

### 5.3.4 Typical Health Seeking Behaviour to Cure Malaria

The results of the study of malaria case management provide actual cases of the use of the measures available to the people in the Study Area, which not only shows how people behave when faced with malaria but also reveals more detailed and contextualized decision-making process of health seeking behaviors. Table 5.3.16 is the result obtained about how people acted against malaria which occurred within the previous month of the Study<sup>5</sup>.

**Table 5.3.16 Malaria Case Management**

	No. of cases	Severe?		Symptoms	Reasons to take the action	How many days before? (No. of days)	Costs (Ksh)	Cured? (No. of yes)
		Yes	No					
Home	21 (17.5%)	3	18	Fever; 17 Headache; 9 Vomiting; 7	Not too sick; 9 Nearest; 6 Cheap; 3	1.6	68.1	19
Dispensary	20 (16.6%)	7	13	Headache; 14 Fever; 11 Vomiting; 9	Nearest; 15 Cheap; 11 Drugs available; 2	1.7	23.9	20
Private clinic	22 (18.3%)	12	10	Fever; 7 Headache; 10 Vomiting; 5	Good facility; 15 Nearest; 10 Cheap; 4	2.1	453.0	21
Health Center	44 (36.6%)	18	26	Headache; 31 Fever; 20 Vomiting; 16	Nearest; 30 Cheap; 11 Good facility; 8	1.8	248.3	39
Govt. Hospital	11 (9.1%)	7	3	Fever; 7 Headache; 3 Backache; 2	Good facility; 7 Nearest; 3 Cheap; 2	2.5	332.2	9
Mission Hosp.	3 (2.5%)	2	1	Fever; 2 Diarrhea; 2 Abdominal pain; 2	Nearest; 2 Good facility; 2	2	1105	3
Total / average	120					1.95	371.7	12

Among the 120 cases, 21 cases (17.5%) were treated at home, which are almost equal to the number of cases where people visited dispensaries and private clinics. Health Centers are visited in the largest cases, which goes in line with the trends that emerged from the general health seeking behaviors. Mission hospitals were visited in least cases, which may suggests that this expensive HCF is not so often used, at least at the time of Malaria Survey, that is supported by the results of the past health seeking behaviors.

<sup>5</sup> As indicated earlier, some of the cases obtained occurred within two months previous of the Study.

Home treatment is usually carried out when it is not perceived to be severe. Other than this, no obvious trend was found among the use of HCFs, though people tend to visit HCFs other than dispensaries when the degree of severity is perceived to be severe. As for symptoms, no conspicuous difference was found; the symptoms raised were almost the same, where fever, headache and vomiting were commonly raised. Differences are most obvious in terms of the reasons of the choice of actions. As reasons to try self-treatment, the reason most often cited was the non-severity, followed by the proximity and the cheap costs. Against this, private clinics and Government hospitals were chosen because they are perceived as good facilities, which were also mentioned for Health Center and mission hospital if by less respondents. Health Centers and dispensaries are chosen as relatively cheap facilities. Proximity was also often mentioned as reasons of choice of all the HCFs, though most often cited for dispensaries, Health Centers and mission hospitals.

Response of people to malaria is generally speaking swift, where actions were taken on average 1.95 days after the symptoms were perceived. People tend to try self-treatment or visit dispensaries and Health Centers relatively earlier than visiting Government hospitals, private clinics and mission hospitals. As will be argued later, this reflects the path people take until they have completely recovered from malaria. In terms of costs, surprisingly, self-treatment is less cheap than the cost that incurs from chemists. Health Centers are a lot more expensive, which cost on average Ksh. 248. Private clinics and Government hospitals cost around Ksh. 300 - 400. Mission hospitals, as is indicated by comments of attendants put earlier, are one digit more expensive, with the costs on average being Ksh. 1105. In most cases, they could manage to cure with the means/places listed, though 5 out of 44 cases treated at Health Centers were not completely cured and referred to other HCFs such as Government hospitals and private clinics.

A bit clearer trend emerged from the case management study than that obtained from the study of health seeking behavior in general. For example, it was found that only rich households visited mission hospitals. Interestingly, home treatment is distributed almost equally among households of all the wealth level, as shown in Table 5.3.17. These findings suggest that 1) wealth level in reality matters whether to go to expensive HCFs like mission, although the study result about health seeking behaviors suggests otherwise; and 2) wealth level is found not relevant as to whether to go about self-treatment.

Far clearer trend was obtained in terms of accessibility. More people of good access community visit Health Centers than do those of poor-access communities, while the former group of people do not go about self-treatment nor visit dispensaries, private clinics and government hospitals.

**Table 5.3.17 Use of HCFs (by Wealth Level and Accessibility)**

	Home	Dispensary	Private clinic	Health Center	Govt. hospital	Mission hospital	Total
Rich	7 (9.5%)	6 (8.1%)	4 (5.4%)	14 (18.9%)	0 (0%)	43 (58.1%)	74 (100%)
Middle	6 (10.9%)	8 (14.5%)	12 (21.8%)	21 (38.2%)	8 (14.5%)	0 (0%)	55 (100%)
Poor	8 (25.8%)	6 (19.4%)	6 (19.4%)	9 (29.0%)	2 (6.5%)	0 (0%)	31 (100%)
Total	21 (13.1%)	20 (12.5%)	22 (13.8%)	44 (27.5%)	10 (6.3%)	43 (26.9%)	160 (100%)
Good-access	6 (10.2%)	7 (11.9%)	8 (13.6%)	36 (61.0%)	2 (3.4%)	0 (0%)	59 (100%)
Poor-access	15 (23.4%)	13 (20.3%)	16 (25.0%)	8 (12.5%)	9 (14.1%)	3 (4.7%)	64 (100%)
Total	21 (17.1%)	20 (16.3%)	24 (19.5%)	44 (35.8%)	11 (8.9%)	3 (2.4%)	123 (100%)

As sources of money for the treatment, 91 respondents used their own money, 24 borrowed from non-family members, 5 made money from the sales of farm produce and 2 borrowed from grandfather/mothers.

Interesting insight can be obtained when one compares these results with comments of attendants of FGD. As is already remarked, people in the Study Area tend to move around different HCFs until one gets completely recovered. Such comments like below were obtained:

"I buy tablets from the kiosk; if no improvement I go to Nyamira Hospital, if there is no improvement, I go to herbalist and I became well before." (a female clinician of Nyamira Hospital, Masosa)

"When a person has malaria, we say let's buy some Panadol from the shop. If it persists, we go to the hospital and be given drugs. If I take the drug and don't get well, I now decide that since it has failed from this side, let me try from the side of witchdoctors or herbalists." (a male farmer of Kenyanya)

"Me when I become sick, I rush to the shop and buy Panadols and if there is no change, I go to the hospital. If I fail from the hospital, I seek advice from the herbalist and finally the witchdoctors as the last resort." (a male carpenter of Bogiakumu)

"When my small child got sick, I bought Malarquin. When I saw no response, I took the child to Kipkelion Health Center, but no improvement. I went to Londian Hospital, but no change and diarrhea was severe. Finally I was given a letter to go and buy some drugs costing Ksh. 2600." (a male attendant of Kipkelion)

These comments, which are quite often cited by many attendants, suggest there is a characteristic path one takes to cope with malaria; one that start with self-treatment, stepping up to more expensive but perceived to be more effective measures, until one reach herbalists or even witchdoctors as a last resort. The results of the Study suggest that the second stage of treatment path consists of two sub-stages: dispensaries, chemists, and Health Centers being the first sub-stage which are the sets of HCFs that are relatively cheap and easily accessible; private clinics, Government hospitals and mission hospitals being the second sub-stage, a set of HCFs that require relatively higher amount of money and time. Usually people take the first stage before moving up to the second stage.

Therefore, the costs and distance in the practical sense, two objective factors, are only second-degree determinants, which matters only in the sense that people tend to start with relatively each and easily-accessible measures. But the perceived curative capabilities of each HCFs, and the perceived degrees of severity at each stage when decision is made, two circumstantial factors, are stronger determinants in the sense

that people prioritize the latter kinds of determinants to the former ones. In fact, people are ready to and actually do make all the way to Government hospitals or mission hospitals spending considerable amounts of money.

With this understanding, the infrequent use of private clinics that emerged from case management of malaria, which contradicts the past health seeking behaviors in general, can be easily understandable; malaria is usually cured before one reaches such stage of treatment as of mission hospitals, the kind of treatment which is effective but requires considerable amount of expenditure. Also, the frequent use of Health Centers can be interpreted as showing the point where malaria episode usually ends.

This said, however, actual decision-making process as to where to go for treatment is not a clear-cut process as the hypothesis above suggests. The choices of measures of treatment, especially choices of HCFs of the same sub-stage in ranking, entirely depend on the purely personal perception as to the effectiveness of each of the HCFs, which, as is indicated earlier, stems from both purely personal opinions and past experiences of the use of specific HCFs.

Many attendants of FGD remarked that herbs and drugs available at the localities are effective, while others said self-treatment and herbal treatment should be avoided. Also, some highly regard the services of Government hospitals while others criticized them as ineffective. These personal opinions in large part stem from the actual experiences of the use of the measures; one who defies herbal- and self treatment do so in large part from their own experiences. They may also be the result of some ideological opinion that a given person embrace; one who prefers 'modern' facilities will not choose to go to herbalists so often.

Thus these subjective factors in large part determine actual health seeking behaviors to be employed. But the actual decision is also highly conditioned by such circumstantial factors as the perceived degree of severity and perceived curative capability of specific HCFs available. Costs of treatment matter for the choice; people of all wealth rank tend to go about self treatment first. The cost factors, though, matter only subject to other determinants of higher rank, which is demonstrated by the choice tend to make in favor of visiting Health Center rather than trying self-treatment when perceived as necessary.

To sum the chapter, herbalists and TBA are used for specific purposes by many people in the Study Area, but those who do not highly evaluate them tend not to use them. Herbalists tend to be used for diseases that have stronger perceived relationships with stomach problems, though some use them for other kinds of diseases. In-depth study is suggested to understand the actual practices of and situations surrounding both herbalists and TBA, so that their potential capabilities to be cheap alternatives to existing HCFs can be fully exploited.

As for modern HCFs, Health Centers are most often visited, especially for the treatment of malaria. The choice of places to seek for treatment, though, is subject to such determinants as objective factors, circumstantial factors and subjective ones. Objective factors such as costs and accessibility are found to be less significant in terms of the actual choice of HCFs to visit. Such circumstantial factors as perceived degree of severity and perceived curative capabilities of each HCF, are far stronger determinants. Subjective factors that put specific level of profile to each HCFs, which stem from past experiences of the use of specific HCFs and/or ideological opinions, also influence actual health seeking behaviors to be taken.

People in the Study Area tended to hop around different HCFs without sticking to one single HCFs, to the direction of stepping up the ladder to more expensive but perceived to be more efficacious HCFs. It is advisable to motivate people to commit themselves to one single HCFs rather than moving to another one without the advice of medical practitioners to do so, so that the curative capabilities of each of the HCFs can be fully used. This motivation, at the same time, need to be paralleled by the measures to increase the actual curative capabilities of HCFs in order not to disappoint the clients and further deteriorate the already low level of evaluation people put to the HCFs.

