. Water proofing, sheet has serious damage, and some rooms are unused because of rainwater leakage due to lack of maintenance. - Most of the defects to the buildings are aggravated by lack of preventive maintenance. - Damaged windows, doors, and leaking pipes are left unrepaired..	- Most of the buildings are old. However the condition of the older buildings is better than the condition of the new building. - There are ventilation, lighting and plumbing problems, because of the repeated expansion and/or renovation of old buildings.
(M/E, Plumbing) -Water supply	Water demand: 80,000 litres/day Supply is inadequate to meet the demand, due to limited tank capacity and tank leakage. No system for rainwater collection is in use.	Water demand: 180,000 litres/day Supply is inadequate to meet the demand, due to inadequate capacity of the tank and ground reservoir. Rainwater is not collected for use. MIsrouting & disconnecting sources of water supply
-Sanitation	- Sewage: System extensively blocked and sewage overflowing into open gutters. Septic tanks are full and blocked because of lack of maintenance. - Disposal: Hospital waste is burned or dumped. Special hospital waste is not handled properly and the disposal system is poor.	- Sewage System is often blocked because of lack of maintenance. - Disposal: Hospital waste is usually burned. However, the hole is filled to over flowing. - Hospital Special Waste is not disposed of properly or effectively.
Relative project	- 5 buildings, which are for Pharmacy, Surgical contraceptive unit, MCH, Dental and Injection units are under construction supported by World Bank. These are going to be completed in 1998. - Administrative Department will be moved to outside the MSCU compound.	

Rural Health Facilities

Based on the "Definition and Categorisation of Health Facilities in Kenya", the standard facilities in a dispensary and health centres are shown below.



Generally, the RHFs in the Study Area can be categorised into four types.

Type A: The standard type of the MoPW for Health Centres consists of several single story buildings that are connected by roofed walkway. Between the main OPD building and MCH/FP, there is a waiting area and an inner corridor.

Type B: The main building has a corridor in the middle. It depends on roof lighting. The waiting area is well lighted and ventilated.

Type C: The design is based on the World Bank Scheme. Most of the dispensaries are of this type. The new buildings reconstructed or expanded by PMIU are also mostly of this type. Basically, the main building consists of 3-4 rooms that have been extended over time.

Type D: This is the original style that has been modified in several ways. Most of the RHF built by the communities are of this type.

If the above standard is applied to RHF, most of dispensaries meet the MoH requests while only a few health centres satisfy the MoH requirements.

When it comes to the physical condition of RHF, many dispensaries, except those being renovated under the PMIU project, leave much room for improvement. The common problems are as follows:

1) windows are broken;
2) door and window locks are broken;
3) roof leaks when it rains;
4) ceiling board is damaged and has molds;
5) water tank leaks; and
6) floor and walls have cracks.

The survey conducted by the Study Team revealed that many RHFs have difficulty in providing standard facilities and services. Specifically, only 14 out of 27 health centres that were visited could assist mothers in delivering their babies because they do not have a maternity ward and basic equipment (Table 11.2.3). There are many facilities that do not have water system. The establishment of rainwater collection system using roof

gutters and tanks is being considered to improve services in health centres. Some health centres lack skilled staff. To attract and retain qualified staff in remote areas, provision of staff houses is important.

Two cases would be cited. Koiwa HC in Bomet has facility and equipment that is good enough for a sub-district hospital. However its function is limited to that of a dispensary because of lack of water. Although the Masimba HC in Kisii has a water treatment system and an elevated tank, water could not be available in different departments because the piping system has broken down.

Table 11.2.3 Evaluation of Health Centres(1/2)

Name of Facility	OPD *1	EH *2	MCH *3	Labo *3	Obs. *4	IPD *5	Facility *6	Equip. *6	Remarks
<KERICHO>									
Sosiot HC		1PHO 3PHT	○		4 beds 20 div/m	(4beds)	○		Ward in MCH Bldg. is not usec. 4beds located in a main bldg. is for both maternity and IPD use.
Momoniat HC	15p/d (50)	1PHT	○				△	△	Only OPD Bldg. Maternity ward will be constructed by community in future.
Kipkerion HC	20p/d (100)	1PHO 3PHT	○				△	○	Water pressure of piped water is too low because of that location. Only OPD Bldg.
Chaplanget HC	30-50p/d (100)	1PHT	○				△	△	Piped water is coming, but water pressure is not enough. Only OPD Bldg.
Sigowet HC	40 p/d (200)	1PHT	○	○	6beds	18beds			6 beds are in the isolation ward. IPD Bldg. and Staff House are under construction.
Lemotit HC	20 p/day		○				△	△	
Fort Teman HC	50 p/d (120)	2PHT	○		-		△	○	1 Main building.
<BOMET>									
Olbutyo HC		1PHT	○				△	△	The land for Maternity ward has been obtained by the Community.
Bomet HC	30p/d	1PHO 1PHT	○	○			△	△	In the process of preparing construction Maternity Ward.
Koiwa HC	30 p/d	1PHT	○		(6beds)	(24 beds)			This was built as a SDH, however no IPD service because of lack of water.
Cheptalal S DH	30p/d	1PHT	○		6beds 20 div./m	(9 beds)		○	This was built in 1985 with a support by WHO, but has not been full operationed yet. Operation theatre has not been used because of lack of equipment.
Kapkoros HC		1PHT	○	○	6beds		○	△	OPD: 29,000p/y Maternity's BOR:50%
Sigor HC	42p/d (150)		○	○	6beds	(24 beds)		○	Rural training HC. No. IPD service because of lack of water.
Ndanai HC	30-40p/d	1PHO 2PHT	○	○	5beds	5beds	○	△	1 Main Building and 5 staff houses.
Siongoroi HC			○	○	6beds	6beds	○	○	Capacity is not enough except for IPD. No service function.

Source : Field Survey by JICA Study Team (November,1997)

* 1 :OPD : Average No. of OP per day.(Malaria season) ■ : 50 prs/d and over, ▨ : Less than 50 prs/d.
* 2 :EH(Environmental Health) : No. of PHO(Public Health Officer), PHT(Public Health Technician), Field Educator.
* 3 :MCH and Labo. : ○ means the HC provides MCH and Labo. service as a ordinary work.
* 4 :Obs : ▨ : HC which povides Delivery service ordinary. The No. shows the beds' number in Maternity Ward.

