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HOUSEHOLD TRAVEL AND TRANSPORT ANALYSIS



Rural Transport Infrastructure Research
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Rural Transport Infrastructure Research

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PREFACE

“I leave around four o’clock in the morning with one bunch of rattan on my head. I do not have a bike and I do not have the money to pay a motodup. Around eight, I arrive at Puok market. I sell my rattan to some of the local traders, buy some fish or meat at the market, buy some medicines if necessary and leave around noon. Normally, I am back home around four o’clock in the afternoon.”

This quote from a survey respondent illustrates the travel burden of rural households in Northwest Cambodia. It also shows the need for the development of accessibility based rural policies and strategies by local, regional and national authorities. Although the accessibility situation varies considerably in the survey area, there is clear justification for the development of accessibility planning tools.

This research attempts to address these issues by collecting accessibility data at the household level. The survey would not have been possible without the help of many individuals and organisations. The ILO Upstream Project would like to thank the Puok district authorities, commune and village officials and particularly the village respondents. The Project would also like to thank the Siem Reap Department of Planning, for their assistance during data collection and the National Institute of Statistics for undertaking the data entry and tabulation.

Days in the field were long and hot and the villages were sometimes hard to access. However, through these hardships, the researchers gained an invaluable insight and understanding of the travel burden of rural households. We hope that this study will – in the context of ILO Upstream accessibility improvement activities - contribute to reducing this burden.

September 2000
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ILO AE Socio Economic Studies

EXECUTIVE SUMMARY

Within the ILO Upstream Project, the Integrated Rural Accessibility Planning (IRAP) sub-project aims to improve accessibility for rural households. IRAP is a planning process based on the concept that limited access to goods and services is one of the fundamental constraints to rural development. This paper examines the travel and transport characteristics of households in the ILO IRAP target district of Puok. The information gathered will also serve to evaluate the IRAP procedure.

Eight villages were surveyed, four with a poor accessibility rating and four with a good accessibility rating. This was to discover the travel and transport variations between the IRAP ranked villages. Three methods of data collection were used, village mapping, wealth ranking and household interviews. Travel was evaluated according to time, distances travelled and load carried.

Most trips were made on foot (91%). Bicycle and oxcart were the most commonly used vehicles. Puok families spend an average of 6 hours and 43 minutes per day travelling and transporting goods. They make around 16 trips per day. Water collection accounts for over 60 percent of these trips or 10 trips per day. Families transport 58.8 tonnes of water annually however more energy is expended collecting firewood (5.4 tonnes per year) or fishing as greater distances are covered. Trips for rice cultivation accounts for the most time and the greatest distance covered, accounting for over 20 percent of the total household distance travelled per year.

Households with poor accessibility spend substantially more time on travelling per day (around 8hrs) than good accessibility households (around 5hrs). Households with poor accessibility make 13 trips per day compared to 20 trips in good accessibility villages. Good accessibility households make three times as many trips to school and visit the market .83 times per day. Poor accessibility households travel to market an average of twice per month.

Both village types covered similar average distances per day - roughly 23km, however people from poor accessibility villages took longer to cover this distance. Good accessibility villages were found to be more integrated with local economies while poor accessibility villages were more insular and focused on subsistence needs. People in good accessibility villages spent more travel time on non-farming activities.

The study revealed a heavier transport burden on men than women. Women make more trips and carry more weight while men travel for a longer time, over longer distances and expend more transport effort. Seasonal travel patterns were also revealed - 60 percent of all annual trips are made during the dry season. More trips of greater distance are made in the dry season however travel is slower during the wet season. There are also seasonal patterns to the transport of goods, the amount of water and firewood carried almost doubles in the dry season.

This study confirmed the IRAP accessibility rankings and the link between good accessibility and socioeconomic benefits. Villages deemed by IRAP to have poor accessibility to goods and services spent more time travelling to meet basic needs at the expense of other activities like education or trade.

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INTRODUCTION

Since the 1970s, the Employment Intensive Investment Branch (EIIB) of the International Labour Organisation (ILO) has promoted social and economic development through Labour Based Appropriate Technologies (LBAT). The ILO is active in the Asia-Pacific region assisting countries to implement employment generating programmes and projects. The ILO Cambodia program benefits from technical support from the EIIB in Geneva and from the Regional Office for Asia and the Pacific. Additional synergies are generated by collaboration with other ILO projects in Asia, in particular the ILO ASIST A-P Project.

The ILO has promoted LBAT in Cambodia since 1992. LBAT is a means of generating employment through improving and maintaining rural infrastructure. In the process, ILO programmes have generated over 3.5 million days of employment and constructed or maintained 550 kilometres of rural roads. The Royal Government of Cambodia (RGC) has endorsed LBAT as the technology of choice for their rural infrastructure program.

The ILO has been involved in rural infrastructure improvement projects in Siem Reap Province since 1993. The first two projects (CMB/92/008 and CMB/95/011) focused on rehabilitating rural roads and setting up maintenance systems. The present project (UPSTREAM–CMB/97/M02/SID) complements the previous projects by introducing the Integrated Rural Accessibility Planning (IRAP) method to Puok District, Siem Reap Province.

IRAP is a local planning process based on the concept that limited access to goods and services is one of the fundamental constraints to rural development. It is designed to assist local decision makers in prioritising rural transport infrastructure investments. Improving accessibility to goods and services through enhanced mobility or improved transport systems is a major tool in poverty alleviation. Therefore, reducing travel times to economic and social services lies at the core of ILO UPSTREAM's Rural Transport Infrastructure (RTI) improvement projects.

Travel time is an important theme in this paper. Previous research included an Origin and Destination (O&D) Survey, roadside traffic count studies and a school survey to obtain a detailed picture of vehicular traffic around Puok district market. The results of these previous research activities were presented during the first Rural Transport Infrastructure Forum held in February 2000 in Siem Reap.¹

The present study aims discover detailed characteristics of rural travel and transport. It supplements the earlier RTI studies and the household data collected by the IRAP team. The information was collected using a 'family travel time budget analysis' taken from a sample of 373 households in Puok district. The survey also complements the prioritising procedure of IRAP at the family or household level. The IRAP procedure is based on the perceptions of village, commune and district leaders about accessibility. The study will provide useful household travel and transport data and verify at the household level the village level priorities identified by the IRAP process.

¹ ILO UPSTREAM - CMB/97/M02/SID Project (2000): *Traffic Characteristics around Puok Market, Rural Transport Infrastructure Research* (MRD/ILO Socio Economic Series No.1, February 2000).

HOUSEHOLD TRAVEL STUDIES: BACKGROUND

Studies on Transport Characteristics and Demands of Rural Households

The first systematic use of the rural household as the basic unit of travel analysis in developing countries took place in Africa during the mid-1980s (Barwell and Leggett 1986; Barwell and Malmberg 1986; Barwell and Howe 1987). These studies relied on a structured interview to record basic household data and local and external travel activities. More recently these studies were replicated in a modified form in the Philippines and in Laos (Guillin 1999).

These studies measured household movements through trips. They gathered detailed information on the time and distance travelled for various purposes like collecting water, firewood, travelling to markets, health clinics etc. Data was collected on the weight transported during these trips and the modes of transport used. The gender and age division of trips was also investigated. The most striking results of the African studies were the substantial time and effort spent travelling and the disproportionate burden that fell on women. The study also found that travel time significantly reduced the time available for producing goods for market (Barwell, et. al, 1987).

The diagnostic nature of these studies showed that they were a powerful tool for transport and general development planning (Howe 1997). This planning tool can be applied in the Cambodian context. During the Upstream Project it was decided that household level surveys would be developed, implemented and analysed to generate a better understanding of the transport characteristics and demands of rural households. This would increase the knowledge about transport and accessibility characteristics in Cambodia while supporting the IRAP process.²

Information about travel frequency was obtained through roadside traffic surveys around Puok Market. Studies of this nature only provide details about regional travel or travel outside the village. To gain an insight into local travel patterns, particularly those related to domestic activities, it is necessary to collect information at the household level.

Puok District Information

The ILO/UPSTREAM Socioeconomic Team carried out this research in Siem Reap Province. The team was set up in conjunction with the IRAP team to conduct a series of RTI studies related to IRAP and other ILO UPSTREAM activities.

The household travel survey was conducted in Puok where IRAP began operations in 1999. Puok district is the most developed district in Siem Reap province measured by literacy, school attendance, clean water sources, number of primary classrooms, etc (PDP/CARERE 1999). Puok District consists of 16 communes and 154 villages. The total population is 110,404 (see Table 1).

² For more information see “Establishment of a Framework for Socio-Economic Studies” by John Tracey-White, August 1999, or the Cambodia Mission Report by Donnages (February, 2000).

No	Commune	Total Population	Male	Female	Households
1	Sasar Sdam	9,910	4,681	5,229	1,846
2	Doun Kaev	9,880	4,690	5,190	1,864
3	Kdei Run	4,129	1,999	2,130	777
4	Kaev Poar	5,210	2,555	2,655	929
5	Khnat	7,330	3,445	3,885	1,404
6	Krabei Riel	6,210	2,982	3,228	1,132
7	Lvea	8,623	4,234	4,389	1,549
8	Mukh Paen	4,511	2,162	2,349	832
9	Pou Treay	1,342	657	685	242
10	Puok	11,660	5,653	6,007	2,142
11	Prey Chruk	8,124	3,849	4,275	1,514
12	Reul	10,808	5,157	5,651	1,994
13	Samraong Yea	4,462	2,104	2,358	811
14	Tuek Vil	7,204	3,490	3,714	1,270
15	Trei Nhoar	7,351	3,469	3,882	1,338
16	Yeang	3,650	1,700	1,950	713
Total		110,404	52,827	57,577	20,357

Table 1: Population of Puok District

The IRAP procedure revealed that accessibility varies enormously from village to village (Puok Accessibility Action Plan, 2000). IRAP use a combination of five indicators (access to water, schools, health care, markets and transport infrastructure) to determine an overall accessibility rating for a given area. Villages are ranked from first to fourth priority according to their accessibility rating. Table 2 shows these rankings for the villages in Puok District.

No	Priority	Accessibility	Number of Villages
1	First Priority	Poor	20
2	Second Priority	Not Good	23
3	Third Priority	Average	61
4	Fourth Priority	Good	50
	Total		154

Table 2: Village Accessibility in Puok District³

³ Taken from the Puok District Accessibility Action Plan

METHODOLOGY

Before beginning the project, the questionnaire was prepared and piloted. Piloting took place over one week in April 2000. The questionnaires were shown to key informants in Puok District. After this feedback, the questionnaires were modified to make them easier to understand. During these pilot interviews, researchers determined the most common village travel activities. The result was a list of 13 travel related activities that were then used in the questionnaire.

Three methods were used to examine the characteristics of rural travel. These were village mapping, wealth ranking and household interviews. The latter included a seasonal activity calendar, a daily activity calendar and a series of specific travel and transport questions.

Initially the project planned to survey two villages from each IRAP priority class. However, it was decided that the differences between the second and third priority classes would be marginal and unlikely to provide a significant range of results. Therefore, the team decided to survey villages at either end of the accessibility spectrum.

Eight villages were selected, four villages with good accessibility and four villages with poor accessibility. This allowed the project to determine whether the villages ranked by the IRAP process were comparatively worse or better off in terms of access to basic needs and services. This approach complemented the prioritising procedure of IRAP at the household level.

National Highway 6 forms a natural boundary in Puok District. Generally, villages to the north of this boundary have poor accessibility and villages to the south have good accessibility.⁴ Four villages were selected from either side of the highway. Puok District officials and commune leaders helped to select villages that represented the two extremes of accessibility. Table 3 shows these villages and their respective accessibility ranking.

No	Village	Commune	Accessibility Situation	National Highway #6
1	Pou	Pou Treay	Poor	South
2	Srah	Reul	Poor	North
3	Kouk Pou	Kdei Run	Poor	North
4	Kcheay	Sasar Sdam	Poor	North
5	Puok Chas	Puok	Good	South
6	Ketteyos	Prey Chhruk	Good	South
7	Totea	Krabei Riel	Good	South
8	Pralay	Khnat	Good	North

Table 3: Surveyed Villages in Puok District

⁴ See Appendix 3 for Accessibility Map of Puok District.

Village Level Research: Wealth Ranking and Village Mapping

After village selection, project staff visited village leaders to introduce the project, explain procedures and make the first appointments. The first activity was selecting a stratified household sample using the wealth ranking method. Wealth ranking is widely used and documents differences in living standards as perceived by the people participating in the study. This makes it possible to gain insights into relative social stratification (CRD, 1999). For this purpose, meetings with key village informants were organised. These included the village leader, a representative from the Village Development Committee, ‘*achaar*’ (old wise, religious men), teachers and other influential persons. Other villagers were always present during these meetings and contributed to the discussions.

Villagers used a variety of criteria to stratify their populations. Some universal wealth indicators were used with specific, localised indicators that varied from village to village. Local indicators included the amount of rice in storage, roofing material used, bicycles owned, arable land owned, television ownership or whether children could attend school.⁵

In general, villagers called the upper strata of their society the “*kandal*” (‘medium’) or rarely “*mian*” (‘rich’). The middle group and usually the largest, was the “*kroh*” (‘poor’) and the third group were the “*toal kroh*” (‘poorest of the poor’), indicating hand to mouth subsistence. The informants only subdivided one village into the three groups of rich, medium and poor. The exercise was complicated by the lack of basic population lists for many villages. In these cases informants helped to compile new population lists.

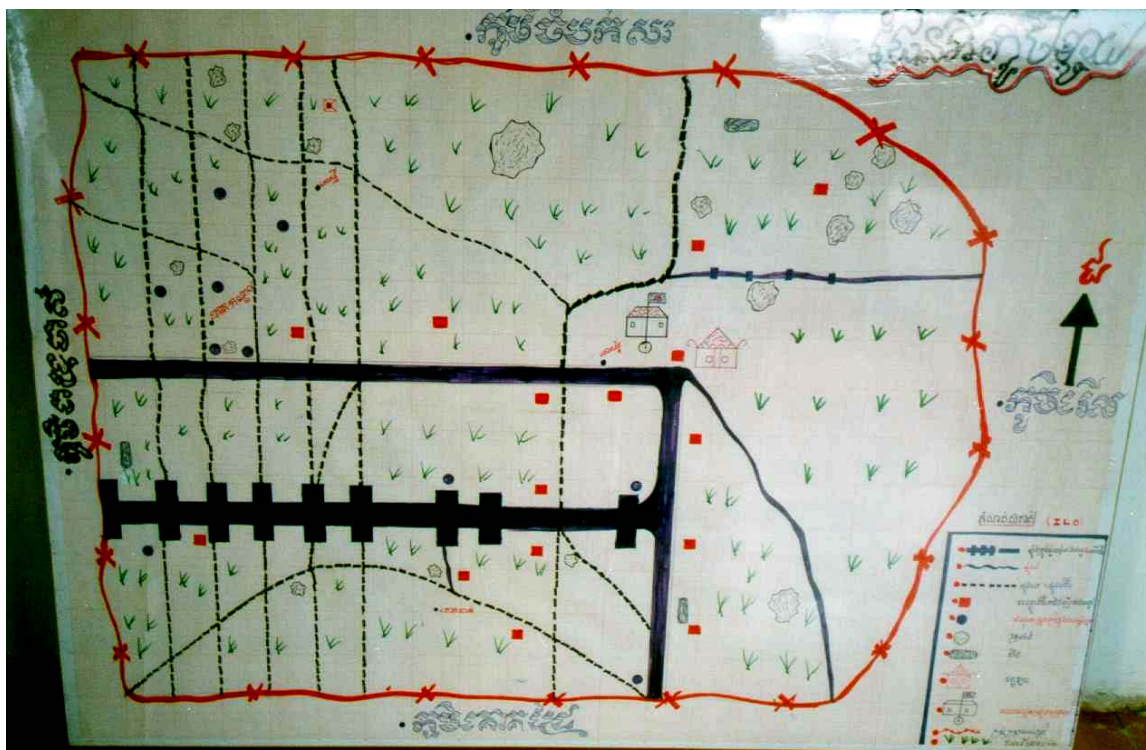
No	Village	Number of Households		Percentage	High	Average	Low
1	Pou	Total	83	100.0 %	6	34	43
		Sample	26	31.3 %	2	11	13
2	Srah	Total	172	100.0 %	14	109	49
		Sample	57	33.1 %	6	34	17
3	Kouk Pou	Total	173	100.0 %	29	69	75
		Sample	51	29.5 %	9	21	21
4	Kcheay	Total	254	100.0 %	86	118	50
		Sample	75	29.5%	25	35	15
5	Puok Chas	Total	207	100.0 %	10	141	56
		Sample	62	30.0 %	3	42	17
6	Ketteyos	Total	132	100.0 %	36	70	26
		Sample	42	31.8 %	12	22	8
7	Totea	Total	76	100.0 %	36	22	18
		Sample	24	31.6 %	11	7	6
8	Pralay	Total	123	100.0 %	40	62	21
		Sample	36	29.3 %	12	18	6
	Total	Total	1,220	100.0 %	257	625	338
		Sample	373	30.6 %	80	190	103

Table 4: Sampled Households and Wealth Categories

⁵ See Appendix 5 for a list of the different ranking criteria.