**Table 5.3.18 Kinds of Malaria, Their Symptoms, Causes and Actions to be Taken**

	Kind of malaria						Total
	Mild/ general	Severe	Head/ cerebral	Stomach/ abdominal	Vomiting/ diarrhea	Blood	
<b>Symptoms</b>							
Fever	46	11	6	5	3	1	72
Headache	46	17	9	0	0	0	72
Abdominal pain	10	0	0	3	0	0	13
Diarrhea		11	2	4	0	0	17
Joint pains	34	10	2	2	2	0	50
Vomiting	16	24	4	0	2	0	46
Stomachache	0	6	0	0	0	1	7
Coughing	7	0	0	0	0	0	7
Backache	7	0	0	0	0	0	7
Mental disorder	0	0	4	0	0	0	4
Dizziness	2	7	0	2	0	0	11
<b>Causes</b>							
Mosquito	58	16	8	3	1	1	87
No idea	6	1	1	1	0	1	10
Rain	9	7	1	1	0	0	18
Contaminated food	12	5	0	2	1	0	20
Contaminated water	13	9	2	4	0	1	29
Stagnant water	2	1	0	0	0	0	3
Bad air	0	6	5	1	0	0	12
Poor diet	1	1	0	0	0	0	2
Green roasted maize	1	1	0	0	0	0	2
Cold weather	6	6	2	0	1	0	15
Fly	0	1	1	0	0	0	2
Rat	0	1	1	0	0	0	2
Fatty food	1	0	0	0	0	0	1
Sugary food	0	1	0	0	0	0	1
Maize plants	4	2	0	0	0	0	6
Change of climate	0	0	1	0	0	0	1
<b>Actions</b>							
Buy drugs at kiosk	41	5	4	2	0	0	52
Go to Traditional healer	2	2	0	0	0	0	4
Go to dispensary	5	10	3	1	0	1	20
Go to health center	8	14	0	0	0	0	22
Go to hospitals (Government, mission)	18	30	1	3	3	2	57
Go to private doctor	2	4	0	0	0	0	6
Go for fruit	1	0	0	0	0	0	1

Note: Multiple answers were allowed.

'Stomach/abdominal malaria,' of which the symptoms were diarrhea, stomachache, abdominal pain, dizziness etc., are perceived to be caused by mosquitoes, contaminated water or inappropriate food. This kind of malaria can be cured with drugs sold in the local shops, or one may go to hospitals. Many people consider that serious malaria, as the name indicates, need medical treatment at health care facilities, though some considered self-treatment is possible.

When we look into the linkages between kinds of malaria, their symptoms, causes and actions to be taken, it is clear that the terms by which to distinguish malaria are more the description of symptoms than the reflection of some pre-existing taxonomic system. Therefore, 'head malaria' is a kind of physical disorder of which the problem mainly lies in one's head, while 'serious malaria' simply means malaria of serious one. The word stomach malaria is used to refer to the kind of physical problem, which mainly centers around stomach/abdominal part of one's body.

Moreover, when considering the considerable confusion about the symptoms of malaria, it is highly likely that the term 'malaria' is used not just as an emblematic word for malaria which includes a variety of diagnostic features, but as a term that embraces a wide coverage of diseases which are locally perceived as malaria.

One hypothesis can be developed why such a degree of confusion has occurred. In the Study Area, strong preoccupation with stomach problems, rather than fever, was found even in terms of malaria. As one female farmer of Bomet said, "one kind of malaria is that which one feels dizzy and headache and does not vomit, but this is still malaria". The prefix 'esso-' of 'essosera' and 'esset', two local terms that refer to malaria in Gusii speaking areas and Kipsigis speaking areas respectively, derives from 'esset' which refers to 'yellow fluid' one vomits. This may suggest that the term traditionally used to refer to certain kinds of physical problem, of which the distinctive feature being vomits of yellow fluid, is now turned to mean malaria due to the partial similarity of symptoms. In fact, the comments like below were obtained from FGD.

"'Esset' which we used to see before used to be stomachache and we used to use herbs to induce vomits or diarrhea and it cleaned (cured)." (a male respondent of Kericho)

"Long ago it (malaria) used to be general body weakness and nausea, but now it starts from the head right from the fontanelle to the whole head, joint pains - now malaria is very bad because it is fatal." (a male respondent of Kericho)

"Long ago one could have slaughtered a goat, and drink the soup without salt, and one could get well." (a male respondent of Kericho)

These comments do not make sense, unless considering that the terms now used to mean malaria have been used for different kind of disease, given the fact that malaria is new to the Study Area.

It is therefore possible to argue that behind the confusion of symptoms and causes of malaria lies this extension of terminology of diseases. That is, because malaria often accompanied symptoms similar to those of some kind of diseases that have

traditionally been there in the Study Areas, people who faced malaria recently have come to associate malaria with those diseases. The causes and symptoms that have been attributed to the diseases were also attributed to malaria with some parts being modified as a results of contemporary health education, which may reflect in the view that insects not just mosquitoes but flies and moths are perceived to cause malaria.

Whatever the origin, the confusion as to the causes and symptoms of malaria on the part of local population in the Study Area has a profound negative implication to the attitude and practice towards both the prevention and treatment of malaria. The implications of this confusion and necessary measures to be taken will be discussed in the following chapters.

## 5.4 MALARIA PREVENTION

### 5.4.1 People's Knowledge and Usage of Malaria Preventive Measures

A bulk of population in the Study Area agreed that malaria is preventable with technical measures. In fact, 108 out of 147 (73.4%) attendants of FGD agreed that malaria is preventable and said that they knew some kind of preventive measures. Table 5.4.1 below shows the results of HHS regarding the people's knowledge and the usage pattern of a variety of malaria preventive measures.

**Table 5.4.1 People's Knowledge and Usage of Malaria Preventive Measures**

Preventive measures	Know the measures?			Currently using?				Frequency of use (av. per day)
	Yes	No	N/A	Never used	Currently using	Used before, but not now	N/A or do not know	
Clear the bush around compound	90	9	1	7	84	8	1	0.08 *
Drain/bury stagnant water	88	11	1	12	80	4	4	0.24
Use mosquito coil	63	36	1	56	25	14	5	0.75
Use bet-net	62	37	1	82	9	4	5	0.94
Take anti-malaria drugs	48	51	1	59	29	7	5	0.92
Use traditional herb/plant	41	58	1	61	16	8	15	0.52
Spray insecticide	26	73	1	50	23	23	4	0.68 **
Burn cow dung	77	22	1	55	11	11	23	0.85
Use pyrethrum	29	71	0	70	11	8	11	0.81
Others	No. of cases cited							
Boiling water				1				1
Collect empty tins				3				0.42
Keep good sanitation				2				0.14

As many answers as possible were asked to probe 'Others.'

\*: Two cases are excluded; in one case bush was cleared only once a year and the other case twice a year.

\*\* : One case is excluded, where insecticide is sprayed only 3 times an year.



Among a variety of preventive measures, clearing bush and draining/burying stagnant water usually do not require costs to employ, though there were 5 cases for clearing bush and 2 for draining/burying stagnant water where people reportedly paid money, ranging from Ksh. 50 to Ksh. 200. As for other measures, mosquito coil was found to be relatively cheap, with the highest price found in Market Survey being Ksh. 10 per pair of coils and Ksh. 6 per pipe. Bed-net is indeed expensive, with the average retail price at the Study Area being Ksh. 563.8, while spray insecticide on average cost Ksh. 105. Only one case was reported where a respondent paid Ksh. 60 for pyrethrum, while 5 cases were reported in which herbs/plants were bought with the maximum price of Ksh. 50, excluding one case where Ksh. 500 was reportedly spent. As for Anti-malaria drugs, Malariaquine was sold between Ksh. 3.5 - 4 per tablet.

As is shown in Table 5.4.1, a considerable degree of disparity can be found in terms of the knowledge about different malaria preventive measures. Such measures as clearing bush around compound and draining or burying stagnant water around homestead were found to be commonly known in the Study Area. Mosquito coil and bed-net were known by approximately 60% of respondents of HHS, while spray insecticide was known only by 26% of them. Anti-malaria drugs, either bio-medical or traditional one, were known by less than half the respondents. The list of traditional herbs cited during FGD and raised by respondents of HHS is given in Annex 5. Pyrethrum was not known widely, which was known only by 29%.

The measures that were relatively well-known were not necessarily actually used. For example, mosquito coil and bed-net, both of which were known by more than 60% of respondents, were used only by 25% and 9% of them respectively at the time of the Study. Moreover, 14% of respondents used coil before but they stopped using them. Spray insecticide, which was not widely known, was nonetheless being used by almost everyone who knew this measure. Against these measures that need to be 'purchased' at shops, such measures as clearing bush and draining/burying stagnant water were relatively well practiced, where more than 80% of respondents were found to practice these measures when the Study was carried out. Such 'traditional' measures as herbs, cow-dung and pyrethrum were not practiced even by half the respondents who knew these measures; herbs were known by half the respondents but used only by 11%, while cow-dung, which was known by 77% as being able to repel mosquitoes, was actually used only by 11% of them. Pyrethrum, too, was used by 11% of respondents even though it is known by 29%.

How often these measures were employed reveals that many people in the Study Area do not use preventive measures in an appropriate manner. Spray insecticide was used on average twice in three days, but among the 41 respondents who used this measure then, 7 said that they spray only once a week and 6 said twice a week. There were even 3 respondents who said they do so just once a month. Pyrethrum, too, was used less often than once a week by three respondents among 13 who use it in one way or the other, while 11 among 33 used coil less often than once a week. Therefore, while bush is cleared and stagnant water is drained or buried relatively often, other measures that require costs are not necessarily appropriately practiced in the Study Area.

A considerable degree of disparity was found among Districts regarding to the level of knowledge about preventive measures, as shown in Table 5.4.2. Although little significance was found regarding to such measures as clearing bush and draining/burying stagnant water, difference is obvious when it comes to other measures except for spray insecticide. For example, bed-net was not known widely in Bomet, while anti-malaria drugs were known widely only in Kisii District. A far greater disparity can be identified as to such non-biomedical measures as cow-dung, herbs and pyrethrum. While about 70% of respondents in Kisii District knew herbs and pyrethrum for malaria prevention, the ratio became smaller in Nyamira where it was about 50%, until it got almost minimized in Gucha, Kericho and Bomet District where only a few people knew these measures. The knowledge about cow-dung is very low in the Study Area in general, but especially so in Bomet.

**Table 5.4.2 Knowledge of Malaria Preventive Measures (by District)**

		Kisii	Gucha	Nyamira	Kericho	Bomet	Total
Clear the bush around compound	Know the measure	18	1	0	19	1	39
	Do not know	19	18	18	16	13	84
Drain or bury stagnant water	Know the measure	17	18	19	17	17	88
	Do not know	3	1	1	2	3	10
Mosquito coil	Know the measure	14	10	15	12	12	63
	Do not know	6	10	5	7	8	36
Bed-net	Know the measure	15	10	13	15	9	62
	Do not know	5	10	7	4	11	37
Anti-malaria drugs	Know the measure	14	12	9	4	9	48
	Do not know	6	8	11	15	11	51
Traditional herbs/plants	Know the measure	14	12	9	1	5	41
	Do not know	6	8	11	18	15	58
Spray insecticide	Know the measure	15	13	11	16	19	74
	Do not know	5	7	9	3	1	25
Burn cow-dung	Know the measure	8	3	5	5	2	23
	Do not know	12	17	15	14	18	76
Pyrethrum	Know the measure	12	1	11	1	4	29
	Do not know	8	19	9	19	16	71

Note: Multiple answers were allowed.

In fact, the results of FGD suggest that people of Kericho/Bomet are far less informed about the range of preventive measures, especially about 'traditional' ones, despite that no significant difference was found as to the source of health information among

people of different Districts. According to the Survey result, people of all the Districts receive health information usually from health workers, who deliver the information at chief's baraza (community meeting at chief's yard) or at Health Centers. Despite that, the variety of preventive measures cited was much poorer in Kericho and Bomet than it was in Kisii, Gucha and Nyamira.

The disparity of the level of knowledge reflects to some degree in the different pattern among Districts as to how these measures are actually used, as shown in Table 5.4.3. Reflecting the low level of knowledge, more people in Kericho had never used anti-malaria drugs, followed by Gucha and Nyamira. Spray insecticide was found to be used by more people in Kisii and Kericho where more people knew the measure than did the people of the other Districts. The same kind of trend can be found as to the use of pyrethrum.