Table 11.2.3 Evaluation of Health Centres(1/2)

Name of Facility	OPD *1	EH *2	MCH *3	Labo *3	Obs *4	IPD *5	Facility *6	Equip. *6	Remarks
<KERICHO>									
Sosiot HC	80p/d (200)	1PHO 3PHT	○		4 beds 20 dlv/m	(4beds)	○	◎	Ward in MCH Bldg. is not usee 4beds located in a main bldg. is for both maternity and IPD use
Momoniat HC	15p/d (50)	1PHT	○				△	△	Only OPD Bldg. Maternity ward will be constructed by community in future.
Kipkenion HC	20p/d (100)	1PHO 3PHT	○				△	○	Water pressure of piped water is too low because of that location. Only OPD Bldg.
Chaplanget HC	30-50p/d (100)	1PHT	○				△	△	Piped water is coming, but water pressure is not enough. Only OPD Bldg.
Sigowet HC	40 p/d (200)	1PHT	○	○	6beds	18beds	◎	◎	6 beds are in the isolation ward. IPD Bldg. and Staff House are under construction.
Lemotit HC	20 p/day		○				△	△	
Fort Tenan HC	50 p/d (120)	2PHT	○		-		△	○	1 Main building
<BOMET>									
Olbutyo HC	80-100p/d	1PHT	○				△	△	The land for Maternity ward has been obtained by the Community.
Bomet HC	30p/d	1PHO 1PHT	○	○			△	△	In the process of preparing construction Maternity Ward
Kowa HC	30 p/d	1PHT	○		(6beds)	(24 beds)	◎	◎	This was built as a SDH, however no IPD service because of lack of water.
Chepalal's DH	30p/d	1PHT	○		6beds 20 dlv./m	(9 beds)	◎	○	This was built in 1985 with a support by WHO, but has not been full operationized yet. Operation theatre has not been used because of lack of equipment.
Kapkatet HC	50-100 p/day	1PHT	○	○	6beds		○	△	OPD: 29,000p/y Maternity's BOR 50%
Sotik HC	42p/d (150)		○	○	6beds	(24 beds)	◎	○	Rural training HC. No. IPD service because of lack of water
Ndanai HC	30-40p/d	1PHO 2PHT	○	○	5beds	5beds	○	△	1 Main Building and 5 staff houses.
Shongonot HC	62 p/day		○	○	6beds	6beds	○	○	Capacity is not enough except for IPD. No service function

Source : Field Survey by JICA Study Team (November,1997)

* 1:OPD : Average No. of OP per day (Malaria season) ▨ : 50 prs/d and over, ☐ : Less than 50 prs/d.
* 2:EH(Environmental Health) : No. of PHO(Public Health Officer), PHT(Public Health Technician), Field Educator.
* 3:MCH and Labo. : ○ means the HC provides MCH and Labo. service as a ordinary work.
* 4:Obs : ☐ : HC which povides Delivery service ordinary. The No. shows the beds' number in Maternity Ward.

Name of Facility	OPD *1	EH *2	MCH *3	Labo *3	Obs. *4	IPD *5	Facility *6	Equip. *6	Remarks
<NYAMIRA>									
Chepngombe HC	25 p/d		○				△	△	OPD Building only.
Nyamaiya HC	15 p/d (40-50)	2PHT	○				△	△	Maternity Ward, a half of the building has not been completed yet.
Tinga HC	50p/d (200)	1PHT	○		(Emer. Case only)	4beds	○	○	Delivery service is only for the emergency case because of lack of equipment.
Etono HC	31 p/d (100)	1PHT 1Fld Ed.	○				△	△	Under construction of Maternity building by community. Inconvenient to access.
Manga HC	25p/d	1PHO 4 PHT	○		6beds	6beds	◎	○	1 old bldg. and 3 bldgs. However, Kitchen bldg. has not been used. Microscope was stallen.
Ekerenyo HC	30p/d	1 PHO 1 PHT	○	○	(6beds/ Emer. only)		○	△	Mail bldg. and Kitchen bldg. Maternity ward and Kitchen were not used.
Keroka HC	40 p/d	2PHT	○	○	6beds 2 p/d		○	△	Under construction of Maternity Ward and Kitchen.
<KISII>									
Masimba HC	48 p/d	1PHO 2PHT	○	○	8 beds (2-3 div/w)	8 beds BOR 55%			Elevated tank and water purification tank is out of order.
Keumbu HC			○	○	4 beds (2-3 div/w)	8 beds BOR 25%!			Under renovation and remodelling of old staff house to Kitchen and Laundry. Meals are supplied from nearby hotels.
Ibeno HC		1PHO	○		(IPD)	20 beds BOR 25%	△	△	OPD and IPD buildings built ten years ago has not been used because of lack of drainage system.
Marani HC		PHO	○	○	2beds	16beds BOR 75%		○	Design capacity : OPD 50p/d IPD 24beds
Riana HC		1PHT	○		3beds	6beds BOR 30%		△	Design capacity : OPD 50p/d IPD 16beds
<GUCHA>									
Ogembo HC		2PHO 2PHT	○	○	10del/w 4beds	7beds 300p/m			This is required to be up-graded to DH.
Nduru HC	24 -50 p/d	1PHT	○	○		20beds BOR 60%			Design Capacity : OPD 50p/d
Kenyenya	40p/d	1PHT	○		5beds		○	△	1 OPD bldg and 1Maternity bldg. PMIU renovated this HC last year.
Nyamache HC	45 p/d (200)	1PHT	○		2beds		○		Design Capacity : OPD 50p/d

* 5 :IPD : No. of beds for in-patients. [ ] :more than 3 beds, ■ :1-3 beds.
* 6 :Facility/Equipment : ○:It has required facility and equipment to function as a HC(Type1)
◎:It has required facility and equipment to function as a)HC(Type2)
△:It does not have enough facility and equipment to function as HC.

Name of Facility	OPD*1	FH*2	MCH*3	Labo*4	Obs*4	IPD*5	Facility*6	Equip*6	Remarks
<NYAMIRA>									
Chepngombe HC	25 p/d		○				△	△	OPD Building only
Nyamaiya HC	15 p/d (40-50)	2PHT	○				△	△	Maternity Ward, a half of the building has not been completed yet
Enea HC	50p/d (200)	1PHT	○		(Emer Case only)	4beds	○	○	Delivery service is only for the emergency case because of lack of equipment
Etono HC	31 p/d (100)	1PHT 1Fld Fd.	○				△	△	Under construction of Maternity building by community Inconvenient to access
Manga HC	25p/d	1PHO 4 PHT	○		6beds	6beds	◎	○	1 old bldg. and 3 bldgs However, Kitchen bldg. has not been used Microscope was stollen
Ekerenyo HC	30p/d	1 PHO 1 PHT	○	○	(6beds/ Emer. only)		○	△	Mail bldg. and Kitchen bldg. Maternity ward and Kitchen were not used
Keroka HC	40 p/d	2PHT	○	○	6beds 2 p/d		○	△	Under construction of Maternity Ward and Kitchen
<KISII>									
Masimba HC	48 p/d	1PHO 2PHT	○	○	8 beds (2-3 dlv/w)	8 beds BOR 55%	◎	◎	Elevated tank and water purification tank is [illegible] under
Keumbu HC	150 p/d		○	○	4 beds (2-3 dlv/w)	8 beds BOR 28%1	◎	◎	Under renovation and remodelling of old staff house to Kitchen and Laundry. Meals are supplied from nearby hotels
Iteno HC	50-100 p/d	1PHO	○		(IPD)	20 beds BOR 25%	△	△	OPD and IPD buildings built ten years ago has not been used because of lack of drainage system
Marani HC	50 p/d	PHO	○	○	2beds	16beds BOR 75%	◎	○	Design capacity : OPD 50p/d IPD 24beds
Riana HC	50 p/d	1PHT	○		3beds	6beds BOR 30%	◎	△	Design capacity OPD 50p/d IPD 16beds
<GUCHA>									
Ogembo HC	70 p/d	2PHO 2PHT	○	○	10del/w 4beds	7beds 300p/m	◎	◎	[illegible] to DH
Nduru HC	24 -50 p/d	1PHT	○	○		20beds BOR 60%	◎	◎	Design Capacity OPD 50p/d
Kenyenya	40p/d	1PHT	○		5beds		○	△	1 OPD bldg. [illegible] bldg. [illegible] last year
Nyamache HC	45 p/d (200)	1PHT	○		2beds		○	◎	Design Capacity : OPD 50p/d

