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UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT
AND
UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS

**NJOMBE - MAKETE ROAD
SOCIO-ECONOMIC
BASELINE SURVEY**

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P R E F A C E

The Njombe-Makete Socio-Economic Baseline Survey was carried out in May 1993. An initial reconnaissance trip was made along the road to select a section for the survey in April by USAID/Tanzania Rural Economy Advisor, J. Strauss. In May he returned to the area with two officers from the Ministry of Works: Mr. I. Macha, traffic engineer, who supervised the traffic survey, and Mrs. G. Mwakilufi, road planner, who supervised the household surveys. Mr. Macha was assisted by enumerators Mr. Mangula and Mr. Kibang'ani from the Njombe District Engineer's Office. Mrs. Mwakilufi was assisted by Mr. E. Madeha and Mr. F. Mpwehwe of the Iringa Regional Agricultural Office. The report was prepared by Strauss from his own survey work and with assistance from Mrs. Mwakilufi and traffic analysis by Mr. Macha. Any opinions expressed are those of the authors.

EXECUTIVE SUMMARY

The Njombe-Makete road runs through 100 km of Tanzania's Southern highlands. The USAID Agricultural Transport Assistance Program (ATAP) will support the Ministry of Works (MOW) in rehabilitation of this road beginning in 1993. In order for the GOT and USAID to measure road impact, USAID Rural Economy Advisor J. Strauss, along with traffic engineer I. Macha and planner Mrs. G. Mwakilufi of the Ministry of Works, conducted a socio-economic baseline survey along the road in May 1993. The Makoga-Kipengere section in Igosi Ward was chosen as it was both representative of the road as a whole and was most comparable to other roads where baseline surveys and evaluations have been carried out.

The Makoga-Kipengere section's area of influence is the whole of Igosi Ward, which has 11 villages with a population of 23,219 living in 4725 households, for an average of 4.9 persons per household, somewhat under the national average of 5.2. This may be because men often leave the area to seek employment elsewhere. One-quarter of the households surveyed were female-headed. Only 22% of the homes had corrugated iron roofs - well below the average of 33% in other baseline survey areas. Women spend an average of 32 hours a week collecting water and firewood. There are 3 dispensaries in the area - all along the road - with an average daily attendance of 170; 12 primary schools with about 4000 students and 86 teachers, 1 small secondary school with 90 students and 6 teachers, 2 small church-run technical schools teaching carpentry and sewing, and 18 kindergartens with almost 1200 children.

An important part of the baseline survey was a 5-day traffic count. It revealed traffic was somewhat higher than expected, 42 v.p.d., which when projected throughout the year yields annual average daily traffic (AADT) of 85 v.p.d. The passenger count averaged 356 per day projected to an annual daily average of

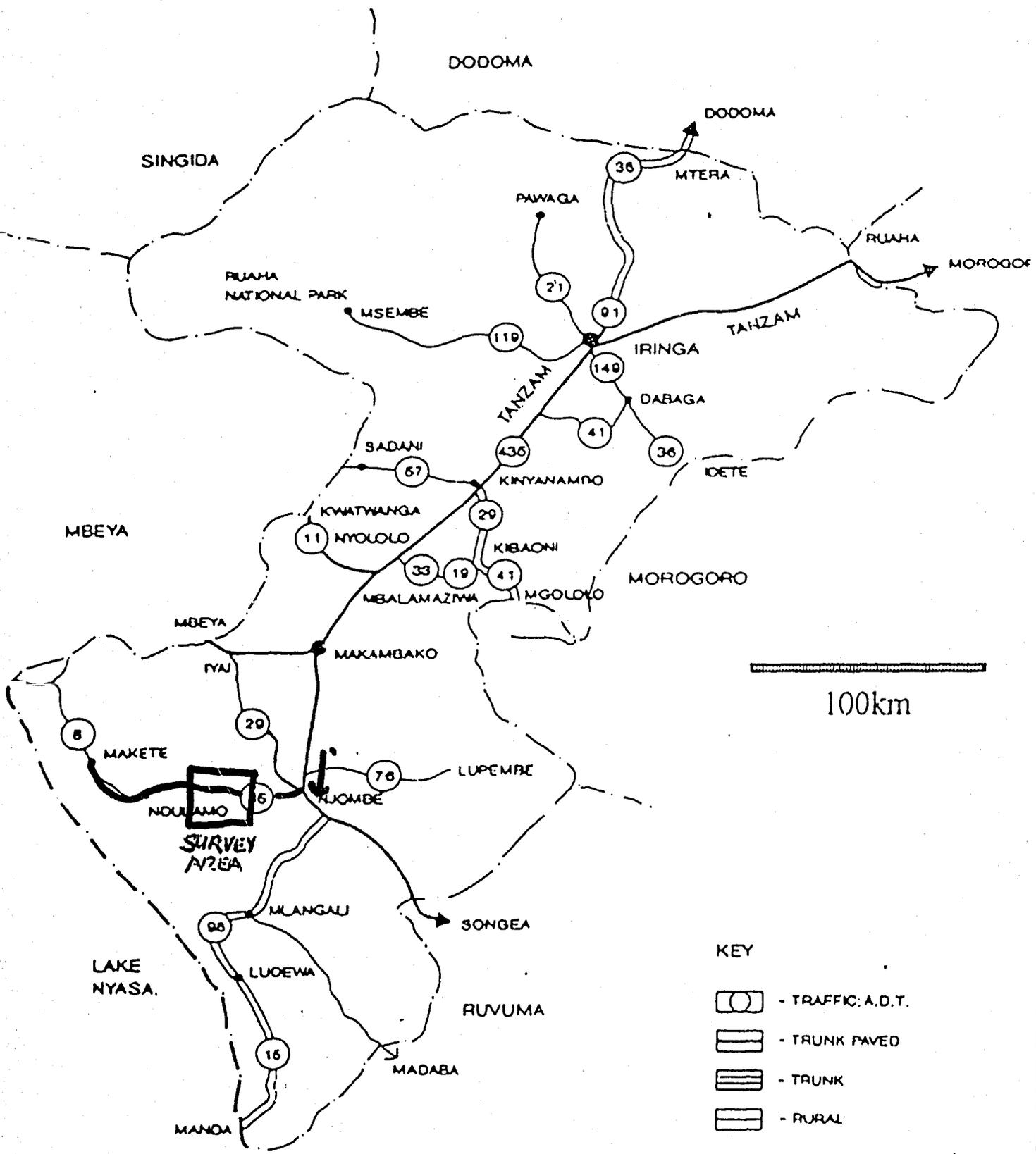
around 500-550. There are 90 bicycles using this section of the road, double the number of motor vehicles. Vehicle operating costs ranged from a low of Tshs. 128/km* for pick-ups to Tshs. 759/km for heavy rigs over 15 tons. Long distance passenger rates now stand at Tshs. 15/km while short distance rates jump to Tshs. 50-km. Cargo rates vary from Tshs. 45 ton-km to Tshs. 300 ton-km. There are 40 vehicles registered in the 11 villages of Igosi Ward along with 8 motorcycles and 941 bicycles. There are 3 scheduled buses along the road which operate during the dry season. Some days during the heavy rains the road is completely impassable even to tractors. It is estimated that in the course of a year the Makoga-Kipengere section carries 150,000-200,000 passengers and 45,000-50,000 tons of cargo.

In 1992 Igosi Ward produced 11,800 tons of maize, wheat, potatoes, beans and peas on 7700 hectares with a gross value of Tshs. 513 million (Tshs. 103 million net). There are 10,500 cattle, goats, sheep and pigs, and almost 8000 chickens in the area. However less than half the households own any livestock and get almost no income from their few animals. The average household earns about Tshs. 32,000 from 2.5 tons of crops on 1.6 hectares of land. Total household income averages Tshs. 89,000 with Tshs. 56,000 of expenditures a year. These low incomes are mirrored in the volume of trade as measured by average daily sales in the shops which amount to only Tshs. 2820.

* Official rates of exchange to one US dollar: May 1993 - Tshs. 360; 1992 - Tshs. 330.

From the above numbers a picture emerges of the Njombe-Makete area and we might conclude the following:

- The area is poor. Average household income is less than half the national average, with median income even lower.
- The area is isolated due to the poor roads which are sometimes totally impassable during the rainy season.
- Because the area is poor and isolated, roughly a quarter of the households are headed by women; the men leave to look for more lucrative occupations elsewhere.
- Potential exists with better agricultural practices and improved transport to increase incomes with higher value crops. Increased incomes will likely lead to a greater volume of trade.



I N T R O D U C T I O N

USAID/Tanzania initiated its rural road rehabilitation program, internally referred to as the Agricultural Transport Assistance Program (ATAP), in 1987. In 1989-90, a socio-economic baseline survey was conducted along four roads in Ruvuma, Mbeya, Shinyanga, and Kilimanjaro regions. Roads in the latter two regions were evaluated in 1992 and 1993 respectively. These evaluations helped to clarify what information was most essential in order to determine economic viability and impact. Roads in Iringa region are scheduled for rehabilitation beginning in 1993. USAID Rural Economy Advisor J. Strauss, who was responsible for the ATAP monitoring plan and was involved in both the Shinyanga and Kilimanjaro evaluations, chose the Njombe-Makete road for reasons which will be explained in the following section.

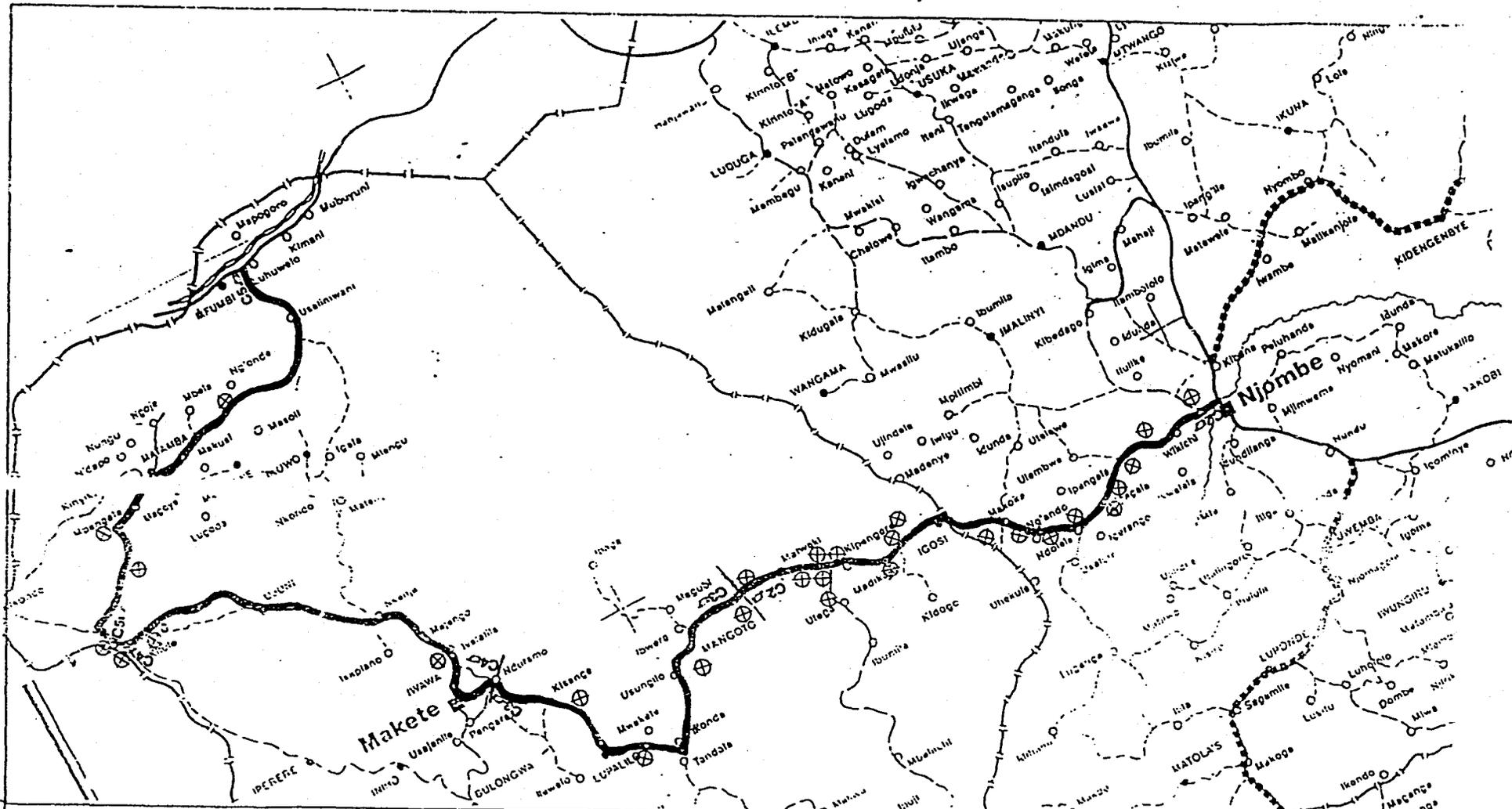
The primary purpose of this survey is to establish a baseline for future evaluations. However two other purposes were served by the exercise. From start to finish this survey took 45 workdays. It may act as a model for a fairly quick, simple, inexpensive and, hopefully, thorough baseline survey. Also by involving staff of the Ministry of Works, the survey work further institutionalizes monitoring and evaluation of roads - an ATAP objective.

Before getting into the substance of the report, a few comments should be put forward on data reliability. When you read that on Saturday, May 15, 1993, 45 vehicles were counted, that is 100% accurate. The Annual Average Daily Traffic (AADT) of 85 v.p.d. is a computer projection and was not pulled out of the air, but like any projection it is subject to a margin of error . . . maybe plus/minus 10%. Vehicle Operating Costs (VOC) are also computer estimates. When shopkeepers are asked the price of kerosene, the answer is 100% reliable. However when estimating average daily sales, the margin of error jumps into the stratosphere. So the figure of Tshs. 2820 average daily

sales may be understated by as much as 75-100%.

The main question when collecting data in rural Tanzania is what (who) to believe. Since crop production is so important in Njombe-Makete, we asked three different sources and, not surprisingly, got three different answers - almost completely unrelated to each other. What to do? It seemed the division extension officer had the best figures on areas under cultivation and the most realistic yield figures would be an average of the 80 households surveyed. Value of production could best be reflected by using average district prices, rather than household data. This composite, we believe, gives the best indication of crop production in the survey area.

The key word here is indication. It is our job to provide indicators with which to measure road impact. This we have done. However it is important to remember that these numbers are measurement tools. Average household income is less important than its component parts. Average daily sales are important only in that they indicate a low volume of trade, especially in comparison with other areas surveyed. Ultimately we have strived, and we believe succeeded, to give a realistic indication of conditions in the Njombe-Makete area prior to road rehabilitation.



LEGEND:



Project Roads with Road Number



BORROW AREAS

United Republic of Tanzania
 Ministry of Communications and Works
 Inter-consult Ltd P.O. Box 422
 Tel. 32115, 30384, 32379 Telex 41447 Inter
 dar es salaam

Core Rural Roads Rehabilitation Programme

GENERAL LOCATION PLAN

IRINGA REGION

Package No.
 Scale: see
 Date: Oct
 Drg. No. 1

THE NJOMBE-MAKETE ROAD

Each road has its unique characteristics. The Njombe-Makete road runs 104 km. between two district headquarters and, unlike previous roads rehabilitated, is classified as a regional road rather than a district (feeder) road. It serves as the major link between Makete and the outside world. At times during the rainy season, November-April, the road is impassable and Makete entirely cut-off from the rest of the planet. One trip from Njombe to Makete will reveal why this happens.

Out of Njombe (6500 ft), the road mainly rises, with several valleys along the way, to Kipengere (7200 ft) 42 km away, at which point the road winds up steep hills and down deep valleys all the way to Makete (8500 ft). During the rains, the red clay varies in consistency between glass and glue. In some places even tractors can't pass. Makete is the main producer of pyrethrum in Tanzania and both districts yield up large amounts of potatoes and wheat. There is great potential for barely. Coffee is being introduced in the area.

The Makoga-Kipengere section was chosen primarily for its comparability with roads previously evaluated. The Kanawa-Kalitu road begins 25 km outside Shinyanga; the Kwa Sadala-Mbweera road is 22 km from Moshi. Makoga lies 25 km from Njombe. The area of influence of the Kwa Sadala-Mbweera road encompassed 11 villages. There are 11 villages in Igosi ward through which the Makoga-Kipengere section passes. The section is located far enough away from Njombe to be no more influenced by it than the other roads by their nearest towns. The villages seem fairly representative of those along the entire length of the Njombe-Makete Road.