Disparate level of knowledge granted, however, the people of Kericho and Bomet Districts are generally speaking less likely to implement almost all the preventive measures regardless of the level of knowledge. For example, coil was not used by far more people of Kericho and Bomet although it was as well known to these people as to the people in other Districts. The smaller number of respondents answered they clear bush and drain/bury stagnant water in Kericho and Bomet. It is therefore possible to argue that the people of Kericho and Bomet are not just less informed of a variety of preventive measures but also less aware of the significance/necessity of practicing them for whatever the reasons.

**Table 5.4.3 Use of Malaria Preventive Measures (by District)**

		Kisii	Gucha	Nyamira	Kericho	Bomet	Total
Clear the bush around compound	Never	0	1	1	2	3	7
	Using	19	18	18	16	13	84
	Used before	0	1	1	2	4	8
	N/A	1	0	0	0	0	1
Drain or bury stagnant water	Never	2	2	1	2	5	12
	Using	16	17	19	15	13	80
	Used before	1	1	0	1	2	5
	N/A	1	0	0	2	0	3
Mosquito coil	Never	5	11	8	16	16	56
	Using	8	6	7	1	3	25
	Used before	5	2	4	2	1	14
	N/A	2	1	1	1	0	5
Bed-net	Never	16	15	15	17	19	82
	Using	3	3	3	0	0	9
	Used before	0	1	1	2	0	4
	N/A	1	1	1	1	1	5
Anti-malaria drugs	Never	7	13	13	17	10	60
	Using	10	7	5	1	5	28
	Used before	2	0	2	1	2	7
	N/A	1	0	0	1	3	5
Traditional herbs/plants	Never	11	10	13	16	11	61
	Using	3	5	6	1	1	16
	Used before	2	2	0	0	4	8
	N/A	4	3	1	3	4	15
Spray insecticide	Never	6	11	11	11	11	50
	Using	7	5	2	7	2	23
	Used before	5	3	7	1	7	23
	N/A	2	1	0	1	0	4
Burn cow dung	Never	5	12	12	13	14	56
	Using	3	2	4	2	0	11
	Used before	3	2	4	1	1	11
	N/A	9	4	0	4	5	22
Pyrethrum	Never	10	17	10	19	14	70
	Using	5	1	4	0	1	11
	Used before	1	1	5	0	1	8
	N/A	4	1	1	1	4	11

A degree of disparity can also be found among communities of different level of accessibility to HCFs, as is shown in Table 5.4.4. Although the difference is not very conspicuous, the greater proportion of respondents in good access area implemented many of the preventive measures, except in the case of draining/burying stagnant water and the burning of cow-dung, where the reverse trend was found. This may mean that the people of good-access community enjoy relatively easy access not only to HCFs but also to a variety of information new to the area. One case where the difference is considerable is the use of pyrethrum. While 25% of respondents of good-

access community use pyrethrum, the number for those of poor-access community is only 0.1%.

**Table 5.4.4 Use of Preventive Measures (by Accessibility)**

		Never used	Using	Used before but not now	N/A	Total
Clear bush	Good-access	0 (0%)	38 (95%)	1 (3%)	1 (3%)	40 (100%)
	Poor-access	7 (11%)	46 (78%)	7 (11%)	0 (0%)	60 (100%)
	Total	7 (7%)	84 (84%)	8 (8%)	1 (1%)	100 (100%)
Drain stagnant water	Good-access	38 (95%)	1 (3%)	0 (0%)	1 (3%)	40 (100%)
	Poor-access	11 (18%)	42 (70%)	4 (7%)	3 (5%)	60 (100%)
	Total	49 (49%)	43 (43%)	4 (4%)	4 (4%)	100 (100%)
Mosquito coil	Good-access	20 (50%)	13 (32%)	4 (10%)	3 (8%)	40 (100%)
	Poor-access	36 (60%)	12 (20%)	10 (16%)	2 (3%)	60 (100%)
	Total	56 (56%)	25 (25%)	14 (14%)	5 (5%)	100 (100%)
Bed-net	Good-access	33 (82%)	4 (10%)	2 (5%)	1 (3%)	40 (100%)
	Poor-access	49 (81%)	5 (8%)	2 (3%)	4 (7%)	60 (100%)
	Total	82 (82%)	9 (9%)	4 (4%)	5 (5%)	100 (100%)
Anti-malaria drugs	Good-access	23 (57%)	13 (32%)	3 (8%)	1 (3%)	40 (100%)
	Poor-access	36 (60%)	16 (26%)	4 (7%)	4 (7%)	60 (100%)
	Total	59 (59%)	29 (29%)	7 (7%)	5 (5%)	100 (100%)
Traditional herbs/plants	Good-access	21 (50%)	10 (25%)	3 (8%)	6 (15%)	40 (100%)
	Poor-access	40 (66%)	6 (10%)	5 (8%)	9 (15%)	60 (100%)
	Total	61 (61%)	16 (16%)	8 (8%)	15 (15%)	100 (100%)
Spray insecticide	Good-access	22 (55%)	10 (25%)	6 (15%)	2 (5%)	40 (100%)
	Poor-access	28 (46%)	13 (21%)	17 (28%)	2 (3%)	60 (100%)
	Total	50 (50%)	23 (23%)	23 (23%)	4 (4%)	100 (100%)
Burning cow-dung	Good-access	23 (57%)	3 (8%)	3 (8%)	11 (27%)	40 (100%)
	Poor-access	32 (53%)	8 (13%)	8 (13%)	12 (20%)	60 (100%)
	Total	55 (55%)	11 (11%)	11 (11%)	23 (23%)	100 (100%)
Pyrethrum	Good-access	21 (52%)	10 (25%)	5 (13%)	4 (7%)	40 (100%)
	Poor-access	49 (81%)	1 (2%)	3 (5%)	7 (11%)	60 (100%)
	Total	70 (70%)	11 (11%)	8 (8%)	11 (18%)	100 (100%)

Given the difference of the level of knowledge/use pattern of malaria preventive measures among communities/Districts, one hypothesis can be developed; because malaria is new in the Study Area in general, traditional preventive measures have been absent, and how far and how much people are informed about the range of preventive measures available depend on the informational distance, which is at least partially determined by the attitudes of each District in disseminating health information. Therefore, the less those concerned in each District succeed in delivering health information to the people, the less people are informed of a range of preventive measures especially 'traditional' ones. Also, it is highly likely, as is the case with treatment, the attitudes towards 'traditional' measures of those concerned in delivering health information influence how far people are informed about these measures and whether they actually practice them.

This said, however, regional differences alone cannot fully explain people's actual practices around malaria prevention. For example, little regional differences were found as to the use of herbs, cow-dung and pyrethrum; although these measures were relatively well known in Kisii District, few people including those of Kisii District actually use them. Bed-net, which was well known in the Study Area in general, have never been used by many people in any District. These findings suggest factors other than regional difference also operate behind people's behaviors around malaria prevention.

The Study findings suggest that the level of wealth also determines at least partially people's practice of a variety of preventive measures. Table 5.4.5 shows the difference of the use of preventive measures in terms of wealth rank. As is expected, more rich respondents were found to implement measures that incur relatively high costs. The case in point is the use of bed-net and spray insecticide. While only one poor household (0.025%) had ever used bed-net, and while the only one had stopped using it, 16 rich households (80%) used it at the time of the Study. The contrast is stronger when looking at the numbers of households that had never used the measure; while 20% of rich households had never used bed-net, hefty 90% of poor households had never used it. Spray insecticide, too, was used only by two poor households (0.05%), as against 11 rich households that used it (55%). The degree of difference gets reduced when looking at much cheaper measures such as coil; against 25 % in the case of rich households, the ratio of poor households that were found to use coils was 20%. The difference becomes also minimized when looking at such low-cost measures as clearing bush and draining or burying stagnant water. While 90% of rich households clear bush and 80% of the same category of people drained or buried stagnant water, 72% and 77.5% of poor households, respectively, practiced these measures. This suggests that the richer the people in the Study Area, the more the number of people that implement relatively expensive measures.

This finding suggest that the costs of preventive measures and one's purchasing power also influence one's choice of which of the preventive measures one tries; those relatively cheap measures such as clearing bush and draining or burying stagnant water are within the budgetary constraints of almost all the households and thus actually practiced, while the other more expensive measures are practiced by only those who can afford them.

**Table 5.4.5 Use of Preventive Measures (by Wealth Level)**

		Rich	Middle	Poor	Total
Clear bush	Never used	0	2	5	7
	Using	19	36	29	84
	Used before but not now	1	2	5	8
	N/A	0	0	1	1
Drain or bury stagnant water	Never used	2	3	7	12
	Using	16	33	31	80
	Used before but not now	0	2	2	4
	N/A	2	2	0	4
Mosquito coil	Never used	9	19	27	55
	Using	5	13	8	26
	Used before but not now	4	7	3	14
	N/A	2	1	2	5
Bed-net	Never used	4	33	36	73
	Using	15	3	0	18
	Used before but not now	1	2	1	4
	N/A	0	2	3	5
Anti-malaria drug	Never used	12	18	29	59
	Using	6	15	8	29
	Used before but not now	1	4	2	7
	N/A	1	3	1	5
Traditional herbs/plants	Never used	11	27	23	61
	Using	3	6	7	16
	Used before but not now	0	3	5	8
	N/A	6	4	5	15
Spray insecticide	Never used	5	18	27	50
	Using	11	10	2	23
	Used before but not now	4	10	9	23
	N/A	0	2	2	4
Burning cow-dung	Never used	12	21	22	55
	Using	1	3	7	11
	Used before but not now	3	7	1	11
	N/A	4	9	10	23
Pyrethrum	Never used	15	28	27	70
	Using	2	4	5	11
	Used before but not now	1	3	4	8
	N/A	2	5	4	11

#### 5.4.2 Reasons of Non-use of Preventive Measures

As reason of non-use of such measures as bed-net and spray insecticide, their high costs were quite often raised during both FGD and HHS. As Table 5.4.6 shows, quite a few respondents of HHS answered that they do not use bed-net nor insecticide, because it is too expensive. Some of them answered that even mosquito coil and anti-malaria drugs are expensive, even though, as was reported at the beginning of this chapter, coil is available usually around Ksh. 5 - 6, which is as cheap as one cup of tea. This is not too hard to understand, however, when one take into account that using coil every day cost around Ksh. 150, which may be difficult to bear for the poor people in the Study Area whose monthly cash income is sometimes below Ksh. 100. Even herbs and plants were cited by a few respondents as too expensive to use.

**Table 5.4.6 Reasons of Non-use of Preventive Measures**

Measures	Reasons of non-use				
Clear bush	No time; 4	Do not think it effective; 2	Not necessary; 1	Too expensive; 1	Not interested; 1
Drain water	Do not know the measure; 2	Do not think as effective; 2	Not necessary; 2	Not interested; 1	Water drained enough and others.; 1
Coil	Do not know the measure; 15	Too expensive; 12	No mosquito now; 9	Not effective; 4	Not necessary; 4
Bed-net	Too expensive; 44	Not available locally; 12	Do not know the measure; 7	Not necessary; 5	No mosquito now; 2
Anti-malaria drugs	Do not know the measure; 18	Not necessary; 11	Too expensive; 9	Not effective; 3	Not available locally and others; 2
Herbs/plants	Do not know the measure; 22	Do not think it effective; 6	Very bitter; 5	Too expensive; 4	Not necessary; 3
Insecticide	Too expensive; 36	Do not know the measure; 9	Not necessary; 7	No mosquito now; 3	Not effective; 2
Cow-dung	Do not know the measure; 24	Do not think it effective; 4	Not available locally; 3	Fear of side-effect; 2	Not effective and others; 2
Pyrethrum	Do not know the measure; 20	Not available locally; 17	Do not think it effective; 2	Not interested; 2	Not necessary; 1

Note: Respondents were asked to raise as many reasons as they like.