＊5 :IPD : No. of beds for in-patients. [blank box] :more than 3 beds, [shaded box] :1-3 beds.
＊6 :Facility/Equipment : ○:It has required facility and equipment to function as a HC(Type1)
◎:It has required facility and equipment to function as a)HC(Type2)
△:It does not have enough facility and equipment to function as HC

11.2.3 Maintenance System for Infrastructure

Under the current institutional system, even tiny repairs can hardly be undertaken timely and effectively because of certain bureaucratic procedures on requesting for permission and budgeting. Almost all the health facilities in the Study Area have many kinds of problems (e.g. broken window, water leakage, and damaged lock) that are left unrepaired because of several reasons.

a. Shortage of Funds Appropriated for Each Facility

Hospitals:
One source of funds for maintenance is from the recurrent budget of MoH that is remitted every 3 months. The total amount of the budget appropriated for each hospital is reportedly as little as Kshs. 1,800-2,800. As a percentage of the total facility appropriation, this maintenance budget is equivalent to only 0.11% of Kericho DH, 0.39% of Longisa DH, 0.07% of Nyamira DH, and 0.05% of Kisii DH budget. The average for all the DHs in the Study Area is less than **0.1%**. In comparison, Tenwek Mission Hospital allocates about **11%** of its total budget for maintenance.

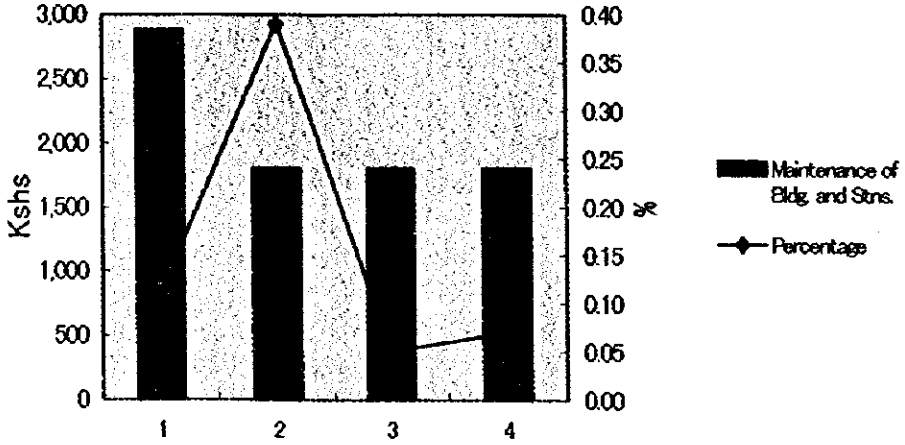


Fig. 11.2.9 Maintenance Budget for District Hospitals (Absolute Amount & % of Total)

The FIF is another source of fund for maintenance. Out of the total collection from cost-sharing, 75% is allocated for operational expenses, 25% of which usually goes to maintenance. In case of the Nyamira Hospital, the amount appropriated for maintenance is only approximately Kshs. 64,000 per year, or Kshs. 5,300 per month.

Rural Health Facilities:
RHFs also have a chronic budgetary problem. Minimal funds are allocated for their maintenance. Only **0.4%** of the total budget appropriated to RHFs is used for maintenance work in each district. The budget is evenly allocated among all facilities, regardless of the number of users or scale of the facility.

Financial arrangements are normally made on a quarterly basis. The budget for repair work is arranged on request. This financial system is one of the reasons why much damage is left without repair.

b. Attributes of the Maintenance System

The current administrative system for building maintenance is very bureaucratic and complicated. It takes a long time because it is a back-and-forth process between the district and central levels, as well as between MoPW and MoH.

While maintenance of health facilities is the responsibility of MoPW, the staff could carry out daily or minor maintenance work in the hospital. In fact, Preventive Health Officers (PHO(M)) and Preventive Health Technicians (PHT(M)) have successfully attempted preventive maintenance of RHFs. However, because of the limited number of skilled maintenance staff, some damage facilities are left unrepaired.

c. Maintenance Unit and Staff

District Hospitals
Each hospital has a Hospital Maintenance Unit (HMU). Table 11.2.3 shows the number of staff available for maintenance work in each hospital. It seems that the number of artisans and carpenters are not enough to actually carry out all the required maintenance work. For major repair work on the facility, an engineer from MoPW should be consulted.

Table 11.2.3 : The number of Maintenance staff in DH

	Kericho DH	Longisa DH	Nyamira DH	Kisii DH
No. of Maintenance Staff	1 Technologist 6 Technicians	3 Technicians 2 PHO 1 PHT	2 Technologists 2 Technicians 1 Carpenter 1 Support staff	2 Technologist 5 Technicians 6 Artisans 1 Mech. Eng. for Vehicles 1 Support staff

Source: JICA Study Team Field Survey

Problems regarding the water system for DH are many, too. The problems in Nyamira DH are more complicated than in Kisii and Kericho DH. For this reason, some maintenance staff, inclusion of those in Longisa DH, may benefit from special training on plumbing to carry out effective repair works.

It has been observed that the focus of HMU is on maintenance of hospital and medical equipment rather than hospital buildings.

Rural Health Facilities
At RHF, the degree of maintenance work was observed to be improving on account of the PMIU Project. The project consists of the following components (Appendix 7):

1) renovation of dispensary;
2) training programme;
3) preventive maintenance;

4) supply of medical equipment; and
5) supply of non-medical equipment.

The condition of dispensaries has gradually improved. However, some damaged facilities or equipment have not been repaired yet because of financial constraints and limited skills of PHO(M)s' and PHT(M)s', whose capacities are still limited only to minor maintenance work.

d. Motivation

In order to keep the buildings in good condition, motivation of the staff-in-charge is also necessary. Although built during the same year, some buildings are in better condition than others. This could be attributed to the attitude and motivation of staff using the facilities as well as those using them.