In total, 373 households or about 30 percent of households in the eight villages were surveyed. This comprised 209 households with good accessibility and 164 households with poor accessibility. A household was defined using the ‘cooking-pot theory’- people who get their food from the same kitchen. This sample size gave a good representation of the village population. Table 4 shows the number of households and the sample size for each surveyed village, including the subdivision into different wealth categories. A 30 percent sample was taken from each wealth subgroup.

The next step was to map each village. The maps were either drawn by the villagers themselves or through collaboration and group discussions. Participatory village mapping allowed the research team to discover the ‘mental maps’ of community members (CRD 1999). These maps show public buildings, infrastructure, rice fields, fishponds and village borders.



Photograph 1: Hand Drawn Map of Kcheay Village

These maps were invaluable in subsequent interviews. Interviewees could easily demonstrate the routes taken to various local destinations. This simplified the process of calculating distance travelled and time taken. The maps also made it easy to identify weak points in the village infrastructure. Laminated versions of the village maps were later given to the village officials. Officials were pleased to have a map of the local geography, which is a useful tool to assess the local situation.

Household Level Research: Time Budget Study and Structured Interview

The research teams started their activities at the household level. The questionnaire used for this survey consisted of three sections.⁶ The first section contained questions relating to socioeconomic characteristics (number of adults/children, age, source of income etc.). The second section asked respondents to describe a typical day in both the wet and the dry season, focussing on local and regional travel and transport activities (*a family time budget study*). The third section was a structured interview. This consisted of 13 sets of questions that systematically documented daily travel related activities. These questions were used to verify and expand on the daily activity description. Data on these 13 activities was collected for both seasons.

No	Travel Related Activity
1	Collecting Water
2	Fetching Firewood
3	Fishing
4	Cultivating Rice
5	Growing Vegetables
6	Growing Fruit
7	Raising Animals
8	Non Agricultural Activities
9	Visiting Market
10	Attending School
11	Visiting Health Facilities
12	Visiting Pagoda
13	Social Visits

Table 5: Identified Travel Related Activities ⁷

Household interviews took between 1 and 1.5 hours to administer, depending on the family situation. Villagers were asked to estimate the number of trips made, the time taken, distance travelled, quantity of goods carried or the fare paid, for each of the 13 activities. Interviews also covered the mode of transport used, gender differences, children's involvement and problems encountered while travelling.

The household questionnaire was the most important survey technique. Researchers interviewed 219 male household members (59%) and 154 female household members (41%), during the seven week research period. In all, 373 interviews were conducted; the average age of respondents was 43 years.

The research encountered some methodological problems. Respondents found it difficult to estimate time and distance. Villagers measured the length of their trips by changes in the position of the sun or by the time taken to smoke a cigarette. The village maps proved helpful for determining the distance and travel time for local trips. The earlier Puok market studies

⁶ The full version of the survey questionnaire appears in Appendix 8.

⁷ This list of activities excludes 'peak' agricultural activities like transplanting and harvesting. Major religious ceremonies are also not included.

(Origin and Destination/School Survey) and additional meetings with village key informants helped to determine accurate time/distance measurements for regional market trips. Respondents also found it difficult to distinguish between wet and dry seasons in the questionnaire. Asking respondents to describe a typical day both in wet and dry seasons made the comparison easier during the structured interviews. Respondents found the number of trips and weight carried easier to estimate.

Explanation of Basic Terms

Although the terms *transport* and *travel* are often used interchangeably, they refer to different types of mobility. Travel is a personal movement, the interaction between households and the wider socioeconomic environment to access services or fulfil social functions (travel to school, hospital etc.). According to Barwell (1996), most of this travel does not involve carrying a load.

Transport, on the other hand, refers to the *carrying* of goods and commodities. This is similar to the distinction made in the Laos IRAP household survey between personal trips and load carrying trips (Guillin, 1999).

Only three of the 13 activities surveyed in the study involved a significant transport element - carrying water, collecting firewood and fishing. Other trips generally did not involve major transportation efforts e.g.; trips to the rice field only involve transporting harvested rice for a few days during each season.

Each of the 13 travel or transport related household activities was analysed using the following five indicators:⁸

Number of Trips per Household per Annum. The total number of *round* trips per household per year.

Travel/transport Time per Household per Annum. A pure travel time figure is calculated by estimating the time spent on travel/transport per household per year.⁹

Travel/transport Distance per Annum. The total distance covered for each activity per year.

Tonnes per Household per Annum. The total weight of goods moved per household per annum for each of the three load carrying activities.

Tonne.km per Household per Annum. The total transport effort expended per household per year. Tonne.km is the standard unit for measuring the magnitude of a load carrying activity. One (1) tonne.km is the transport effort involved in moving a 1 tonne load over a distance of 1 kilometre.¹⁰

⁸ This section draws heavily on the IRAP/UNDP Laos household survey report (Guillin 1999). Similar indicators were used to develop the Puok survey questionnaire.

⁹ For example, trip time would include the time spent travelling from the house to the forest and back, but not the time spent in the forest collecting firewood.

¹⁰ A transport activity involving the movement of 50 kg over a distance of 5 km is repeated 100 times during a year. The total transport effort is calculated as $(50/1000) \times 5 \times 100 = 25$ tonne.km per annum.

HOUSEHOLD TRAVEL AND TRANSPORT SURVEY

Socioeconomic Characteristics of Households

Each respondent gave details about the composition of their household. The average household size was 5.8 members. This is slightly higher than the Puok district average of 5.4 people per household (IRAP AAP 2000). About 40 percent of household members were below 15 years. The average age for the total sample was 23 years, 48.5 percent were male and 51.5 percent were female.

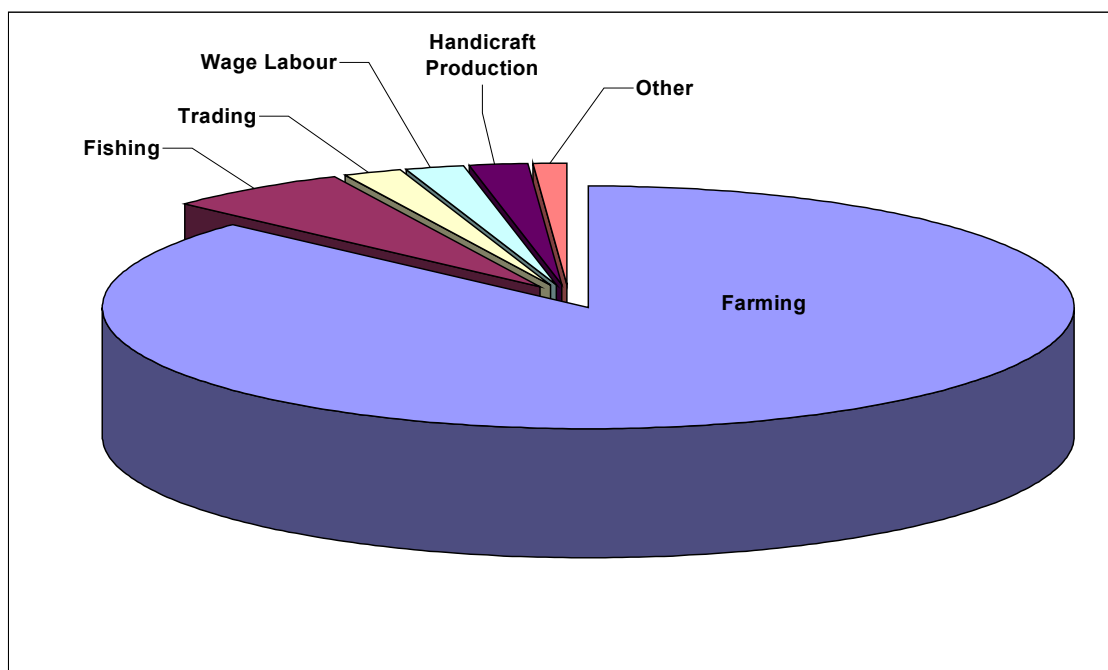


Figure 1: Main Source of Income in Surveyed Households (Appendix 7, table A)

Farming was the main source of income for the majority of households (87%). Fishing was the main source of income for six percent of the families. Trading (2%), wage labour (2%) and handicraft production (2%) were other main sources of income.

No	Type of Vehicle	Total Number of Vehicles	Number of Households per Vehicle Type
1	Bicycle	264	191
2	Motorbike	51	47
3	Oxcart	176	174
4	<i>Koyun</i> ¹¹	1	1
5	<i>Remorque</i> ¹²	1	1
6	Car	2	2
7	Motorised Boat	6	6
8	Non Motorised Boat	52	26

Table 6: Vehicle Types and Numbers

Households owned a variety of vehicles, 191 households (51%) owned at least one bicycle and 47 households (13%) owned one or more motorbikes. One hundred and seventy four households (47%) owned oxcarts, 26 families (7%), all in Pou village, owned non motorised boats.

Rural Travel and Transport Trends

Travelling is an integral part of human life; people are always on the move. In the developed world, trips to obtain necessities like water and fuel have become shorter or have disappeared. Infrastructure and transport modes have evolved, making travel safer, more comfortable and more affordable. This is not the case in large parts of the developing world. In rural areas, where most travel and transport is still by foot, not much has changed.

Ninety one percent of trips registered by the survey were made on foot. This figure reflects the fact that most trips are local, however people travel by foot even over long distances. Travelling outside the village takes a long time even if villagers own a bicycle or motorbike. This is due to the poor quality of roads or the absence of bridges, especially in the wet season. The next figure shows a comparison of the different modes of transport used by survey respondents.

¹¹ A *koyun* is a local vehicle with an irrigation pump engine (*ko* is the Khmer word for ox and *yun* means machine).

¹² A *remorque* is a motor trailer that carries approximately ten persons.

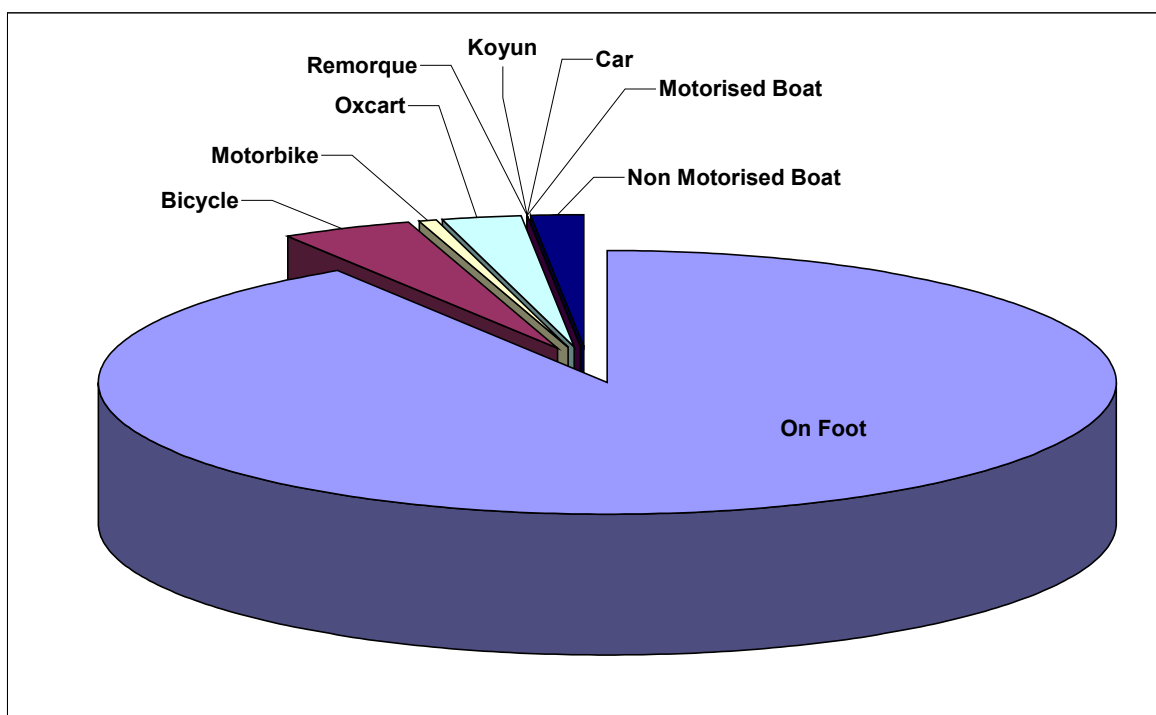


Figure 2: Frequency of Use for Different Modes of Transport (Appendix 7, table B)

Comparison of Trips per Annum

No	Travel Activity	Annual Number of Trips per Household	Percentage (%)	Cumulative Percentage (%)
1	Collecting Water	3,677	62.7%	62.7%
2	Raising Animals	319	5.4%	68.1%
3	Cultivating Rice	314	5.3%	73.4%
4	Growing Vegetables	304	5.2%	78.6%
5	Fishing	243	4.1%	82.7%
6	Attending School	241	4.1%	86.8%
7	Non Agricultural Activities	191	3.3%	90.1%
8	Fetching Firewood	183	3.1%	93.2%
9	Visiting Market	146	2.5%	95.7%
10	Growing Fruit	120	2.0%	97.7%
11	Visiting Pagoda	69	1.2%	98.9%
12	Visiting Health Facilities	58	1.0%	99.9%
13	Social Visits	5	0.1%	100%
	Total	5,870	100%	

Table 7: Number of Trips per Household per Year.¹³

Each household in the survey sample made an average of 5,870 trips per annum or about 16 trips per day. This is considerably higher than the households in the Laos survey, who

¹³ Some trips have multiple purposes; e.g., trips to the paddy fields may be combined with fishing.

averaged nine trips per day (Guillin 1999). The percentage of water collection trips is similar to that reported in the Laos survey. The majority of all trips made by surveyed families in Puok were from the house to the water source and back (62.7%). This is equivalent to about ten trips to the water source per family per day. In the Lao study, 60 percent of all trips were made to collect water.

Trips to the fields with cattle account for 5.4 percent of annual household trips. Trips to the rice field and trips to the vegetable fields each account for about five percent of annual household trips. Fishing and attending school each represent about four percent of annual trips. The remaining 13.2 percent of all trips are divided between the other seven travel destinations.