Note here the costs mean more than their retail prices of each of the preventive measures; the issue of costs should be understood in their practical sense. The cost of bed-net, for example, should be evaluated not in terms of the retail price of one single net but, instead, in terms of the total costs that incur in purchasing a number of nets enough to protect all the family members. When considering the level of cash income of households, these costs may be difficult to bear, as the comments below indicate:

"When we think of nets, it's impracticable when we consider the size of the family; it is unaffordable." (a male farmer of Nyambuho).



"There are these ways which are known to prevent malaria, but they are quite expensive, e.g., spraying the whole maize plantation, clearing all the bushes is not possible, spraying river banks is quite expensive" (a male farmer of Kipkelion)

"That (net) can be used by someone like me because I can afford, but what happens to those who cannot? Maybe out of 100 persons, only 5 might afford." (male farmer of Bomet)

"We have been doing what is in our capacity, but we have not managed to control malaria. We may talk of things like nets, but most people may not afford." (a male party chairman of Koisagat)

This issue of budgetary constraints is all the more important for prevention than it is for treatment. Although, as was mentioned in the previous chapter, people did mobilize huge amount of money for treatment, amassing the same amount of money for the purchase of preventive measures is a lot harder to do. Given the potential risk of life, people are ready to sell property to cover the payment, and community members are also prepared to extend financial help in such an emergency. The story becomes, however, different when it comes to prevention. With the generally low level of income, people are understandably reluctant to sell properties or be indebted for such a non-emergent expenditures as those for the purchase of preventive measures. We have comments like this:

"Illness is an emergency; you can sacrifice the much you can, but the net is just there." (a female farmer of Kenyena)

Table 4-6 also suggests that factors other than budgetary constraints matter. As many people pointed out, many of the preventive measures are difficult to obtain in the Study Area in general. The results of market survey shows that mosquito coil, for example, were not found at 5 out of 16 shops visited, and no drugs were found to be available in three communities at the time of the Study. As for bed net, it was not sold in all the shops visited. Spray was not found at 6 shops out of 16 visited.

Together with the unavailability in the practical sense, many people cited that they do not use measures because they do not know these measures, or do not think it necessary to use them, as is indicated in the comments below:

"Because I don't know the importance of a net, a net is just there." (a female farmer of Moticho)

"We are not aware of the mosquito net." (a female farmer of Masosa)

"We do not use such (nets), because mosquitoes are rare, not like Mombasa. The coil is mainly used in towns." (a female attendant of Kapkolos)

Given the above findings, it is possible to argue that both objective and circumstantial factors matter here. That means that behind the specific behaviors as to preventive measures of malaria, surely lie 1) objective constraints that arise both from the relative prices of preventive measures and from the level of the purchasing power of individuals, and 2) circumstantial factors like the availability of the measures at the localities and the informational distance to these measures.

Evidences, however, show that there are factors other than objective and circumstantial factors. In fact, among the 12 respondents who cited that they did not use coil, because they were expensive, only 2 of them knew its retail price. In terms of

bed-net, too, only 8 out of 44 knew its retail price, while as for spray insecticide, 11 out of 35 knew its retail price. Also, as was already reported, even rich people do not necessarily use expensive measures appropriately; while 53.8% of poor respondents spray less often than once a week, the number is 38.4% in the case of those of rich households.

Moreover, although many respondents remarked that many preventive measures were physically not available, it is not necessarily true. For example, all the attendants of FGD in Bomet did not know that coil was actually available at a shop nearby, least to say their costs. A serious question therefore arises whether it is only cost factors, together with the availability and the level of informational exposure, which deterred people from trying many preventive measures. This is especially so when one considers both the amount of expenditure that malaria treatment impose upon households and the level of cash income in the Study Area by which to bear the expenditure. Moreover, some people were surely not well informed about a variety of preventive measures, but if malaria impose upon them huge amount of expenditure, why did they not make every effort and look for what kinds of measures were available at which places with how much the money?

As was already reported at the beginning of this chapter, people in the Study Area acknowledged that malaria is preventable with technical measures. Moreover, given that quite a few numbers of people often visited HCFs if only for the treatment of malaria, why did they not take advantage of the opportunity and seek for the information about malaria preventive measures? HCFs are actually over-crowded, but results of the Study revealed that people were actually informed of a variety of things there related to PHC including immunization and MCH. In short, what characterizes people's practice around the prevention of malaria in the Study Area is its half-heartedness; costs, purchasing power and lack of knowledge about preventive measures surely operate, discouraging and deterring people from practicing a number of preventive measures, but evidence shows that people did not do even what they can do.

Table 5.4.7 shows the relative evaluation of the effectiveness of preventive measures. It is striking to find that no measures were regarded by more than 50% of respondents as always effective to prevent one from malaria. Such measures as clearing bush and draining/burying stagnant water, which were relatively well practiced in the Study Area in general, were relatively highly regarded, but still only 40% or less acknowledged that these measures are always effective. 'Traditional' measures like burning cow-dung and using pyrethrum are extremely poorly regarded, where only 6% of the respondents thought these measures are always effective. Coils and anti-malaria drugs were no better regarded; only around 10% of respondents regarded them as always effective.

This does not mean that the people in the Study Area are unanimous in only negatively regarding these preventive measures; the number of respondents who

evaluated these measures as 'very effective' was as small as those who evaluated them as 'always effective'. We have indeed positive comments like below:

**Table 5.4.7 Effectiveness of Preventive Measures**

Preventive measures	Effective always	Effective sometimes	Not effective	Do not know	N/A	Total
Clear the bush around compound	40	45	6	6	3	100
Drain stagnant water	34	50	5	7	4	100
Use mosquito coil	11	32	5	30	22	100
Use bet-net	24	21	0	38	17	100
Take anti-malaria drugs	10	23	3	43	21	100
Use traditional herb/plant	14	16	3	44	23	100
Spray insecticide	26	28	4	26	16	100
Burn cow-dung	6	14	5	50	25	100
Use pyrethrum	6	14	1	57	22	100

Note: Respondents were asked to evaluate whether the specific measures are 'effective always,' 'effective sometimes,' or 'not effective.'

"I buy a mosquito coil and burn it and I will never hear the mosquitoes again." (a male electrician of Masimba)

"We have local plants 'esurancha'; (with them) you will not be bitten by mosquitoes." (a male attendants of Masosa)

On the other hand, we have comments like these:

"I use a net and sometimes the mosquitoes enter into the net." (a male farmer of Masimba)

"We burn pyrethrum leaves but still there are mosquitoes." (a female farmer of Moticho)

"I used to use coils but stopped. It gets finished at night and hence mosquitoes attack. I have wondered if the coil do repel mosquitoes." (a female teacher of Koisgat)

"I have taken a step of slashing the compound, but all the same. I have not seen any improvement." (a female housewife of Koisgat)

"Spray is not also effective in that when sprayed, mosquitoes go but comes after a short while. It also has a joking effect." (a male teacher of Numbugo)

It is fair to say, therefore, that the attitude of people towards a variety of preventive measures against malaria in the Study Area were highly mixed one where people have not reached an unanimous agreement about the effectiveness of each preventive measure, whether positively or negatively. In fact, as Table 5.4.7 shows, except for clearing bush and draining/burying stagnant water, no measures were evaluated either positively or negatively by a large number of respondents; most of them simply remarked they do not know or cannot tell whether a given measure is effective or not. This lack of confidence in preventive measures does not contradict with their stated opinion that malaria is preventable; people in the Study Area consider that malaria prevention is just not feasible, if not impossible.

First of all, this lack of confidence derives from the inappropriate use of these preventive measures that makes only limited differences. As has been reported at the beginning of this chapter, many people do not spray more often than once a week. As

for coil, also, many people burn a coil less often than once a week. There were respondents who did not use bed-net everyday. This inappropriate use may partly be due to their lack of knowledge about the appropriate manner of usage. But the comments like this indicates that people do not use them appropriately simply because they do not like them:

"We burnt mosquito coils, but it caused coughing." (a businesswoman of Moticho).

"We burn coils but it is irritating." (a male attendant of Keroka)

"Some people did use smoking of cow-dung, but the smell wasn't pleasant." (a male teacher of Nyambugo)

These complaints were often raised by many people during the Study as a reason why they did not or stopped using coil or cow-dung. Also, many people expressed their fear of possible side effect caused by coils or spray insecticide.

Secondly, in order for a preventive measure to be effective, one needs to overcome a number of obstacles. For example, although such low-cost measures as slashing bush and draining or burying stagnant water do not require much money to implement, carrying out these measures nonetheless requires the collaboration among neighbors. Such a collaboration, though, is not necessarily easy to attain as the comment below indicate:

"Me even if I clear my homestead, still the mosquitoes will come from the neighbors." (a male hospital chairperson of Masimba)

"If we could follow what we have known like clearing bushes, it can help. But if I clear the bush alone and the neighbor doesn't, it doesn't help much" (a male farmer of Nuambugo)

Many people in the Study Area complained that the structure of their houses, which are in many cases not large and made of smeared mud, does not suit for coil, because it is suffocating and cause coughing if kept burnt all through the night. In addition, the rural way of life is such that mosquitoes are everywhere, not just around the compound. We have indeed had comments like below:

"You can use the net and still become sick, because mosquitoes are everywhere even in the shambas." (a male farmer of Masosa)

"As for mosquito control, it's almost hard because when we go fetching for firewood, or when plucking coffee we get bites." (a female clinic assistant of Koisagat)

"In a place where I used to work before, the compound used to be cleared, but still had mosquitoes bites. We have tried clearing bush, but still the mosquitoes persist. Even if the nets are used, still mosquitoes penetrate." (a male farmer of Kipkelion)

Far more important problem arises from the misperception about malaria held by the people in the Study Area. Local people tend to consider malaria not as an endemic that requires one to employ preventive measures and countermeasures recurrently and continuously not just during the outbreak but all through the year. Instead, people tend to consider malaria as an epidemic that dwindles as time goes by, which negatively affects people's attitudes towards malaria prevention especially during the non-outbreak season, as is indicated by comments below:

"Normally we use the methods when there is epidemic, but tend to forget soon when it ceases." (a female attendant of Koisagat)

"Now like this month of July when we expect the outbreak of malaria, when one child becomes sick, I tend to separate him so that he cannot pass on the fever to the other child." (a female farmer of Masimba)

The misperception about causes of malaria, which was reported in the second chapter, also has profound effects on people's behaviors around malaria prevention. As is argued earlier, quite many factors from contaminated water, rain and fly to such supernatural factors as bad air or wind are perceived to cause malaria. Attendants of FGD raised a variety of actions that they consider as necessary to prevent malaria. The comments below are among them:

"We clear bushes, clear broken vessels around houses, pour paraffin in swamps and stagnant water." (a male farmer of Koisagat)

"We don't plant bananas and maize near the houses where we live." (a male farmer of Moticho)

"As for dirty water, it can be boiled, the compound should be clean." (a chairwoman of Nyambugo)

"We need to make our houses tidy and build toilets far so that we can have clean water" (a male chancellor of Masimba)

"As for fat, one should heat it properly when frying food." (a female farmer of Nyambugo)

"We cover our food to prevent germs and flies." (a female casual laborer of Moticho)

Given the variety of factors that are perceived to cause malaria, it is understandable that people consider that they need to employ enormous varieties of measures such as raised above in order to 'prevent malaria'. When considering the size of farmland, costs of firewood and time needed to spent to boil water, however, it is easy to understand that implementing all these measures on everyday basis is no easy task to do. And yet even if one can manage to conduct all such things as purifying water, avoiding inappropriate food, and repelling mosquitoes by slashing bushes around compound, draining stagnant water near houses, burning coil and spraying insecticide, one may still be bitten by mosquitoes in the field.