In addition, some patients and visitors might still be unfamiliar in the use of toilets and other sanitary facilities. As such, orientation or training might help in maintaining these facilities in good condition.

11.3 CONDITIONS OF MEDICAL EQUIPMENT AT HEALTH FACILITIES

In general, many of the medical equipment in all the facilities surveyed were in a less-than-satisfactory condition. Even some essential equipment, deemed to be necessary to provide minimum services, was observed to be damaged or inadequately maintained.

11.3.1 At District Hospitals

The average age of medical equipment is 15 years. Some of the equipment has not been used either because of difficulty to procure spare parts or lack of skilled staff in certain types of equipment. Additional findings are as follows

1) The maintenance staff of DH spend most of their time on repair work.
2) A "Preventive Maintenance Programme/Plan" still has to be developed in some DH.
3) District hospitals use an "Equipment Inventory Card" and inventory labels prepared by MoH. Additionally, the MES of MoH has also prepared an instruction about the conduct of inventories. However, the maintenance history of medical equipment is hardly recorded, thereby losing information important for carrying out future preventive maintenance.
4) The Health Facility Maintenance Management System Programme of MoH supports DH in preparing inventories of medical equipment. The Medical Engineering Department of each hospital receives medical equipment inventory prepared by the Development Workshop in Kisumu. However, feedback systems seem to be out of place.
5) Users of medical equipment commonly request for more maintenance staff, new medical equipment, spare parts and maintenance tools. Some suggested further training on new equipment.

Considering the vital function, DHs have higher level facilities to which patients may be referred. It is crucial to repair or replace broken and/or non-functioning medical equipment as soon as possible. This is particularly urgent for equipment in the following:

1) X-ray department;
2) surgery department; and
3) laboratory department.

Notable findings at major district hospitals are briefly described in the succeeding section.

Kericho DH:

- In the operation theatre, essential medical equipment such as suction units, operation room lamps, and the emergency power supply system do not work. In the X-ray room, only one X-ray machine out of five is kept in good condition. In the laboratory, some equipment does not work so much that its ability to function is hampered.
- The present maintenance staff consists of one medical engineering technologist and eight medical engineering technicians. The number of staff is adequate for this hospital. However, no "Preventive Maintenance Programme" has been prepared and implemented.

Bomet (Longisa) DH:

- In spite of the new buildings, hospital services are limited to OPD only because of a water supply shortage.

- There are five medical engineering technicians in the Medical Engineering Department. The maintenance system for medical equipment is not yet fully functional.

Nyamira DH:

- In the X-ray room, only one machine is functional. In the laboratory, four out of five microscopes do not work. In the main operation theatre, the autoclaves and anaesthetic machine are broken, and the automatic switch for the generator is out of order.
- The present maintenance staff is composed of two engineering technologists, two engineering technicians, one carpenter and one subordinate. At present, maintenance staff implement the "Preventive Maintenance Programme" for a limited number (5 types) of medical and hospital equipment. Staff shortage is reported as a critical problem.

Kisii DH:

- Most of the key medical equipment in the X-ray room, the physiotherapy room and the operation room do not work.

- This hospital established a Medical Engineering Department with 15 staff including two medical engineering technologists, five medical engineering technicians, and two carpenters. The manager of the Medical Engineering Department has prepared a medical equipment inventory and a record of maintenance work. All the staff have difficulty in using their working time to preventive maintenance work.

11.3.2 At Health Centres and Dispensaries

The PMIU, supported by DANIDA and UNICEF, provided medical equipment kits to 110 facilities in Kericho, Bomet and Kisii districts. It also distributed tool kits to facilities in Nyamira. Occasionally, it dispatches PHTs (Public Health Technicians) to the RHF to carry out maintenance of facilities and medical equipment.

Since the medical equipment used by RHF are simple and robust, many are generally kept in fairly good condition. Nevertheless, it was observed that some essential equipment (e.g. sphygmomanometers and stethoscopes) is out of order. Table 11.3.1 indicates the results of a survey of medical equipment.

11.3.3 At Mission Hospital and Health Centre

In contrast to Gok health facilities, mission hospital and health centre were found to have maintained their facilities and equipment fairly well. Facilities were all clean. The medical equipment and other instruments were in good working condition. It was noted that one mission health centre extends mobile clinic services for consultation and immunisation in remote areas twice a month with the use of three vehicles, all of which are well maintained.

11.4 MEASURES FOR REHABILITATION OF FACILITIES AND EQUIPMENT

11.4.1 Establishment of a "New Maintenance System"

(1) "New Maintenance System" for District Hospital

The current administrative system for maintenance is reported to be bureaucratic and complicated. The official documentation procedure from initiation of a request for repair or replacement by a district hospital, to purchasing then completion of the repair, even for a tiny part, is a back-and-forth process between the district and the central levels, as well as MoPW and MoH. Many letters are necessary at each level, and it takes a long time to get approvals and/or permission to proceed with the repair or replacement. Furthermore, financial arrangements are normally made on a quarterly basis. Hence, timely and urgent repairs are almost impossible as they take at least three months for approval to be issued.

In order to maintain facilities and equipment in good operational condition, it is necessary to establish a "New Maintenance System" in each District Hospital. Considering the important function of health facilities, a much more efficient

maintenance management system is recommended with the following essential elements:

1) appropriation of a larger maintenance budget from FIF;
2) providing each department in the hospital with job description for maintenance work;
3) thorough cleaning of each buildings wherein the users may also be involved;
4) involvement of users of health facilities and medical equipment (doctors, technologists, technicians and nurses) in the important "daily check" as a part of "Preventive Maintenance System";
5) decentralisation and simplification of the procurement procedures for spare parts, based on an "Annual Maintenance Programme";
6) introduction of an auditing System; and
7) training of maintenance staff both periodically and continuously in accordance with a standard "Medical Engineering Training Programme".

All the departments in the DH should be involved with the operation and management of the new maintenance. An organisation chart of the DH should first be written. Job specifications for each department that is involved with the maintenance system should be defined. An administration system for the maintenance of facilities and equipment includes at least four departments.

1) User Department - The User Department includes staff such as doctors, technologists, technicians and nurses. It also includes patients and visitors. It would help in determining the needs for the facility such as new buildings and equipment.
2) Supplies and Procurement Department - On the other hand, the Supplies and Procurement Department would be responsible for responding to the needs of the User Department. It would ensure compliance to the specifications defined by the User Departments in its acquisition of new equipment or facilities. It would allocate an inventory number to each facility and piece of equipment.
3) Finance Department - The Finance Department makes and records an asset evaluation for each facility and piece of equipment and adjusts the accounts with regard to depreciation.
4) Maintenance Department - The Maintenance Department maintains such facilities and equipment, handles spare parts, retains specifications of equipment, inventory cards, failure reports, records of preventive maintenance, inventory lists of facilities, equipment and spare parts, etc. The maintenance activities carried out by the Maintenance Department would include preventive maintenance and repair. It is advisable to increase preventive maintenance. Users are expected to play an important role by carrying out a daily check as part of the preventive maintenance procedure.