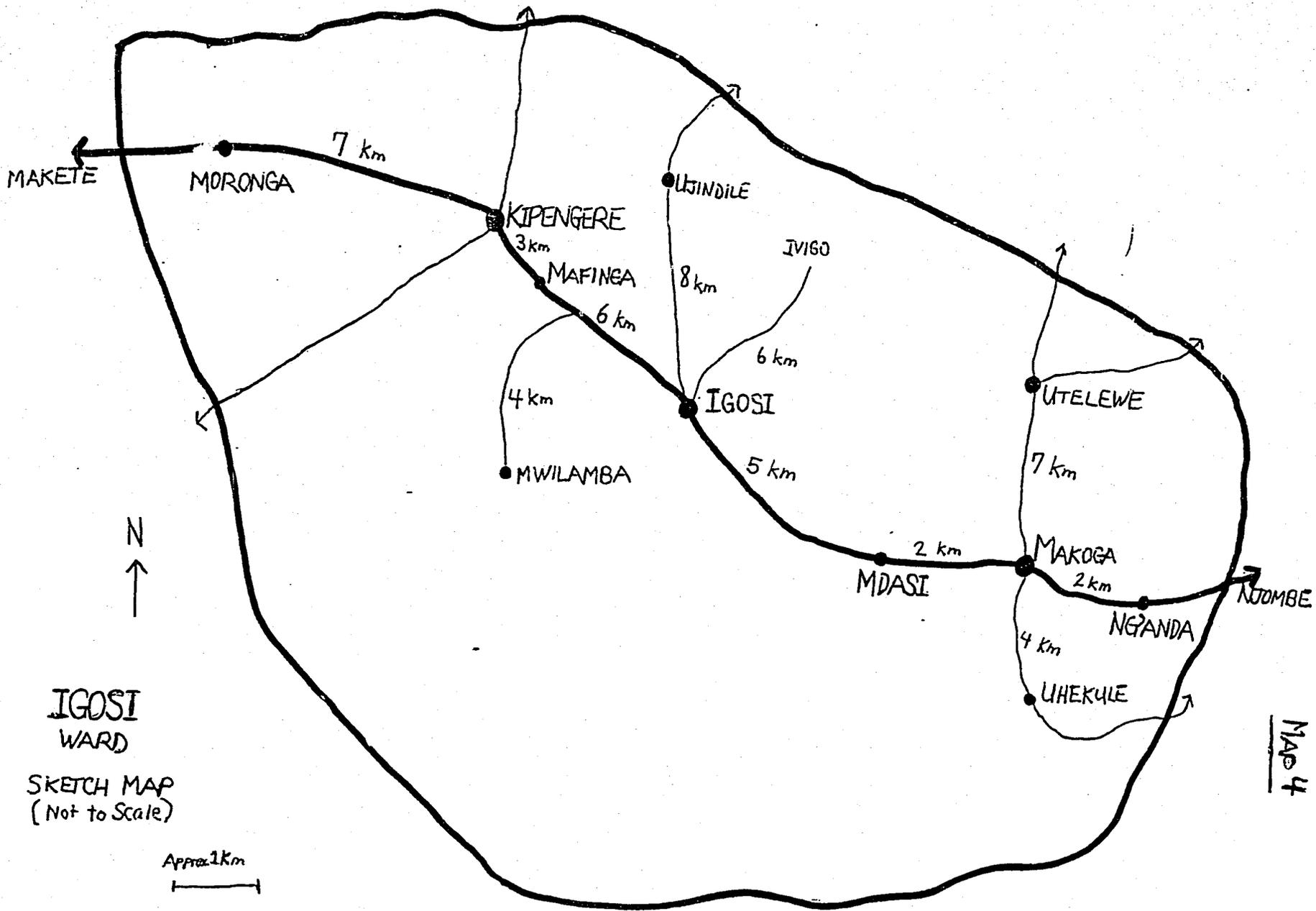
As with other rural roads, not much appears to be going on between Njombe and Makete. Or to paraphrase one critic - these are high-cost low-volume roads in the middle of nowhere. But as with much of life, first appearances can be deceiving. If our baseline data is anywhere near reality - as we are convinced

it is - a few extrapolations might change a few minds. We could estimate the cost of rehabilitation from Njombe to Makete at Tshs. 800 million to one billion - around \$2 million at current exchange rates. That is indeed a sizable chunk of cash. But we are also talking about an estimated two billion shillings gross value of agricultural production annually; roughly Tshs. 1.4 billion in household incomes; 30,000-50,000 vehicles a year using the road now, plus some 150,000 or more passengers. If past evaluations are anything to go by, once the road is rehabilitated production will go up 25% or better; incomes will rise 50% or more; vehicle and passenger traffic would easily double; plus vehicle operating costs, cargo rates and passenger fares will likely decline. It is not likely that Njombe-Makete will become an industrial center, but it could become a major producer of wheat, barley, (possibly rye) and very definitely potatoes. If the area begins to improve economically it will have social effects as well.

One somewhat unique feature of this area - unlike others where baseline surveys have been conducted - is that one out of four households is female-headed. It is a fairly common practice for men to seek employment outside the area, returning once every several years long enough to get their wives pregnant and depart again. The practice is even wider-spread in Makete than Njombe where an ILO study estimated 31% of the households are female-headed.* In Makete it's not unusual to find 25-50% more females in a village than males. In Njombe it's more like a 10-20% difference.

* ILO: Makete Integrated Rural Transport Project - "Transport Demands on Rural Households: Report of First Village Survey, Vol. I", 1987, pg. 5.

Unlike evaluation surveys where we hid our true purpose for surveying in order not to bias the responses, during this exercise we were quite open about our purpose. We got full cooperation from the Regional Development Director and Regional Engineer on down to the village officials, which indicates the high priority given to road rehabilitation. The question we were asked over and over in every meeting, in every village, in every household: When will they start working on the road? It seems, pardon the pun, that ATAP is on the right track.



IGOSI
WARD
SKETCH MAP
(Not to Scale)

Approx. 1km
|-----|

Map 4

MAKOGA-KIPENGERE

The Makoga-Kipengere section of the Njombe-Makete road constitutes roughly one-quarter of the total length. As with other roads previously examined a great deal of activity occurs behind the facade of just another out-of-the-way rural area.

Makoga has a women's sewing group with 10 members and a private collective with over 100 members growing wheat. Makoga also has a secondary school built by an NGO - the Njombe Development Trust - to which each family in the area contributes Tshs. 400 toward recurrent costs. The school is also supported by a commercial farm supervised by a German Volunteer. There is a sheep project with the wool going to two weaving groups in Utelewe who make blankets. A Norwegian Volunteer works on this project. DANIDA supports a vehicle workshop in Makoga. Several villages have cultivation collectives and tree planting groups. The DANIDA-funded HIMA (Conservation) project is starting up in Njombe and Makete and has already begun activities in the area. Mdasi has a local food storage (kihenge) construction group. There is a youth carpentry center in Igosi supported by the Catholic Church, which also has a small sewing school in Kipengere. Ng'anda has a youth group growing wheat, potatoes and sunflower. The Lutherans are involved in a water supply project for Igosi and Utelewe. Global 2000 has supported small farmers in Makoga and Mdasi. Ujindile has a women's group with their own pilot coffee plot, supported by a Danish Volunteer.

Demographics

The survey area lies within Igosi Ward made up of 11 villages - seven along the Njombe-Makete road and the other four within a few kilometers. (See preceding map.) Ivigo is not a village but rather a satellite of Ujindile. The population of Igosi Ward in May 1993 stood at just over 23,200 in 4725 households, for an average of 4.9 persons per household, somewhat smaller than the national average of 5.2. (See Table 1) Note

that the random 80 household survey (Table 13) turned out an average household size of exactly 5.2. (For purposes of this baseline survey, HOUSEHOLD is defined as those who sleep under the same roof or share the same cooking pot.) The size of villages varied considerably with the largest, Utelewe, over six times bigger than the smallest. However of more interest to the baseline is the wide variation in average household size among the villages with Mafinga at 3.8 and Mwilamba at 6.5. No one could adequately explain this over-50% variation in average size. The most likely reason is that the village executive officers did not necessarily adhere to the agreed definition of household. However, if one average is a bit inflated and another somewhat under, the 4.9 average is reasonably accurate plus or minus two or three-tenths of a percent.

Table 1
VILLAGE SURVEY
NJOMBE-MAKETE ROAD MAY 1993

	POPULATION	HOUSEHOLD	AV/HH
1. NG'ANDA	884	222	4.0
2. MAKOGA	2869	617	4.6
3. MDASI	1076	244	4.4
4. IGOSI	2968	621	4.8
5. MAFINGA	668	177	3.8
6. KIPENGERE	2873	547	5.3
*7. MORONGA	2896	671	4.3
8. UJINDILE	2386	471	5.1
9. UTELEWE	4063	647	6.3
10. UHEKULE	1621	320	5.1
11. MWILAMBA	1215	188	6.5
TOTAL	23219	4725	4.9

Source: Village Executive Officers, May 1993

* Moronga population and household numbers from 1991 ward census.

There has been for many years a problem of outmigration, especially of young adult males as mentioned earlier. Several reasons are given for this. First, the area is poor by many standards and certainly isolated in the rainy season. Second, Njombe-Makete men have a reputation for being hardworking,

industrious people sought out for various sorts of both skilled and unskilled labor. Third, the common factor of witchcraft comes into play. Like many other places in Tanzania, Njombe-Makete people are supposed to be modest with no household visibly much better off than any other. Ostentatious displays of wealth or even inordinate success are likely to bring down a torrent of jealous curses. In a nutshell, everyone is reduced to the lowest common denominator for fear of a wizard's hex.

This can be amply seen in the case of two natives from Kipengere. One Alphonse Chengulla owns two buses which ply the Njombe-Makete road. He is also reputed to own trucks but it wasn't possible to interview him because he lives outside the area with homes in Iringa and Dar. Madoido Chaula however resides closer to home in Njombe. When he finished schooling, he moved to Njombe from Kipengere where he began his working life as a shoe shine boy. He then got into a soft drink kiosk selling soda. He later became an agent supplying soft drinks to hotels and bars in Njombe, Makete and Ludewa districts. He has just recently purchased a 35 seater bus. His bus spends the night in Kipengere. Madoido spends the night away from the evil eye of a jealous neighbor. He is 26 years old.

Quality of Life

On average villagers spend 7 hours collecting water 2-3 times a day and 3.2 hours on firewood 4-7 times a week which comes to a weekly 23-36 hours, practically a full-time job in some countries but considered part of the daily drudge for women and children in rural Tanzania. While past evaluations indicate that road improvements have had virtually no impact on the collection of water and firewood, the household survey shows a small ray of hope. In the two homes where there are ox carts, firewood is collected in bulk only four times a year BY MEN. True, women still cut the wood and carry it to collection points, but men haul the stuff to the family compounds. Ox carts in Shinyanga are also used to haul water. In all of Igosi Ward,

however, there are only 8 ox carts, and it is doubtful that a rehabilitated road will mean any sort of substantial increase in that figure.

According to the village survey, just under 22% of the villagers live under a corrugated iron roof. This percentage is quite a bit under the random household survey (Table 13) of 36% (29 out of 80 households). The 36% is dead certain because enumerators interviewed the respondents in their homes. However there is the possibility that although the aim was for a fairly representative 10% sample (80 households out of 794) something went slightly amiss in the selection. It could also be that the village executive officers miscounted. The combined average of the 1990 four-region baseline survey was 33% corrugated iron roofs so neither the 22% or 36% figure is out of the ballpark.

TABLE 2

QUALITY OF LIFE
NJOMBE--MAKETE ROAD MAY 1993

	VILLAGES	HOUSING % WITH IRON ROOF	WATER COLLECT (HRS)	FIREWOOD COLLECT (HRS)	DISPENSARY		SCHOOLS												
					AV. DAILY ATTENDANCE	DRUGS	NO	STUDENTS	TEACH	NO	STUDENTS	TEACH	NO	STUDENTS	TEACH	NO	STUDENTS	TEACH	
1	NG'ANDA	32.9	.2	1.0			1	191	8	1	102	2							
*2	MAKOGA	24.5	.7	3.5	30	60-80	1	415	10	1	103	2	1	90	6				
3	MDASI	15.2	.5	2.0	-	-	1	238	5	1	42	1							
**4	IGOSI	32.4	.7	3.0	80	60-80	1	524	10	1	109	2					CARPENTRY 18	3	
5	MAFINGA	18.1	.8	3.0	-	-	1	186	6	1	33	1							
6	KIPENGERE	20.3	.5	4.0	60	40-60	1	436	9	2	110	2					SEWING 10	1	
7	MORONGA	13.0	.8	6.0	-	-	1	360	5	4	176	5							
8	UJINDILE	9.3	.3	6.0	-	-	2	571	14	3	180	6							
9	UTELEWE	24.9	.5	2.0	-	-	1	526	8	3	175	6							
10	UHEKULE	37.5	.7	2.0	-	-	1	344	7	1	167	2							
11	MWILAMBA	10.1	1.0	3.0	-	-	1	177	4	-	-	-							
	AV./TOTAL	21.7%	.7	3.2	170	-	12	3968	86	18	1197	29	1	90	6	2		28	4

* MAKOGA IS DIVISION CENTER - ALSO HAS BANK

** IGOSI IS WARD CENTER

Health

There are three dispensaries in the survey area, all located in villages along the road. On average 170 people attend these three centers each day. (See Table 3). This corresponds almost exactly to what the 80 households said about dispensary attendance - 11-14 times per year. Most of these visits in many households are for monthly MCH clinics for children under five. For any serious illness, people travel either to the district hospital just outside Njombe at Kibena or, more likely, to the mission hospital at Tandala in Makete district. These trips to the hospital are almost always taken in motor transport, either by public bus or by getting a lift (with or without paying fares) in a private vehicle. This can become quite problematic during the rainy season when the road is occasionally impassable. The staff at the Makoga and Igesi dispensaries rated their drug supplies as "good" - 60-80% of requirement, while the Catholic mission nurse at Kipengere rated the supply as only fair - 40-60% of requirement. Households pretty much went along with dispensary staff on medicine supply (Table 14) - almost half (38 out of 80) rate it "fair", with the other half evenly split (20 and 20) between "good" and "bad". None thought drug supplies either "very good" or "very bad". Slightly over half (44 households) rated their family's health as "fair", 18 rated health as "good", and 15 rated it "bad". One (in the upper income group) went so far as to rate family health as "very good". None thought it was "very bad". The most common diseases reported at all three dispensaries are upper respiratory and malaria. The first is not surprising considering the cold weather (just above freezing at times) and the light clothing people wear. The second seems somewhat suspect, however very often any sort of fever is termed "malaria".

Table 3

HEALTH SURVEY SUMMARY
Njombe-Makete ROAD MAY 1993

TYPE OF FACILITY	<u>M A K O G A</u> DISPENSARY (GOT)	<u>I G O S I</u> DISPENSARY (GOT)	<u>KIPENGERE</u> DISPENSARY (MISSION)
NO. OF STAFF	5	3	5
AV. DAILY ATTEND	30	80	60
MCH CLINIC:	YES	YES	YES
FAMILY PLANNING:	YES	YES	YES
CONDOMS AVAILABLE	YES	YES	NO
BOXES PER MONTH	5	3	0
*DRUG SUPPLY	GOOD	GOOD	FAIR
COMMON DISEASES:	MALARIA (3)	WORMS (2)	
	UPPER RESPIRATORY (3)	DENTAL (1)	
	DIARRHEA (2)	SKIN DIS. (1)	
	CONJUNCTIVITIS (2)	ANAEMIA (1)	
	PNEUMONIA (2)		

* GOOD: 60-80% of requirements
 FAIR: 40-60% of requirements

Education

Each village in Igosi Ward has a primary school with Ujindile having two. A total of just under 4000 children attend the 12 primary schools which employ 86 teachers. The teacher-student ratio of 1 to 46 is, unfortunately, about average in Tanzania. More heartening is the move toward enrolling 4-6 year olds in kindergartens. There are now 18 in the 11 villages with almost 1200 kinder watched over by 29 adults - some trained as pre-school teachers, others little more than attendants. There is also a small secondary school at Makoga with 90 students and 6 teachers which was built and is administered by an NGO - the Njombe Development Trust. Each family contributes 400/= a year to its operation. In addition there's a youth center training carpenters at Igosi and a sewing center for young women at Kipengere Catholic Mission. As a matter of interest, 12 out of 15 shops in 5 villages stock exercise books and all but one sell

ballpoint pens - the two staple supplies of student life (see table 12).

TRANSPORTATION

A major part of the baseline survey consisted of a 5 day traffic count and origin-destination (O-D) survey supervised by Ministry of Works Traffic Engineer Mr. I. Macha. His complete report is included as Annex 1.