Malaria is also perceived to be caused by such supernatural powers as 'bad-air' or 'wind/bad spirit', against which only witchcraft can tackle. The problem is not so much whether local population 'believes' in the power of such supernatural phenomena to cause malaria; by explaining malaria as being caused by supernatural powers, it become something treatable and preventable, with sets of ready-made measures already available. The tendency to explain malaria as being caused by supernatural powers is reinforced by the impracticability of containing malaria using conventional measures.

The confusion of causes of malaria, therefore, have far deeper implication than one may suspect. Given the range of causes, no single technical measure can effectively deal with every factor that is perceived to cause malaria. This has the effect of reducing people's commitment towards any one of the preventive measures. The seriousness of this implication can be succinctly summarized by the comment below:

"It (coil) can only prevent mosquitoes but not malaria." (a female attendant of Kapkoros)  
"It doesn't really help us." (a female farmer of Nyambugo)

Therefore, the misperception as to the causes of malaria has an immense repercussion to the people's practice of malaria prevention; the practical impracticability to deal with all the possible causes of malaria reduces people's commitment to the implementation of each of the preventive measures, especially those that require relatively huge costs, which only works to reduce the chance of the containment of malaria. The failure to contain malaria further deteriorate people's confidence in the effectiveness of a variety of preventive measures, further reduces people's commitment, while inducing people to explain malaria by some supernatural powers including witchcraft, against which ready-made measures are already available. The comments like below therefore have profound meaning:

"If we could know the causes, it is possible to do it (prevention)."

#### **5.4.3 Need for Education on Malaria**

Given the implication of the misperception of the causes and nature of malaria, it is advisable to let the local population understand the real causes and nature of malaria. Local population should be stimulated and induced to practice the preventive measures not only during the out-break but all through the year, because one can be infected with malaria all through the year, though greater attention and commitment is necessary during the out-break season. Community members need to be informed of the real causes of malaria so that people can know the appropriate range of actions necessary for the prevention. It will make it possible for people to understand more accurately what is really necessary to prevent malaria, so that people can invest more effectively and efficiently their money, time and attention towards it.

One qualification is due. It is no bad thing that people treat water, maintain general cleanliness around and within their compound and observe balanced diet. Given the low level of hygienic and nutritional situation in the Study Area, one may argue that letting people know that the quality of drinking water or nutritional balance has no direct relationships with the prevention of malaria will only deter people from following such virtuous behaviors.

Such an argument, although sounds correct, nevertheless miss the point. Enhancing people's knowledge and understanding of malaria, such that can increase people's commitment towards malaria prevention, is of great importance per excellence. Encouraging people to purify water, observe good hygienic environment and raise nutritional quality of food should be sought as important and virtuous actions on their own sake.

When it comes to the specific strategy to enhance people's knowledge and understanding of malaria, though, we can deliver both kinds of information at one single opportunity. Given the time constraints faced by many people, especially

females, it is advisable to utilize the already established opportunities that constitute parts of the people's ways of life in specific communities. Sunday gathering at church may be a good opportunity where many people voluntarily get together and attentively listen to whatever the topic discussed.

By such educational steps that seek to enhance people's knowledge and understanding of malaria, potential demands for effective measures of malaria prevention will thus be turned into a real one. Conversely, any measure that seeks to merely increase the supply of goods for prevention will not make a much difference unless educational steps that have been suggested here are effectively combined with such a supply of goods.

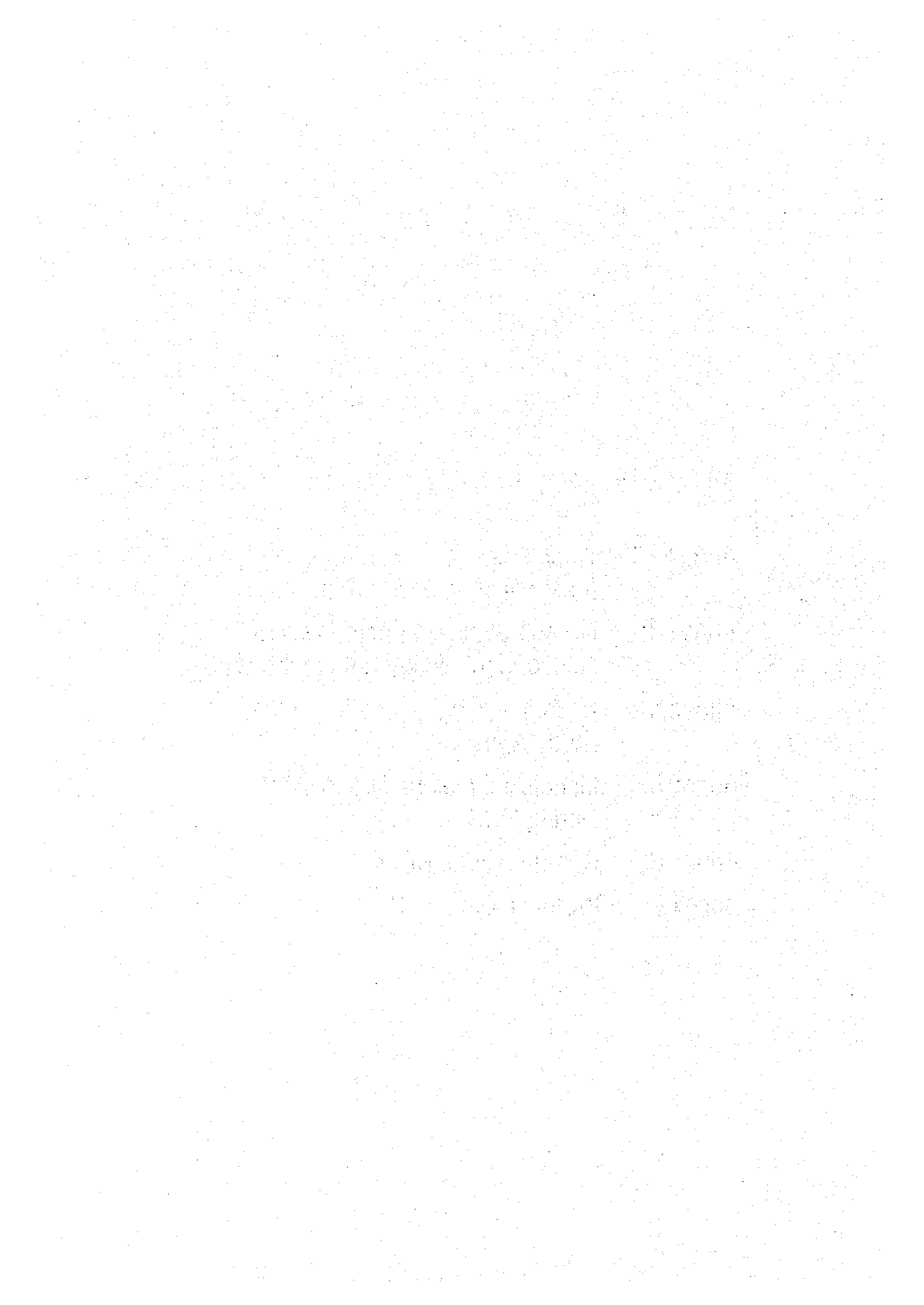
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# **Annexes to Chapter 5**

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- Annex 1: Study Sites**
  - Annex 2-A: Questionnaire of People's Knowledge, Attitude and Practice (KAP) on Malaria**
  - Annex 2-B: Focus Group Discussion Guide for KAP Survey on Malaria**
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  - Annex 3: Demographic Characteristics of Respondents/attendants of the Study**
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**Annex 1: Study sites**

District	Division	Location	Sub-location	Village		
Kisii	Masaba	Masaba	Riuri	Mabaroka		
				Mwangangeri		
			Kerema	Mwamarucha		
				Bonyakoni		
			Nyaribari	Metembe	Metembe	
					Bonyakoni	
		Suneka	Bogiakumu	Bonyando	Nyabari	
					Nyabare	
				Bomwanda	Gisonso	
				Bogiakumu	Mwamonochi	
Gucha	Kenyanya	Masaba	Kenyanya	Bokimonge		
				Metembe		
				Kerongorori		
				Keberesi		
		Etago	Gitenga	Nyambara	Bobita	
					Ruma	
				Bogetagonka		
Nyamira	Rigoma	E. Kitutu	Embaro	Masera		
					Metembe	
			C. Kitutu	Bochaia	Nyasore	
		Nyamira	Mogirango	Bokiambori	Nyasore	
					Masosa	
					Keroka	
				Nyawacha		
				Gesusura		
Kericho	Kipkelion	Kipsegi	Kakuresi	Kimologit		
				Gapukure	Kimologit	
				Kapkoros	Kimologit	
					Kapsegem	
					Borowet	
				CHilchila	Koisagat	Kopkomwet
						Koisagat
					Siwot	Siwot
Bomet	Sigor	Sugumeriga	Nyambugo	Sugumerika		
				Motegere		
				Chepnyaliliet		
				Nyambugo		
					Sugumeriga	Chetuiyet
						Kegegut
		Bomet Central	Sibayan	Sibayan	Hainamoi	
					Kapmabiriri	
						Kapkoros

## Annex 2-A. Questionnaire on People's Knowledge, Attitude and Practice (KAP) on Malaria

JICA Study Team

District: \_\_\_\_\_ Village: \_\_\_\_\_ Sub-Location: \_\_\_\_\_ Location: \_\_\_\_\_ Division: \_\_\_\_\_  
 Serial No. \_\_\_\_\_ Interview Date: \_\_\_\_\_ Name of Interviewer: \_\_\_\_\_  
 Household No: \_\_\_\_\_ Data Entry Date: \_\_\_\_\_ Name of Supervisor: Some, Gichohi, Tanaka, Kawahara, Ishihara

### 1. Household Members

Q1. Please describe about the household members who usually live in this household.

Ethnic Group: \_\_\_\_\_

Church name: \_\_\_\_\_

No.	Name	Sex	Age	Relation	Married?	Education (the highest grade completed)	Occupation	Monthly Cash Income from Employment (Ksh.)
1				yourself	Yes/No			
2					Yes/No			
3					Yes/No			
4					Yes/No			
5					Yes/No			
6					Yes/No			
7					Yes/No			
8					Yes/No			
9					Yes/No			
10					Yes/No			

(The following summary table will be filled by the interviewer after the interview.)

Summary	All members	under the age of 5	between the age of 6 to 15	above the age of 15
Total				
Male				
Female				

## 2. Resource/Wealth Condition

Q2. How many houses do you have in your homestead?

- (a) one      (b) two      (c) three      (d) four      (e) five      (f) other (specify: \_\_\_\_\_ )

Q3. Type of the wall of the main house (by interviewer's observation)

- (a) mud wall    (b) grass wall    (c) wooden wall    (d) brick wall    (e) concrete wall    (f) other (specify: \_\_\_\_\_ )

Q4. Type of the roof of the main house (by interviewer's observation)

- (a) grass thatched roof      (b) iron sheet roof      (c) tiled roof      (d) other (specify: \_\_\_\_\_ )

Q5. Crop Cultivation (Please describe about the major five crops you are cultivating.)