Comparison of Travel Time per Annum

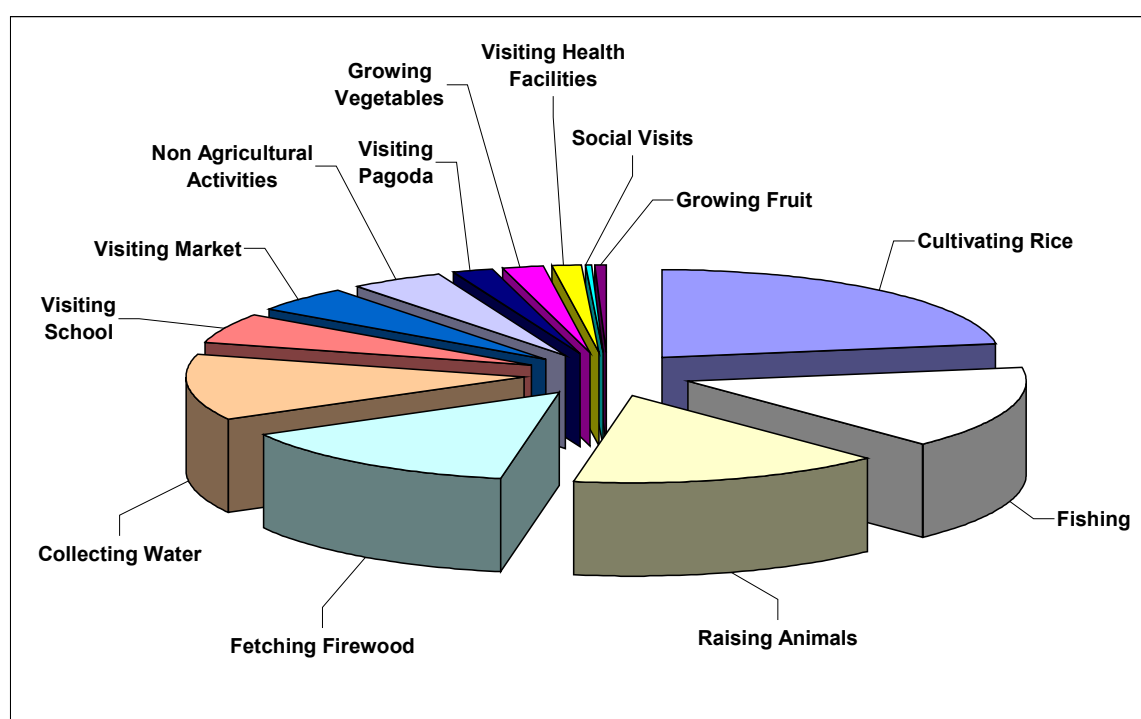


Figure 3: Travel Time per Household per Year (see Appendix 7, table C)

An examination of time spent travelling gives a different picture. The ranking of the travel activities changes and the divisions between travel activities become more even. The households surveyed travelled an average of 6 hours and 43 minutes per day. With an average household size of 5.8 members, this is an average of 1 hour and 9 minutes travel per family member per day.

Figure 3 shows that travel to the rice field takes up the largest amount of family travel time (22.5%). Fishing and animal raising also account for a substantial part of the total travel time. Transport related activities take up 41.6 percent of the total travel time. Each trip took around 25 minutes on average. For water collection, the average trip lasted approximately 5 minutes. A trip outside the village, for a social visit, took an average of 2 hours and 20 minutes.

Comparison of Distance Travelled per Annum

Figure four shows the annual distance covered per household for each of the main travel and transport activities. More distance is covered in cultivating rice than any other travel activity. It accounts for 20.2 percent of the total distance travelled in a year or approximately 1,680 kilometres. The average round trip to the rice field covers over five kilometres.

Fishing, raising animals and fetching firewood combined make up 37.9 percent of the total distance covered in a year. Growing fruit and vegetables only account for a small share of the total distance travelled, as these activities are carried out close to home.

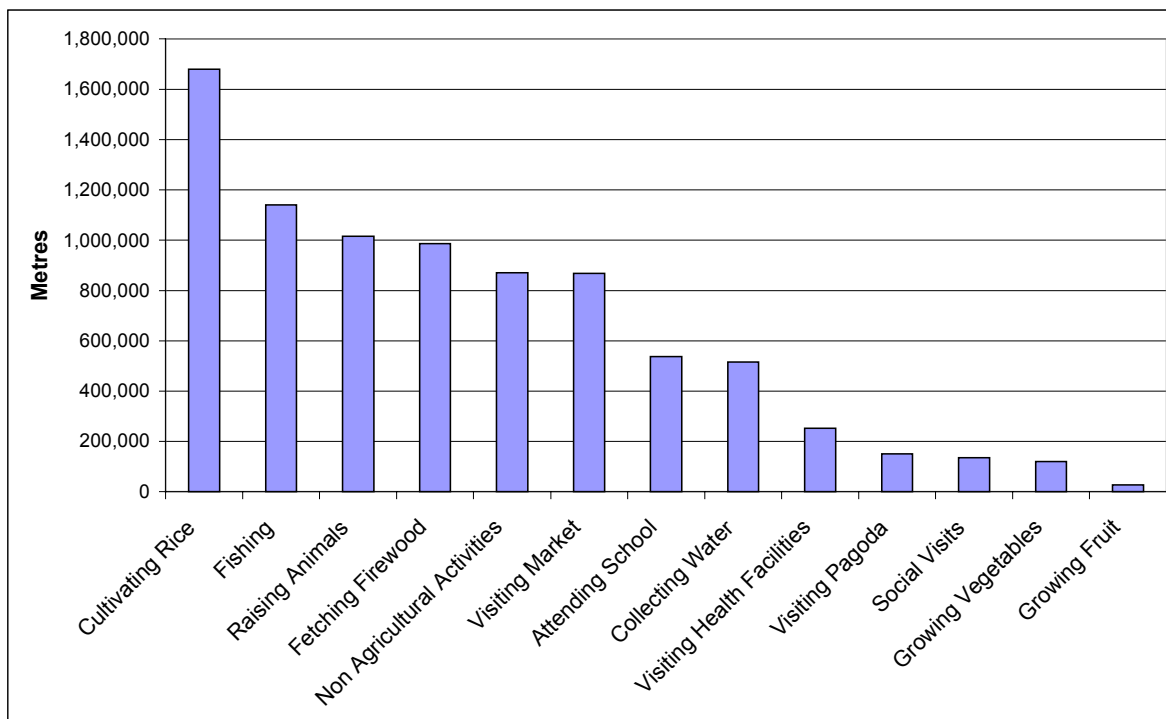


Figure 4: Annual Distance Travelled per Household (see Appendix 7, table D)

Puok households travel on average 23 kilometres daily, or about 8,300 kilometres per year. A similar household in Laos travels 12,000 kilometres per annum due to geographical circumstances (Guillin 1999). Although Cambodian households make a greater number of trips per day, the average trip in Puok is much shorter. Each trip covers about 1.4 kilometres while the Lao study found the average trip covered 3.7 kilometres (Guillin, 1999).

Comparison of Weight Transported per Annum

This section focused on the three major transport activities, water collection, fetching firewood and fishing. Water accounts for more than 90 percent of the total weight carried on transport activities per household per annum. Almost 59 tonnes of water are carried per year, or 163 kilogrammes per day. The second most significant activity is fetching firewood

(8.3%), with more than five tonnes transported per year.¹⁴ Almost one tonne of fish is transported per annum or 2.5 kilogrammes per day. Families transport 65.1 tonnes per year, or about 181 kilogrammes per day.

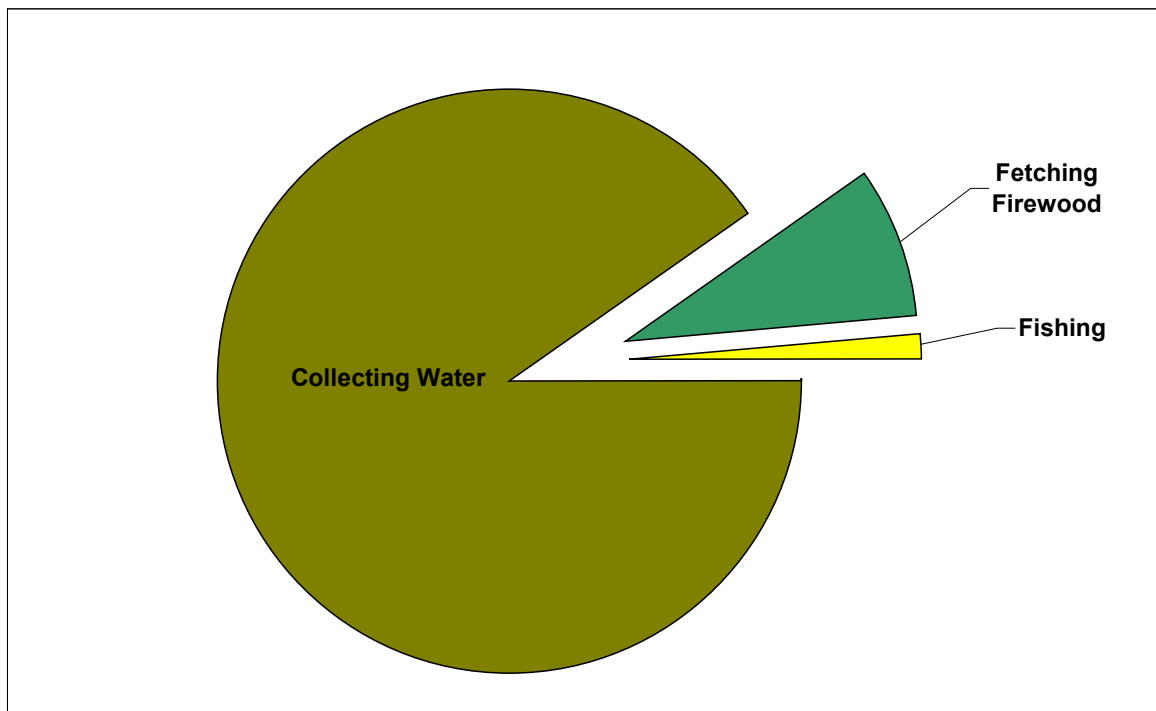


Figure 5: Annual Weight Transported per Household

No	Travel Activity	Annual Weight Carried per Household (tonne)	Daily Weight Carried per Household (kg)	Percentage (%)	Cumulative Percentage (%)
1	Collecting Water	58.8 tonne	163.3 kg ¹⁵	90.3%	90.3%
2	Fetching Firewood	5.4 tonne	15.0 kg	8.3%	98.6%
3	Fishing	0.9 tonne	2.5 kg	1.4%	100%
	Total	65.1 tonne	180.8 kg	100%	

Table 8: Annual Weight Transported per Household ¹⁶

¹⁴ Many villagers transport firewood for trading purposes, which may have inflated this figure.

¹⁵ 1 litre = 1 kilogramme as was the case in the survey questionnaire.

¹⁶ These figures do not include the weight of the containers goods were transported in.

Comparison of Transport Effort per Annum

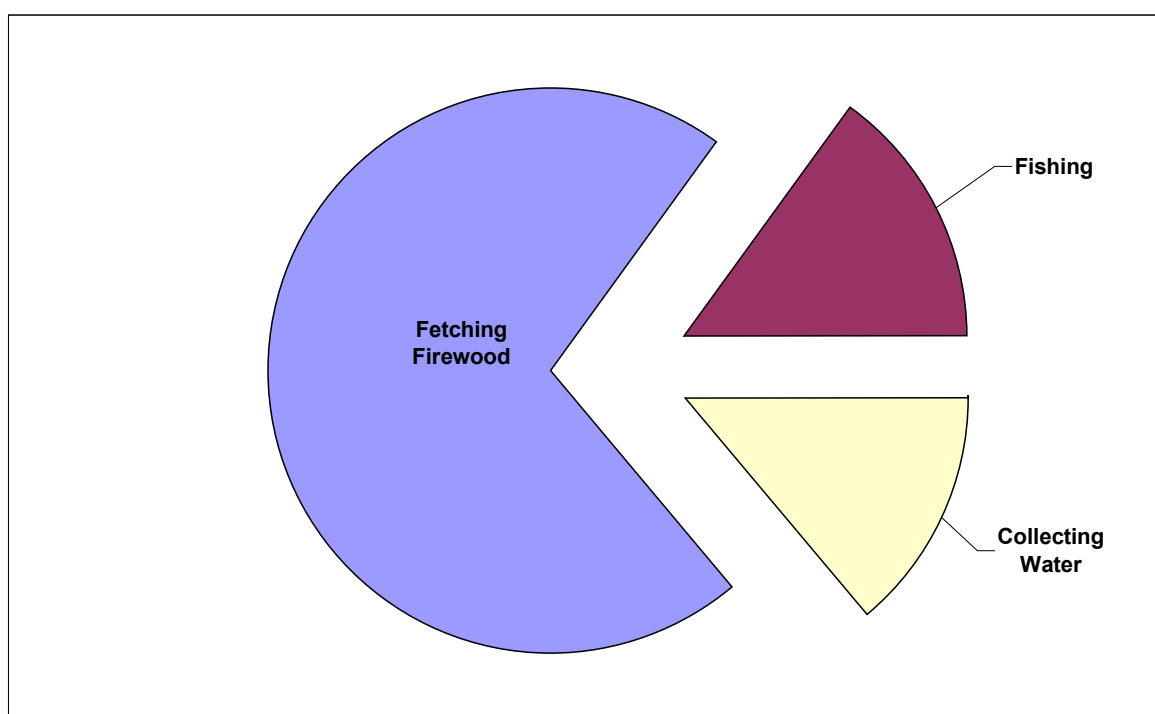


Figure 6: Annual Transport Effort per Household

No	Travel Activity	Transport Effort per Annum per Household	Percentage (%)	Cumulative Percentage (%)
1	Fetching Firewood	47.4 tonne.km	71.0%	71.0%
2	Fishing	10.2 tonne.km	15.2%	86.2%
3	Collecting Water	9.2 tonne.km	13.8%	100%
	Total	66.8 tonne.km	100%	

Table 9: Annual Transport Effort per Household¹⁷

In Puok district, 71 percent of the load carrying effort is spent collecting firewood at 47.4 tonne.km per annum. The second most significant activity is fishing at 15.2 percent or 10.2 tonne.km/year. Water collection is only 13.8 percent of the total transport effort because of the shorter distances travelled. A Puok household's total annual transport effort is 66.8 tonne.km per annum. This is slightly higher than the 61 tonne.km per annum found among households in the Lao study (Guillin, 1999).

Figure 7 shows an overview of the five main travel and transport indicators for Puok District households.

¹⁷ The transport time is more than half the trip time: depending on the load, this could vary from 30 % (no load) – 70 % (load) to 40 % (no load) - 60 % (load).