As a preface to what follows, the reader should keep in mind that the half of the road in Makete district is generally in worse condition and more likely to be impassable than the section in the survey area. The average travelling speed over the Makoga-Kipengere section is 30-35 k.p.h while for the Njombe-Makete road as a whole it's more like 25-30 k.p.h.

To measure road roughness, a devise called a bump integrator is attached to the back of a vehicle and driven at least 32 k.p.h. Given that the average speed on this section is only 30-35 k.p.h there are many places too rough to measure roughness. However where the devise can be used, it measured 20,000 mm/km which translates to one bump every 5 cm ($2\frac{1}{2}$ inches). In short this is a rough road.

Traffic

The five-day traffic count is summarized below in Table 4

Table 4

TRAFFIC SURVEY SUMMARY*
NJOMBE-MAKETE ROAD MAY 1993
(5 DAY COUNT - 6 A.M-6 P.M)

DAY DATE	TOTAL VEHICLE	ORIGIN			BICYCLES	MOTORCYCLE	TOTAL PASSENGERS**
		NJOMBE MAKETE	IGOSI WARD	OUTSIDE NJO-MAK			
WED 12 MAY	44	22	15	7	95	2	396
THURS 13 MAY	36	17	13	6	91	6	232
FRI 14 MAY	50	31	18	1	97	4	380
SAT 15 MAY	45	28	12	5	56	0	404
SUN 16 MAY	38	21	11	6	113	3	368
TOTAL	213	119	69	25	452	15	1780
AVERAGE	42.4	23.6	13.8	5	90.4	3	356

* Survey point located at Makoga by IMALINYI DIVISION Office 26 km from Njombe.

** Passenger defined as any rider, whether or not paying a fare, not employed by vehicle owner.

The: 42.4 vehicles can be broken down by types as:

car:	2	full trailer:	1
pickup/van:	25	semi-trailer:	2
lorry < 5 tons:	2	bus > 25 pax	5
lorry > 5 tons:	5	other:	4

As the traffic count was done during the low season, Macha ran the results through the RTIM3 model at the Iringa regional engineer's office to come up with a projected annual average daily traffic count (AADT). The RTIM3 program reclassified vehicles as cars, lights (under 2.5 tons), medium (2.6-15.5 tons), heavies (over 15.5 tons) and buses. The projected AADT for Njombe-Makete comes out as follows:

cars	4
lights	51
medium	14
heavies	5
<u>buses</u>	<u>11</u>
<u>AADT</u>	<u>85</u>

Of the 213 vehicles counted, 55% had their origins in either Njombe or Makete, which is not really surprising. However 32% had their origins within the survey area, the two most important being Makoga itself and Kipengere. Of those vehicles with origins or destinations outside Njombe or Makete districts, Iringa and Mbeya were the first and second locations, with Dar, Morogoro, Dodoma and even far away Arusha included.

Operating Costs

No one yet has devised a fool-proof procedure for coming up with vehicle operating costs. This survey used two entirely different methods which yielded two entirely different results. Macha ran some numbers through the RTIM3 model and came up with one set, while Strauss went the less modern scientific route and

asked operators what their costs were. With no particular reason to lie, the operators' calculations invariably came in under the RTIM3 numbers. For example the RTIM3 breakdown for lights yields an operating cost of T.Shs 283/km. The German volunteer at Makoga has kept complete cost records for his 2.8 liter diesel 4 x 4 pick-up purchased in August 1991. As of 30 April 1993, the operating cost came to T.Shs 38.33/km excluding depreciation. If we add that plus crew cost to equate it with the RTIM3 model, it comes to almost exactly T.Shs 50/km. The Catholic missionary at Kipengere hires out his Landrover at a rate he says covers the cost - T.Shs 50/km. RTIM3 puts mediums at T.Shs.430/km. The NJOLUMA Cooperative Union operates a 7 ton Isuzu and an 8 ton Fiat Iveco at costs of T.Shs. 360/km and 408/km respectively. It is doubtful that NJOLUMA keeps its records with teutonic accuracy but let's move on to buses. RTIM3 puts the cost at T.Shs 223/km. One operator of big buses came close with T.Shs 202/km, another with a smaller bus could only manage T.Shs 146/km. We were unable to get figures for cars and heavies. For future evaluation, the table below has been prepared as something of a compromise.

Table 5

VEHICLE OPERATING COSTS (1993 T.SHS/KM)
NJOMBE-MAKETE ROAD MAY 1993

	CARS	LIGHTS	MEDIUMS	HEAVIES	BUSES
MAX	189	283	431	759	223
MIN	-	50	360	-	146
MEAN	-	128	400	-	191

Rates

Rates, like operating costs, vary considerably also, but not because man and the computer program cannot agree. Rather the determining factor here is greed, with an added dash of stupidity. All public buses charge exactly the same fare whether it's T.Shs.1,500 from Njombe to Makete (102 km) or T.Shs 600 to

Kipengere (42 km). It come to T.Shs 15 per km. This T.Shs 15/km per long-haul passenger on a public bus seems set in stone by Moses off the mountain. However around 38% of travellers along the road get lifts in private and, occasionally, government vehicles. Here the rate varies from nil to katie-bar-the-door in the rainy season. (Just how badly do you want to get from here to there?) The best estimated overall average we could make of the various fares people gave us was T.Shs. 40-60/km.

Cargo rates also varied from a low (and loss-making) T.Shs 45 ton-km to a stratospheric T.Shs.300 ton-km. Down in Never-Never Land is NJOLUMA Cooperative Union at 45 which means the coop loses T.Shs 45-48/km every time the driver turns on the ignition switch, assuming the lorry is fully loaded. If it's less than full, it loses even more per km. At the top end are the poor (and some not-so poor) shop keepers who pay from T.Shs. 240-300 ton-km to ferry goods from Njombe to their locations in Makoga and Kipengere respectively. There are all sorts of rates in between. Table 6 below summarizes the full spectrum.

Table 6

PASSENGER AND CARGO RATES (1993 TSHS)
NJOMBE-MAKETE ROAD MAY 1993

TYPE	RATE*
<u>PASSENGERS</u>	
Public buses	15/KM
Private vehicles (average)	40-60/KM
<u>CARGO</u>	
NJOLUMA Coop - 7-8 ton lorry	45 ton-km
Kipengere Missionary pick-up	125 ton-km
Village-owned landrover	150 ton-km
Long-haul commercial lorry-5 ton	140 ton-km to-from rate**
Long-haul commercial lorry-7 ton	130 ton-km
Short-haul commercial goods on bus	240-300 ton-km

*Rates for cargo assume vehicle is fully loaded. In reality the transporter will try to underload if he's being paid a set rate for the trip, and will overload if he's paid a set rate per item (i.e T.Shs x per crate of beer).

**Many transporters will claim their rates are "to and from", meaning double the actual price as a way of protecting themselves from "returning empty". In other words, you could hire a 5 ton lorry to haul cement from Njombe to Makete for T.Shs. 70,000 and then load 5 tons of potatoes to bring back to Njombe. This works out to T.Shs.70 ton-km. In fact almost no-one hires "to-from" and almost no transporter ever returns empty, so the T.Shs 140 ton-km is more realistic than 70.

Volumes

At 356 passengers a day, the annual total would be about 130,00. However May is still the low traffic season. If we go by the projected AADT, we might estimate passenger traffic average double our figure or 717 persons/day (260,00/year). However certain factors ought to be considered before letting a computer dictate the baseline. It's quite true that the greatest number of vehicles use the road between August and November when crops are evacuated and inputs brought in. In addition a good quantity of non-farm goods must be available to those farm families who have been paid for their crops and have a bit of

loose change in their pockets. But we shouldn't automatically assume more vehicles means more passengers. During this same period of Aug-Nov., farmers are harvesting and preparing fields for the next season's planting. When the rains come in November or early December, the roads turn to goo and travel by anything with wheels becomes very problematic. So if 130,000 may be a bit low, 260,000 is likely to be too high. It might not be unrealistic to estimate a 500-550 range for passengers/day.

Estimating annual tonnage hauled is even more difficult, bordering on your-guess-is-as-good-as-mine. However there very definitely is method to this madness. We start with estimated agricultural production sold extrapolated from the household surveys (using the full amount transported wholly by road) and add another 10% to take into account fruit, vegetables and other crops/inputs not quantified. This is multiplied by 2 to include farm produce transitting/terminating in the area rather than originating there. Using this formula farm produce hauled per year comes to about 30,000 MT.

Non-farm cargo hauled is based on our O-D survey which included several questions on freight. For the five-day survey we got a total non-farm cargo of 284 tons. If we multiply this by 60, figuring around two months a year the road is currently impassable to cargo vehicles, we come up with 17,040 tons. Add that to farm produce and the total annual tonnage hauled is about 47,000. Simple enough. We tried an even more complex method of calculation and still came up with 47,000 MT so let's use it for annual cargo tonnage.

Vehicles in Survey Area

Igosi Ward has 40 four wheel motorized vehicles plus 8 motorcycles. Of these 40, only 22 are "road" vehicles, the other 18 being tractors. And of these 22, half reside in Kipengere, eight of which can be found in the compound of the Catholic

mission (see Table 7 below). All these numbers can be considered highly accurate except for bicycles which have a margin of error of around 10%.

Not only are there few vehicles in Igosi ward, but people do not travel much by road. Fifty-nine out of 80 households surveyed (Table 13) travel by bus an average of 5 times per year; only 37 households use private transport (most probably because it's quite a bit more expensive) an average of 6 times a year. Business people travel more than others; shopkeepers usually go to Njombe 2-4 times a month to purchase merchandise. The most common purposes for travelling - to collect firewood or water, go to the grinding mill or attend the nearest dispensary - mean walking. Only distant places like the hospitals in Kibena or Tandala, Njombe, Makete, Iringa and beyond merit using hard-earned cash to pay a fare. Considering a single journey from Kipengere to Njombe and return sets back the traveller T.Shs.1,200 this is not too surprising. The average amount spent on travel of T.Shs 6,200 a year doesn't take you too far too often, even though it represents 11-12% of the household's total annual expenditure.

Table 7

**VEHICLES REGISTERED - IGOSI WARD
NJOMBE-MAKETE ROAD, MAY 1993**

		pickup	4x4	saloon	tractor	-5 ton	+5 ton	Buses	Motor cycle	Bicycles	Ox- carts	Hand carts
1	NGANDA	3			1		1			70		
2	MAKOGA	3			2	2			4	103	2	
3	MDASI				1				1	45		
4	IGOSI		1	1	2				1	205	2	4
5	MAFINGA									20		
6	KIPENGERE	1	5		5	1	1	3		54		
7	MORONGA									21		
8	UJINDILE	2			2				2	63		
9	UTELEWE	1			4		1			217	4	
10	UHEKULE				1					114		
11	MWILAMBA									39		
	TOTALS	7	6	1	18	3	2	3	8	941	8	4

Source: Village Executive Officers, May 1993.

AGRICULTURE

Crops

By far the most important activity along the Njombe-Makete road is crop production. As will be seen shortly, livestock does not feature prominently in the economy of most families. The Makoga-Kipengere area (Igosi Ward) produced approximately 11,800 tons of crops in 1992 on 7700 hectares with a gross value of somewhat over T.Shs.500 million, which after costs are deducted comes to T.Shs100-150 million. (See Table 8 below). While maize is still the primary crop cultivated, wheat and potatoes are big income earners. Some farmers are beginning to cultivate cabbages and other horticultural crops as income earners. The DANIDA-financed HIMA project is promoting afforestation including fruit trees. Coffee has been introduced on a trial basis. (Makete grows a big cash crop in pyrethrum). The Tanzania Breweries barley farm outside Kipengere has not done well, not because barley won't grow in the area but because of mismanagement. Barley has great potential, given the quantities of beer consumed in the country.

At the household level, approximately 2.5 tons of crops are grown on 1.6 hectares of land bringing in an average of around T.Shs.32,000 after cost deductions in 1992. Some explanation is required to fully understand these calculations. Being economist, we have taken into consideration the opportunity costs of both capital and labor. In simple terms this means we've calculated all crops grown as income whether sold or consumed in that if the amount were not eaten, it would necessarily have to be purchased. Similarly labor is included as a production cost whether or not money was paid. This last point caused a tremendous distortion as can be seen in Table 9. Maize sells for T.Shs. 40,000 a ton. Were farmers to pay the full economic production cost of T.Shs. 35,000 per ton, few would likely go to the trouble of growing the crop. But the financial cost is only

about T.Shs. 6,000 a ton. So farmers are quite prepared to plant maize on over half the land under cultivation in the survey area. The most obvious reason is that they don't believe in opportunity costs and other economic hocus pocus. But a second more subtle and insidious reason ought to be put forward. The farmer doesn't figure labor into his calculation of cost because it's not his labor. Around 75% of all farm labor is carried out by women. Since it's neither his sweat nor does he have to pay for it, the farmer is not too worried about economic costs, labor-saving methods, more intensive higher yielding procedures. Why bother? Therefore in the interest of presenting a realistic, less distorted, picture of conditions in the survey area and possibly opening a few eyes, the full value of women's labor has been calculated for the five principal crops grown. Women's labor constitutes T.Shs 218 million or 52% of the net financial value of crops in Igosi ward. Whether or not one is sensitive to the exploitation of rural women, Table 9 ought to make it obvious that little "progress" will come about in the modernization of crop cultivation as long as the cheapest mode of production is a woman with a hoe in her hands. If we look at the net economic value of crops, it makes more sense to grow wheat and potatoes than maize, beans and peas, but the latter three take up 69% of the land cultivated. Whether all this makes much difference to the rural road baseline, it certainly affects the base of rural production.

Table 8

CROP PRODUCTION ESTIMATES - 1992*
(T.SHS. '000)
NJOMBE-MAKETE ROAD MAY 1993

VILLAGE	MAIZE			WHEAT			POTATOES			BEANS			PEAS		
	HA	MTS	T.SHS.	HA	MTS	T.SHS.	HA	MTS	T.SHS.	HA	MTS	T.SHS.	HA	MTS	T.SHS.
NG'ANDA	316	570	22,800	120	110	8,800	65	140	5,250	31	15	930	80	48	1,296
MAKOGA	520	940	37,600	140	130	11,200	103	220	8,250	31	16	960	15	9	243
MDASI	214	390	15,600	84	80	6,720	35	70	2,625	20	10	600	13	8	216
IGOSI	654	1,180	47,200	20	110	8,800	118	250	9,375	200	100	6,000	60	36	972
MAFINGA	182	330	13,200	130	120	9,600	130	270	10,125	30	15	-900	20	12	324
KIPENGERE	430	770	30,800	250	230	18,400	220	460	17,250	40	20	1,200	45	27	729
MORONGA	92	170	6,800	60	50	400	110	230	8,625	15	8	480	20	12	324
UJINDILE	485	870	34,800	100	90	7,200	105	220	8,250	125	66	3,960	10	6	162
UTELEWE	900	1,620	64,800	60	50	4,000	54	110	4,125	47	24	1,440	5	3	81
UHEKULE	384	690	27,600	192	170	13,600	90	190	7,125	64	32	1,920	64	39	1,053
MWILAMBA	145	260	10,400	64	50	4,000	115	240	9,000	15	8	480	20	12	324
TOTALS	4,322	7,790	311,600	1,320	1,220	93,320	1,080	2,260	84,750	618	299	17,940	352	12	5,724

* Area under production source: Division Extension Officer

Tons cultivated: Extrapolation from Household Survey

Value of production: Based on data from District Ag. Office.

Table 9

CROP PRODUCTION COSTS AND VALUES
(IN 1992 T.SHS. '000)
NJOMBE-MAKETE ROAD MAY 1993

	MAIZE	WHEAT	POTATOES	BEANS	PEAS	
1992 PRICE /MT	40.0	80.0	37.5	60.0	27.0	
FINANCIAL PROD. COST	6.0	28.0	3.0	8.0	5.0	
ECONOMIC PROD. COST	35.5	54.5	22.0	56.5	32.0	
WOMEN'S LABOR	17.0	23.0	11.0	29.0	27.0	
						TOTALS
GROSS PROD. VALUE	311,600	93,320	84,750	17,940	5,724	513,400
NET FINANCIAL VALUE	264,900	58,900	77,900	15,500	4,600	421,800
NET ECONOMIC VALUE	37,400	29,860	35,600	1,080	-1,060	102,900
WOMEN'S LABOR	132,400	47,600	24,900	8,700	4,400	218,000

Livestock

Given a total population of 23,200 in 4700 households, the number of animals listed in Table 10 is not very impressive (only about 1½ chickens per household). This is made even more dramatic by the findings of the household survey (Table 13). Only two households out of 80 owned cattle and only half had poultry, the average being 7 chickens and the biggest owning a mere 46 birds. Only one person admitted to earning any income off livestock, a whole T.Shs. 400 a year selling eggs. The Division Extension Officer claimed that around 75% of the households with poultry sold some eggs, but this amounted to an insignificant monetary figure, or "Mama's pocket money" as he called it. No one mentioned dairy production at all.