Type of Crop	Usage	Cultivated Areas (acres)	Annual Yield ( kg/acre)	Price ( Ksh./kg)	Annual Sale (Ksh.)
tea	home consumption, sale, both				
coffee	home consumption, sale, both				
maize	home consumption, sale, both				
	home consumption, sale, both				
	home consumption, sale, both				

Total Farm Land Holding (acres): \_\_\_\_\_

Total Annual Sale of Crops: Ksh. \_\_\_\_\_

Q6. Animals Owned

Type of Animal	Usage	Number of Animal	Sale (Ksh.) (per day, month, or year)
cow (grade or indigenous)	home consumption, sale, both		milk production: l/day x Ksh. /l = Ksh. /day
goat	home consumption, sale, both		
sheep	home consumption, sale, both		
chicken	home consumption, sale, both		
other (specify: _____ )	home consumption, sale, both		

Total Annual Sale from Animals: Ksh. \_\_\_\_\_

Q7. If you have any income source not listed above (e.g. income from group activities), please describe it.

Type of Income Source: \_\_\_\_\_

Amount of Annual Income from It: Ksh. \_\_\_\_\_

### 3. Water, Sanitation, Kitchen and Group Activities

Q8. What is the major source of the drinking water for your household?

- (a) river (b) spring (c) well (d) piped water in the public place (e) piped water in your house (f) other (specify: )

Q9. How do you perceive the suitability of the above water for drinking?

- (a) good (b) poor (c) I do not know.

Q10. If you think the water quality is poor, how do you treat water?

- (a) no treatment (b) keep at least one day before drinking (c) three pot system (d) boiling (e) filtering (f) other (specify: )

Q11. Where do your family members usually defecate?

- (a) bush (b) toilet/latrine in the public place (c) toilet/latrine in your house (d) other (specify: )

Q12. What kind of the kitchen stove do you have in your house?

- (a) three stone stove (b) improved stove made of mud (c) modern stove (d) other (specify: )

Q13. What kind of fuel do you use for cooking?

- (a) firewood (b) propane gas (c) electricity (d) other (specify: )

Q14. Describe the group activities (e.g. women's group, youth group, PTA, cooperative, Village Health Committee, church group) which your family member is participating.

Name of the Group (Name of Leader)	Name of Participant in Your Family	No. of Members (No. of Female)	Main Activities (Frequency per month)	Monthly Member's Contribution	Benefits for Members
		Total: Female:	1. 2. 3.	Cash: Ksh. Labor: hrs/month Other:	
		Total: Female:	1. 2. 3.	Cash: Ksh. Labor: hrs/month Other:	
		Total: Female:	1. 2. 3.	Cash: Ksh. Labor: hrs/month Other:	

**4. People's Knowledge, Attitude and Practice on Malaria**

Q15. Are there different types of malaria? (Probe what kind of malaria needs care at health facility - so-called "serious malaria" - and what kind of malaria can be treated at home - so-called "mild malaria"?) What are the local name and symptoms for each type of malaria? What do you think about the possible causes of each type of malaria? What do you do for treatment of each type of malaria?

Type of malaria	(1) Local name	(2) Symptoms	(3) Perceived Causes (List ALL possible causes.)	(4) Your Action for Treatment

Key: (4) "Your Action for Treatment" can be: (a) buy a drug (name: \_\_\_\_\_) at a kiosk; (b) go to a traditional healer; (c) go to a dispensary; (d) go to a health center; (e) go to a hospital (government, mission, or private?); (f) go to a private doctor; (g) other (specify: \_\_\_\_\_).

Q16. Do you think the following is the possible cause of malaria?

- |                                     |         |           |        |                    |
|-------------------------------------|---------|-----------|--------|--------------------|
| (1) natural phenomena               | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (2) inheritance from the parents    | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (3) dirty water                     | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (4) rain                            | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (5) curse by someone or bad spirits | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (6) mosquito                        | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (7) fly                             | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (8) moth                            | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (9) bad air                         | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |
| (10) eating green maize             | (a) Yes | (b) Maybe | (c) No | (d) I do not know. |

Q17. We would like to ask you about malaria in this household. Who in your family suffered from malaria in the last one month? Please describe how you treated them in the following format.

Name of the patient	(1) Severity of Malaria	(2) Symptoms	(3) Place of Treatment (distance by km)	(4) After how many days from onset?	(5) Who Decided?	(6) Reasons to Choose This Facility	(7) Contents of Treatment	(8) Cost of Treatment (Ksh)	(9) Source of money paid	(10) Result of Treatment
	mild serious			same day next day ( )th day	husband wife other:			transport: drug: other:		
	mild serious			same day next day ( )th day	husband wife other:			transport: drug: other:		
	mild serious			same day next day ( )th day	husband wife other:			transport: drug: other:		

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Key: (2) "Symptoms" can be: (a) fever; (b) headache; (c) no appetite; (d) crying; (e) restlessness; (f) coughing; (g) convulsion; (h) other (specify: ).

(3) "Place of Treatment" can be: (a) home; (b) herbalist; (c) chemist; (d) private doctor; (e) dispensary; (f) health center; (g) government hospital; (h) mission hospital;

(i) other (specify: ). Please write down the name of the health facility and its distance from the home (how many km).

(4) "After how many days from onset?" means "After how many days from the onset of malaria symptoms did you take the patient to this health facility?"

(6) "Reasons to Choose This Treatment" can be: (a) nearest; (b) cheap; (c) good facility; (d) good staff; (e) good reputation of the service; (f) know someone working there;

(g) other (specify: ). (Multiple answers are welcome.)

(7) "Contents of Treatment" can be: (a) drug; (b) injection; (c) hospitalization; (d) herbal treatment; (e) other (specify: ).

(8) "Cost of Treatment" includes (a) cost of transportation to the health facility; (b) cost of drug; (c) other cost (specify: ) which includes paying Health Center or Dispensary maintenance fee.

(9) "Source of money paid" can be: (a) ourselves; (b) borrowed (from whom?: ); (c) waived and paid later (when: ); (d) not paid yet.

(10) "Result of Treatment" can be: (a) recovered (after how many days of treatment?); (b) left the hospital (after how many days of hospitalization?);

(c) died (after how many days of treatment?); (d) other (specify: ).

Q18. Do you know the following measures to prevent malaria? Do you use any of these measures? If you do not use, why? How do you evaluate the effectiveness of each measure?

No.	Measure to prevent malaria	(1) Do you know this measure?	(2) Cost (Ksh)	(3) Do you use this measure?	(4) If use, how often do you use this?	(5) If no use or stopped to use, why?	(6) How effective is it?
1	Clear the bush around the homestead.	(a) Yes (b) No	-	(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
2	Drain or bury the stagnant water around the homestead.	(a) Yes (b) No	-	(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
3	Use a mosquito coil at home.	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
4	Use a mosquito bednet at home.	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
5	Take an anti-malarial drug. (name of the drug: )	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
6	Use a traditional herb/plant. (name of herb/plant: )	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
7	Spray the insecticide at home. (name of the insecticide: )	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.



					month		know.
8	Burn cow dung.	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
9	Use pyrethrum. (how: )	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.
10	Other method to prevent malaria (Specify: )	(a) Yes (b) No		(a) never used; (b) using; (c) used before, but not now	times/ day, week, or month		(a) effective always; (b) effective sometimes; (c) not effective; (d) I do not know.

Key: (5) Answers to "Why don't you use this measure?" can be: (a) not available locally; (b) too expensive; (c) not effective; (d) other (specify: ). (Multiple answers are welcome.)

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Q19. Please describe your experiences with using the following health facilities.

Type of Health Facility (name of facility)	(1) Have you ever used this facility? (If yes, ask how often.)	(2) Distance from your house (one way)	(3) For what kind of diseases, did you use this facility?	(4) Cost for Treatment (Ksh)	(5) Your Evaluation of Service (If you never use, write the reputation.)	(6) Any Complaints?
(a) Herbalist	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(b) Traditional Birth Attendant (TBA)	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu		Cost of Delivery:	(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(c) Chemist	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	

(d) Private Doctor, Clinical Officer, Nurse	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(e) Dispensary (name: )	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(f) Health Center (name: )	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(g) Government Hospital (name: )	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(h) Mission Hospital (name: )	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	
(i) Other (Specify: )	(a) Yes (often, sometimes, rarely) (b) No	minutes Ksh. by matatu			(a) very good; (b) good; (c) average; (d) poor; (e) very poor	

Key: (6) Answers to "Any Complaints?" can be: (a) lack of drug; (b) absence of the qualified health staff; (c) attitude of the staff; (d) high cost of treatment; (e) short hours of operation;

(f) long distance from your house; (g) long waiting time; (h) other (specify:

). (Multiple answers are welcome.)

Q20. From whom do you usually get the information on the following health issue? List all persons who gave information on each issue.

health issue	information source (From whom?)
(1) malaria	
(2) immunization	
(3) delivery and ante-natal and post-natal care	
(4) family planning	
(5) nutrition	
(6) water and sanitation (environmental health)	

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Key: "Information source" can be: (a) senior household member; (b) relative; (c) friend; (d) other mother; (e) herbalist; (f) community health worker (CHW); (g) community-based distributor (CBD); (h) traditional birth attendant (TBA); (I) chemist; (j) health personnel at the health facility (specify:      ); (k) private doctor, clinical officer, or nurse.

Q21. From which media do you usually get the information on the health issue? (Multiple answers are welcome.)

- (a) chief's baraza    (b) poster    (c) pamphlet, booklet    (d) newspaper    (e) radio    (f) television or video  
 (g) theater (folk media)    (f) other (specify:      )

Q22. Please describe when your family members are usually outside the home, inside the home, or in the bed during the malaria season. Also indicate when your family usually takes the various methods to prevent malaria.

	Place	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm	12 pm	1 am	2 am	3 am	4 am	5 am	6 am
children	outside home													
	inside home													
	in the bed													
adult (male)	outside home													
	inside home													
	in the bed													
adult (female)	outside home													
	inside home													
	in the bed													
prepare food (dinner, breakfast)														
eat food (dinner, breakfast)														
listen to radio														
watch television														
close windows														
use mosquito coil, if you use														
spray insecticide, if you use														
other prevention against malaria (specify: )														

Instruction: Draw a line to indicate the time period, or mark "x" to indicate the specific time.

## Annex 2-B.

### Focus Group Discussion Guide for KAP Survey on Malaria

JICA Study Team

#### **Introduction**

1. Organize two separate focus group discussions with (1) 10 to 12 fathers (in the morning) and (2) 10 to 12 mothers with children under 5 (in the afternoon) in the community.
2. Ask the recorder to record the names of all participants on the List of Attendants.
3. Introduce the purpose of this survey to the participants.

#### **Knowledge on Malaria**

4. What is malaria? (Probe the local name and definition of malaria.) What are the typical symptoms of malaria? (List the symptoms which the participants think are the symptoms of malaria.)
5. How do you classify the various types of malaria (e.g. mild malaria, serious malaria, or any other type)? (Probe the local classification of malaria.) Which symptoms listed in the above are associated with each type of malaria?
6. What do you think are the possible causes of malaria? (Probe as many answers as possible.) Why do these events cause malaria (What is the link between these causes and malaria)?

#### **Treatment of Malaria**

7. How many participants had someone in his/her house who suffered malaria in the last six months? Count the number by child (under the age of 5), child (between the age of 5 to 15) and adult and by month (in January, February, March, April, May and June). (Fill the table in the record form.)
8. (For those who answered yes in the above question) What did you do to treat malaria? (List all types of treatment.  
Explore if there is any type of local or traditional treatment.  
In case of going to the health facility, differentiate by its type, that is, district hospital, health center, dispensary, mission hospital/clinic, or private clinic.)
9. Which treatment (listed in the above question) do you try first? What comes second, third... and last? Why? (People's ranking of each type of treatment)
10. For each type of treatment, ask the following questions:
  - (1) Why did you choose this treatment?
  - (2) When was this treatment done? After how many days from the date that symptoms came out?
  - (3) Before trying this treatment, did you try any other treatment? If yes, what was it and why?