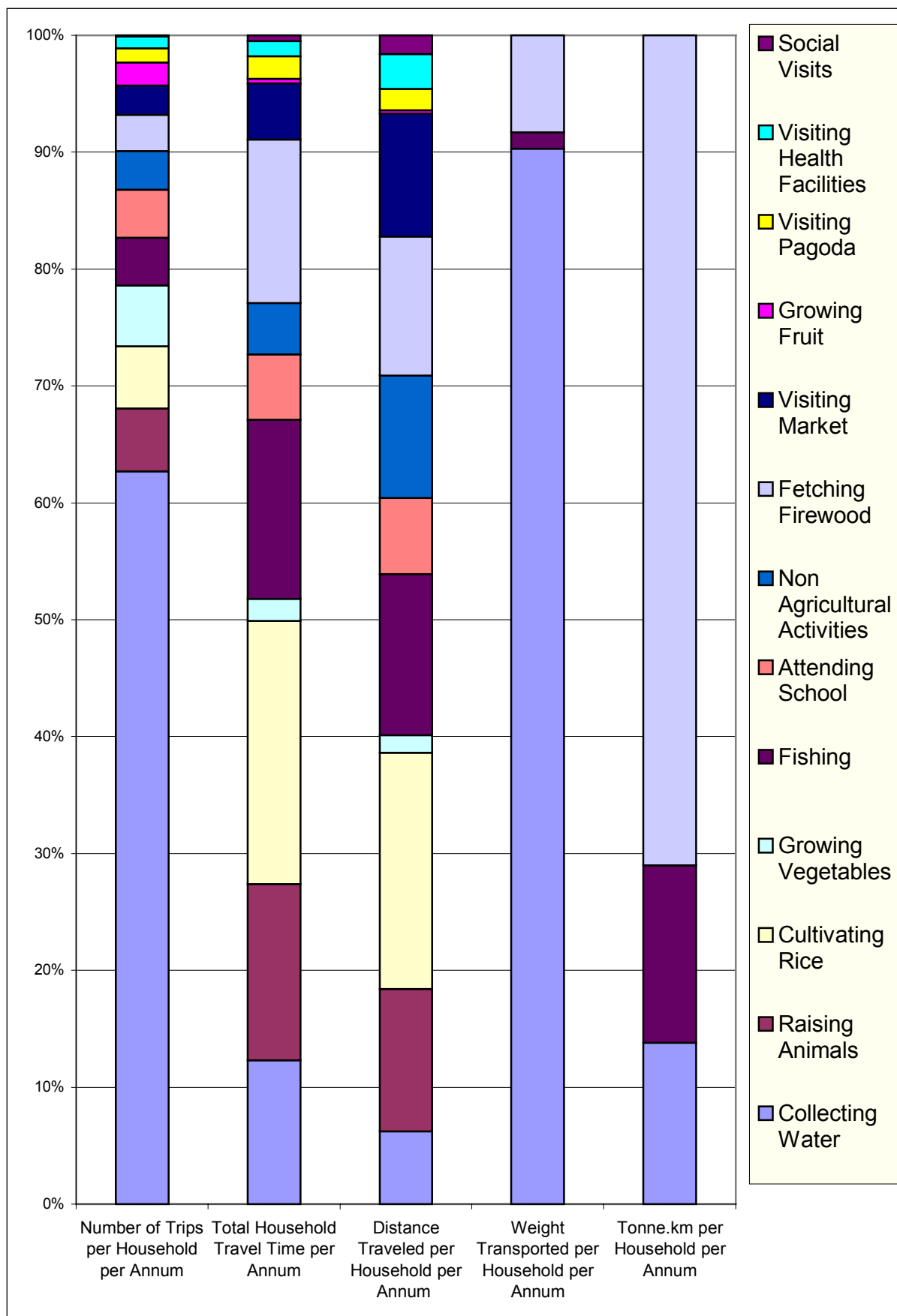


Figure 7: Five Main Travel and Transport Indicators for Puok District

STRATIFICATIONS

Analysis of the data so far has been on an aggregate level. The travel activities of 373 families have been evaluated for the period of one year. However, the survey questionnaire was constructed in a way that made it possible to stratify the data.



Photograph 2: Water Transport in Puok District

This section will compare these stratifications. Travel and transport in villages with good and poor accessibility will be compared and the gender dimensions of rural household travel will be examined. Wet and dry season travel patterns will be discussed along with the influence of wealth and other travel related issues.

Accessibility Comparison

Travel and transport allow rural households to access the facilities and services they need for everyday life. As the preceding section demonstrated, travel and transport involve time and effort. By calculating time and effort costs, access to facilities can be quantified. If these costs are too high, they limit opportunities and hamper development (Dennis 1998).

IRAP is a planning tool for use at the local level. It examines village accessibility to basic needs and services. It also identifies problem areas and priorities for future investment (IRAP AAP 2000). In Puok district, the IRAP procedure has been used to rank villages according to their relative accessibility. This study included four villages with good accessibility and four with poor accessibility.

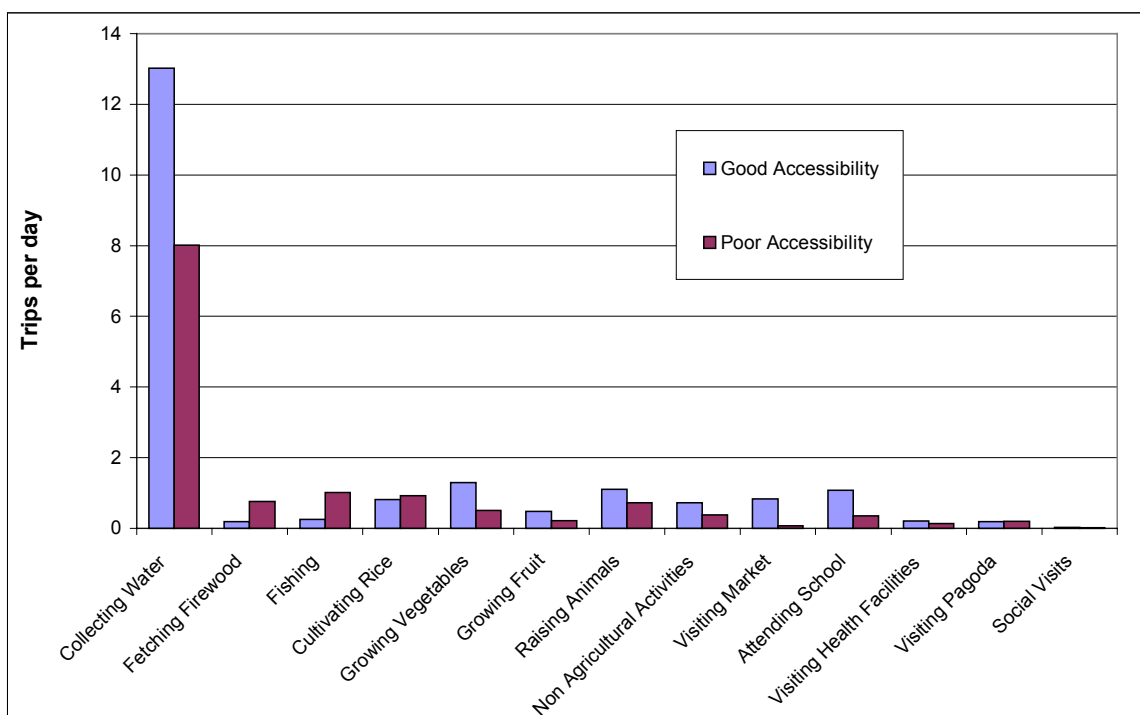


Figure 8: Trip Comparison by Accessibility Ranking (Appendix 7 table E)

Families in good accessibility villages make substantially more trips than families in poor accessibility villages. A household in a poor accessibility village averages 13 trips per day, while a household in a good accessibility village makes more than 20 trips per day. This is probably because of a better accessibility situation. Destinations are easier to reach and villagers travel more often.

This is particularly true for trips to the market or to school. Families from good accessibility villages make 0.83 trips per day to the market, while those from poor accessibility villages make only 0.07 trips per day, or two trips per month, to the market. Trips to school show a similar pattern. Good accessibility households make three times as many trips to school as poor accessibility households - 1.08 trips per day compared to 0.35 trips per day.

Figure 8 shows that poor accessibility households make substantially more trips for primary activities like fetching firewood and fishing, than good accessibility villages. Proportionally, water collection trips are similar across both types of households, about two thirds of the total trips.

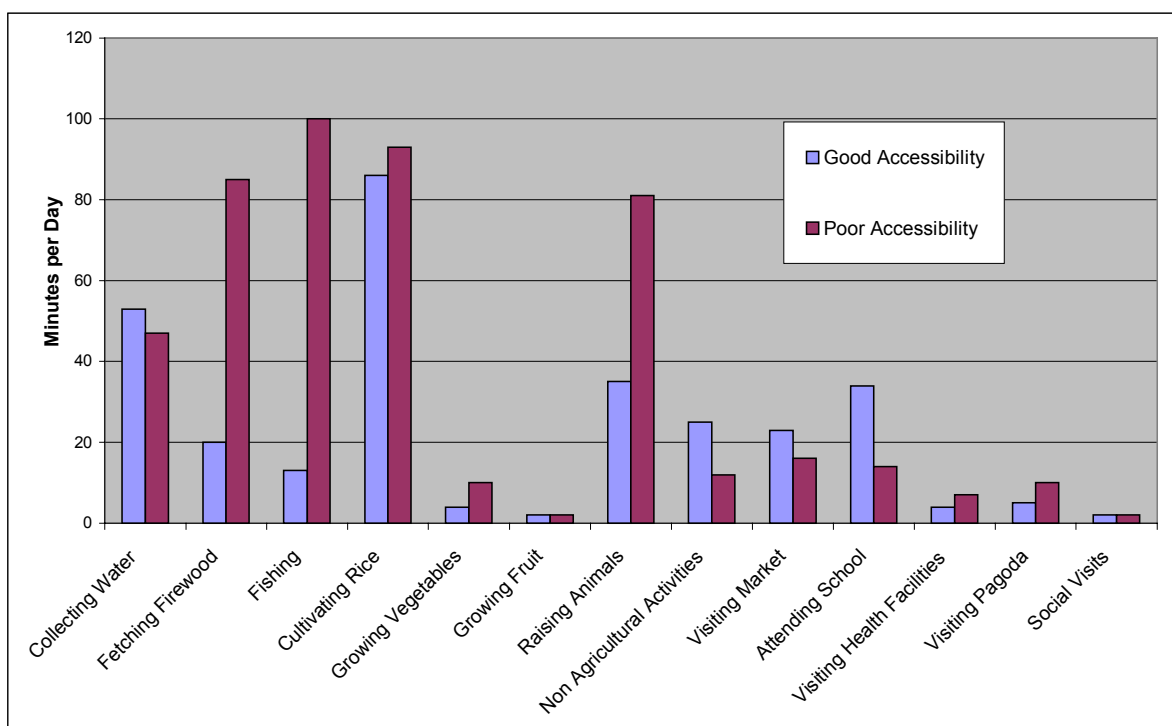


Figure 9: Travel Time Comparison by Accessibility Ranking (Appendix 7, table F)

The survey found large differences in average travel time according to accessibility. Families in good accessibility villages average 5 hours and 6 minutes travelling per day. Villages with poor accessibility spend 7 hours and 59 minutes travelling per day. In poor accessibility villages, the majority of travel time is spent on primary, farming related activities, while good accessibility villages spend more time on non farming activities.

When the number of trips is combined with travel time, they give the average trip time for the two accessibility situations. An average trip in a good accessibility village lasts 15.2 minutes, in a poor accessibility village a trip averages 36.1 minutes. This demonstrates that the village accessibility differentiation measured by the IRAP procedure is accurate and corresponds to the rural needs in this district.

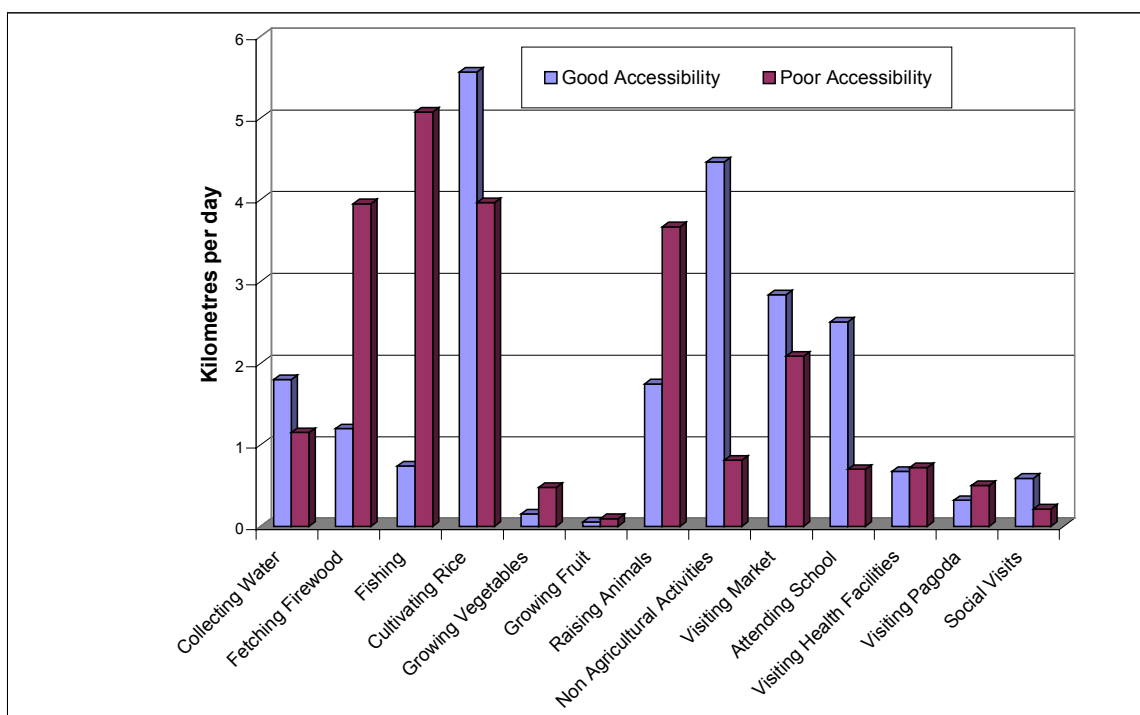


Figure 10: Travel Distance Comparison by Accessibility Ranking (Appendix 7, table G)

The distances travelled by inhabitants of both village types are similar. Both types of households travel around 23 kilometres per day. However, the picture changes dramatically when the number of trips is combined with the travel time. An average trip in a good accessibility village covers 1.1 kilometres. In a poor accessibility village, trips are substantially longer, about 1.8 kilometres.

Combining the travel time and the travel distance reveals the relative speed of trips in both village types. In good accessibility villages, the average speed is approximately 4.4 km/hour while in poor accessibility villages the average speed is only 2.9 km/hour.