Table 10

**LIVESTOCK CENSUS
NJOMBE-MAKETE ROAD MAY 1993**

	CATTLE	GOATS	SHEEP	PIGS	DONKEYS	POULTRY	G/PIGS	RABBITS
NGANDA	40	52	26	62	-	700	-	-
MAKOGA	293	677	371	193	3	882	4,711	-
MDASI	12	45	22	14	-	360	-	45
IGOSI	270	324	251	52	-	706	308	26
MAFINGA	55	260	61	10	-	304	-	-
KIPENGERE	320	469	175	30	-	1,539	146	29
MORONGA	162	164	69	1	-	362	258	-
UJINDILE	418	381	283	31	-	568	613	472
UTELEWE	793	1,950	230	83	-	1,320	408	-
UHEKULE	410	507	531	253	-	424	-	-
MWILAMBA	29	165	12	11	-	757	-	-
TOTAL	2,802	4,994	2,031	740	3	7,922	6,444	572

SOURCE: Village Executive Officers, May 1993.

BUSINESS

According to our May 1993 survey, there are a total of 393 businesses or business people operating in Igosi Ward (Table 11). Several comments are appropriate. The general shop category includes both "maduka" and "vioski" (very small shops selling only a few items). It may seem odd that there's only one bar in a total of 11 villages, but that is counter-balanced by 76 pombe clubs selling the local brew made from bamboo sap called ulanzi. This is truly wonderful stuff tasting like cider and selling for Tshs. 50 a liter, as opposed to bottled beer at Tshs. 450 a half-liter. Hence one bar and 76 pombe clubs. The small number of butcheries reflects both the paucity of livestock and low incomes in the area. The large number of carpenters includes apprentices. Kipengere has the area's only bar, only lodging, only fuel station and 26 food vendors. This relates to its position as the major rest stop for commercial vehicles and travellers between Njombe and Makete. Whether there are exactly 393 businesses in the survey area, we get the general impression that it is not a hotbed of commercial activity.

The survey of 15 general shops in five villages along the road reinforces that impression (Table 12). Average daily sales of under Tshs. 3000 are not the sign of a dynamic economy. In all likelihood the shopkeepers understated their sales which are probably in the Tshs. 4500-5000 range. Still, a comparison with a "poor" area like Shinyanga with stated sales of Tshs. 6000 (estimated real sales closer to 10,000) or a "rich" area like Kilimanjaro (stated Tshs. 13,000, estimated 25,000) reveals that Makoga-Kipengere is way behind. But let's take it from the top.

The 15 shops constituted one-third of the total number in the five villages. Of the 15, three could be considered "high volume" with daily sales over Tshs. 4000 and four were "low volume" of under Tshs. 2000; the remaining 8 had sales of Tshs.

TABLE 11

BUSINESS CENSUS
NJOMBE – MAKETE ROAD, MAY 1993

	NG'ANDA	MAKOGA	MDASI	IGOSI	MAFINGA	KIPENGERE	MORONGA	UJINDILE	UTELEWE	UHEKULE	MWILAMBA	TOTAL
GEN SHOPS	6	11	4	9	3	18	2	14	17	6	3	93
TEA SHOPS	3	5	1	7	-	2	-	1	4	2	-	25
BARS	-	-	-	-	-	1	-	-	-	-	-	1
POMBE	4	18	15	20	6	3	2	3	3	1	1	76
BUTCHERIES	1	1	1	2	-	1	-	1	1	1	-	9
GRAIN MILLS	1	2	1	2	1	3	3	2	6	2	1	24
GARPENTERS	10	7	5	18	-	3	4	11	9	5	1	73
MECHANICS	-	3	2	6	-	3	-	1	-	-	-	15
TAILORS	8	4	6	12	1	2	3	3	6	1	-	46
FUEL STATION	-	-	-	-	-	1	-	-	-	-	-	1
LODGING	-	-	-	-	-	1	-	-	-	-	-	1
*FOOD VENDORS	-	-	-	-	-	28	-	-	-	-	-	28
GRAIN TRADERS	-	-	1	-	-	-	-	2	-	-	-	3
TOTAL	33	51	36	76	11	64	14	38	46	18	6	393

*FOOD VENDORS AT KIPENGERE CATER TO BUS AND LORRY PASSENGERS;
 KIPENGERE IS ROUGHLY HALFWAY BETWEEN NJOMBE AND MAKETE.

SOURCE: VILLAGE EXECUTIVE OFFICERS, MAY 1993

2000-4000 a day. Two-thirds of shops started operating in 1992. The reason never surfaced. No shop is older than 1987; up until that year private shops were prohibited in the villages. All 15 shops are operated as family enterprises and therefore the 8 females out of 28 employees doesn't mean anything as these are wives, daughters, sisters, etc. of the male owners.

We've already discussed the high cost of transport, Tshs. 240-300 ton-km. This is because all shopkeepers haul their merchandise by bus from Njombe in small quantities. Apparently none have the cash flow or storage space to buy in bulk and save on transport costs. However the very same situation prevails in other areas surveyed.

A note of explanation regarding daily sales is in order. Shopkeepers were asked three related questions. On a bad day how much money would you take in? (The answers ranged from Tshs. 300 to 6000.) On a really good sales day, the amount was Tshs. 1,000-12,000. An average day meant sales of Tshs. 800-10,000 with the average of Tshs. 2820.

With regard to the often-heard comments and firmly-held beliefs that the cost of living is rapidly going up, purchasing power declining, and shopkeepers generally a bunch of bloodsuckers, the "facts" just don't match up. In comparing 1992 and 1993 prices of 20 basic consumer items, we find increases on average of 21%, no greater than inflation. Prices in general are quite reasonable, especially taking into account the high cost of transport. Nonetheless, it is interesting to note the price variations (Kerosene at Tshs. 150 to Tshs. 300 depending on where you shop). For a rural location the range of goods is quite adequate: 12 (60%) of the 20 items were available in not less than two-thirds of the shops, meaning most common items can be purchased in your friendly neighborhood shop.

Shops surveyed: Makoga-4, Mdasi-1, Igosi-3, Mafinga-3,
 Kipengere 4, Total 15
 Employees (including owners): 28 of which 8 female:
 Year established: 1987-1, '88-1, '90-10, '93-1
 Transport cost: 50 kg bag of sugar/salt from Njombe by bus to:

<u>Location</u>	<u>km</u>	<u>Cost (Tshs.)</u>
Makoga	25	300-400
Mdasi	27	400
Igosi	32	500-600
Mafinga	38	500-600
Kipengere	41	500-600

Daily Sales:	Range (Tshs.)	Average*
Minimum	300-6000	1250
Maximum	1000-12,000	4750
Average	800-10,000	2820

Volume: (Average daily sales)

High	Tshs. 4000 +	3 shops
Medium	Tshs. 2-3999	8 shops
Low	Tshs. 2000 or less	4 shops

Cost increase between 1992 and 1993:
 Min - 11.8%, Max - 39.4%, Average - 21.1%.

<u>ITEM</u>	<u>UNIT</u>	<u>AVAILABILITY OUT OF 15</u>	<u>MIN. PRICE</u>	<u>MAX. PRICE</u>	<u>MOST COMMON*</u>
1. SUGAR	kg.	15	200	300	240
2. COOKING OIL	lt	9	200	700	500
3. SALT	kg.	14	80	140	100
4. TEA	100 gr	14	120	190	150
5. RICE	kg.	6	220	300	260
6. KEROSENE	lt.	15	150	300	200
7. SOAP	pc.	15	60	70	70
8. TOOTHPASTE	20 gr.	11	100	150	120
9. MATCHES	box	15	15	25	20
10. BATTERY	pc.	15	100	120	110
11. EXERCISE BOOK	book	12	20	40	30
12. BUCKET	20 lt	4	1450	2000	1900
13. PANADOL	2 tabs	14	25	50	30
14. PET. JELLY	100 gr.	15	80	100	90
15. RUBBER SANDALS	pr.	10	450	850	650
16. SMALL LAMP	pc.	8	50	80	70
17. HOE	head	6	1000	1000	1000
18. KHANGA	pr.	9	1450	2400	2400
19. PEN (BIC)	pc.	14	50	60	50
20. PANGA	pc	4	650	950	850

* Location was not a significant factor in daily sales, availability or price.

One final observation which has no bearing on the baseline but does offer an insight into how many people in the area regard business and those who engage in commercial activities. Whereas in most areas, a business person in Swahili would be called something like "mfanya biashara" (a business maker) or "mwenye duka" (shop owner), in Makoga-Kipengere such people are called "walanguzi" which can be translated as black marketeer, racketeer, middleman. However you chose, "mlanguzi" is a derogatory term which indicates that many villagers view with suspicion anyone who is connected with business. Coupled with the fact that private shops were prohibited until 1987, it begins to explain why of 15 shops, more than two-thirds, have opened in the last one and a half years. It also may help to explain why the most important business in the area is not discussed in this section but rather in the next.

HOUSEHOLDS

Much of the information contained in this section has been referred to throughout the preceding pages. In conducting the household surveys we followed procedures established for the 1990 socio-economic baseline survey. We chose two villages along the road - one large, Makoga with 2,869 people, and one small, Mafinga with 668 people. With a total of 794 households in the two villages, our 80 households represent a 10% sample. While trying to cover an equal number of males and females, old and young, various income groups, the survey is still fairly random, if not in the strictest statistical sense, at least those who assisted in the selection process made an effort to present a good cross-section of the communities. As it turned out, the survey took in 36 males and 44 females of which 20 were the head of their households. Of the 80 households, 22 were in our arbitrary upper income group (T.Shs. 100,000+), 34 were in the middle group (40-100,000), and 24 were in the lower group (under 40,000). The median income for all 80 households was T.Shs.62,000.

In general the families didn't have a lot of possessions. Half owned a radio, and 42% had a bicycle, but only one had a motorcycle, none owned a vehicle or tractor and only two had oxcarts (out of a total of 8 in the survey area). The number of iron roofs was greater in the household survey (36%) than in the village survey (22%). Could this mean that our survey group is somewhat richer than the population as a whole? Possibly. It could also mean our village surveyors didn't count accurately. Two less obvious explanations both previously mentioned could also be considered. First, the suppression of commerce in the area may mean people just did not have much to buy up until a few years ago. Second, conspicuous consumption is not only frowned upon but is dangerous to a household's well-being. (In the rural, and even urban, areas witchcraft is no joking matter).

The crop and livestock data reveal that none of those surveyed could be classified as big (rich) farmers. Five tons of maize or 4 tons of potatoes is not major league production and as will be seen shortly, although everyone farms, agriculture is not the big income earner that other activities are. The average production is 2.5 tons on 1.6 hectares bringing in a net income of T.Shs.32,000 a year. Livestock is not economically significant to the great majority of families in the survey area - either as an income earner or as a sign of wealth.

The amount of travelling villagers do is not very accurately demonstrated in our survey, especially regarding trips to Njombe and Makete. A few go to Njombe (or Makete) as often as every week (52 times a year) which pushed the average way up. What is more revealing is that around one-quarter of those surveyed never go anywhere by motor transport. Opening up the road many mean for these folks opening up a whole new world outside the village.

Respondents were asked two separate questions about household expenditure. The first was a quick estimate of monthly expenses. The second was a slow detailed break-down of expenses by category. Neither should be taken at absolute face-value. (Note that an average of T.Shs. 4,000 a month comes to 48,000 a year while the annual overall average is T.Shs. 56,000, a 15% margin.) More important (and interesting) is the proportion of the total spent on various items. "Household items" refers to goods normally purchased at the local shop like sugar, salt, kerosene, soap, batteries, etc. "Food" is those items like meat, onion, rice, etc. not grown on the farm. Note that clothing is the second biggest expense after farm inputs. At first this seemed surprising, but then considering the cold climate and the cost of warm clothing, it makes sense. "School" not only means fees and supplies but also school uniforms.

Travel as noted previously constitutes 11-12% of total expenditure. "Family contributions" refers to cash given for

weddings, funerals, baptisms, etc. Given extended family relations, this figure seems surprisingly low: in-kind contributions were probably not included. The "Other" expenses include the secondary school levy, development levy, the Uhuru Torch fee, kindergarten school levy, etc. Even if these "self help" expenses are taxation by another name, the combined taxes and "Other" is less than 5% of the total expenses, and only 3% of income.

As with expenditure, household income cannot be taken at face-value. The average family income of T.shs. 89,000 should not be quoted with a hand on the Bible. Again, proportions are much more revealing than amounts. (Figure on any given item of income a margin of error as much as 30%). First we note that everyone farms. The "negative" income is a result of calculating economic rather than financial costs of production. Livestock brings in almost nothing. "Labor" means casual or part-time employment - almost always farm work. Only two persons surveyed earned wages from full-time jobs. "Family" refers to people who get money from relatives, maybe husbands working outside the district sending money home on a regular basis or someone in Iringa or Dar helping out the homestead. "Skills" is the best English translation of "Ufundi" which can mean carpentry, masonry, mechanics, tailoring. Almost half the households surveyed make income off ufundi.

By far the most important off-farm income generator comes from brewing ulanzi - bamboo cider, if you will. On average those involved in brewing make more income from it than from farming. From the 1990 baseline survey, we note that in two areas - Ruvuma and Mbeya (which incidentally border Iringa) - 90% of the households sold local brew, but this made up only 2-3% of their household incomes. In Kilimanjaro brewing constituted 5% of household income but only 25% of the families engaged in it. In Igosi Ward, 78% of the surveyed households engaged in ulanzi brewing, which represents 32% of total household income. It is,

in reality, the most important business in the area outside farming. Almost all ulanzi in this area is brewed by women. (In some other areas it's solely male brewers). Whereas women do most of the farm work but men control the income, women get to keep the money they make off ulanzi. Furthermore most ulanzi is drunk by men. So what we have here is a cash transfer from men to women. And it is ulanzi that keeps many households afloat (pun intended).

The question on everybody's mind, no doubt, is: who earns T.Shs. 600,000 a year in Makoga-Kipengere? Unfortunately all those interviewed were promised anonymity so only one detail can be told. The richest person surveyed is a women. In fact several of the upper income group (T.Shs.100,000+) were females engaged in one type of business or another. It emerged that business is the means to wealth in this predominantly agricultural area. Few farmers were "successful" in economic terms. But then those few residents of the area who have become wealthy one way or another are loathed to let anyone know it for fear of a witch's curse.

Vox Pop

As part of the household survey, we asked respondents to rate local conditions on a scale from "Very Good" to "Very Bad" with "Fair" being average. The results are given in Table 14a - overall response, Table 14b - gender disaggregation, and Table 14c - income disaggregation.

In general, the households rated food supply and health/drug supply as "Good" (Only four households out of 80 rated anything as "Very Good" - all from the "upper" income group). Those conditions rated "Bad" or "Very Bad" (40+ respondents) included supply of agricultural inputs, condition of roads and transport.

Gender disaggregation reveals no discernable pattern of

responses at variance with the norm or, for that matter, male responses. (In order for there to be "significant" variation, more than 22 females had to give one rating in a category while more than 18 males gave another rating).

Looking at responses by income groups, we do find some variations. The "Middle" group rated almost everything "Fair", that is average. Only supply of agricultural inputs got a significant negative rating (20 out of 34 Bad or Very Bad) and household food supply almost rated "good" with 15, but then got off-set by 18 rating it "Fair" or "Bad". The upper group rated food supply as "Good" or "Very good" (17 out of 22) and family health got a healthy 8 "Good" or "V. Good". On the negative side ("Bad" or V. Bad) come availability of agricultural inputs (which wealthier farmers can afford but have difficulty getting locally), road conditions and transport. It is the upper income households most likely to use the roads for business and personal travel and therefore most likely to complain when conditions are bad. However it's the lower income groups that surprisingly also gives negative ratings ("Bad" or "Very Bad") to roads and transport, agricultural inputs and, as one might expect, availability of consumer goods at a price they can afford. (Many people got confused about the two questions of availability of goods and ability to purchase). Why poor households are concerned about agricultural inputs, roads and transport is something of a mystery, since most don't use inputs or travel much by road.

Snapshot

What emerges from this survey is a snapshot of the Makoga-Kipengere area. We see an area that is relatively poor: most people engaged in subsistence farming, growing low-value crops on worn-out soil with only small quantities of marketable surplus. We see few health facilities but people fairly healthy. We see education available at the primary level to all but the quality

of that education rated only "fair." We see a low volume of trade although most basic consumer items are available at fairly reasonable prices. We find several signs that could bode well for the future. Potential exists, with proper application of inputs, to turn wheat, potatoes and possibly barley into high income earners. There is great scope to expand business if people change their attitudes about acquisitions and the credibility of commerce as a legitimate occupation. And finally we see clearly a completely distorted economic picture as everywhere else in rural Tanzania due to the exploitation of women's labor. However, unlike some other areas, we also see women getting a bit of their own back through a subtle transfer of cash. And in conclusion we can postulate that road improvement will likely change this entire snapshot in a few years time.