(2) "Maintenance System" for Rural Health Facilities

As mentioned above, the PMIU has been executing the project for strengthening the preventive maintenance for RHFs. It prepared a " Maintenance Manual" for Rural

Health Facilities that was published in October 1994. It seems there is a need to strengthen the section of the manual on waterworks.

Moreover, a "Construction Manual" for RHFs might be needed to support the initiatives of the communities. The manual may include recommendation on financial management, site selection, choosing and controlling contractors, procurement of construction materials, designs of facilities, and specifications of equipment.

11.4.2 Upgrading of Facilities and Medical Equipment

To strengthen the health care referral system in each district, the following measures are considered critical:

To rehabilitate district hospitals that are at the top of the patient's referral system;

To strengthen priority health centres that are proposed in chapter 8;

To strengthen all RHF in each district in order to function as designated;

To ensure a reliable supply of consumables and spare parts.

(1) To rehabilitate district hospitals

<u>Kericho District Hospital</u>

- Comprehensive rehabilitation of the buildings, related facilities and the laboratory
  - Change in the organisation of facilities and departments to improve the flow of patients, staff and services
  - Reconstruction or renovation of some buildings
  - Repair or renovation of a number of things such as windows, doors, ceilings, roofs and pipes
- Replacement of medical equipment
  - Stethoscope, blood pressure machine, operation room lamp, suction unit, trolley, X-ray machine for general purpose, mobile X-ray machine
  - Generator for emergency use
  - Personal computer and measuring instruments for the maintenance department

<u>Longisa District Hospital (Bomet)</u>

- Installation of a water supply system and completion of some construction works
  - Water collection system from the roof could be enhanced
  - Rehabilitation of some facilities that have not been used for a long time such as the IPD building
- Replenishment of medical equipment to support the full operation of the hospital
- Establishment of a maintenance management plan and schedule

Nyamira District Hospital

- Minor rehabilitation of the building and facilities
- Urgent rehabilitation of waterproofing
- Renovation of piping system
- Replacement of medical equipment
  - X-ray machine for general purpose, mobile X-ray machine, microscope, pH meter, infrared lamp
  - 4-WD ambulance
  - Personal computer and measuring instrument for the maintenance department

Kisii District Hospital

- Comprehensive rehabilitation/renovation of the dilapidated buildings and facilities, including the laboratory
  - Change in the organisation of facilities and departments to improve the flow of patients, staff and services
  - Reconstruction or renovation of some old buildings
  - Repair or renovation of windows, doors, ceilings, roof, etc.
- Replacement of medical equipment
  - X-ray machine for general purpose, mobile X-ray machine, dental X-ray machine, automatic film processor, X-ray film viewer
  - Physiotherapy machine (ultrasonic, short-wave, microwave, infrared, and ultraviolet) and wheelchair
  - Operating room lamp, operating table, microscope for eye surgery
  - Blood cell counter and microscope
  - Personal computer and measuring instrument for the maintenance department

(2) To strengthen priority health centres

At present, there is an existing programme for improving the physical facilities of dispensaries. However, there is no development programme for health centres. To optimise the benefits expected from limited resources, prioritisation of existing HCs becomes inevitable. The priority health centres are conceptualised to serve as intermediate referral centres for nearby dispensaries and other health centres. They are to provide logistical and training support to other facilities. First and foremost, the priority health centres would be strengthened so that they could be fully functional based on the MoH standards.

In this regard, the JICA Study Team evaluated 27 HCs as to the conditions of facilities and equipment, capacities of staff, accessibility, and security. Per consultation with local officials, who are more familiar with the terrain and requirements in the Study Area, the list of priorities was revised to include a total of **14 health centres**:

1) in Kericho - Fort Terman, Kipkelion, and Sosiot;
2) in Bomet - Kapkoros, Ndanai, and Sigor;
3) in Nyamira - Keroka and Manga;
4) in Kisii - Keumbu, Masimba, and Marani; and
5) in Gucha - Kenyenya, Nduru, and Nyamache.

(3) To strengthen all health centres and dispensaries up to a level of functionality based on MoH standards, the following recommendations are submitted:

- To examine the needs of RHF for essential infrastructure, including that for water supply system;
- To develop short- and long-term programmes of rehabilitation of seriously-deteriorated RHFs
- To ensure the provision of essential equipment, such as a sphygmomanometer and a stethoscope, at RHFs;
- To improve the maternity ward and equipment (e.g. spot light, simple delivery bed, vaginal examination set) for obstetrical care at HCs; and
- To improve the screening for malaria by providing microscopes and other laboratory supplies at HC's.

(4) To ensure a reliable supply of consumable and spare parts

The majority of facilities and equipment in DH are old. Some are not being used due to lack of spare parts. For example, equipment in the operating theatre, laboratory, and radiology departments have remained idle. Consequently, the ability of these facilities to provide critical services has been hampered.

11.4.3 Budgetary Basis for Maintenance

Good maintenance is a key to ensure that valuable assets remain in good condition and that investment in these assets is not wasted. It requires skilled and disciplined staff equipped with appropriate tools. More importantly, it requires financial support. At present, however, it seems the budget for maintenance is only about 0.23% of the total allocation for the districts. To keep facilities and equipment in functional condition, increasing the maintenance budget to at least 10% might be advisable. The National Health Reform Secretariat has already proposed an enlargement of the maintenance budget. This policy proposal could be implemented in association with the following strategies:

1) to devolve the power and authority over FIF to district authorities;
2) to strengthen auditing function;
3) to simplify the process of procurement of spare parts and other consumables required for maintenance; and
4) to enhance the technical capacity the Medical Engineering Services in establishing policies, setting up of standards, and providing training programmes.

Appendix

Annex 1 : District Health and Management Information System

1. Concept of District Health Information Management system

District Health Information Management System consists of sub database components described below. Each database can be relational by linking the common field (e.g. Facility code in Health facility and Facility code in Outpatient morbidity). Linking of different databases enable those concerned (1) to understand the correlation between the factors in the health sector; and (2) to plan and manage district health activities efficiently and effectively.