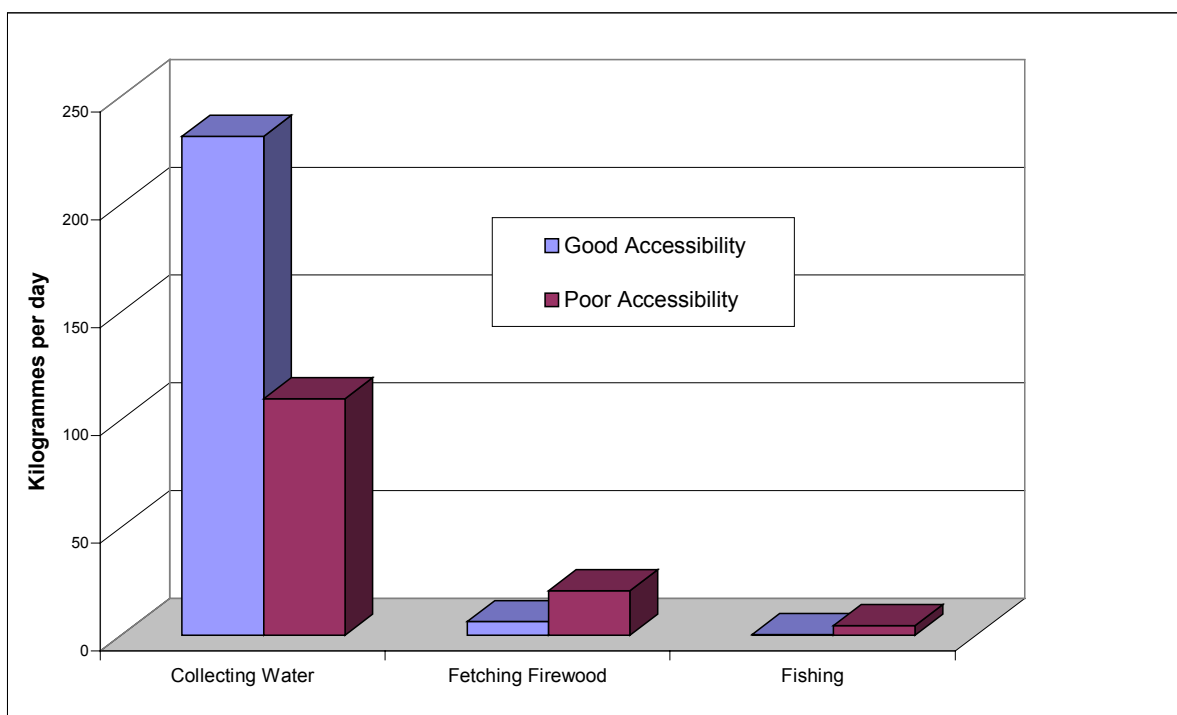


Figure 11: Weight Comparison by Accessibility Ranking

No	Travel Activity	Weight Transported per Household per Day			
		Good Accessibility		Poor Accessibility	
		Weight	Percentage	Weight	Percentage
1	Collecting Water	231.5 kg	97.2%	109.7 kg	81.4%
2	Fetching Firewood	6.3 kg	2.6%	20.7 kg	15.4%
3	Fishing	0.4 kg	0.2%	4.4 kg	3.2%
	Total	238.2 kg	100%	134.8 kg	100%

Table 10: Weight Comparison by Accessibility Ranking

Water makes up the majority of weight carried, 97 percent in good accessibility villages and 81 percent in poor accessibility villages. Transporting firewood also makes up a significant weight, (15.4%) in poor accessibility villages. Fishing only accounts for a small transport weight in both village types.

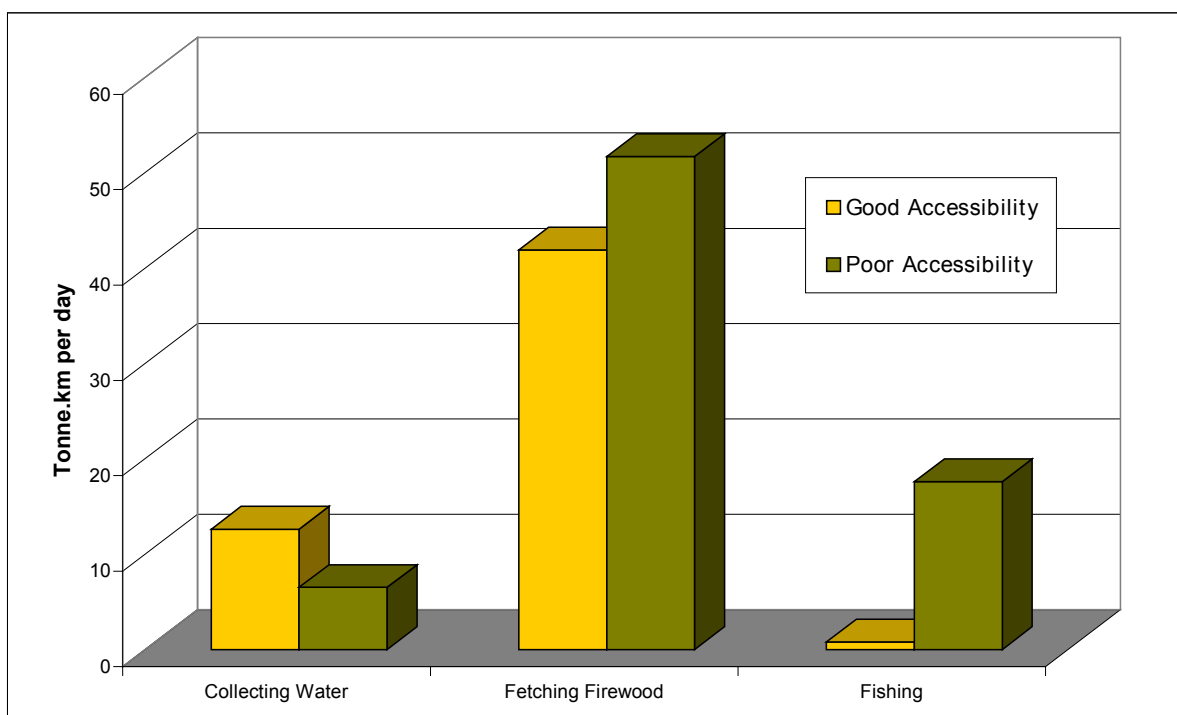


Figure 12: Transport Effort Comparison by Accessibility Ranking

No	Travel Activity	Transport Effort per Household per Day			
		Good Accessibility		Poor Accessibility	
		Tonne.km	Percentage	Tonne.km	Percentage
1	Collecting Water	12.6	22.8%	6.5	8.6%
2	Fetching Firewood	41.9	75.8%	51.7	68.2%
3	Fishing	0.8	1.4%	17.6	23.2%
	Total	55.3	100%	75.8	100%

Table 11: Transport Effort Comparison by Accessibility Ranking

Tonne.km is the standard method of expressing the magnitude of any load carrying transport activity. It combines the travel distance and the transported weight. Fetching firewood accounts for the highest transport effort because of the long distances involved. This is 41.9 tonne.km in good accessibility villages and 51.7 tonne.km in poor accessibility villages. These figures clearly show that poor accessibility villages expend more effort transporting weight than good accessibility villages.

Good accessibility villages seem more integrated into the district economy. Poor accessibility villages tend to be more insular and focus on their subsistence needs. This is illustrated by the prevalence of primary activity related trips in poor accessibility villages and by fewer market trips.

A “Balanced Load”: The Gender Comparison

Rural transport patterns have been studied in developing countries, particularly in Africa. Many studies have found a heavier transport and travel burden for females. In these studies, the female members of the family undertake the majority of household travel and transport activities (Barwell et al 1987, Barwell 1996, IRFTD 1999).

In Cambodia, like Laos (Guillin 1999), the travel and transport burden seems more equally divided. Women make more trips and carry more weight, however men travel longer over greater distances and expend more transport effort. Trips by women are usually shorter in time and distance and involve less transport effort. To get a more detailed understanding of the gender comparison, it is necessary to examine the different travel and transport activities.

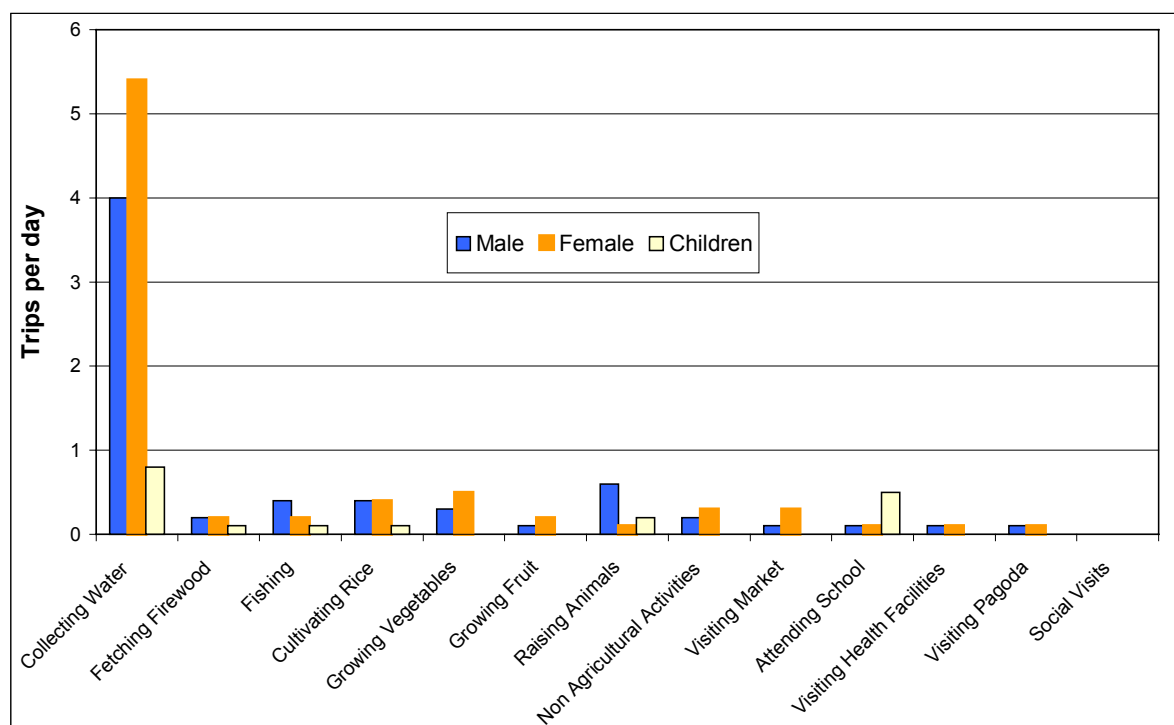


Figure 13: Daily Trip Frequency by Gender and Age Group (see Appendix 7, table H)

Women undertake 48.5 percent of all household trips in the surveyed families. Men make 40.5 percent of trips and children make the remaining 11 percent.¹⁸ Women make most trips for water collection and growing vegetables. Men make most fishing and animal raising trips. Generally, the differences are not large. Women make more market trips and trips for growing fruit.

¹⁸ Children are defined as those under 15 years.

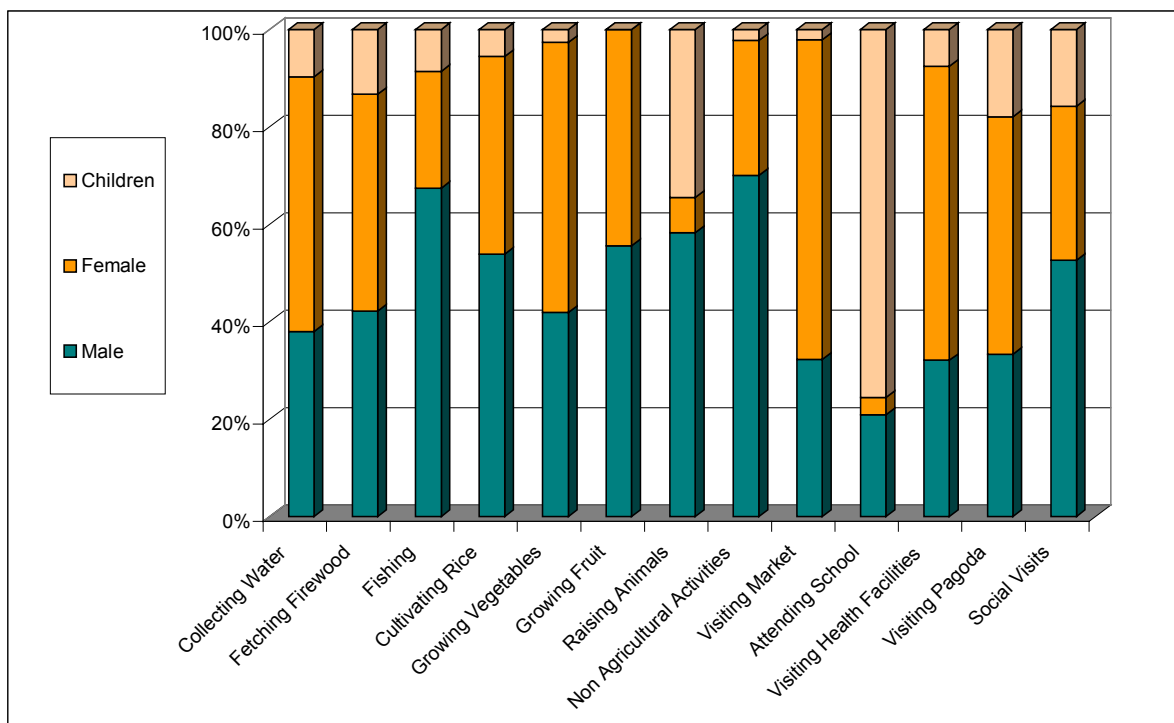


Figure 14: Daily Travel Time by Gender and Age Group (Appendix 7, table I)

This picture changes when travel and transport time is examined. Male household members spend an average of 3 hours and 21 minutes per day travelling. Women however, spend approximately 2 hours and 18 minutes per day on travel.

Women spend significantly more time collecting water, travelling to the market and visiting health facilities. Men dominate the travel time statistics for fishing, cultivating rice and non agricultural activities. Children spend most of their travel time on raising animals and trips to school.

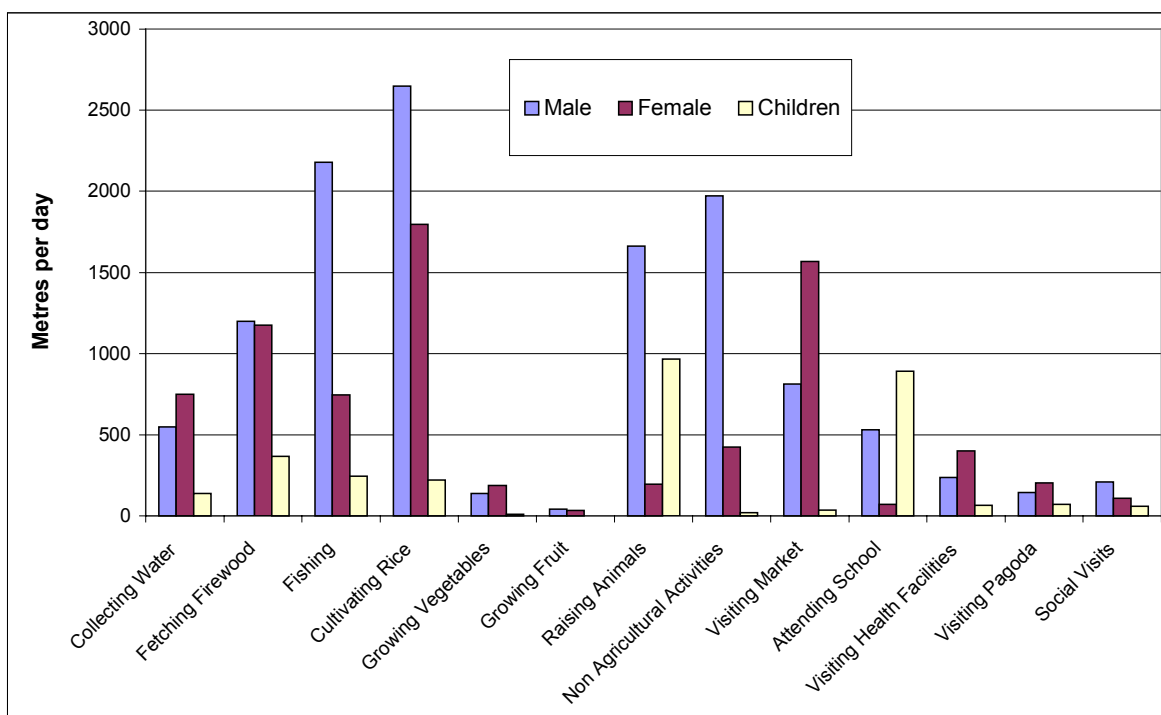


Figure 15: Daily Travel Distance by Gender and Age Group ¹⁹ (Appendix 7, table J)

The gender difference is even more apparent when the kilometres travelled are examined. The households surveyed covered 23,058 metres daily. Men travel 12,320 metres and women travel 7,657 metres per day. Rice cultivation and fishing require long journeys, which explains some of this difference.

Combining these figures with trip numbers, the average trip distance for males is 1,867 metres. The average female trip is 969 metres. The average trip time is 30.5 minutes for men and 17.4 minutes for women.