**HOUSEHOLD SURVEY
NJOMBE-MAKETE ROAD MAY 1993**

1. TOTAL HOUSEHOLDS SURVEYED: 80
2. MALES: 36 FEMALES: 44 (20 FEMALE HEADED HH)
3. AGE RANGE: 25-65
4. NO OF PERSONS IN HH: 1-10 AVERAGE: 5.2
5. POSSESSIONS: (OUT OF 80 HH)

IRON ROOF	29	OX CART	2
RADIO	40	MILLING MACHINE	1
BICYCLE	34	SEWING MACHINE	3
MOTORCYCLE	1		
TRACTOR	0		

6. CROP DATA 1992

CROP	NO. OF HH	ACRES		PRODUCTION (KG)		CONSUMPTION (KG)		SOLD (KG)	
		RANGE	AVG	RANGE	AVG	RANGE	AVG	RANGE	AVG
MAIZE	80	0.5-6.0	2.1	34-5400	1376	34-1700	596	0-3500	681
WHEAT	70	0.2-3.0	0.8	34-1800	273	17-700	108	17-1500	157
BEANS	45	0.2-3.0	0.7	26-500	105	17-164	85	0-250	60
POTATOES	56	0.2-3.0	0.7	80-4000	565	50-800	239	0-3600	483
PEAS	25	0.1-1.0	0.5	34-250	106	17-150	55	0-150	52

7. LIVESTOCK DATA 1992

LIVESTOCK	NO OF HH	MIN	MAX	AVERAGE
CATTLE	2	4	6	5
GOATS	11	1	33	6
SHEEP	7	1	8	3
PIGS	10	1	7	2
POULTRY	40	1	46	7
GUINEA PIGS	25	1	30	12
RABBITS	3	3	6	4

8. TRAVEL FREQUENCY

WATER: 2-3/DAY; FIREWOOD: 4-7/WK; GRAIN MILL: 12-52/YR;
 DISPENSARY: 11-14/YR; HOSPITAL: 2.4/YR; IRINGA/OTHER
 LOCATION: 1/YR.
 MOTOR TRANSPORT: BUS (59HH) 5/YR; *PRIVATE VEHICLES (39 HH)
 6/YR.

*Other than Public service vehicles whether or not paying a fare to ride.

10. ANNUAL HOUSEHOLD EXPENDITURE

ITEM	MINIMUM	MAXIMUM	AVERAGE
HOUSEHOLD ITEMS	200	30,000	5,650
FOOD	2,500	40,000	5,725
CLOTHES	700	54,000	13,525
SCHOOL	1,200	19,500	4,525
AGRICULTURE INPUTS	800	90,900	15,575
HEALTH	200	15,000	3,550
TRAVEL	300	45,000	6,175
FAMILY CONTRIBUTIONS	100	3,400	850
GOVERNMENT TAXES	600	4,000	950
OTHER	120	10,000	1,625
OVERALL	10,000	197,000	56,000

11. HOUSEHOLD INCOME

INCOME	NO OF HH	MIN	MAX	AVERAGE
CROPS	80	Negative	225,000	32,150
LIVESTOCK	1	-	-	400
LABOR	7	2,400	24,000	8,725
WAGES	2	10,000	90,000	50,000
FAMILY	8	6,000	25,000	10,275
SKILLS	32	3,000	150,000	26,175
BREWING	62	4,500	144,000	36,500
TIMBER	5	1,500	38,000	15,500
BUSINESS	8	20,000	600,000	197,200
OVERALL		11,700	639,000	89,000

12. INCOME DISTRIBUTION

GROUP	T. SHS	NO OF H H
UPPER	200,000 Plus	5
	100-200,000	<u>17</u>
		22
MIDDLE	60-100,000	19
	40- 60,000	<u>15</u>
		34
LOWER	20-40,000	13
	20,000 or less	<u>11</u>
MEDIAN INCOME:	62,000	24

OPINION POLL
LOCAL CONDITIONS
TOTAL HOUSEHOLDS

LOCAL CONDITIONS	VERY GOOD	GOOD	FAIR	BAD	VERY BAD	NO ANSWER
AVAILABILITY OF CONSUMER GOODS	0	6	44	19	9	2
AVAILABILITY OF AGRICULTURE INPUTS	0	3	19	40	15	3
HOUSEHOLD FOOD SUPPLY	3	39	30	7	0	1
QUALITY OF EDUCATION	0	10	42	10	2	6
AVAILABILITY OF MEDICINE AT DISPENSARY	0	20	38	20	0	2
CONDITION OF ROADS	0	0	39	9	31	1
ABILITY TO PURCHASE GOODS	1	10	34	31	3	1
TRANSPORT OF GOODS	0	1	24	27	14	14
TRANSPORT OF PEOPLE	0	1	37	34	7	1
FAMILY HEALTH	1	18	44	15	0	2

Table 14b

**OPINION POLL
LOCAL CONDITIONS
GENDER DISAGGREGATION**

LOCAL CONDITIONS	VERY GOOD		GOOD		FAIR		BAD		VERY BAD		NA
	M	F	M	F	M	F	M	F	M	F	-
AVAILABILITY OF CONSUMER GOODS	0	0	3	3	18	26	10	9	4	5	2
AVAILABILITY OF AG.INPUTS	0	0	3	0	8	11	18	22	6	9	3
HOUSEHOLD FOOD SUPPLY	1	2	16	23	14	16	4	3	0	0	1
QUALITY OF EDUCATION	0	0	5	5	22	30	5	5	0	2	6
AVAILABILITY OF MEDICINE	0	0	6	14	18	20	9	11	0	0	2
CONDITION OF ROADS	0	0	0	0	19	20	6	3	11	20	1
ABILITY TO PURCHASE GOODS	1	0	4	6	13	21	3	18	1	2	1
TRANSPORT OF GOODS	0	0	1	0	13	11	7	20	8	6	14
TRANSPORT OF PEOPLE	0	0	1	0	17	20	4	20	3	4	1
FAMILY HEALTH	1	0	6	12	21	23	5	10	0	0	2

C

**OPINION POLL
LOCAL CONDITIONS
INCOME DISAGGREGATION***

LOCAL CONDITIONS	VERY GOOD			GOOD			FAIR			BAD			VERY BAD			NA
	U	M	L	U	M	L	U	M	L	U	M	L	U	M	L	-
AVAILABILITY OF CONSUMER GOODS	0	0	0	4	2	0	9	25	10	5	5	9	4	1	4	2
AVAILABILITY OF AG.INPUTS	0	0	0	3	0	0	5	13	1	10	17	13	4	3	8	3
HOUSEHOLD FOOD SUPPLY	3	0	0	14	15	10	5	13	12	0	5	2	0	0	0	1
QUALITY OF EDUCATION	0	0	0	4	5	1	13	23	16	2	4	4	1	1	0	6
AVAILABILITY OF MEDICINE	0	0	0	6	4	10	11	21	6	5	7	8	0	0	0	2
CONDITION OF ROADS	0	0	0	0	0	0	8	22	9	3	6	0	11	5	15	1
ABILITY TO PURCHASE GOODS	1	0	0	4	6	0	13	14	7	4	12	15	0	1	2	1
TRANSPORT OF GOODS	0	0	0	1	0	0	7	13	4	7	11	9	5	4	5	14
TRANSPORT OF PEOPLE	0	0	0	0	1	0	9	20	8	11	12	11	2	0	5	1
FAMILY HEALTH	1	0	0	7	8	3	12	17	15	2	7	6	0	0	0	2

*** INCOME GROUPS:**

Upper: T.Shs. 100,000+ 22 households
 Middle: 40-100,000 34 households
 Lower: 40,000 or less 24 households

EVALUATION CHECKLIST

The purpose of this baseline study is to collect data now in order to evaluate road impact at a future date. To make this a bit simpler we've included a handy-dandy evaluation checklist below. The * indicates a number with a margin of error estimated to be somewhat greater than in the vicinity of approximately plus or minus 10% or thereabouts.

Table 15

BASELINE DATA SUMMARY NJOMBE-MAKETE ROAD MAY 1993

IGOSI WARD	11 Villages
DEMOGRAPHICS	
Population	23219
Households	4725
Av. HH Size	4.9
QUALITY OF LIFE	
Housing	1025 or 22% corrugated roofs*
Water	Collection time 14 hrs./week*
Firewood	Collection time 18 hrs./wk*
HEALTH	
No. of Dispensaries	3
Daily Attendance	170
EDUCATION	
Primary Schools	12 schools, 3968 students, 86 teachers
Kindergartens	18 schools, 1197 students, 29 teachers
Secondary Schools	1 school, 90 students, 6 teachers
Technical Schools	2 schools, 28 students, 4 teachers
TRAFFIC	
5-day Count	42 v.p.d.
AADT (projected)	85 v.p.d.
Passengers	356/day
Bicycles	90/day
VEHICLE OPERATING COSTS	
Cars	Tshs. 189/km*
Lights	Tshs. 128/km*
Mediums	Tshs. 400/km*
Heavies	Tshs. 759/km*
Buses	Tshs. 191/km*
PASSENGER RATES	
Long Distances	Tshs. 15/km.
Short Distances	Tshs. 50/km.

Coop lorries	Tshs. 45/ton-km.
Village-owned	Tshs. 150/ton-km.
Long-haul Commercial	Tshs. 135/ton-km.
Short-haul Commercial	Tshs. 270/ton-km.
VOLUMES	
Passengers	150,000-200,000/year*
Cargo	45,000-50,000 tons/year*
VEHICLE REGISTRATION	
Motor Vehicles (4 wheels)	40
Motorcycles	8
Bicycles	941
PUBLIC TRANSPORT	3 scheduled buses per day
AREA CULTIVATED	
Igosi Ward	7700 hectares (1992)
HH Average	1.6 hectares (1992)
VOLUME PRODUCTION	
Igosi Ward	11,800 tons (1992)
HH Average	2.5 tons (1992)
VALUE OF CROPS	
Igosi - gross	Tshs. 513 million (1992)*
Igosi - net econ	Tshs. 103 million (1992)*
HH - net econ	Tshs. 32,000 (1992)
LIVESTOCK	
Cattle	2802
Goats	4994
Sheep	2031
Pigs	740
Poultry	7922*
BUSINESS REGISTRATIONS	393
VOLUME OF TRADE	Tshs. 2820 AV. DAILY SALES*
COST INCREASES (Inflation)	21% 1992-93
HOUSEHOLD INCOME	
Average	Tshs. 89,000/yr*
Median	Tshs. 62,000/yr*
HOUSEHOLD EXPENDITURE	Tshs. 56,000/yr*
HOUSEHOLD TRAVEL	
By bus	74%, 5 times/yr.
By prvt. vehicle	46%, 6 times/yr.

BY I. MACHA

ROAD CONDITION SURVEY

As part of the baseline exercise, a road condition survey was conducted. This was done to ascertain surface condition and pavement material in place. A visual inspection was carried out along the Makoga-Kipengere road section. It was found that, with the exception of a few relatively short stretches which have been graveled to provide traction at rainy times, the road is basically an earth type of 6.0-7.0m track width.

The pavement material is essentially silt-clay type characterized by expanding and shrinking when wet and dry respectively. This has made the road surface crack (in alligator formation), eventually leading to uneven vehicle load distribution causing failure to the surface, as can be seen by the existence of deep ruts and potholes.

Further, the road lacks proper camber and drainage facilities; i.e. cross drains, side drains, etc, are absent. The effect of this is excessive backlogging of storm water which weakens the pavement structure.

TRAFFIC SURVEY

A survey was carried out to assess the traffic volume and movement pattern along the study road. A 5-day survey/count from 6.00am to 6.00pm was carried at a census point called Makoga, which is some 26.9km from Njombe town.

The Origin-Destination (O-D) Survey was conducted by stopping all vehicles moving in each direction. From the O-D survey form, traffic volume as vehicles per day was established.

TRAFFIC VOLUME

The traffic volume established in each day is as in Table A.

TABLE A: Vehicle classification - Makoga point.

Day..Date	Car	P/up Van	Lorry		Full Trailer	Semi Trailer	Bus		Other	Total v.p.d
			<5T	>5T			<25p	>25p		
Wed..12/5/93	3	26	2	2	-	1	-	9	1	44
Thu..13/5/93		20	3	7	-	1	1	3	1	36
Fri..14/5/93	5	32	2	2	2	1	-	6	-	50
Sat..15/5/93	-	28	1	6	2	2	-	6	-	45
Sun..16/5/93	2	21	2	7	-	3	-	3	-	38
5 day average	2	25	2	5	1	2	0	5	1	43

For proper analysis, the average daily traffic (a.d.t) in vehicles per day (v.p.d), was projected to annual average daily traffic (a.a.d.t). This was achieved by applying relevant adjustment factors that cater for seasonal variation. The factors adopted were similar to those of CP.no.13 of Ministry of Works adjustment factors established in 1988-adjustment factors report.

The resulting AADT is in Table B.

Table B: Estimated A.A.D.T.

Car	P/up Van	Lorry		Full Trailer	Semi Trailer	Bus		Other	Total a.a.d.t
		<5T	>5T			<25p	>25p		
4	51	4	10	2	3	0	11	1	86

The RTIM3 is a computer program used to analyze road projects in Africa, and has been adopted by the Ministry of Works to assess rehabilitation and maintenance activities. In RTIM3 analysis, vehicle categories are reduced to cars, lights,

mediums, heavies and buses. These classes have been established with regard to average gross weight: cars at less than 2 tons, lights up to 2.3 tons, mediums up to 15.6 tons, heavies up to 35.6 tons and buses at 13.9 tons. Traffic reclassified for vehicle operation cost analysis as established by the RTIM3 model is as in Table C.

Table C: Reduced AADT for RTIM3-Model

Cars	Lights	Mediums	Heavies	Buses	Total a.a.d.t.
4	51	14	5	11	85

It can be observed that the 'other' category is missing because the class essentially represents such traffic as tractors, earth moving equipment, etc. which seldom forms part of the daily traffic movement on the roads. As the model is used for investment investigations, it disregards this class.

ORIGIN - DESTINATION SURVEY.

Table D summarizes the 5-day O-D survey results. The major origins and destinations are Makete and Njombe with an average of 6-7 v.p.d between them.

Also, the survey has established the following as indicated in the table below.

Table D: Traffic logistics - 5-day average.

S/N	DESCRIPTION	AVERAGE TOTAL
1.	Vehicles with origin within Makete and Njombe districts	23
2.	Vehicles with origin within road section division	14
3.	Vehicles with origin outside (1) and (2)	5
4.	Average passengers aboard at count point	356
5.	Average total motorcycles at count point	3
6.	Average total bicycles at count point	90

24

Further, the survey found out that the majority of cargo hauled was basically processed food and/or drinks and building materials (mostly cement). Since the road passes through a predominantly agricultural area, this shows that May is the low season and much more traffic is expected during the harvest season between July-September. If this happens, the road is expected to carry more heavy vehicles than are currently found, of which the majority are owned privately. Despite a large number of passengers along the route, only two 65-seater and one 35-seater bus ply between Njombe and Makete districts. The reason put forward for this is the poor road condition which makes bus operators reluctant to use the route. Alternatively, passengers try to get lifts on private vehicles using the road. The complete O-D survey summary is provided below in Table E.



VEHICLE ORIGIN AND DESTINATION SUMMARY

TABLE E

O/D	UHEKULE	UTELEWE	MAKOGA	UJINDILE	NG'ANDA	MOROGA	IGOSI	MDASI	KIPENGERE	IMALINYI	NJOMBE	MAKETE	IRINGA	LUDEWA	MBEYA	DODOMA	ARUSHA	MOROGORO	DSM	KILIMANJARO
	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
UHEKULE			1																	
UTELEWE				2																
MAKOGA					8			1	1		18		2							
UJINDILE											4									
NG'ANDA			5																	
MOROGA											1	1								
IGOSI											3				1					
MDASI																				
KIPENGERE											18		1		3					
IMALINYI																				
NJOMBE			21	4			2		13	1		30								
MAKETE											34		8	1	2	1		1	1	1
IRINGA			1									10								
LUDEWA												1								
MBEYA												3								
DODOMA												1								
ARUSHA												1								
MOROGORO																				
DSM												2								
KILIMANJARO																				
TOTAL	-	-	27	6	6	-	2	1	14	1	78	49	11	1	6	1	1	1	1	1

3-9

MAINTENANCE WORKS ON UNPAVED ROADS

Normal maintenance provides light and heavy grading before and after the rainy season. Also routine maintenance involving ditch cleaning, grass cutting, etc. is provided. The proposed costs for the maintenance works, both for routine and periodic maintenance, have been prepared by Regional Engineer's Office-Iringa Region. While assessing the condition and associated structures of the Njombe-Makete Road, it was evident that the maintenance schedule is not adhered to. Probably the only work which can be said to be done on the road is that of grading. The reason is lack of funds brought about by low funding levels as opposed to actual budget. Thus for purposes of cost requirements in the RTIM3 model, it was found reasonable to input actual funding levels for maintenance works as opposed to the budget. The approach will make a project case scenario more realistic.