Health facility
- Facility code
- District code
- Facility name
- Postal address
- Agency name
- Facility type
- Type of services provided

Outpatient morbidity
- Facility code
- District code
- New cases of diseases (36 categories)
- Referrals
- No. of first attendance and re-attendance

Inpatient morbidity & mortality
- Facility code
- District code
- Year
- Quarter
- Sex
- Disease category
- Total death by age

Personnel
- Personnel ID
- Facility code
- District code
- Job category
- Qualification
- Sex
- Birthday
- Training history

Workload
- Facility code
- District code
- Outpatient services
- Inpatient services
- Maternity services
- Operations
- Special services

Equipment Inventory
- ID
- Facility code
- Equipment category
- Equipment model
- Manufacturer
- Purchase price
- Condition
- Repair and management

Immunisation
- Facility code
- District code
- BCG
- DPT
- Oral polio
- Measles
- Tetanus toxoid

Logistics of drugs and medical supply
- Record of receipt and dispatch of drugs and medical supplier

2. Tabulation from the database system: Reported new cases of outpatient morbidity

The data shown here are taken from the health database system at the MOH headquarters and converted to a table of monthly summary table of reported outpatient morbidity in Nyamira district by using Microsoft Access. The Data of a particular health facility regarding a can be also converted into a table.

District Name	Year	Month	Diarrhoea (Dysentery)	Tuberculosis	Leprosy	Whooping Cough	Meningitis	Tetanus	Poliomyelitis	Chicken pox	Measles
Nyamira	95	1	904	0	0	3	3	1	0	50	43
Nyamira	95	2	3	0	0	0	0	0	0	3	0
Nyamira	95	3	1178	0	0	6	0	0	0	91	51
Nyamira	95	4	795	0	0	10	2	0	1	34	72
Nyamira	95	5	1002	13	1	21	9	2	2	45	29
Nyamira	95	6	1263	2	0	116	7	9	0	94	49
Nyamira	95	7	1208	0	0	15	1	0	0	55	31
Nyamira	95	8	1060	2	1	14	4	0	2	107	79
Nyamira	95	9	1013	1	0	20	2	2	0	96	19
Nyamira	95	10	1370	1	1	17	3	0	15	118	51
Nyamira	95	11	701	1	0	16	0	0	0	105	18
Nyamira	95	12	644	1	0	35	0	1	0	50	7

Infection Pelvic	Mumps	Malaria	Gonorrhoea	Urinary Tract Infections	Bilhazia (Schistosomiasis)	Intestinal Worms	Malnutrition	Anaemia	Eye Infections
2	60	9928	116	617	1	1104	18	142	482
0	0	560	58	0	0	110	0	0	39
33	695	9597	423	843	44	1416	48	414	1185
5	26	7425	178	530	2	1188	18	72	1117
2	32	8786	179	518	10	1155	47	217	1224
37	98	12965	749	800	296	1286	366	391	1851
5	48	12772	252	853	7	1723	33	437	1781
7	72	10830	206	802	2	1525	17	246	1561
4	85	8762	252	800	25	1436	24	577	1177
16	402	10548	272	453	47	1353	91	418	1193
0	32	7236	93	447	2	888	37	248	598
6	16	6336	119	387	2	983	7	291	616

NB: The data of all diseases are not shown due to the limitation of the space.

2. Tabulation from the database system: Reported new cases of outpatient morbidity

The data shown here are taken from the health database system at the MOH headquarters and converted to a table of monthly summary table of reported outpatient morbidity in Nyamira district by using Microsoft Access. The Data of a particular health facility regarding a can be also converted into a table.

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Nyamira	95	2	3	0	0	0	0	0	0	3	0
Nyamira	95	3	1178	0	0	6	0	0	0	91	51
Nyamira	95	4	795	0	0	10	2	0	1	34	72
Nyamira	95	5	1002	13	1	21	9	2	2	45	29
Nyamira	95	6	1263	2	0	116	7	9	0	94	49
Nyamira	95	7	1208	0	0	15	1	0	0	55	31
Nyamira	95	8	1060	2	1	14	4	0	2	107	79
Nyamira	95	9	1013	1	0	20	2	2	0	96	19
Nyamira	95	10	1370	1	1	17	3	0	15	118	51
Nyamira	95	11	701	1	0	16	0	0	0	105	18
Nyamira	95	12	644	1	0	35	0	1	0	50	7

Infectious Hepatitis	Mumps	Malaria	Gonorrhoea	Urinary Tract Infections	Bilhazia (Schistosomiasis)	Intestinal worms	Malnutrition	Anaemia	Eye infections
2	60	9928	116	617	1	1104	18	142	482
0	0	560	58	0	0	110	0	0	39
33	695	9597	423	643	44	1416	48	414	1185
5	26	7425	178	530	2	1188	18	72	1117
2	32	8786	179	518	10	1155	47	217	1224
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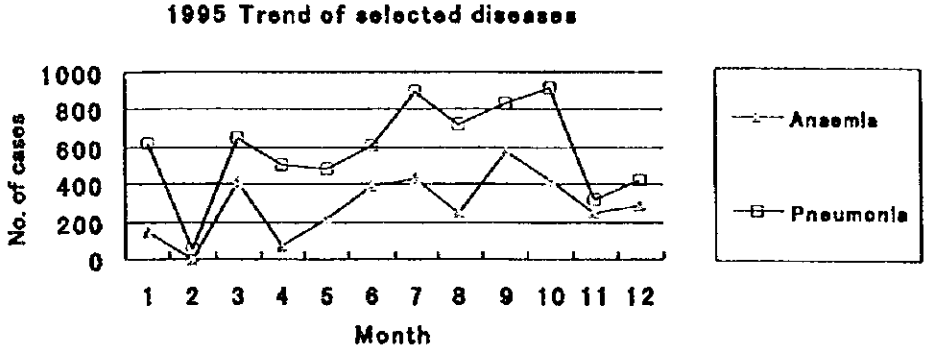
7	72	10830	206	802	2	1525	17	246	1561
4	85	8762	252	800	25	1436	24	577	1177
16	402	10548	272	453	47	1353	91	418	1193
0	32	7236	93	447	2	888	37	248	598
6	16	6336	119	387	2	983	7	291	616

NB: The data of all diseases are not shown due to the limitation of the space.