¹⁹ The male and female figures for attending school include children older than 15 attending high school.

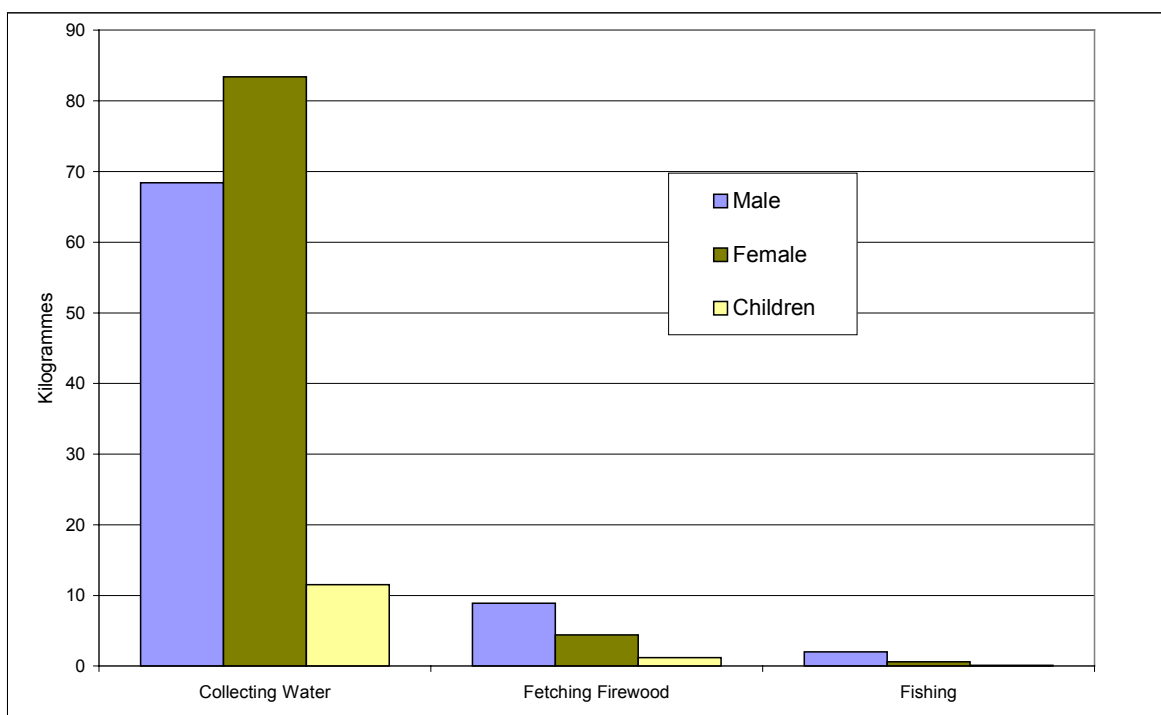


Figure 16: Daily Weight Transported by Gender and Age Group

No	Travel Activity	Daily Transported Weight by Gender and Age Group						
		Male		Female		Children		Weight Total
		Weight	%	Weight	%	Weight	%	
1	Collecting Water	68.4 kg	41.9%	83.4 kg	51.1%	11.5 kg	7.0%	163.3 kg
2	Fetching Firewood	8.9 kg	61.4%	4.4 kg	30.3%	1.2 kg	8.3%	14.5 kg
3	Fishing	2.0 kg	74.1%	0.6 kg	22.2%	0.1 kg	3.7%	2.7 kg
	Total (weight/%)	79.3 kg	43.9%	88.4 kg	49.0%	12.8 kg	7.1%	180.5 kg

Table 12: Daily Transported Weight by Gender and Age Group

Women carry most of the daily weight (49%) because of the high number of trips to collect water. Men transport 43.9 percent of the total weight.

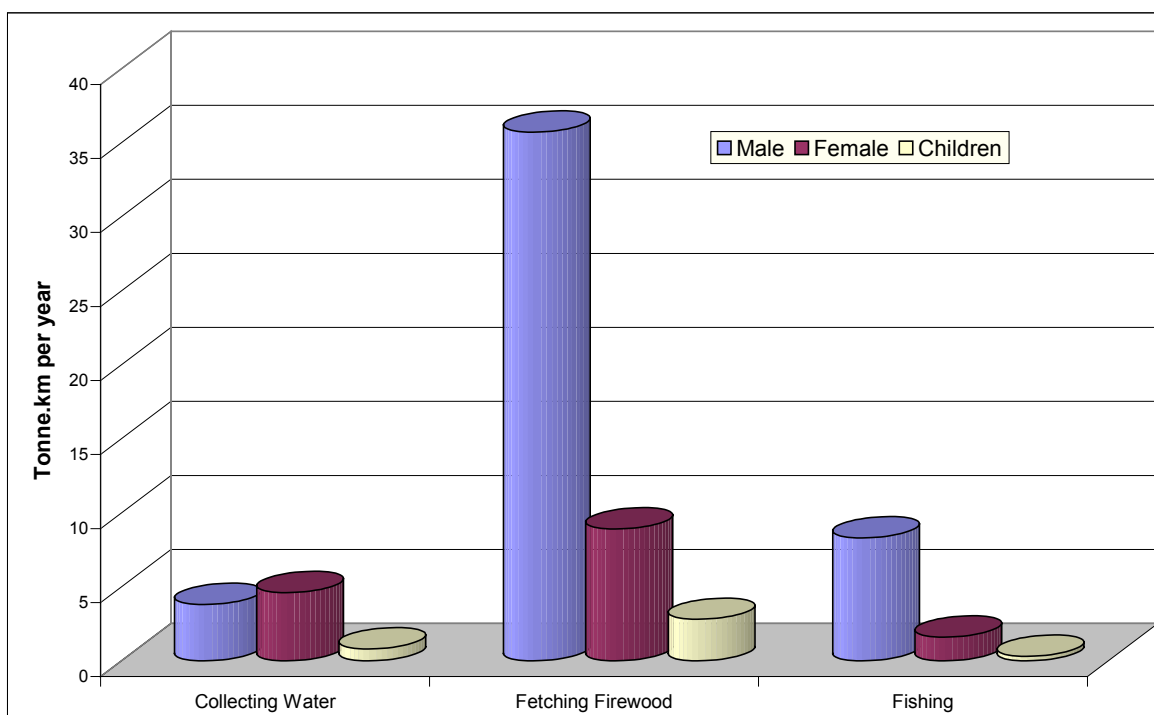


Figure 17: Annual Transport Effort by Gender and Age Group

No	Travel Activity	Annual Transport Effort by Gender and Age Group						
		Male		Female		Children		Total
		Tonne.km	%	Tonne.km	%	Tonne.km	%	
1	Collecting Water	3.8	41.3	4.6	50.0	0.8	8.7	9.2
2	Fetching Firewood	35.7	75.3	8.9	18.8	2.8	5.9	47.4
3	Fishing	8.3	81.4	1.6	15.7	0.3	2.9	10.2
	Total (tonne.km/%)	47.8	71.6	15.1	22.6	3.9	5.8	66.8

Table 13: Annual Transport Effort by Gender and Age Group

Combining distance and weight, men make the largest transport effort. Men account for 71.6 percent of the total transport effort, while women account for 22.6 percent.

Seasonal Comparison

The time of year influences rural transport patterns. There is an obvious impact on agricultural activities and microeconomic activity but it also affects the travel itself. Travel times increase and people are forced to change their travel routes and mode of transport.

The graph below shows the different modes of transport used in each season. Transport by foot still predominates. In the wet season, travel by foot decreases slightly because people tend to travel more by oxcart during this season.

No.	Mode of Transport	Frequency of Use in Dry Season	Frequency of Use in Wet Season	Yearly Frequency of Use
1	On Foot	92.87%	90.79%	91.24%
2	Bicycle	4.01%	3.98%	3.99%
3	Motorbike	0.62%	0.65%	0.63%
4	Oxcart	1.07%	2.39%	2.40%
5	Koyun	0%	0%	0%
6	Remorque	0.02%	0.02%	0.02%
7	Car	0.10%	0.04%	0.09%
8	Motorised Boat	0.01%	0.09%	0.04%
9	Non Motorised Boat	1.30%	2.04%	1.59%
	Total	100%	100%	100%

Table 14: Frequency of Use for Different Modes of Transport by Season

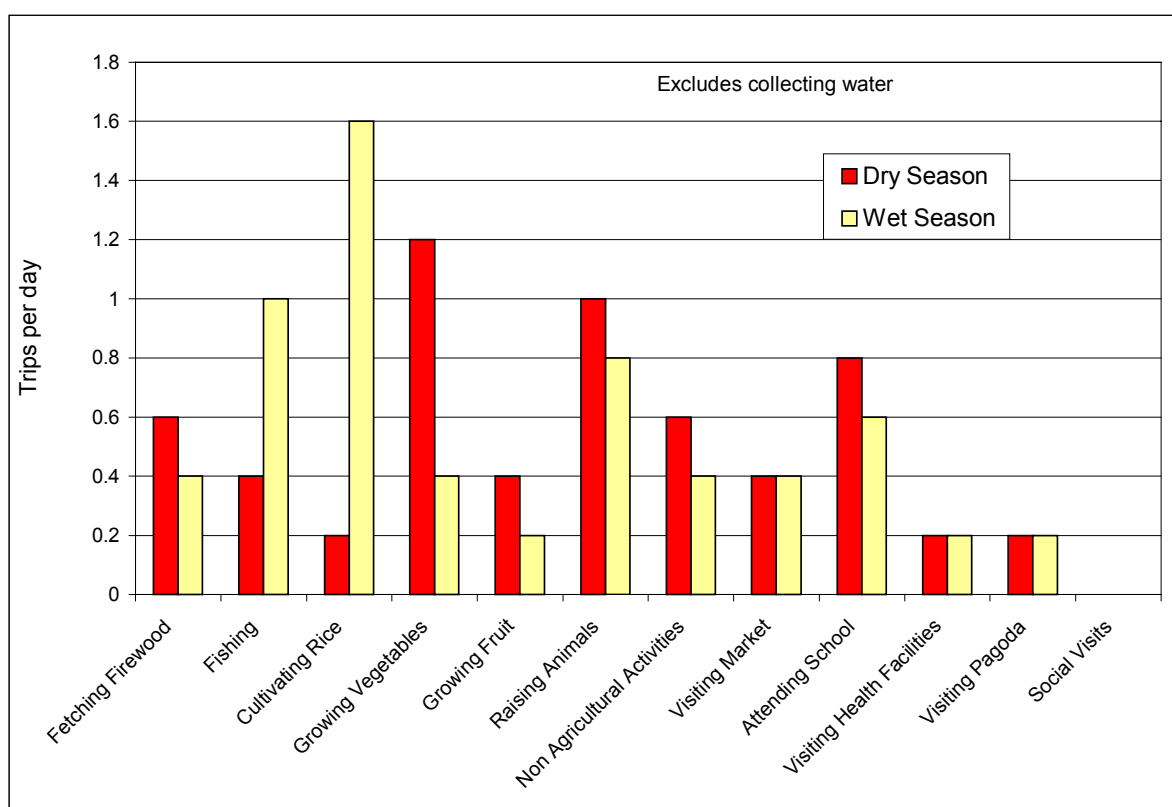


Figure 18: Daily Trip Frequency by Season (Appendix 7, table K)

Around 60 percent of annual trips are made in the dry season and 40 percent in the wet. Water collection, growing vegetables, non agricultural activities and growing fruit account for most of the dry season trips. The number of social trips is relatively higher in the dry season. Trips to most destinations decrease in the wet season, however fishing and rice field trips increase.

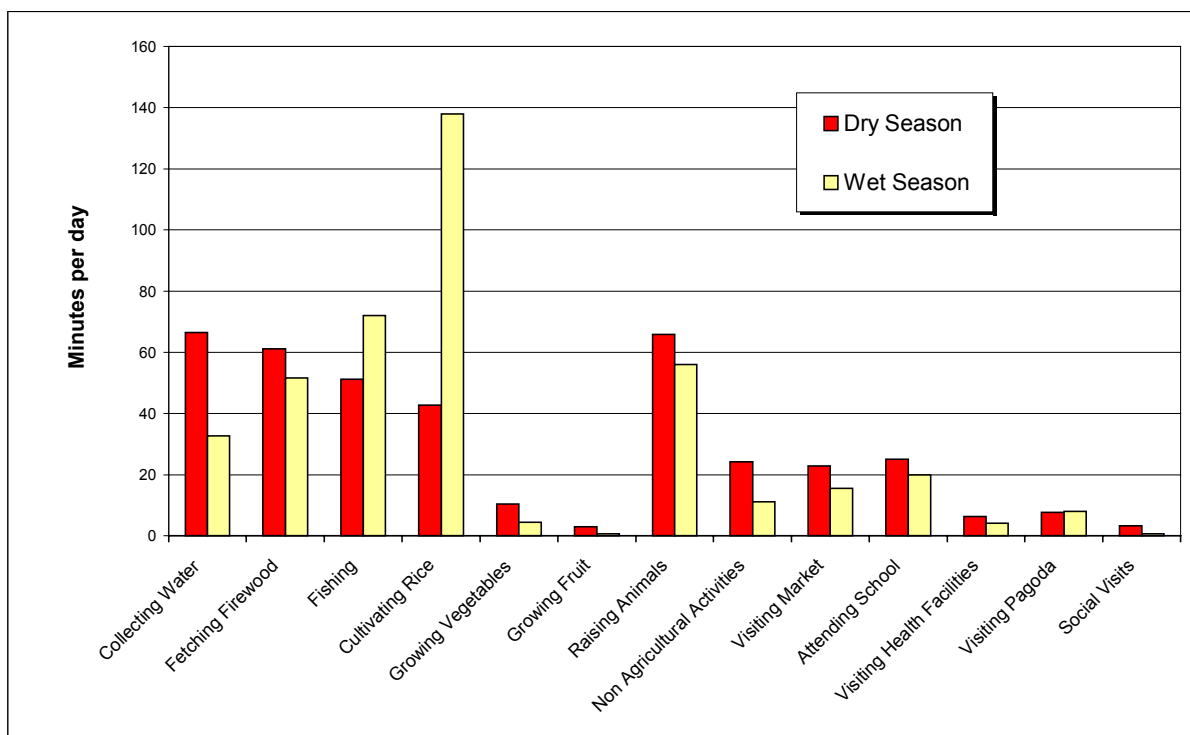


Figure 19: Daily Travel Time by Season (Appendix 7, table L)

Difficult travel conditions and more trips to the distant rice fields mean more time is spent travelling in the wet season. In general, more trips are made in the dry season, but trips are longer in the wet season. On average, it takes a household more than 90 minutes per day to travel to the rice field. In the wet season, a family spends 138 minutes per day travelling to the rice field. In the dry season, this figure is around 43 minutes.