NOTES ON RTIM3 PROGRAM PRINTOUT

INTRODUCTION

The RTIM3 is programmed for two basic scenarios, the Base Case and Project Case. Base Case involves establishing the existing or current project situation and activities that are ongoing at the present time/year. The Project Case scenario figures out major improvements and anticipated impact or progress that may be achieved as a result of rehabilitating the road. In this particular situation, the Makoga-Kipengere road study emphasizes the Base Case. These notes will explain some of the printout information which might not be clear.

Printout

The printout has three parts, which focus on different inputs:

1. Part 1 - Traffic Information;
2. Part 2 - Maintenance Information
3. Part 3 - Vehicle Operating Cost Data.

PART 1

Traffic figures appearing for first year ADT 1993 represent Normal Traffic as Annual Average Daily Traffic. Since we are dealing with a Base Case Scenario, neither generated nor percent growth of normal traffic is anticipated, thus in the respective tables it is indicated as zeros. Furthermore, the program has a fixed project life of 20 years. Thus the tables often print out repeated figures of the 1993 figures (Base Case) because no project figures are yet available.

PART 2

Roughness value is computed by the formula and constants indicated as per Bump Integrator (B.I.) measurements. The terminal value (salvage value) for the road is termed NIL Tshs. because it is assumed no investment (i.e construction) in form of road cushions etc is yet in place.

PART 3

Vehicle operating cost tables give journey cost/km. As explained in Part 1, only the 1993 figures are valid though it repeats itself over the years as it is the Base Case Scenario for 1993.

Project title: MAKOGA-KIPENGERE

TRAFFIC LEVELS

Base case or project case (1/2) = 1 (Base case)
 *** Wrong Directory ***

First year = 1993

First Year ADT

	Cars	Lights	Mediums	Heavies	Buses	Total
NORMAL TRAFFIC	4	51	14	5	11	85
GENERATED TRAFFIC	0	0	0	0	0	0

Normal Traffic
 Traffic Growth to the Following Year (%)
 *** To clear table, press F6 ***

	Year	Cars	Lights	Mediums	Heavies	Buses	Total
1	1993	0	0	0	0	0	0.0
2	1994	0	0	0	0	0	0.0
3	1995	0	0	0	0	0	0.0
4	1996	0	0	0	0	0	0.0
5	1997	0	0	0	0	0	0.0
6	1998	0	0	0	0	0	0.0
7	1999	0	0	0	0	0	0.0
8	2000	0	0	0	0	0	0.0
9	2001	0	0	0	0	0	0.0
10	2002	0	0	0	0	0	0.0
11	2003	0	0	0	0	0	0.0
12	2004	0	0	0	0	0	0.0
13	2005	0	0	0	0	0	0.0
14	2006	0	0	0	0	0	0.0
15	2007	0	0	0	0	0	0.0
16	2008	0	0	0	0	0	0.0
17	2009	0	0	0	0	0	0.0
18	2010	0	0	0	0	0	0.0
19	2011	0	0	0	0	0	0.0
	20-year mean	0.0	0.0	0.0	0.0	0.0	0.0

Generated Traffic
Traffic Growth to the Following Year (%)
*** To clear table, press F7 ***

	Year	Cars	Lights	Mediums	Heavies	Buses	Total
1	1993	0	0	0	0	0	0.0
2	1994	0	0	0	0	0	0.0
3	1995	0	0	0	0	0	0.0
4	1996	0	0	0	0	0	0.0
5	1997	0	0	0	0	0	0.0
6	1998	0	0	0	0	0	0.0
7	1999	0	0	0	0	0	0.0
8	2000	0	0	0	0	0	0.0
9	2001	0	0	0	0	0	0.0
10	2002	0	0	0	0	0	0.0
11	2003	0	0	0	0	0	0.0
12	2004	0	0	0	0	0	0.0
13	2005	0	0	0	0	0	0.0
14	2006	0	0	0	0	0	0.0
15	2007	0	0	0	0	0	0.0
16	2008	0	0	0	0	0	0.0
17	2009	0	0	0	0	0	0.0
18	2010	0	0	0	0	0	0.0
19	2011	0	0	0	0	0	0.0
	20-year mean	0.0	0.0	0.0	0.0	0.0	0.0

ADT - Normal Traffic

	Year	Cars	Lights	Mediums	Heavies	Buses	Total
1	1993	4	51	14	5	11	85
2	1994	4	51	14	5	11	85
3	1995	4	51	14	5	11	85
4	1996	4	51	14	5	11	85
5	1997	4	51	14	5	11	85
6	1998	4	51	14	5	11	85
7	1999	4	51	14	5	11	85
8	2000	4	51	14	5	11	85
9	2001	4	51	14	5	11	85
10	2002	4	51	14	5	11	85
11	2003	4	51	14	5	11	85
12	2004	4	51	14	5	11	85
13	2005	4	51	14	5	11	85
14	2006	4	51	14	5	11	85
15	2007	4	51	14	5	11	85
16	2008	4	51	14	5	11	85
17	2009	4	51	14	5	11	85
18	2010	4	51	14	5	11	85
19	2011	4	51	14	5	11	85
20	2012	4	51	14	5	11	85

ADT - Generated Traffic

	Year	Cars	Lights	Mediums	Heavies	Buses	Total
1	1993	0	0	0	0	0	0
2	1994	0	0	0	0	0	0
3	1995	0	0	0	0	0	0
4	1996	0	0	0	0	0	0
5	1997	0	0	0	0	0	0
6	1998	0	0	0	0	0	0
7	1999	0	0	0	0	0	0
8	2000	0	0	0	0	0	0
9	2001	0	0	0	0	0	0
10	2002	0	0	0	0	0	0
11	2003	0	0	0	0	0	0
12	2004	0	0	0	0	0	0
13	2005	0	0	0	0	0	0
14	2006	0	0	0	0	0	0
15	2007	0	0	0	0	0	0
16	2008	0	0	0	0	0	0
17	2009	0	0	0	0	0	0
18	2010	0	0	0	0	0	0
19	2011	0	0	0	0	0	0
20	2012	0	0	0	0	0	0

ADT - All Traffic

	Year	Cars	Lights	Mediums	Heavies	Buses	Total
1	1993	4	51	14	5	11	85
2	1994	4	51	14	5	11	85
3	1995	4	51	14	5	11	85
4	1996	4	51	14	5	11	85
5	1997	4	51	14	5	11	85
6	1998	4	51	14	5	11	85
7	1999	4	51	14	5	11	85
8	2000	4	51	14	5	11	85
9	2001	4	51	14	5	11	85
10	2002	4	51	14	5	11	85
11	2003	4	51	14	5	11	85
12	2004	4	51	14	5	11	85
13	2005	4	51	14	5	11	85
14	2006	4	51	14	5	11	85
15	2007	4	51	14	5	11	85
16	2008	4	51	14	5	11	85
17	2009	4	51	14	5	11	85
18	2010	4	51	14	5	11	85
19	2011	4	51	14	5	11	85
20	2012	4	51	14	5	11	85

MAKOGA-KIPENGERE - Base case

ROAD MAINTENANCE - Earth

Length of section (km) = 17.6
Average gradient (m/km) = 1.13

Soil Type

- 1. Sand
2. Clay
3. Other
Choice (1,2,3) = 2 (Clay)

Roughness progression with trafficking:

$Roughness = RR0 + RR1*T + RR2*T^2 + RR3*T^3$
(where Roughness is BI in mm/km and T is traffic in '000s)

RR0 = 7000 (A) (Values for RR0, RR1, etc
RR1 = 314 can be entered directly.
RR2 = 0 Press F6 to clear)
RR3 = 0

*** Note: (A) indicates amended value ***

Maximum roughness, BI (mm/km) = 20,000

At start of project:

Flow since regrading ('000) = 0

Unit of currency = 000's Tshs

	1990	1991	1992
Construction costs ('000) =	0	0	0
Terminal value ('000) =		0	
Grading cost/km =		150	
Annual routine maintenance cost/km =		0	

WAKOGA-KIPENGERE - Base case

VEHICLE OPERATING COSTS

 * When data entry is completed, calculate *
 * yearly costs by pressing F8 *

DATA INPUT

=====

A. ROAD DESCRIPTORS

Data from PART_2:

Paved/Unpaved(1/2)	2
Gradient (m/km)	1.13
Road length (km)	17.6
Curvature(deg/km)	20
Width (m)	6
Moisture (%)	6

B. VEHICLE DESCRIPTORS

	Age ('000 km)	Power (BHP)	...Gross Weight...		...Power/Weight...	
			Uphill (tonnes)	Downhill	Uphill (BHP/tonne)	Downhill
Cars	125	-	-	-	-	-
Lights	160	-	2.3	-	-	-
Mediums	327	165	15.6	15.6	10.6	10.6
Heavies	385	185	35.6	35.6	5.2	5.2
Buses	475	220	13.9	13.9	15.8	15.8

	Speed constant (km/hr)	Working hr/yr	Percent private	Number of crew
Lights	80	2,700	15	1
Mediums	65	2,700	0	2
Heavies	65	2,900	0	2
Buses	60	2,800	0	3

	Cars	Lights	Mediums	Heavies	Buses
Ave current value as % of new price	59	59	60.7	61	58
Ave annual deprec as % of curr price	12.9	12.9	12.9	12.9	12.9

C. ECONOMIC COSTS AND RATES

Unit of currency = 000's Tshs

	Vehicle cost	Tyre cost	Cost per litre		
Cars	6,261	14.23	Petrol	0.2	
Lights	8,518	25.82	Diesel	0.13	
Mediums	23,487	78.83	Luboil	0.74	
Heavies	40,099	103.31			
Buses	24,300	100.98			

	Labour cost per person hour				
Interest rate(%) =	16	Maint.	1.386		
Overhead rate(%) =	10	Crew	0.11		

	Cars	Lights	Mediums	Heavies	Buses
Value of time/hr	0	0	0	0	0

D. CALIBRATION FACTORS

	Cars	Lights	Mediums	Heavies	Buses
Fuel	1	1	1	1	1
Oil	1	1	1	1	1
M parts	1	1	1	1	1
M labour	1	1	1	1	1
Tyres	1	1	1	1	1
Standing costs	1	1	1	1	1

DATA OUTPUT

=====

RESULTS TABLE

Year	Roughness BI (mm/km)	Journey cost/km.....					
		Cars	Lights	Mediums	Heavies	Buses	
1	1993	11,871	0.19	0.28	0.43	0.76	0.22
2	1994	11,871	0.19	0.28	0.43	0.76	0.22
3	1995	11,871	0.19	0.28	0.43	0.76	0.22
4	1996	11,871	0.19	0.28	0.43	0.76	0.22
5	1997	11,871	0.19	0.28	0.43	0.76	0.22
6	1998	11,871	0.19	0.28	0.43	0.76	0.22
7	1999	11,871	0.19	0.28	0.43	0.76	0.22
8	2000	11,871	0.19	0.28	0.43	0.76	0.22
9	2001	11,871	0.19	0.28	0.43	0.76	0.22
10	2002	11,871	0.19	0.28	0.43	0.76	0.22
11	2003	11,871	0.19	0.28	0.43	0.76	0.22
12	2004	11,871	0.19	0.28	0.43	0.76	0.22
13	2005	11,871	0.19	0.28	0.43	0.76	0.22
14	2006	11,871	0.19	0.28	0.43	0.76	0.22
15	2007	11,871	0.19	0.28	0.43	0.76	0.22
16	2008	11,871	0.19	0.28	0.43	0.76	0.22
17	2009	11,871	0.19	0.28	0.43	0.76	0.22
18	2010	11,871	0.19	0.28	0.43	0.76	0.22
19	2011	11,871	0.19	0.28	0.43	0.76	0.22
20	2012	11,871	0.19	0.28	0.43	0.76	0.22

INTERMEDIATE WORKING

WORK AREA

Year	Roughness		Journey cost/km.....				
	BI (mm/km)		Cars	Lights	Mediums	Heavies	Buses
2012	11,871		0.19	0.28	0.43	0.76	0.22

Speeds
 =====

	.....km/hr.....			Hrs per 1000km
	Uphill	Downhill	Average	
Cars	43.6	43.7	43.6	22.9
Lights	50.7	51.0	50.8	19.7
Mediums	27.9	28.3	28.1	35.6
Heavies	21.9	22.3	22.1	45.3
Buses	29.7	30.1	29.9	33.5

Fuel
 =====

	.....Litres per 1000km.....			Cost per 1000km	km per litre	M.P.G
	Uphill	Downhill	Average			
Cars	67	65	66	13.2	15.2	42.8
Lights	114	110	112	22.4	8.9	23.2
Mediums	157	136	147	19.1	6.8	19.2
Heavies	197	153	175	22.8	5.7	16.1
Buses	152	134	143	18.6	7.0	19.7

Oil
 =====

	...Per 1000km.....		km per litre
	Litres	Cost	
Cars	2.4	1.8	417
Lights	3.6	2.7	278
Mediums	8.0	5.9	125
Heavies	8.0	5.9	125
Buses	8.0	5.9	125

Maintenance Parts
 =====

	New vehicles per million km	Cost per 1000km
Cars	21.00	131.5
Lights	22.66	193.0
Mediums	10.46	245.6
Heavies	10.83	434.3
Buses	3.41	82.8

MAKOGA-KIPENGERE - Base case
 RTIMJ. Part 3 - Vehicle Operating Costs

Maintenance labour
 =====

	...Per 1000km....	
	Hours	Cost
Cars	8.0	11.1
Lights	8.7	12.0
Mediums	26.2	36.3
Heavies	27.2	37.6
Buses	7.4	10.3

Tyres
 =====

	...Per 1000km....		Km/tyre
	Tyres	Cost	('000)
Cars	0.62	8.8	6.43
Lights	0.62	16.0	6.43
Mediums	0.29	22.5	20.99
Heavies	0.65	68.7	15.33
Buses	0.25	25.7	23.56

Crew
 =====

	Hrs per 1000km	Cost per 1000km
Cars	0	0.0
Lights	20	2.2
Mediums	71	7.8
Heavies	91	10.0
Buses	100	11.0

Depreciation
 =====

	Cost per hour	Cost per 1000km
Cars	0.11	2.5
Lights	0.20	4.0
Mediums	0.68	24.3
Heavies	1.09	49.3
Buses	0.65	21.7

Interest
 =====

	Cost per hour	Cost per 1000km
Cars	0.13	3.1
Lights	0.25	5.0
Mediums	0.84	30.1
Heavies	1.35	61.1
Buses	0.81	27.0

MAKOGA-KIPENGERE - Base case
 RTIN3. Part 3 - Vehicle Operating Costs

Calibrated Cost Breakdown		Per 1000km				
	Cars	Lights	Mediums	Heavies	Buses	
Fuel	13.2	22.4	19.1	22.8	18.6	
Oil	1.8	2.7	5.9	5.9	5.9	
M parts	131.5	193.0	245.6	434.3	82.8	
M labour	11.1	12.0	36.3	37.6	10.3	
Tyres	8.8	16.0	22.5	68.7	25.7	
Tot run	166.5	246.2	329.5	569.3	143.3	
Crew	0.0	2.2	7.8	10.0	11.0	
Deprecn.	2.5	4.0	24.3	49.3	21.7	
Interest	3.1	5.0	30.1	61.1	27.0	
Tot stand	5.6	11.2	62.2	120.3	59.8	
Overheads	17.2	25.7	39.2	69.0	20.3	
Time	0.0	0.0	0.0	0.0	0.0	
Total	189.2	283.1	430.8	758.6	223.4	