3. Example of simple graph made from the database system

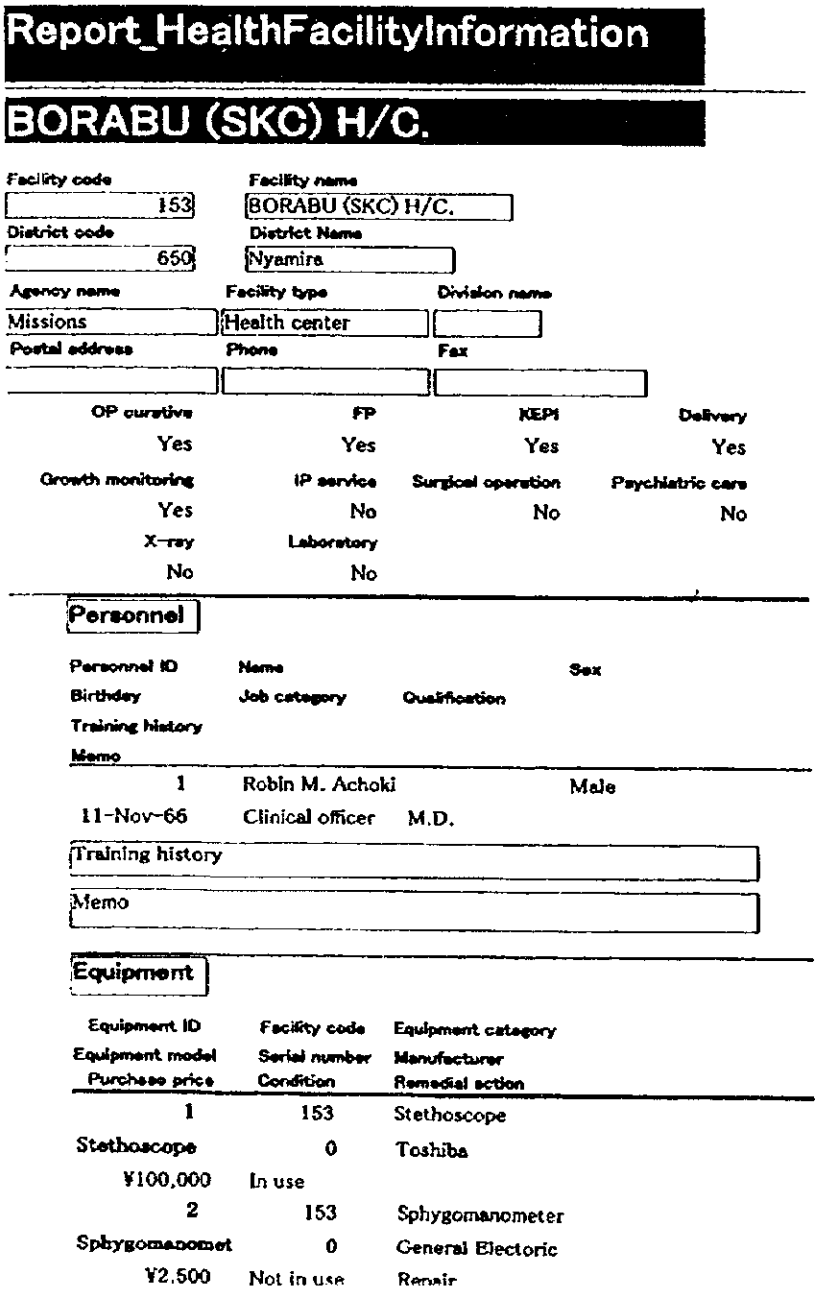
Graphs can be also made using the database system. An example is made from the 1995 outpatient morbidity data of Nyamira district. The example shows only anaemia and pneumonia but graphs can be made for other condtions . Graphs are effective particularly in finding the correlation between one factor and another. Production and distribution of the graphs to health facilities could be of great help to the planning and management of health activities.



NB: The figure is adapted from the current health information system. However, some of the data do not necessarily reflect the actual trend of diseases, as all facilities do not report the forms and the reporting rate varies from one month to another.

4. Example of the report

Those concerned in planning and management of district health activities need to know the information regarding health facilities. The report below is made, combining the data from the tables of health facility, personnel, and equipment. This type of report is an effective tool to have a general understanding of a particular health facility.



Report_HealthFacilityInformation

BORABU (SKC) H/C.

Facility code	Facility name
153	BORABU (SKC) H/C.
District code	**District Name**
650	Nyamira

Agency name	Facility type	Division name
Missions	Health center	
Postal address	**Phone**	**Fax**

OP curative	FP	KEPI	Delivery
Yes	Yes	Yes	Yes
Growth monitoring	**IP service**	**Surgical operation**	**Psychiatric care**
Yes	No	No	No
X-ray	**Laboratory**		
No	No		

Personnel

Personnel ID	Name		Sex
Birthday	Job category	Qualification	
Training history			
Memo			
1	Robin M. Achoki		Male
11-Nov-66	Clinical officer	M.D.	
Training history			
Memo			

Equipment

Equipment ID	Facility code	Equipment category
Equipment model	Serial number	Manufacturer
Purchase price	Condition	Remedial action
1	153	Stethoscope
Stethoscope	0	Toshiba
¥100,000	In use	
2	153	Sphygomanometer
Sphygomanomet	0	General Electoric
¥2,500	Not in use	Repair

Appendix 2 Definition and Categorization of Health Facilities in Kenya

	Dispensary		Health	
	Type 1	Type 2	Type 1	Type 2
Service Provided	Basic Curative OPD Basic Environmental Health	Basic curative OPD Environmental Health, MCH/FP, Immunization services	Basic curative OPD Environmental Health, MCH/FP, Immunization services Nutrition Maternity services Limited Oral Health Services (Mobile Services) Minor Surgery IPD on observation basis (12 hours maximum length of stay before referral)	Curative OPD, Environmental Health, MCH/FP(Integrated), Immunization Services, Nutrition, Maternity Oral Health Services Minor Surgery IPD on observation basis (12 hours Maximum Length of stay before referral) CBR(Community Based Rehabilitation) includes Physio/Occupational therapy.
Physical Facilities	3 rooms for basic treatment.	4-6 Rooms with a waiting area (for basic treatment, MCH/ FP services) Staff houses	Consultation and treatment rooms and equipment. Small laboratory Minor surgery facilities Staff houses.	Consultation and treatment rooms & equipment. Small laboratory Minor surgery. Mortuary Pharmacy Sterilization Delivery Kitchen and Laundry Staff Houses
Catchment Population	Up to 10,000	Up to 15,000	Up to 50,000 - 70,000	50,000 - 100,000
Number of Beds	No beds	No beds (2-4 observation beds)	8 Maternity beds 4 Observation beds	13-24 beds