- (4) Who decided to do so? Husband, wife or anybody else?
- (5) What kind of treatment was given? (In case of buying a drug, ask the name of the drug.)
- (6) What was the result of this treatment? How long did it take before the patient had recovered?
- (7) How much did it cost?
- (8) How did you pay it? (paid on the spot, borrowed money from someone, or waived?) (Explore the affordable price range for the local people.)
- (9) How many participants were satisfied with this treatment?
- (10) Any complaint?

### **Prevention of Malaria**

11. How many participants think that malaria is preventable?
12. (For those who answered yes in the above question) What kind of preventive measures are you taking? (List all types of preventive measures. Explore if there is any type of local or traditional preventive measure such as the use of cow dung, pyrethrum, or other traditional plant to repel the mosquito.)
13. Which preventive measure (listed in the above question) do you prefer the most? What comes second, third... and last? Why? (People's ranking of each type of preventive measure)
14. For each type of preventive measure, ask the following questions:
  - (1) How many participants have ever used this preventive measure?
  - (2) How many participants are currently using this preventive measure?
  - (3) If you are not using or stopped to use this preventive measure, what are the reasons for it?
  - (4) What were your experiences with this preventive measure? Do you think it is effective?

### **Information Source**

15. Where or From whom do you usually get the information on the following health issue? (Where: poster, pamphlet, radio, TV, video, etc.; From whom: friend, other mother, senior family member, health personnel, TBA, CBD, CHW, chemist, etc.)
  - (1) malaria
  - (2) immunization
  - (3) ante-natal and post-natal care (Especially explore the role of TBA.)
  - (4) family planning (Especially explore the role of CBD agents.)
  - (5) nutrition
  - (6) water and sanitation (environmental health)
16. How many participants listen to the radio regularly? What time?

## Annex 2-C. Markets on Goods for Prevention of Malaria

(Visit 2 retailers in the community or 2 nearest shops/per community)

Day: July ,1998

Community: Name of Shop:

Types of shop: Pharmacy (with pharmacist/without pharmacist), Shop, Kiosk

Interviewer Name: Recorder Name:

### 1. Local Market price (retail price) of goods for Malaria prevention

#### 1) Bed nets

Xtra Large	Large	Medium	Small

#### 2) Mosquito coils (by brand, No. contained)

Brand				
No. of coils				
Price				

#### 3) Insect Spray (by brand, volume)

Brand				
Volume (ml)				
Price				

#### 4) Drugs (by brand, per dose)

##### a) Chloroquine

Brand				
Dose				
Price				

##### b) Fansidar

Brand				
Dose				
Price				

c) Pain relief medicine (c.g., Panadol)

Brand				
Dose				
Price				

d) Dextrose (drip) (1 bottle of 5%)

Brand				
Price				

2. Where do you (shops) buy the goods?/how many goods are sold?/No. of stocks

1) Bed nets (where do you buy the goods to sell? )

Size	Xtra Large	Large	Medium	Small
How many are nets sold in a week/in a month?				
No. of stocks				

2) Mosquito coils (by brand & No.) (where do you buy the goods to sell?)

Brand				
How many coils are sold in a week/in a month?				
No. of stocks				

3) Insect Spray (by brand, vol.) (Where do you buy the goods to sell?)

Brand				
Volume (ml)				
How many sprays are sold in a week/in a month?				
No. of stocks				

4) Drugs (by brand, per dose)

a) Chloroquine (where do you buy the drug to sell? )

Brand				
How many doses of Chloroquines are sold in a week/in a month?				
No. of stocks				



b) Fansidar (where do you buy the drug to sell?/ )

Brand				
How many doses of Fansidars are sold in a week/in a month?				
No. of stocks				

c) Pain relief medicine (e.g. panadol) (where do you buy the drug to sell?/ )

Brand				
How many doses of pain relief medicine are sold in a week/in a month?				
No. of stocks				

d) Dextrose (drip) (1 bottle of 5%) (where do you buy the drug to sell?/ )

Brand				
How many Dextrose (drip) are sold in a week/in a month?				
No. of stocks				

### Annex 3: Demographic characteristics of respondents/attendants of the Study

#### Occupation of family members

	Kisii	Gucha	Nyamira	Kericho	Bomet
Farmer	24	27	36	37	30
Housewife	10	7	55	5	7
School teacher	4	1	1	2	3
Student	50	44	0	67	58
School leaver	3	12	6	5	9
Businessperson	0	1	1	1	1
Clerk	1	0	4	0	0
Police officer	9	9	0	0	0
Agricultural Officer	0	0	1	1	0
Artisan	1	0	1	0	2
Watchman	1	0	0	0	0
Casual worker	2	0	2	1	0
Herbalist	0	1	0	0	0
None	1	0	4	4	0
total	105	102	111	123	110

#### Numbers of Household member

	Kisii	Gucha	Nyamira	Kericho	Bomet
under 5	5	7	5	5	5
6 to 10	12	12	14	14	12
11 and above	4	2	1	1	3
average	7.35	6.65	6.95	7.25	7.7
total	21	21	20	20	20

#### Age of Household member

	Kisii	Gucha	Nyamira	Kericho	Bomet
female under 5	12	10	13	9	14
male under 5	9	9	12	13	8
female between 6 and 15	29	19	21	23	22
male between 6 and 15	25	24	16	24	19
female above 16	16	36	36	37	37
male above 16	24	42	42	37	46
total	115	140	140	143	146

#### Education (completed; adults older than 17)

	Kisii	Gucha	Nyamira	Kericho	Bomet
None	6	9	9	15	9
Nursery	0	0	0	4	0
Primary	21	32	32	29	31
Secondly	26	16	26	10	22
Above secondly	0	1	2	2	2
total	53	58	111	60	64

\*including incumbent students

#### Types of wall

	Kisii	Gucha	Nyamira	Kericho	Bomet
Mud	17	12	15	11	13
Grass	0	6	0	0	0
Wooden	0	0	0	8	6
Brick	2	1	5	0	1
Concrete	1	1	0	1	0
total	20	20	20	20	20

#### Types of roof

	Kisii	Gucha	Nyamira	Kericho	Bomet
Grass thatched	3	13	5	9	6
Iron sheet	17	7	15	11	14
total	20	20	20	20	20

#### Numbers of houses in the compound

	Kisii	Gucha	Nyamira	Kericho	Bomet
1	6	5	5	6	5
2	5	6	5	7	11
3	5	4	5	6	3
4	0	3	3	1	0
5	3	1	2	0	1
6	1	1	0	0	0
total	20	20	20	20	20

#### Religion

	Kisii	Gucha	Nyamira	Kericho	Bomet
SDA	9	10	7	0	1
Catholic	7	9	7	1	5
Lutheran	3	0	1	0	0
PAG	1	1	1	0	0
CPU	0	0	1	0	0
AIC (African Independent Church)	0	0	2	0	4
AGC (African Gospel Church)	0	0	0	13	1
Deliverance	0	0	0	1	0
Church of God	0	0	0	2	0
Full Gospel	0	0	0	1	5
FEPA Church	0	0	0	0	1
Christian Liberty Church	0	0	0	0	2
PMCA	0	0	0	0	1
N/A	0	0	1	2	0
total	20	20	20	20	20

**Occupation of participants of FGD**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Farmer	18	38	37	29	27
Housewife	0	0	0	8	7
School Teacher	0	3	0	1	5
Police Officer	0	0	0	0	1
Driver	0	0	2	0	0
Businessman	3	5	4	2	6
Businesswoman	4	5	6	0	1
Agricultural Officer	0	1	0	0	0
Clerk	0	1	0	0	0
Chairman of hospital	0	0	1	0	0
Chancellor	2	0	0	0	0
Social group leader	2	1	0	3	3
Artisan	1	1	1	1	0
Student	0	6	0	0	0
Village elder	0	2	0	0	0
Casual worker	2	0	1	0	0
Tailor	1	0	1	0	0
Secretary	1	0	0	1	0
Bureaucrat	0	0	1	2	0
Herbalist	0	0	1	0	0
Butcher	1	1	0	0	0
Others	1	2	1	1	0
total	36	66	56	48	50

**Annex 4: Economic characteristics of the Study Area**

**Farming**

**Maize acreage (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	0	0	0	0	0
below 1	12	12	8	1	7
1 to below 2	5	5	7	14	9
2 to below 3	1	2	3	2	2
More than 3	1	1	0	3	1
Unknown or N/A	1	0	2	0	1
total	20	20	20	20	20

**Use of produced maize**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Consume all	14	17	18	8	13
Sell all	0	1	0	2	2
Sell partly	6	2	2	10	5
total	20	20	20	20	20

**Sales of maize (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	0	0	1	0	0
1000 - 4999	1	2	0	5	4
5000 - 9999	1	0	0	2	2
10000 - 19999	0	1	0	3	1
More than 20000	4	0	0	1	0
Unknown	0	0	1	1	0
total	6	3	2	12	7

**Beans acreage (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	16	20	20	4	14
below 1	1	0	0	1	4
1 to below 2	1	0	0	11	1
2 to below 3	1	0	0	2	1
More than 3	0	0	0	2	0
Unknown or N/A	1	0	0	0	0
total	20	20	20	20	20

**Use of produced beans**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Consume all	0	0	0	6	1
Sell all	1	0	0	2	1
Sell partly	3	0	0	8	4
total	4	0	0	16	6

**Sales of beans (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	0	0	0	1	1
1000 - 4999	2	0	0	5	3
5000 - 9999	0	0	0	0	0
10000 - 19999	2	0	0	1	0
More than 20000	0	0	0	0	0
Unknown	0	0	0	3	1
total	4	0	0	10	5

**Potato acreage (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	19	19	19	20	15
below 1	1	0	1	0	5
1 to below 2	0	0	0	0	0
2 to below 3	0	0	0	0	0
More than 3	0	0	0	0	0
Unknown or N/A	0	1	0	0	0
total	20	20	20	20	20

**Use of produced potatoes**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Consume all	1	1	1	0	3
Sell all	0	0	0	0	1
Sell partly	0	0	0	0	1
total	1	1	1	0	5

**Sales of potatoes (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	0	0	0	0	1
1000 - 4999	0	0	0	0	0
5000 - 9999	0	0	0	0	0
10000 - 19999	0	0	0	0	0
More than 20000	0	0	0	0	0
Unknown or N/A	1	1	1	0	1
total	1	1	1	0	2

**Wimbi acreage (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	19	20	18	20	20
below 1	1	0	1	0	0
1 to below 2	0	0	0	0	0
2 to below 3	0	0	1	0	0
More than 3	0	0	0	0	0
Unknown or N/A	0	0	0	0	0
total	20	20	20	20	20

#### Use of produced wimbi

	Kisii	Gucha	Nyamira	Kericho	Bomet
Consume all	0	0	2	0	0
Sell all	1	0	0	0	0
Sell partly	0	0	1	0	0
total	1	0	3	0	0

#### Sales of wimbi (Ksh/year)

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	0	0	0	0	0
1000 - 4999	1	0	0	0	0
5000 - 9999	0	0	0	0	0
10000 - 19999	0	0	0	0	0
More than 20000	0	0	1	0	0
Unknown	0	0	0	0	0
total	1	0	1	0	0

#### Cash crop

##### Tea acreage (acre)

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	13	13	11	20	10
below 1	6	4	5	0	5
1 to below 2	1	1	2	0	3
2 to below 3	0	0	2	0	0
More than 3	0	2	0	0	2
Unknown or N/A	0	0	0	0	0
total	20	20	20	20	20

**Tea sales (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	0	1	0	0	0
1000 - 4999	2	2	4	0	1
5000 - 9999	4	0	2	0	0
10000 - 19999	1	1	0	0	1
More than 20000	0	2	1	0	6
Unknown	0	1	2	0	2
total	7	7	9	0	10