RESULTS TABLE

Year	Roughness BI (mm/km)	...Journey cost along whole length of road...					
		Cars	Lights	Mediums	Heavies	Buses	
1	1993	11871	3.33	4.98	7.58	13.35	3.93
2	1994	11871	3.33	4.98	7.58	13.35	3.93
3	1995	11871	3.33	4.98	7.58	13.35	3.93
4	1996	11871	3.33	4.98	7.58	13.35	3.93
5	1997	11871	3.33	4.98	7.58	13.35	3.93
6	1998	11871	3.33	4.98	7.58	13.35	3.93
7	1999	11871	3.33	4.98	7.58	13.35	3.93
8	2000	11871	3.33	4.98	7.58	13.35	3.93
9	2001	11871	3.33	4.98	7.58	13.35	3.93
10	2002	11871	3.33	4.98	7.58	13.35	3.93
11	2003	11871	3.33	4.98	7.58	13.35	3.93
12	2004	11871	3.33	4.98	7.58	13.35	3.93
13	2005	11871	3.33	4.98	7.58	13.35	3.93
14	2006	11871	3.33	4.98	7.58	13.35	3.93
15	2007	11871	3.33	4.98	7.58	13.35	3.93
16	2008	11871	3.33	4.98	7.58	13.35	3.93
17	2009	11871	3.33	4.98	7.58	13.35	3.93
18	2010	11871	3.33	4.98	7.58	13.35	3.93
19	2011	11871	3.33	4.98	7.58	13.35	3.93
20	2012	11871	3.33	4.98	7.58	13.35	3.93

ANNEX 2

SHOPKEEPERS SURVEYED

MAKOGA

VENANCE
PLIVER
LUPUMUKO
BEDA

MDASI

NIKLAUS

IGOSI

B. K. MGAYA
LUTEGAMASO
RAPHAEL

MAFINGA

LINUS
PETRO SANGA
THOMAS

KIPENGERE

PELEGRINO
MWINYUKA
FRANCIS
ROMANUS

ANNEX 3

LIST OF HOUSEHOLDS SURVEYED

MAFINGA

1. JOSEPH CHAULA
2. PETER MALUMA
3. SEVERINA CHAULA
4. LITA MTEWELE
5. MAWAZO MGENI
6. LINUS LWILA
7. PATSON MBILINYI
8. BRYCESON CHAULA
9. BENEDICT CHAULA
10. RAPHAEL CHAULA
11. EFES CHAULA
12. ALPHONCE CHAULA
13. THOMAS CHAULA
14. WILLIAM MGAYA
15. ANNA MGAYA
16. ANASPERI NZIKU
17. FAUSTA CHENGULA
18. ZEBEDAYO
19. WASIWASI NZIKU
20. MAGE MWNUKA
21. ANNA MGENI
22. MWADA MSIGWA
23. YESINA LUGOME
24. ANZAMUCHE MGAYA
25. FRANCISCA CHAULA
26. ALATWAMBA MLAGALA
27. TISIA MBILINYI
28. EDELINA LOMO
29. EZEKIA CHAULA
30. LEONIA CHAULA
31. ANANIA CHENGULA
32. SAMWELI MASAMBILI
33. MODESTUS SANGA
34. ZEPHANIA MDANI
35. MARIA CHENGULA
36. RUJINA LOMO
37. YUDITHA CHAULA
38. VITOLINA LOMO
39. AMALIA
40. STEPHANO MGEYELA

MAKOGA

1. RODIN NGILANGWA
2. PENCELI MWAJOMBE
3. HAPPY MAHENGE
4. RUSELEMO MHAGAMA
5. JANE PYUZA
6. GRETRUDA CHAULA
7. ADEKILE JOMBE
8. ERNESTINA MGANI
9. NEDA MWINUKA
10. DAINESS KILONGE
11. ROMANUS MDIMBWA
12. EDDA LONGO
13. FELICHA MDIMBWA
14. KAMISIA MBILLO
15. KUP MDIMBWA
16. SATATU MHAGAMA
17. FARIDA NGILANGWA
18. JIONEE MWALONGO
19. YOHANES MWALONGO
20. IBRAHIM MGOHELE
21. NATALINE LONGO
22. ALFEDA JOMBE
23. ZABRON CHAULA
24. YOHELI MGAYA
25. ALITA MGAO
26. SEBA SECHULA
27. TAUSI MGAYA
28. JENITA MGIMA
29. MARIO CHAULA
30. ESTA MSIGWA
31. SAYUNA TULO
32. CHARLES CHAULA
33. AMOS MHAGAMA
34. TUPUMUKYE SENGANI
35. REDEMPTE JOMBE
36. ALMELINDA NG'WAVI
37. KAMU MWAJOMBE
38. KAPILE MWALONGO
39. ESTA MANDELE
40. SPINACHI MWALONGO

MAKOGA
HOUSEHOLD SURVEY SUMMARY
NJOMBE-MAKETE ROAD, MAY 1193

1. TOTAL HOUSEHOLDS SURVEYED: 40 AGE RANGE: 28-63
2. MALE HEADED 33 FEMALE HEADED 7
3. TOTAL MALE RESPONDENTS 17 TOTAL FEMALE RESPONDENTS 23
4. TOTAL NO. OF PERSONS IN HOUSEHOLDS 208
MIN 1 MAX 8 AV. 5.2
5. NO. OF HOUSEHOLDS WITH:

IRON ROOF	18	GARI MOTORCYCLE	1	OTHER:	
RADIO	19	TRACTOR	2	HAND MILLING MACHINE	1
BICYCLE	19	OX CART	2		
6. CROP DATA: 1992

CROP	NO. OF HH	RANGE	AV	RANGE	AV	RANGE	AV	RANGE	AV	RANGE	AV
MAIZE	40	0.5-5	1.9	34-5400	1402	34-1700	625	100-3500	662	22-47	28
WHEAT	30	0.2-3	0.8	34-1800	298	17-700	112	17-1500	152	16-108	49
BEANS	21	0.2-1	0.4	34-164	88	9-164	67	25-100	45	13-93	55
POTATOES	23	0.2-2	0.7	80-1260	576	50-800	242	140-2400	447	15-20	17
PEAS	9	0.1-1	0.5	51-250	119	17-125	50	20-150	80	21-45	31
CABBAGE	5	0.2-1	0.4	240-490	342	10-20	13	225-470	329	12-39	18

1991

MAIZE	39	0.5-4	1.8	34-6000	1328	34-2000	634	100-4000	893	7-45	23
WHEAT	35	0.2-3	0.6	17-1500	218	17-500	84	34-1000	190	20-71	38
BEANS	21	0.2-1	0.4	17-480	107	12-385	94	20-200	59	29-73	54
POTATOES	21	0.1-2	0.5	40-2160	447	38-480	175	80-1840	313	7-74	22
PEAS	9	0.1-1	0.5	17-220	91	9-200	61	8-100	46	17-66	33
CABBAGE	5	0.2-0.5	0.3	140-1890	648	10-20	17	140-1870	634	5-20	11

7. LIVESTOCK	NO.OF HH	MIN	MAX	AV
CATTLE	1	0	6	5.0
GOATS	3	1	12	5.0
SHEEP	3	1	8	3.0
PIGS	4	1	7	2.0
DONKEYS	0	0	0	0
POULTRY	23	1	46	7.0
G/PIGS	10	1	24	11.0
RABBITS	3	3	6	4.0

8. INCOME	NO OF HH	MIN.	MAX.	AV.
CROPS	40	-23,700	224,900	34,000
LIVESTOCK	1	-	400	400
KIBARUA	4	4,000	24,000	10,000
WAGES	2	10,000	90,000	50,000
FAMILY	5	6,000	25,000	12,600
UFUNDI	18	3,000	78,000	17,600
POMBE	36	6,000	134,000	35,000
TIMBER	3	1,500	38,000	14,000
BUSINESS	3	42,000	600,000	10,500
		17,300	639,600	103,650

9. HOUSEHOLD EXPENDITURE

a) AVERAGE MONTHLY EXPENDITURE	MIN.900	MAX.9500	AVERAGE 4,570
b) ANNUAL EXPENDITURE:	MIN. 10,600	MAX. 103,000	AVERAGE 55,300
* HOUSEHOLD ITEMS	1,000	20,000	7,000
FOOD	2,500	25,000	5,150
CLOTHES	700	54,000	15,700
SCHOOL	1,200	19,500	4,850
AG. INPUT	800	36,000	11,500
HEALTH	400	10,000	3,100
TRAVEL	300	45,000	8,100
*FAMILY CONTR	100	3,600	1,200
GOVT TAXES	600	1,800	1,050
OTHER	120	10,000	1,600

10. TRAVEL

(a) TRIPS	HH
MARKET N/A WATER 2-3/DAY HOSPITAL	(21) 2.3/YR.
SHOPS N/A FIREWOOD 4-7/WK NIOMBE/MAKETE	(36) 12.8/YR.
MILL 12 DISP. 11/YR IRINGA/OTHER	(16) 1.0/YR.

(b) TRIPS/YEAR OVER 20 KM BY:

BUS	HH	PRVT. GARI	HH
(29) 6			(18) 7

Njombe-Makete ROAD SURVEY - MAY 1993
MAKOGA CONDITIONS - TOTAL HOUSEHOLDS

	V. GOOD	GOOD	FAIR	BAD	V. BAD	N/A
1. AVAILABILITY OF CONSUMER GOODS	0	4	28	6	0	2
2. AVAILABILITY OF AG. INPUTS	0	1	14	22	1	2
3. HOUSEHOLD FOOD SUPPLY	1	22	10	6	0	1
4. QUALITY OF EDUCATION	0	5	27	3	1	4
5. AVAILABILITY OF MEDICINE AT DISPENSARY	0	9	27	3	0	1
6. CONDITION OF ROADS	0	0	17	6	16	1
7. ABILITY TO PURCHASE GOODS	1	5	24	7	2	1
8. TRANSPORT OF GOODS	0	1	13	21	4	1
9. TRANSPORT OF PEOPLE	0	1	21	17	0	1
10. FAMILY HEALTH	1	8	25	5	0	1

Njombe-Makete ROAD SURVEY - MAY 1993
MAKOGA CONDITIONS - GENDER

	V. GOOD		GOOD		FAIR		BAD		V. BAD		N/A
	M	F	M	F	M	F	M	F	M	F	-
1. AVAILABILITY OF CONSUMER GOODS	0	0	1	3	12	16	3	3	0	0	2
2. AVAILABILITY OF AG. INPUTS	0	0	1	0	5	9	9	13	1	0	2
3. HOUSEHOLD FOOD SUPPLY	0	1	9	13	4	6	4	2	0	0	1
4. QUALITY OF EDUCATION	0	0	2	3	11	16	2	1	0	1	4
5. AVAILABILITY OF MEDICINE AT DISPENSARY	0	0	3	6	11	16	0	3	0	0	1
6. CONDITION OF ROADS	0	0	0	0	7	10	4	2	5	11	1
7. ABILITY TO PURCHASE GOODS	1	0	1	4	6	18	5	2	1	1	1
8. TRANSPORT OF GOODS	0	0	1	0	5	8	6	15	3	1	1
9. TRANSPORT OF PEOPLE	0	0	1	0	9	12	5	12	0	0	1
10. FAMILY HEALTH	1	0	1	7	10	15	3	2	0	0	1

Njombe-Makete ROAD SURVEY - MAY 1993
MAKOGA CONDITIONS - INCOME GROUPS*

	V. GOOD	GOOD	FAIR	BAD	V. BAD	N/A
	U M L	U M L	U M L	U M L	U M L	-
1. AVAILABILITY OF CONSUMER GOODS	0 0 0	2 2 0	7 16 5	2 2 2	0 0 0	2
2. AVAILABILITY OF AG. INPUTS	0 0 0	1 0 0	2 11 1	8 8 6	0 1 0	2
3. HOUSEHOLD FOOD SUPPLY	1 0 0	8 9 5	2 6 2	0 5 1	0 0 0	1
4. QUALITY OF EDUCATION	0 0 0	1 3 1	9 14 4	0 2 1	0 1 0	4
5. AVAILABILITY OF MEDICINE AT DISPENSARY	0 0 0	3 2 4	7 17 3	1 1 1	0 0 0	1
6. CONDITION OF ROADS	0 0 0	0 0 0	3 13 1	2 4 0	6 3 7	1
7. ABILITY TO PURCHASE GOODS	1 0 0	2 3 0	8 11 5	0 5 2	0 1 1	1
8. TRANSPORT OF GOODS	0 0 0	1 0 0	3 7 3	6 10 5	1 3 0	1
9. TRANSPORT OF PEOPLE	0 0 0	0 1 0	6 14 1	5 5 7	0 0 0	1
10. FAMILY HEALTH	1 0 0	3 4 1	6 12 7	1 4 0	0 0 0	1

* INCOME GROUPS DEFINED AS FOLLOWS:

UPPER (11) - T.Shs. 100,000 Plus per year

MIDDLE (21) - T.Shs. 40,001 to 99,999

LOWER (8) - T.Shs. 40,000 or less

ANNEX 4B

MAFINGA

HOUSEHOLD SURVEY SUMMARY
NJOMBE-MAKETE ROAD MAY 1993

TOTAL HOUSEHOLDS SURVEYED: 40 AGE RANGE 25 - 65
 MALE HEADED 27 FEMALE HEADED 13
 TOTAL MALE RESPONDENTS 19 TOTAL FEMALE RESPONDENTS 21
 TOTAL NO. OF PERSONS IN HOUSEHOLDS 206
 MIN 2 MAX 10 AV 5.2

NO. OF HOUSEHOLDS WITH:

IRON ROOF	11	GARI	0	OTHER:
RADIO	21	TRACTOR	0	HAND MILLING MACHINE
BICYCLE	15	OX CART	0	3

CROP DATA

1992											
CROP	ACRES		NO. OF HH	PRODUCTION		CONSUMPTION		SOLD		COST	
	RANGE	AV (KG)		RANGE	AV (KG)	RANGE	AV (KG)	RANGE	AV (KG)	RANGE	AV
MAIZE	0.5-6	2.2	40	100-3900	1350	100-1000	567	0-2800	700	14-56	43
WHEAT	0.2-3	0.8	33	34-1200	248	17-250	104	17-1150	162	14-163	60
BEANS	0.2-3	1.0	24	26-500	122	17-100	102	0-251	75	11-207	58
POTATOES	0.2-3	0.6	33	80-4000	553	80-640	236	0-3600	519	10-80	27
PEAS	0.2-1	0.5	16	34-150	98	17-150	59	0-75	24	45-142	99
CABBAGE	0.2-4	0.9	14	500-16000	3598	35-70	52	490-14,000	2903	4-10	7
1993											
MAIZE	0.5-6.0	2.3	36	300-6200	1437	200-5400	803	0-4300	661	14-67	33
WHEAT	0.2-2.0	0.7	27	34-1100	184	34-250	92	20-1050	117	11-200	53
BEANS	0.2-2.5	0.9	22	50-300	125	25-260	89	10-200	48	10-118	56
POTATOES	0.2-2.0	0.7	24	320-2800	550	68-400	320	0-800	238	6-49	15
PEAS	0.2-1.0	0.5	14	34-200	75	34-800	69	0-60	30	23-79	44
CABBAGE	0.2-3.0	0.8	10	420-9850	2630	0-70	40	350-9800	2367	4-10	7

MAFINGA

LIVESTOCK	NO. OF HH	MIN	MAX	AV
CATTLE	1	-	-	4
GOATS	8	1	33	7
SHEEP	4	1	5	3
PIGS	6	1	4	2
DONKEYS	0	0	0	0
POULTRY	17	1	12	6
GUINEA PIGS	15	6	30	13
*EGGS	1			40/mo

INCOME	(T.SHS./YR.) NO. OF HH	MIN.*	MAX.	AV.
CROPS	40	-51,000	109,500	29,700
LIVESTOCK	0	0	0	
KIBARUA	3	2,400	15,500	6,950
WAGES	0	0	0	0
FAMILY	3	7,800	18,500	7,950
UFUNDI	14	3,600	150,000	34,750
POMBE	26	4,500	144,000	38,000
TIMBER	2	12,500	21,500	17,000
BUSINESS	5	<u>20,000</u>	<u>175,000</u>	<u>83,900</u>
		11,700	220,000	74,350

HOUSEHOLD EXPENDITURE

(a) AVERAGE MONTHLY EXPENSES:	MIN. <u>300</u>	MAX. <u>28,000</u>	AV. <u>3,395</u>
(b) ANNUAL EXPENDITURE:	MIN. <u>19,000</u>	MAX. <u>197,000</u>	AV. <u>57,000</u>

HOUSEHOLD ITEMS	200	30,000	3,750
FOOD	2800	40,000	6,300
CLOTHES	1500	40,000	11,350
SCHOOL	1500	11,500	4,200
AG. INPUTS	4000	90,900	19,650
HEALTH	220	15,000	4,000
TRAVEL	400	30,000	4,250
FAMILY CONTR.*	100	3,400	500
GOVT. TAXES	600	4,000	850
OTHER	200	10,000	1,650

TRAVEL

(a) Trips/	MILL 12-52/YR	HH
	WATER 2-3/DAY	HOSPITAL (30) 2.5/yr.
	FIREWOOD 4-7/wk	NJOMBE/MAKETE (29) 3.5/yr.
	DISP. 14/yr	IRINGA/OTHER (11) 1/yr.