Training Health Centers Rural Health Training Centers Rural Health Demonstration Centers	Hospital			
	Sub-District Hospital	District Hospital	Provincial Hospital	National Hospital
Curative OPD Environmental Health MCH/FP(Integrated) Immunization Services, Nutrition, Maternity Services Physical Medicine Oral Health Services Minor Surgery IPD on observation basis CBR Inservices training for health workers	Provides mostly primary and secondary care Limited specialized care Internal medicine General Surgery (Limited) Dental services including dental laboratory services Obstetrics/Gynaecology Paediatrics	Primary, secondary and limited tertiary care as well as training. Service as the first referral level hospital for the SDH: Internal Medicine Obstetrics/Gynecology Full Surgical Services Dental Services Psychiatry Ophthalmology Ear, Nose, Throat (ENT) Forensic medicine	Secondary and tertiary care. Specialized (consultancy) services in various discriplines. Accepts referrals from district hospitals and must have a well established referral system. Training center for all health staff.	a. Spinal Injuries Hospital b. Mental Health Hospitals c. Infections Diseases hospital which includes the Tb/Leprosy Hospitals d. Maternity Hospitals
Consultation and treatment rooms and equipment. Small laboratory Minor surgery facilities. Mortuary Pharmacy Sterilization Delivery Kitchen & Dining Hall Laundry Central Stores Students hostels Lecture rooms Administration Block and Staff Houses.	A modest OPD, IPD; Diagnostic and Treatment Department, Central Supplies Dept. Adm. Block. for OP/IP primary and secondary care. Amenities, Consultation Clinics, Casualty, Admission and Medical Records. Pharmacy, Laboratory, X-Ray, Operating Theater, Intensive Care Sterilization, Delivery, Administration Physiotherapy/Occupational Therapy Kitchen, Laundry, Central Stores, Boiler room & generator house Maintenance Workshop, Mortuary, Incinerator Staff Changing room and Staff Houses.	Fairly large OPD, IPD, Diagnostic and treatment departments, Central Supplies Dept. Adm. Block for OP/IP primary, secondary and limited tertiary care. Amenities, Consultation Clinics, Casualty, Admission and Medical Records. Pharmacy, Laboratory, X-Ray, Operating Theater, Intensive Care Sterilization, Delivery, Administration Physiotherapy/Occupational Therapy Kitchen, Laundry, Central Stores, Boiler room & generator house Maintenance Workshop, Mortuary, Incinerator Staff Changing room, Staff houses	Large and fairly sophisticated OPD, Diagnostic and Treatment Dept., IPD, Central Supplies Dept. and Adm. Blocks, for OP/IP secondary and tertiary care. Amenities, Consultation Clinics, Casualty, Admission and Medical Records. Pharmacy, Laboratory, X-Ray, Operating Theater, Intensive Care Sterilization, Delivery, Administration Physiotherapy/Occupational Therapy, Burns Unit, Psychiatric Unit, Orthopaedics; E.N.T. Kitchen, Laundry, Central Stores, Boiler room & Generator House, Maintenance Workshop, Mortuary, Incinerator Staff Changing room Staff Houses.	This will vary according to the specialization of the hospital.
50,000 to 100,000	100,000 - 250,000	250,000 - 1,000,000	1,000,000 - 2,000,000	National, Regional
13 - 24 beds	80 - 150 beds	150 - 300 beds	250 - 800 beds	Varies

APPENDIX 3: NGO LIST IN THE STUDY AREA

Name of NGO	Postal Address	Telephone	Physical Address	Sectors	Area of
African Medical Research foundation (AMREF)	P.O. Box 30125	50130	Wilson Airport	Health,Refil,Population, WAter, Environment	Kisii
Child Welfare Society of Kenya	P.O. Box 43982	223954/230174	commerce House, Moi Avenue, Nairobi	-	Kisii
Citizen Social Care Centre	P.O. Box 5320	-	busia Road, Opp Vehicle Inspection Centre, Kisumu	Multi-Sectoral	Kisii
Community Initative Support Services (CISS)	P.O. Box 76	035-44635	Milimani, Off Awuor Otiende Road, Kisumu	Health	Kericho
Community Self Help Development (CODE)	P.O. Box 2814	-	Mosoco Road	Informal Sector	Nyamira District
Development Partners	P.O. Box 61671	339940	-	-	Nyamira
Disciples of Mercy International	P.O. Box 20	035-43427	Wathorogo Sub-location	-	Kisii
East African Development Ministry	P.O. Box 1574	035-40276, 40785, 45251	Tom Mboya Estate	Health	Kisii
Effective Relief and Development Services	P.O. Box 19846	712237	80 - Dagoretti Corner, Nairobi	Health	Bomet
Evangelical Lutheran Church in Kenya	P.O. Box 874	20237	Itierio	Health	Nyamira
Foundation for Research in Children's Diseases	P.O. Box 43950	224973	IPS Building, 1st Floor	Health	Kisii
International Fellowship - Kenya	P.O. Box 25119	22210	Kenya National Ass. Building, 9th floor, Kisumu	Health	Kisii
Kaigai Community Development Programmes	P.O. Box 1982	0361-31312	Koin-Eei Plaza, Temple Road	Health	Kericho, Bomet
Kenya Educatiion and Development Organization	P.O. Box 1362, Kericho	-	Rehema pry. Sch. Nhoino Rd., Bureti Division	Health	Kericho, Bomet, Nyamira
Kenya Enterpreneurship Promotion Programmes	P.O. Box 1375	31468	Plot No. 4, Section 5, Banani Bldg., Nakuru	-	Kericho
Kenya International Development Organization	P.O. Box 93676, Mombasa	435008	-	Health	Kericho, Bomet
Koito International Development Organization	P.O. Box 21772	-	KICC	-	Kericho, Bomet
Maendeleo Ya Wanawake Organization	P.O. Box 44412,	222095, 223302, 221136	Maendeleo House Monrovia Street	-	Kericho
Mobile Outreach International	P.O. Box 76096	551158, 568547	Ngong Road, Oposite Caltex	Health	Kericho, Bomet
Nyambene Child Ministry - Kenya	P.O. Box 267, Nyambene	-	Maua Township	-	Nyambene
Plan International	P.O. Box 25196, Nairobi	562593	Kirichwa Lane, Off Ngong Road	-	Nyambene
Seet Rural Women Development Organization	P.O. Box 39303, Nairobi	332389-92 Ext. 34257	KICC 16th Flor, Room 1615	-	Kericho
Small Business Enterprises Development Agency	P.O. Box 63067	211764	United Evangelical Building	Health	Kisii
Solidarity Goodwill Services	P.O. Box 74806	764370	-	Health	Nyambene

Spirit of Faith Limited	P.O. Box 54256	803620	Longonot Place, 6th Floor	-	Kisii
Tenwek Hospital	P.O. Box 39, Bomet	Bomet 36 or 45	Bomet	Health	Bomet, Kericho
The association for the physically disabled of Kenya	P.O. Box 46747	224443/332227	APDK House, Lagos (Bohra) Road	Health	Kisii
The Life Ministry	P.O. Box 62500	723065/723153	Ralph Bunche Road	Health	Kericho
Tolloita Economic Empowerment for Women Organization	P.O. Box 47565	-	-	Health	Kericho
Wesidi Professional Organization	P.O. Box 10266	602860	Southlands Hse. No. 226, Iangata	Health	Nyamira
World Vision of Kenya	P.O. Box 50816	331017/8	National Bank Building	Health	Bomet
Adventist Development and Relief Agency (DRA - Kenya)	P.O. Box 42276	566031	-	Community Health, Agriculture and	Kericho, Kisii
Aga Khan Foundation	P.O. Box 40898	227369	ICEA Building, 8th Floor	Health	Kericho
Family Planning association of Kenya	P.O. Box 221	(0381)-21268	Hospital Road	Family planning	Kisii
KANU Maendeleo Ya Wanawake Organisation	P.O. Box 302	Bomet	-	-	Kericho
KANU Maendeleo ya Wanawake	P.O. Box 340, Sotik	-	-	Family Health	Kisii