**Coffee acreage (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	15	10	12	15	18
below 0.5	4	9	6	2	2
0.5 to below 1.0	1	0	2	0	0
1 and more	0	1	0	3	0
Unknown or N/A	0	0	0	0	0
total	20	20	20	20	20

**Coffee sales (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	2	5	2	2	1
1000 - 4999	1	3	3	0	0
5000 - 9999	0	0	0	0	1
10000 - 19999	1	0	2	1	0
More than 20000	0	0	0	2	0
Unknown or N/A	1	2	1	0	0
total	5	10	8	5	2

**Pyrethrum acreage (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not produce	18	19	19	19	20
below 0.5	0	1	1	0	0
0.5 to below 1.0	2	0	0	1	0
1 and more	0	0	0	0	0
Unknown or N/A	0	0	0	0	0
total	20	20	20	20	20



**Pyrethrum sales (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	0	0	0	0	0
1000 - 4999	2	0	0	0	0
5000 - 9999	0	0	0	0	0
10000 - 19999	0	1	1	0	0
More than 20000	0	0	0	1	0
Unknown or N/A	0	0	0	0	0
total	2	1	1	1	0

**Total farmland (acre)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1	5	7	2	0	4
1 to below 3	6	5	9	7	7
3 to below 5	6	2	6	4	4
5 to below 10	1	3	3	8	5
10 and more	2	3	0	1	0
Unknown or N/A	0	0	0	0	0
total	20	20	20	20	20

**Annual sales of crops (Ksh)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Below 1000	2	2	1	2	1
1000 - 4999	4	0	5	3	5
5000 - 9999	3	3	3	2	1
10000 - 19999	3	2	3	3	3
20000 - 49999	3	3	2	4	2
50000 and more	0	3	0	0	3
Unknown or N/A	5	7	6	6	5
total	20	20	20	20	20

**Animal ownership**

**Number of cows owned**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not own any	4	8	7	2	4
1	5	5	4	0	3
2	3	3	5	6	2
3	7	0	3	0	3
Above 3	0	4	1	0	8
Unknown or N/A	1	0	0	0	0
total	20	20	20	20	20

**Income from milk sales (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Home consumption only	7	9	11	12	5
-1000	0	1	0	0	4
1000 - 4999	5	1	0	2	0
5000 - 9999	1	1	1	0	4
10000 - 19999	2	0	1	0	1
20000 -	1	0	0	1	1
Unknown or N/A	0	0	0	3	1
total	16	12	13	18	16

**Number of goats owned**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not own any	13	15	18	12	15
1	2	1	1	2	2
2	3	1	1	4	0
3	1	1	0	2	2
Above 3	1	0	0	0	1
Unknown or N/A	0	2	0	0	0
total	20	20	20	20	20

**Income from sales of goats (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
No income from goats	0	0	1	2	2
-1000	0	0	1	0	1
1000 - 4999	0	0	0	4	1
5000 - 9999	0	0	0	0	0
10000 - 19999	0	0	0	0	0
20000 -	0	0	0	0	0
Unknown or N/A	0	0	0	2	1
total	0	0	2	8	5

**Number of chicken owned**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not own any	6	3	5	4	8
below 5	5	10	6	4	4
5 to 9	7	2	4	5	5
10 and more	2	4	2	7	3
Unknown or N/A	0	1	3	0	0
total	20	20	20	20	20

**Income from chicken (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
Home consumption only	12	14	11	8	5
-1000	1	1	0	6	4
1000 - 4999	1	0	1	1	1
5000 - 9999	0	0	0	0	0
10000 - 19999	0	0	0	0	0
20000 -	0	0	0	0	2
Unknown or N/A	0	1	1	1	0
total	14	16	13	16	12

**Number of sheep owned**

	Kisii	Gucha	Nyamira	Kericho	Bomet
do not own any	16	16	18	12	14
1	2	1	1	1	0
2	2	2	1	5	3
3	0	0	0	2	3
Above 3	0	1	0	0	0
Unknown or N/A	0	0	0	0	0
total	20	20	20	20	20

**Sales of sheep (Ksh/year)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
No income from sheep	4	3	1	3	2
-1000	0	0	1	3	1
1000 - 4999	0	1	0	1	2
5000 - 9999	0	0	0	0	0
10000 - 19999	0	0	0	0	0
20000 -	0	0	0	0	0
Unknown or N/A	0	0	0	1	1
total	4	4	2	8	6

**Annual non-agricultural income (Ksh)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
none	10	15	13	15	15
below 500	1	1	0	0	0
500 - 999	1	1	0	0	2
1000 - 4999	3	1	3	3	2
5000 - 9999	3	1	1	0	0
10,000 and more	1	0	3	0	1
Unknown or N/A	1	1	0	2	0
total	20	20	20	20	20

**Total annual income (Ksh)**

	Kisii	Gucha	Nyamira	Kericho	Bomet
none	0	0	0	0	0
below 1000	0	2	1	2	1
1000 - 4999	5	0	5	5	3
5000 - 9999	2	3	3	2	0
10000 - 49999	9	4	5	8	7
50000 - 99999	0	2	2	1	3
100,000 and more	0	1	1	0	2
Unknown or N/A	4	8	3	2	4
total	20	20	20	20	20

**Annex 5: List of anti-malaria drugs cited during HHS**

Name of drug	Number of users	Name of herbs	Number of users	Name of sprays	Number of users
Chroloquine	13	Muarobaini	15	Doom	43
Malariaquine	8	Chepkeswot	2	Jonson it	9
Panador	3	Cheborolia	1	Ridsect	3
Fansidar	2	Mokera ogesmba	1		
Hedex	2	Unurorolia	1		
Action	1	Tobacco	1		
Aspilin	1	Mandusiet	1		
Robb	1	Omosebisiou	1		
Neverquine	1	Omokobiiri	1		
		Esoko	1		

## Annex 6: Community Activities

Num. of participants of each community group (multiple answers; 20 respondents in each District)

	Kisii	Gucha	Nyamira	Kericho	Bomet	total
Women's group	3	7	11	11	9	41
Church group	2	2	0	2	0	6
Self-help group	3	1	0	1	0	5
Youth group	4	2	1	3	1	11
Men's group	0	0	1	0	0	1
Matatu group	0	0	1	0	0	1
Cooperative society	0	0	0	2	0	2
total	12	12	14	19	10	67

### Demographic Structure of each community group

	Women's group	Church group	Self-help group	Youth group	Men's group	Matatu group	Cooperative society
Ave. num. of members	27.2	23.5	55.4	24.2	30.0	10.0	200.0
Ave. num. of female members	23.6	14.3	31.0	6.4	0.0	0.0	20.0
Ratio of females in the group (%)	86.8	60.9	55.9	23.1	0.0	10.0	33.8
Average monthly contribution (Ksh)	177.2	135.0	112.0	269.0	100.0	8000.0	750.0
<b>Main activities</b>							
Merry-go-round	19	2	0	1	0	0	0
Fund-raising	2	0	2	0	1	2	0
Cattle raising	11	0	0	2	0	0	0
Prayers	0	3	0	0	0	0	0
Church /School support	1	1	0	0	0	0	0
Collective Farming	6	0	1	1	0	0	1
Saving and Loaning	1	0	1	0	0	0	0
Spring protection	1	0	1	0	0	0	0
Business association	3	0	0	2	0	0	1
Bee keeping	1	0	0	1	0	0	0
School fee raising	3	0	0	0	0	0	0
Land purchase	0	1	0	0	0	0	0
Development	0	0	0	1	0	0	0
<b>Benefits</b>							
Household goods	2	0	1	1	0	0	0
Loan Extension	12	0	2	1	0	0	0
Advice	2	1	0	0	0	0	0
Discontinued	1	1	1	0	0	0	0
Bonus & Dividends	10	0	1	5	0	1	0
Plot purchase	0	6	0	0	1	1	0
Matatu	0	0	0	0	0	0	0
School fees	5	0	0	0	0	0	0
Not yet	5	0	0	1	0	0	0
Building houses	0	2	0	0	0	0	0
Sales of crops	2	0	0	0	0	0	11

## Annex 7: Water, toilet, fuel

### Toilet

	Bush	Latrine;public	Latrine; within compound	Incomplete latrine	Bury it	Pit latrine	Others, N/A	total
Kisii	0	7	7	4	1	0	1	20
Gucha	0	0	14	6	0	0	0	20
Nyamira	0	0	16	4	0	0	0	20
Kericho	4	0	13	3	0	0	0	20
Bomet	5	0	12	2	0	1	0	20
Rich	2	1	15	1	0	1	0	20
Middle	3	4	29	3	0	0	1	40
Poor	4	2	18	15	1	0	0	40

### Fuel

	Three stone	Stove made of mud	Modern stove	Others, N/A	total	Firewood	Propane gas	Electricity	total
Kisii	19	1	0	0	20	20	0	0	20
Gucha	19	0	1	0	20	19	1	0	20
Nyamira	20	0	0	0	20	20	0	0	20
Kericho	17	3	0	0	20	20	0	0	20
Bomet	19	0	1	0	20	20	0	0	20
Rich	17	1	2	0	20	19	1	0	20
Middle	38	2	0	0	40	40	0	0	40
Poor	39	1	0	0	40	40	0	0	40
total	94	4	2	0	100	99	1	0	100

### Water

	No treatment	Leave at least one day before drinking	Three-pot system	Boil before drinking	Filter before drinking	N/A	total
Kisii	3	0	0	14	0	3	20
Gucha	2	6	0	12	0	0	20
Nyamira	1	2	0	17	0	0	20
Kericho	14	1	0	5	0	0	20
Bomet	7	12	0	0	1	0	20
Rich	5	0	1	14	0	0	20
Middle	9	3	0	25	1	2	40
Poor	13	5	0	21	0	1	40

Perceived water quality (source of water, district)

Source of Water	Kisii				Gucha				Nyamira			
	Good	Poor	Do not know	total	Good	Poor	Do not know	total	Good	Poor	Do not know	total
River	0	0	0	0	1	0	0	1	1	0	0	1
Spring	13	7	0	20	12	6	0	18	11	7	1	19
Well	0	0	0	0	0	0	0	0	0	0	0	0
Piped water (public)	0	0	0	0	0	0	0	0	0	0	0	0
Piped water (within compound)	0	0	0	0	0	0	0	0	0	0	0	0
Water tank	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	1	0	0	1	0	0	0	0
Total	13	7	0	20	14	6	0	20	12	7	1	20

Source of Water	Kericho				Bomet				Total			
	Good	Poor	Do not know	total	Good	Poor	Do not know	total	Good	Poor	Do not know	total
River	8	4	0	12	6	7	2	15	16	11	2	29
Spring	5	1	1	7	3	0	0	3	44	21	2	67
Well	1	0	0	1	0	0	0	0	1	0	0	1
Piped water (public)	0	0	0	0	0	0	0	0	0	0	0	0
Piped water (within compound)	0	0	0	0	2	0	0	2	2	0	0	2
Water tank	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	1	0	0	1
Total	14	5	1	20	11	7	2	20	64	32	4	100

Perceived suitability of water for drinking (source of water, wealth level)

Source of Water	Rich				Middle				Poor				Total
	Good	Poor	Do not know	Sub-total	Good	Poor	Do not know	Sub-total	Good	Poor	Do not know	Sub-total	
River	3	2	0	5	3	6	2	11	10	3	0	13	29
Spring	7	5	1	13	19	8	1	28	18	8	0	26	67
Well	0	0	0	0	1	0	0	1	0	0	0	0	1
Piped water (public)	0	0	0	0	0	0	0	0	0	0	0	0	0
Piped water (within compound)	1	0	0	1	0	0	0	0	1	0	0	1	2
Water tank	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	1	0	0	1	0	0	0	0	0	0	0	0	1
Total	12	7	1	20	23	14	3	40	29	11	0	40	100









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