(b) TRIPS/YEAR OVER 20 KM BY:
 BUS (30) 3/YR. PRVT. GARI (19) 5.8/yr.

* Household items includes sugar, salt, kerosene, batteries, soap. etc.
 Family contributions: weddings, funerals, etc.

Negative income results from calculating economic rather than financial value of crop production.

NJOMBE-MAKETE ROAD SURVEY - MAY 1993
MAFINGA CONDITION - TOTAL HOUSEHOLDS

	V. GOOD	GOOD	FAIR	BAD	V. BAD	N/A
AVAILABILITY OF CONSUMER GOODS	0	2	16	13	9	0
AVAILABILITY OF AG. INPUTS	0	2	5	18	14	1
HOUSEHOLD FOOD SUPPLY	2	17	20	1	0	0
QUALITY OF EDUCATION	0	5	25	7	1	2
AVAILABILITY OF MEDICINE AT DISPENSARY	0	11	11	17	0	1
CONDITION OF ROADS	0	0	22	3	15	0
ABILITY TO PURCHASE GOODS	0	5	10	24	1	0
TRANSPORT OF GOODS	0	0	11	6	10	13
TRANSPORT OF PEOPLE	0	0	16	17	7	0
FAMILY HEALTH	0	10	19	10	0	1

CONDITIONS BY GENDER

	V. GOOD		GOOD		FAIR		BAD		V. BAD		N/A
	M	F	M	F	M	F	M	F	M	F	
AVAILABILITY OF CONSUMER GOODS	0	0	2	0	6	10	7	6	4	5	0
AVAILABILITY OF AG. INPUTS	0	0	2	0	3	2	9	9	5	9	1
HOUSEHOLD FOOD SUPPLY	1	1	7	10	10	10	0	1	0	0	0
QUALITY OF EDUCATION	0	0	3	2	11	14	3	4	0	1	2
AVAILABILITY OF MEDICINE AT DISPENSARY	0	0	3	8	7	4	9	8	0	0	1
CONDITION OF ROADS	0	0	0	0	12	10	2	1	6	9	0
ABILITY TO PURCHASE GOODS	0	0	3	2	7	3	8	16	0	1	0
TRANSPORT OF GOODS	0	0	0	0	8	3	1	5	5	5	13
TRANSPORT OF PEOPLE	0	0	0	0	8	8	9	8	0	0	0
FAMILY HEALTH	0	0	5	5	11	8	2	8	0	0	1

CONDITION BY INCOME GROUP*

	V. GOOD			GOOD			FAIR			BAD			V. BAD			N/A
	U	M	L	U	M	L	U	M	L	U	M	L	U	M	L	
AVAILABILITY OF CONSUMER GOODS	0	0	0	2	0	0	2	9	5	3	3	7	4	1	4	0
AVAILABILITY OF AG. INPUTS	0	0	0	2	0	0	3	2	0	2	9	7	4	2	8	1
HOUSEHOLD FOOD SUPPLY	2	0	0	6	6	5	3	7	0	0	0	1	0	0	0	0
QUALITY OF EDUCATION	0	0	0	3	2	0	4	9	2	2	2	3	1	0	0	2
AVAILABILITY OF MEDICINE	0	0	0	3	2	6	4	4	4	4	6	7	0	0	0	1
CONDITION OF ROADS	0	0	0	0	0	0	5	9	8	1	2	0	5	2	8	0
ABILITY TO PURCHASE GOODS	0	0	0	2	3	0	5	3	2	4	7	13	0	0	1	0
TRANSPORT OF GOODS	0	0	0	0	0	0	4	6	1	1	1	4	4	1	5	13
TRANSPORT OF PEOPLE	0	0	0	0	0	0	3	6	7	6	7	4	2	0	5	0
FAMILY HEALTH	0	0	0	4	4	2	6	5	8	1	3	6	0	0	0	1

INCOME GROUPS DEFINED AS FOLLOWS:

- UPPER - (11) - T.SHS. 100,000 plus per year
- MIDDLE - (13) - T.SHS. 40,000 to 99,990
- LOWER - (16) - T.SHS. 40,000 or less.

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INCOME DISTRIBUTION
MAKOGA (MK) & MAFINGA (MF)

ANNEX 5

1.	639,690 (MK)	41.	62,000 (MK)
2.	350,000 (MK)	42.	59,000 (MK)
3.	328,000 (MK)	43.	58,900 (MK)
4.	318,500 (MK)	44.	58,500 (MK)
5.	215,200 (MF)	45.	58,000 (MK)
6.	199,000 (MF)	46.	57,100 (MF)
7.	197,000 (MF)	47.	55,500 (MK)
8.	162,600 (MK)	48.	51,200 (MF)
9.	159,600 (MF)	49.	50,500 (MK)
10.	152,500 (MK)	50.	49,300 (MF)
11.	145,900 (MF)	51.	48,600 (MK)
12.	140,400 (MK)	52.	47,900 (MK)
13.	137,100 (MF)	53.	47,400 (MF)
14.	133,800 (MK)	54.	46,300 (MK)
15.	126,400 (MK)	55.	45,300 (MK)
16.	120,500 (MK)	56.	41,900 (MF)
17.	120,200 (MK)	57.	40,000 (MK)
18.	120,000 (MK)	58.	38,300 (MF)
19.	120,000 (MF)	59.	38,000 (MF)
20.	106,600 (MF)	60.	35,700 (MK)
21.	103,900 (MF)	61.	32,100 (MF)
22.	100,000 (MK)	62.	28,600 (MF)
23.	99,500 (MK)	63.	28,500 (MF)
24.	97,900 (MK)	64.	25,600 (MF)
25.	91,600 (MF)	65.	24,000 (MK)
26.	89,100 (MF)	66.	23,500 (MF)
27.	86,700 (MF)	67.	20,900 (MF)
28.	84,300 (MK)	68.	20,600 (MF)
29.	81,100 (MK)	69.	20,400 (MK)
30.	77,800 (MF)	70.	19,400 (MF)
31.	76,200 (MF)	71.	18,600 (MF)
32.	75,500 (MK)	72.	16,300 (MK)
33.	73,200 (MK)	73.	14,500 (MK)
34.	72,300 (MK)	74.	11,800 (MF)
35.	72,000 (MK)	75.	5,300 (MF)
36.	71,500 (MK)	76.	3,700 (MK)
37.	67,200 (MK)	77.	NEG
38.	67,100 (MK)	78.	NEG
39.	64,600 (MF)	79.	NEG
40.	62,300 (MK)	80.	NEG

ANNEX 6
SURVEY FORMS

GENERAL VILLAGE SURVEY
Njombe - Makete Road Survey
May 1993

1. Name of Village.....
2. Total population..... as of (date).....
3. No. of Households.....
4. Education facilities:

<u>Type</u>	<u>No.</u>	<u>Govt.</u>	<u>Mission</u>	<u>Prvt.</u>	<u>Students</u>	<u>Teachers</u>
Primary
Secondary
Technical
Kindergarten
Other

5. Health facilities

<u>Type</u>	<u>No.</u>	<u>Govt.</u>	<u>Mission</u>	<u>Prvt.</u>	<u>Av. Daily</u> <u>Att.</u>	<u>Drug Supply*</u>		
						80-100	50-80	0-50
Dispensary
Health Center
Hospital
Other

* Monthly drug supply as % of requirements (80-100, 50-80, 0-50).

6. Households with BATI roof..... Thatch roof..... Other.....

7. Vehicles

Pick-ups.....	Lorry - 5 tons.....	Bicycles.....
4x4	Lorry + 5 tons.....	Ox Carts.....
Saloon	Buses	Other
Tractors.....	Motorcycles	

8. Businesses

		Traders type	No.
General shops.....	Carpenters.....	.....	....
Tea shops	Mechanics .....	.....	....
Bars	Tailors .....	.....	....
Pombe Clubs	Fuel Station.....	.....	....
Butcheries	Bank .....	.....	....
Grain Mills	Lodging .....	.....	....

9. Water collection Average time to source.....
- Firewood collection Average time to source.....

10. AGRICULTURE

Crop	1992				1991			
	Volume	Value	Cost	Return	Volume	Value	Cost	Return

Livestock

- | | |
|--------------|---------------|
| Cattle | Figs..... |
| Goats | Donkey |
| Sheep | Poultry |

HEALTH SURVEY
Njombe - Makete Road
May 1993

1. Village.....
2. Type of Facility.....
3. No. of Staff.....
4. Average Daily Attendance.....
5. Common Diseases.....
 - (a) (d) (g)
 - (b) (e) (h)
 - (c) (f) (i)
6. Drug Supply:
 - V. Good.....
 - Good
 - Fair
 - Bad
 - V. Bad
7. MCH Clinic: Yes..... No.....
8. Family Planning: Yes..... No.....
9. Condoms: Yes..... No.....
10. Boxes per month.....

ORIGIN-DESTINATION SURVEY FORM

LOCATION..... SHEET NO.....

DATE:.....

DIRECTION FROM:..... SUPERVISOR:.....

1. TYPE OF CAR: | Tick |
2. AXLE CONFIGURATION:.....

CAR	PICK-UP VAN	LORRY		FULL TRAILLER	SEMI TRAILLER	BUS		OX-HORSE DRAWN CART	TRAC-TORS	OTHERS
		<5T	>5T			<25p	>25p			

3. REGISTRATION..... ADDRESS:.....
4. TRIP STARTED AT: Village/Ward.....
5. TRIP ENDS AT: Village Ward.....
6. LOAD FACTOR: Empty 1-30 % 50-99% FULL

<p>7. PURPOSE OF TRIP</p> <table border="0"> <tr> <th>ORIGIN</th> <th>DESTINATION</th> </tr> <tr> <td><input type="checkbox"/> Home</td> <td><input type="checkbox"/> Home</td> </tr> <tr> <td><input type="checkbox"/> Work</td> <td><input type="checkbox"/> Work</td> </tr> <tr> <td><input type="checkbox"/> Business</td> <td><input type="checkbox"/> Business</td> </tr> <tr> <td><input type="checkbox"/> Shop/Market</td> <td><input type="checkbox"/> Shop/Market</td> </tr> <tr> <td><input type="checkbox"/> Medical</td> <td><input type="checkbox"/> Medical</td> </tr> <tr> <td><input type="checkbox"/> Education</td> <td><input type="checkbox"/> Education</td> </tr> <tr> <td><input type="checkbox"/> Religious</td> <td><input type="checkbox"/> Religious</td> </tr> <tr> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Other</td> </tr> </table>	ORIGIN	DESTINATION	<input type="checkbox"/> Home	<input type="checkbox"/> Home	<input type="checkbox"/> Work	<input type="checkbox"/> Work	<input type="checkbox"/> Business	<input type="checkbox"/> Business	<input type="checkbox"/> Shop/Market	<input type="checkbox"/> Shop/Market	<input type="checkbox"/> Medical	<input type="checkbox"/> Medical	<input type="checkbox"/> Education	<input type="checkbox"/> Education	<input type="checkbox"/> Religious	<input type="checkbox"/> Religious	<input type="checkbox"/> Other	<input type="checkbox"/> Other	<p>8. TYPE OF CARGO</p> <ul style="list-style-type: none"> -Agricultural products, Unprocessed..... <input type="checkbox"/> -Processed food/drinks.... <input type="checkbox"/> -Building materials..... <input type="checkbox"/> -Oil products..... <input type="checkbox"/> -Passengers..... <input type="checkbox"/> -Other..... <input type="checkbox"/>
ORIGIN	DESTINATION																		
<input type="checkbox"/> Home	<input type="checkbox"/> Home																		
<input type="checkbox"/> Work	<input type="checkbox"/> Work																		
<input type="checkbox"/> Business	<input type="checkbox"/> Business																		
<input type="checkbox"/> Shop/Market	<input type="checkbox"/> Shop/Market																		
<input type="checkbox"/> Medical	<input type="checkbox"/> Medical																		
<input type="checkbox"/> Education	<input type="checkbox"/> Education																		
<input type="checkbox"/> Religious	<input type="checkbox"/> Religious																		
<input type="checkbox"/> Other	<input type="checkbox"/> Other																		

9. How often do you make this journey.....

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VEHICLE OPERATORS SURVEY
Njombe - Makete Road
May 1993

1. Operator.....
2. Vehicle Types - No. owned:
 - (a) Pickup (Petrol).....(e) Lorry <5t.....
 - (b) Pickup (Diesel).....(f) Lorry >5t.....
 - (c) 4x4 (Petrol).....(g) Bus <25p.....
 - (d) 4x4 (Diesel).....(h) Bus >25p.....
 (Codes: a-PP, b-PD, c-4P, d-4D, e-<5t, f->5t, g-<25ph->25ph)
3. Number of trips on road per wk/mo/yr...../.....
4. Average km. travelled per trip:.....km. per year.....
5. Costs -

<u>Item</u>	<u>Tshs.</u>	<u>Vehicle code</u>
Petrol/Litre
Diesel/Litre
Lube/Litre
Tire/Pc
Crew/Mo
Mechanic/Hr. (or day)
6. Rates (Tshs.)
 - (a) Cargo...../ton-Km
 - (b) Passenger...../Km
 or
 - (c) Full load of....tons from Njombe to.....Tshs.....
 - (d) Passenger fare from.....to.....Tshs.....

BUSINESS SURVEY
Njombe - Makeke Road
May 1993

1. Village.....
2. Name of Shop.....
3. Number of Employees.....M..... F.....
4. Year Established.....
5. Transport cost of sugar 50kg bag from Njombe:
Tshs..... Hire transport: Tshs...../ton.
6. Availability/Cost:

	ITEM	UNIT	Tshs. 93	Tshs. 92
1.	Sugar	Kg.		
2.	Cooking Oil	Lt.		
3.	Salt	Kg.		
4.	Tea	100 gr.		
5.	Rice	Kg.		
6.	Kerosene	Lt.		
7.	Soap	Pc.		
8.	Toothpaste	tube		
9.	Matches	box		
10.	Batteries	pc.		
11.	Exercise books	book		
12.	Bucket	pc.		
13.	Aspro/Panadol	pk/2		
14.	Vaseline	jar		
15.	Rubber sandals	pr.		
16.	Kerosene Lamp	pc.		
17.	Hee head	pc.		
18.	Khanga	pr.		
19.	Pen	pc.		
20..	Panga	pc.		

7. Daily Sales
 Minimum Tshs.....
 Maximum Tshs.....
 Average Tshs.....

HOUSEHOLD SURVEY
Njombe - Makete Road
May 1993

1. Village
2. Name of Respondent.....
3. Total Persons in Household.....
Male-headed..... Female-headed.....
4. Possessions
Iron Roof..... Gari..... Other.....
Radio..... Tractor.....
Bicycle..... Ox Cart.....
5. Trips per/Wk/Mo/Yr to:
Market...../..... Water...../..... Njombe/Makete...../.....
Shops...../..... Firewood...../..... Iringa/Other...../.....
Gr. Mill...../..... Dispensary...../..... Hospital...../.....

6.

Crop	Acres	1992 (kg)			1991 (Kg)		
		Prod.	Cons.	Sold	Prod.	Cons.	Sold

7. Livestock
Cattle..... Pigs..... Milk(lts.)...../..... (wk/mo)
Goats..... Donkeys..... Eggs (No.)...../..... (wk/mo)
Sheep..... Poultry.....
8. How many shillings on average is used per month to cover household needs?
Tsh:
9. Trips per year of over 20 km by:
Bus..... Private Gari..... Bicycle..... Foot.....

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10. Sources of Income - Tshs./Yr.
- | | |
|----------------|----------------------|
| Crops..... | Other Sources: |
| Livestock..... | Ufundi |
| Kibarua..... | Pombe..... |
| Wages..... | Timber..... |
| Family..... | ..... |
11. Types of Expenses - Tshs. per Mo./Yr.
- | | |
|----------------------------|---------------------------------|
| Household Items...../..... | Family Contributions...../..... |
| Food...../..... | Taxes & Govt. Contr...../..... |
| Clothes...../..... | Others: |
| Schools...../..... |/..... |
| Ag Inputs...../..... |/..... |
| Health...../..... |/..... |
| Travel...../..... |/..... |
12. Rate (Kutathmini au Kupima) the following:
(V. Good-5, Good-4, Fair-3, Bad-2, V. Bad-1, N/A)
- (a) Availability of consumer goods
 - (b) Availability of ag. inputs
 - (c) Household food supply
 - (d) Quality of Education
 - (e) Availability of medicine at health center
 - (f) Condition of roads
 - (g) Ability to purchase goods at shops
 - (h) Transport of goods
 - (i) Transport of people/bus service
 - (j) Family health