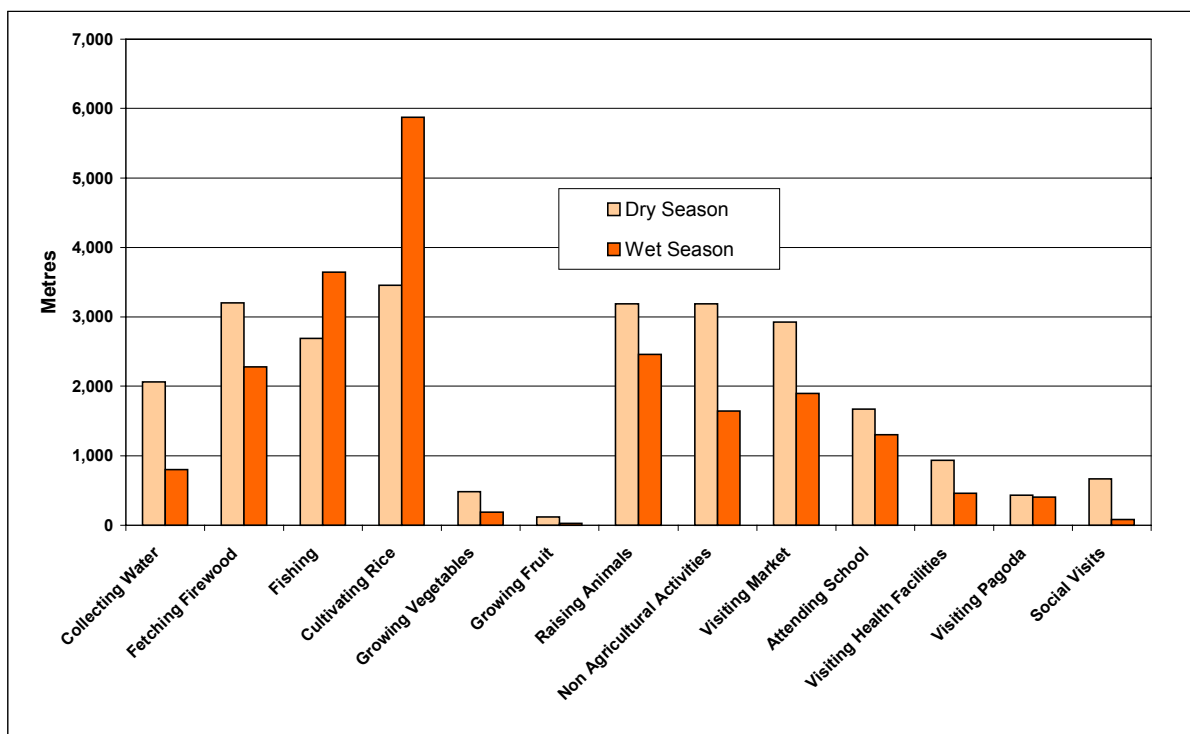


Figure 20: Daily Travel Distance by Season (Appendix 7, table M)

In the dry season, households travel 25,036 metres per day, while in the wet season they travel 21,080 metres. Combining this with the number of trips gives an average trip distance of 1,264 metres for the dry season and 1,646 metres for wet season trips. Travel speed is lower in the wet season, about 3 kilometres per hour compared with 3.9 kilometres per hour in the dry season.

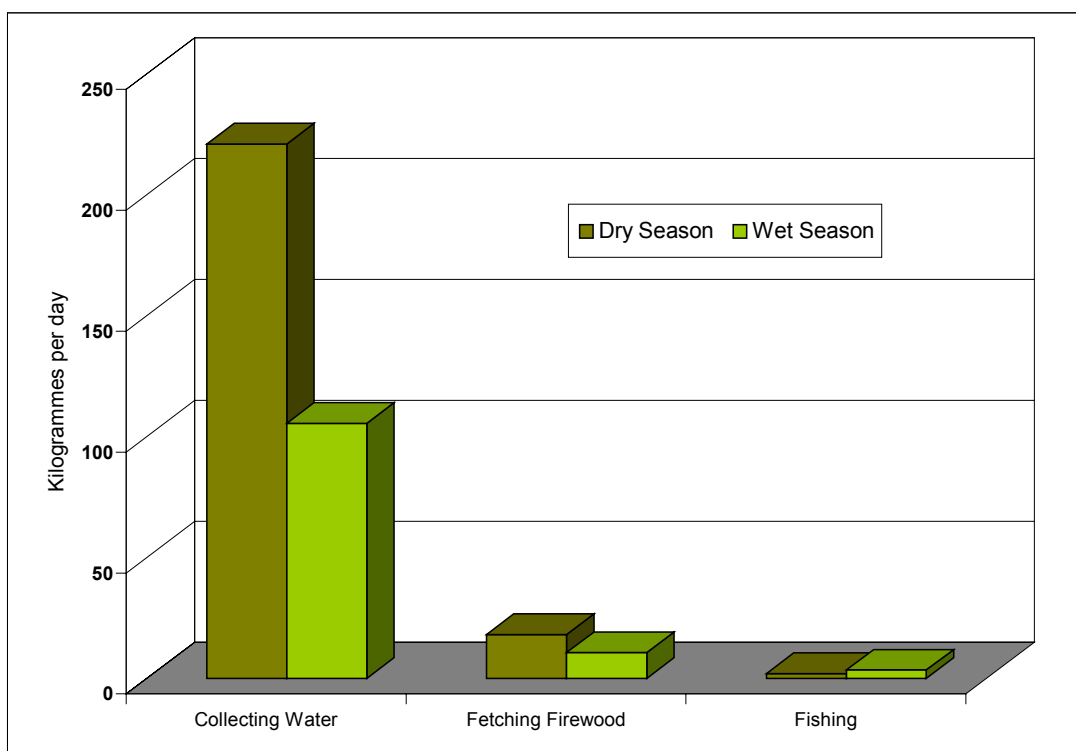


Figure 21: Daily Weight Transported by Season (see Appendix 7, table N)

Most weight is carried in the dry season. The weight of water and firewood carried almost doubles. However, weight for fishing increases in the wet season, because it is often done near the rice field.

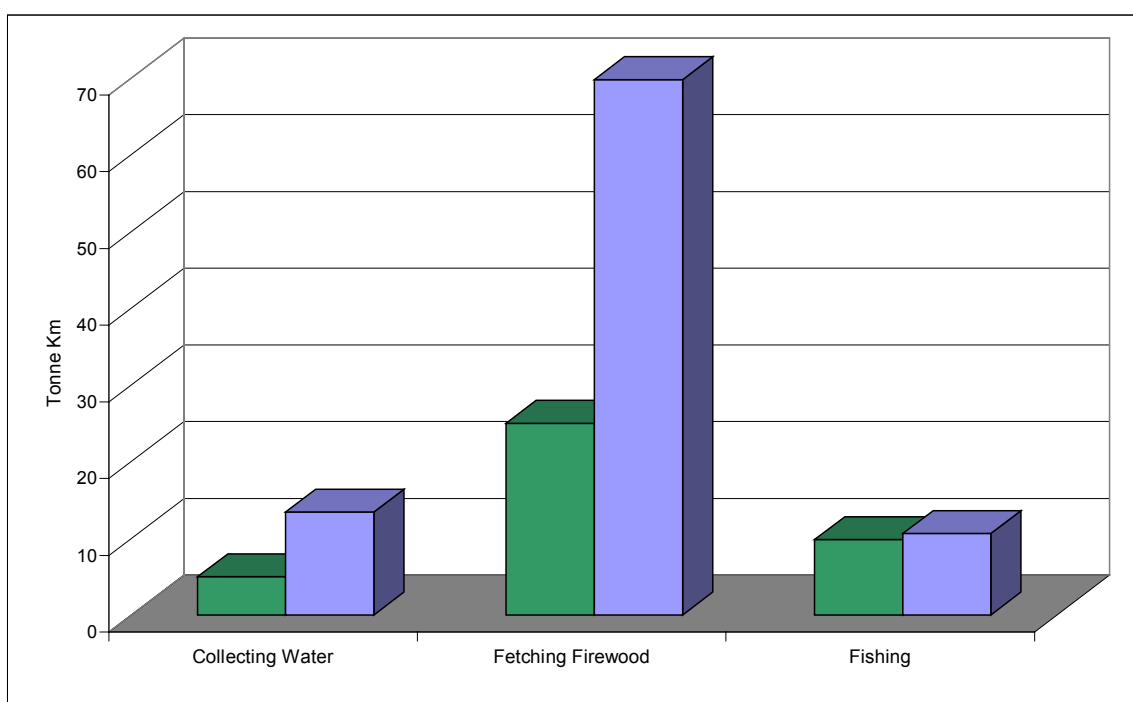


Figure 22: Annual Transport Effort by Season

No	Travel Activity	Transport Effort by Season			
		Dry Season		Wet Season	
		Tonne.km	%	Tonne.km	%
1	Collecting Water	13.4	14.3	5.0	12.6
2	Fetching Firewood	69.8	74.4	25.0	62.8
3	Fishing	10.6	11.3	9.8	24.6
	Total	93.8	100	39.8	100

Table 15: Annual Transport Effort by Season

The greatest transport effort is made fetching firewood. This is true in both seasons. It accounts for 74.4 percent of the total effort in the dry season and 62.8 percent in the wet season. Although the amount of firewood carried in the wet season is lower, the greater distances result in a relatively high transport effort. Collecting water is comparatively lower because of the short distances travelled.

The Wealth Effect: Some Impressions

This section deals with the travel and transport behaviour of different socioeconomic groups in the surveyed villages. Wealth ranking was one of the Participatory Rural Appraisal (PRA) techniques used during the survey. This technique stratified villages into socioeconomic groups.

Initially, it was planned to compare the data of all 373 surveyed households, but due to difficulties with cross comparison among villages, an alternative approach was chosen. Using the village level data did not prove useful, as the sample sizes of some sub stratifications were too small to derive reliable conclusions. Thus, this section is limited to some impressions resulting from the wealth ranking exercise. To apply this technique to Poverty Alleviation schemes, further research is strongly recommended on the relationship between relative wealth and mobility.

In most cases, the villagers divided the population of their village into three wealth groups: the upper strata they gave the name “kandal” (‘medium’), the middle group they called “kroh” and the third group were the “toal kroh” (‘poorest of the poor’). The collected family level data gives the impression that medium households spend considerably less time on travel activities than the poor and poorest households. The same seems to be true for the distance travelled - medium households travel the least distance per day, while poor and poorest families cover much longer distances each day.

Considering the separate travel activities, several interesting trends appear. Collecting water, for example, accounts for around two thirds of daily trips made by the poor and poorer households. Medium wealth households make comparatively fewer trips to the water source.

Medium households also seem to make more trips – and spend more time – travelling to the market, health facilities and school compared to the other household types. The trips made by medium households have more of an economic or social character, while the poor and poorer families spend more time on subsistence trips, i.e. fetching firewood, commuting to the rice

field or collecting water. Table 16 shows a comparison of three individual wealth classified households.

Wealth Ranking	Household 1 (‘medium’)	Household 2 (‘poor’)	Household 3 (‘poorest of poor’)
Average Time Travelled per Day	1 h 21 min	4 h 4 min	6 h 2 min
Average Number of Trips per Day	12.3 trips	11.3 trips	17.5 trips
Average Distance Travelled per Day	3 km 200 m	13 km 477 m	9 km 456 m
Main Travel Activities (Time)	1) Market (59%) 2) School (21%) 3) Social Visits (6%)	1) Rice (51%) 2) Water (19%) 3) School (16%)	1) Firewood (57%) 2) Rice (12%) 3) School (10%)
Main Travel Activities (Distance)	1) Market (50%) 2) Social Visits (18%) 3) Health Facilities (15%)	1) Rice (36%) 2) Non Agricultural Activities (24%) 3) Market (12%)	1) Firewood (49%) 2) Fishing (14%) 3) Rice (11%)
Main Travel Activities (Trips)	1) Water (25%) 2) School (21%) 3) Growing Fruit (16%)	1) Water (58%) 2) Cattle (9%) 3) Market (7%)	1) Water (67%) 2) Rice (6%) 3) Cattle (6%)

Table 16: Comparison of Three Households by Wealth Ranking

CONCLUSIONS

There are three main findings in literature about rural transport and travel development (Dennis 1998). Many studies have found that a high proportion of travel is made on foot. It has also been found that travel takes up a significant amount of time and effort in rural households. Many studies have also reported that women bear a disproportionate amount of the travel burden.

Some of these findings were replicated by the present study. The study found that 91 percent of all trips in Puok District were made on foot. Travel and transport time took up a large part of the day. The gender division of the travel burden seems more balanced in Puok district.

Rural families make an average of 16 trips per day in Puok district. More than 60 percent of these trips are for water collection. Daily, families spend approximately 6 hours and 43 minutes travelling and transporting goods, during which they cover 23 kilometres. Water is most frequently carried, although carrying firewood takes the most energy because of the longer distances involved.

Households in poor accessibility villages spend 7 hours and 59 minutes travelling per day - substantially more than good accessibility households, who spend 5 hours and 6 minutes per day on travel. Travel patterns change with the seasons. More trips are made and more distance is covered in the dry season. However, rural families spend more time on travel in the wet season.

This study compiled a detailed picture of rural travel and transport in Puok District and evaluated the IRAP procedure. It did this by examining and comparing individual indicators and their relevance to village life. Firstly, it verified the investment identification indicators i.e. by identifying the core travel and transport activities, it showed how rural households spend their time. The travel and transport involved in fetching firewood is not currently considered in the IRAP ranking procedure. The survey showed that this was a major household activity in trips, time, distance, weight and effort. It is therefore recommended that that this activity is included in the IRAP ranking procedure.

Secondly, the study helped verify individual IRAP indicators. For example, if IRAP prioritises a village because it lacks water sources, the results of the household survey should confirm this problem. In general, the study confirmed the IRAP indicators.

The third factor relates to IRAP prioritisation. Were the poor accessibility villages worse off than villages with good accessibility? The accessibility comparisons showed that poor accessibility villages spent more time travelling and covered longer distances for domestic purposes. Families in good accessibility villages spent about five hours per day travelling. Families in villages with poor accessibility, on the other hand, travel about eight hours per day.

Trip frequency and destination are also relevant. Families from good accessibility areas travelled to the market .83 times per day. Poor accessibility households only travelled to the market twice per month. Good accessibility households made three times as many trips to school as poor accessibility households. These results demonstrate the socioeconomic benefits that accrue to households in villages with better accessibility.

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APPENDICES

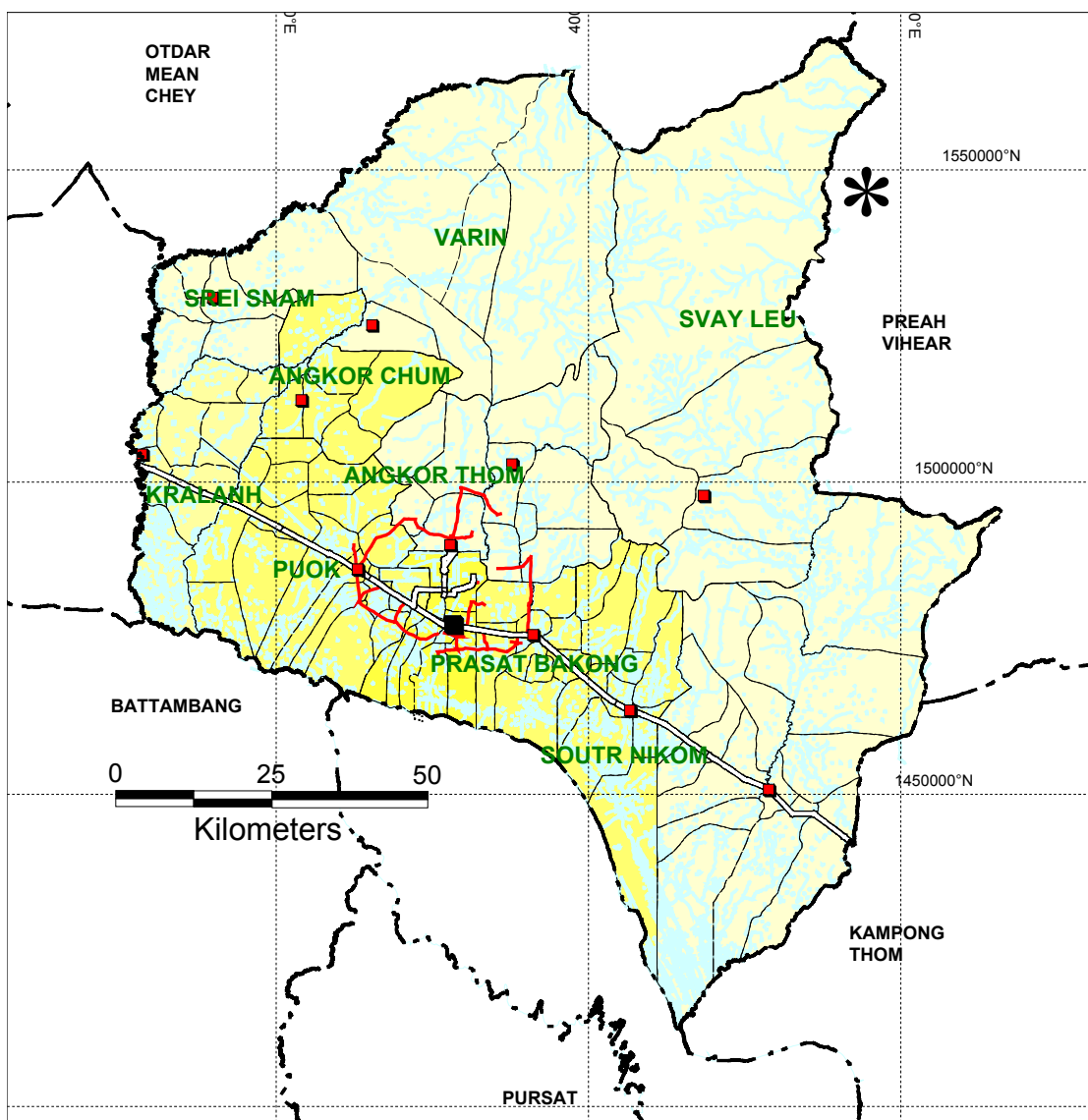
Appendix 1

List of Acronyms

AE	Associate Expert
ASIST A-P	Advisory Support Information Services and Training – Asia Pacific
CARERE	Cambodia Area Rehabilitation and Regeneration Project
CRD	Cambodian Researchers for Development
DoP	Department of Planning
EIIB	Employment Intensive Investment Branch
ILO	International Labour Organisation
IRAP	Integrated Rural Accessibility Planning
LBAT	Labour Based Appropriate Technology
MRD	Ministry of Rural Development
NUNV	National United Nations Volunteer
O&D	Origin and Destination
PDP	Provincial Department of Planning
PDRD	Provincial Department of Rural Development
PRA	Participatory Rural Appraisal
RGC	Royal Government of Cambodia
RTI	Rural Transport Infrastructure
UNDP	United Nations Development Program

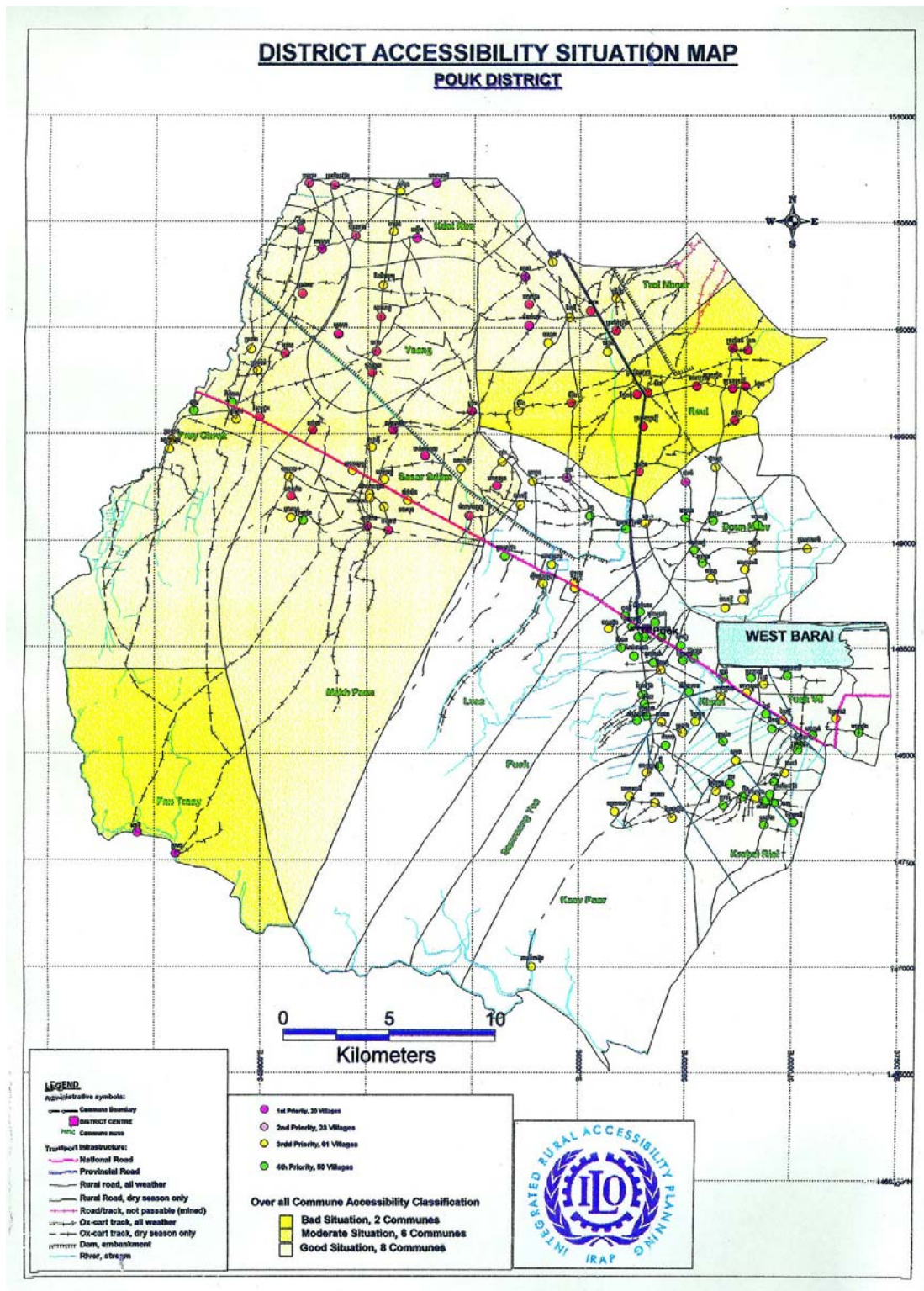
Appendix 2

Map of Siem Reap Province



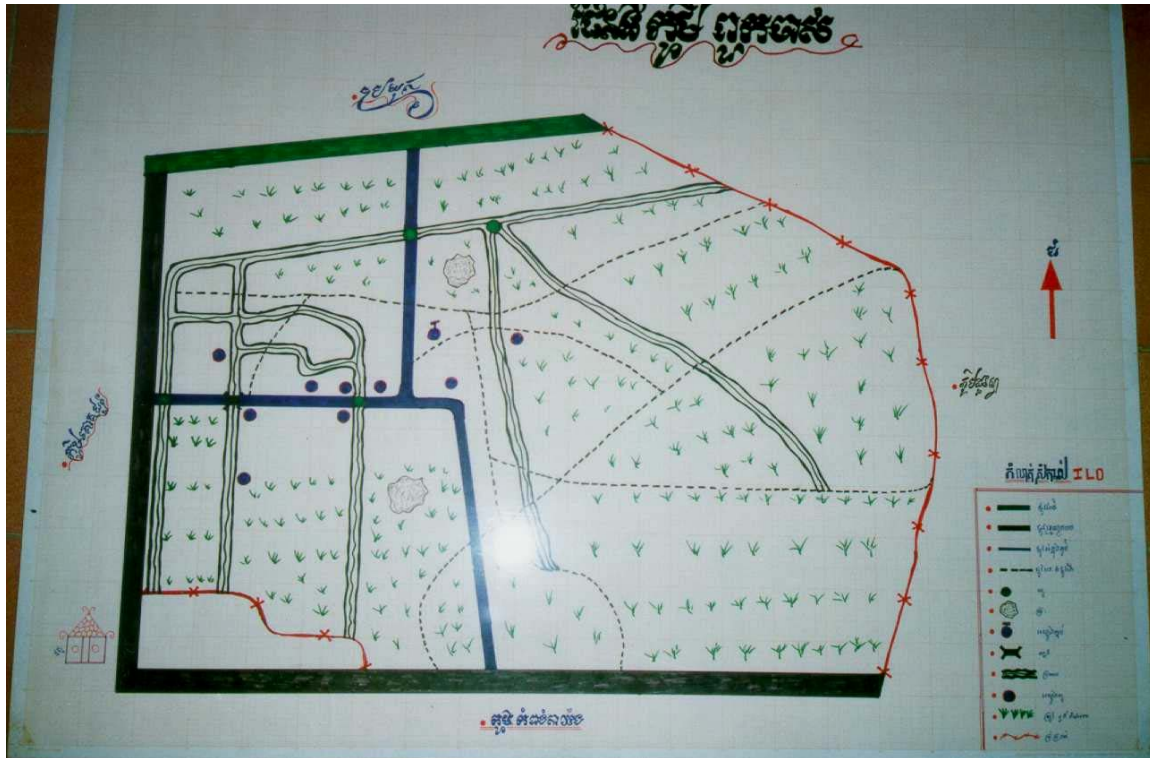
Appendix 3

Accessibility Map of Puok District



Appendix 4

Map of Puok Chas Village



Appendix 5

Wealth Ranking Criteria

1) *General Criteria:*

- Type of house (roof material: corrugated iron/wood/leaves etc.)
- Hectares of farming land
- Quantity of paddy/rice in stock
- Number of fishing ponds
- Radio (Y/N)
- Television (Y/N)

2) *Transport Criteria:*

- Number of ox carts
- Number of draught animals
- Number of bicycles
- Number of *remorques*
- Number of motorbikes
- Number of *koyuns*
- Number of cars
- Number of boats
- Number of motorised boats

3) *Education and Health Criteria:*

- Number of children who attend school
- Number of children (over 15) who attend high school
- Ability to visit health centre/hospital/clinic

4) *Financial Criteria:*

- Wage labour (Y/N)
- Living 'hand to mouth' (Y/N)
- Ability to lend money
- Ability to borrow money
- Ability to make social visits outside village
- Ability to organise ceremonies

Appendix 6

A Comparison of Two Households in Puok District

Village	Khcheay	Ketteyos
Commune	Sasar Sdam	Prey Chruk
Accessibility Rating	Poor (1 st priority)	Good (4 th priority)
Wealth Ranking	Poorest of poor	Medium
Average Travel Time/Day	2 hours 20 minutes	1 hour 12 minutes
Main Travel Activities (percent of travel time)	1) Firewood (37%) 2) Rice (34%) 3) Fish (11%) 4) Water (7%) 5) Non agricultural (6%)	1) Cattle (32%) 2) Rice (32%) 3) Water (12%) 4) Market (6%) 5) Pagoda (6%)
Male Average Travel Time per Day	3 hours 40 minutes	1 hour 40 minutes
Male Travel Activities (percent of travel time)	1) Firewood (37%) 2) Rice (28%) 3) Fish (17%) 4) Non agricultural (9%) 5) Water (8%)	1) Cattle (45%) 2) Rice (30%) 3) Water (8%) 4) Firewood (7%) 5) Market (3%)
Female Average Travel Time per Day	1 hour 20 minutes	40 minutes
Female Travel Activities (percent of travel time)	1) Rice (43%) 2) Firewood (34%) 3) Market (6%) 4) Water (5%) 5) Health (5%)	1) Rice (37%) 2) Water (19%) 3) Non agricultural (14%) 4) Market (14%) 5) Pagoda (10%)

Appendix 7

Additional Tables

No	Main Source of Income	Number of Households	Percentage	Cumulative Percentage
1	Farming	325	87%	87%
2	Fishing	20	6%	93%
3	Trading	8	2%	95%
4	Wage Labour	9	2%	97%
5	Handicraft Production	8	2%	99%
6	Other	3	1%	100%
	Total	373	100%	100%

Table A: Main Source of Income for Surveyed Households

No.	Mode of Transport	Frequency of Use	Cumulative Frequency
1	On Foot	91.24%	91.24%
2	Bicycle	3.99%	95.23%
3	Oxcart	2.40%	97.63%
4	Non Motorised Boat	1.59%	99.22%
5	Motorbike	0.63%	99.85%
6	Car	0.09%	99.94%
7	Motorised Boat	0.04%	99.98%
8	Remorque	0.02%	100%
9	Koyun	0%	100%
	Total	100%	100%

Table B: Frequency of Use for Different Modes of Transport

No	Travel Activity	Annual Travel Time per Household	Daily Travel Time per Household	Percentage	Cumulative Percentage
1	Cultivating Rice	32,548 min	90.4 min	22.5%	22.5%
2	Fishing	22,179 min	61.6 min	15.3%	37.8%
3	Raising Animals	21,925 min	60.9 min	15.1%	52.9%
4	Fetching Firewood	20,292 min	56.4 min	14.0%	66.9%
5	Collecting Water	17,853 min	49.5 min	12.3%	79.2%
6	Attending School	8,074 min	22.5 min	5.6%	84.8%
7	Visiting Market	6,884 min	19.2 min	4.8%	89.6%
8	Non Agricultural Activities	6,382 min	17.7 min	4.4%	94.0%
9	Visiting Pagoda	2,806 min	7.8 min	1.9%	95.9%
10	Growing Vegetables	2,676 min	7.4 min	1.9%	97.8%
11	Visiting Health Facilities	1,929 min	5.3 min	1.3%	99.1%
12	Social Visits	699 min	1.9 min	0.5%	99.6%
13	Growing Fruit	637 min	1.8 min	0.4%	100%
	Total	144,884 min	402.4 min	100%	100%

Table C: Total Annual Household Travel Time

No	Travel Activity	Annual Distance Travelled per Household	Daily Distance Travelled per Household	Percentage	Cumulative Percentage
1	Cultivating Rice	1,679,813 m	4,666 m	20.2%	20.2%
2	Fishing	1,140,471 m	3,168 m	13.8%	34.0%
3	Raising Animals	1,015,782 m	2,822 m	12.2%	46.2%
4	Fetching Firewood	986,148 m	2,739 m	11.9%	58.1%
5	Non Agricultural Activities	869,924 m	2,416 m	10.5%	68.6%
6	Visiting Market	869,144 m	2,415 m	10.5%	79.1%
7	Attending School	536,872 m	1,491 m	6.5%	85.6%
8	Collecting Water	516,616 m	1,435 m	6.2%	91.8%
9	Visiting Health Facilities	252,082 m	700 m	3.0%	94.8%
10	Visiting Pagoda	151,075 m	420 m	1.8%	96.6%
11	Social Visits	135,612 m	376 m	1.6%	98.2%
12	Growing Vegetables	120,412 m	335 m	1.5%	97.7%
13	Growing Fruit	26,768 m	75 m	0.3%	100%
	Total	8,300,719 m	23,058 m	100%	100%

Table D: Annual Distance Travelled per Household

No	Travel Activity	Trips per Household per Day			
		Good Accessibility		Poor Accessibility	
		Number	Percentage	Number	Percentage
1	Collecting Water	13.02	64.5%	8.01	60.3%
2	Fetching Firewood	0.19	0.9%	0.76	5.7%
3	Fishing	0.25	1.2%	1.01	7.6%
4	Cultivating Rice	0.82	4.1%	0.92	6.9%
5	Growing Vegetables	1.29	6.3%	0.50	3.8%
6	Growing Fruit	0.48	2.4%	0.22	1.7%
7	Raising Animals	1.10	5.5%	0.72	5.4%
8	Non Agricultural Activities	0.72	3.6%	0.38	2.9%
9	Visiting Market	0.83	4.1%	0.07	0.5%
10	Attending School	1.08	5.4%	0.35	2.6%
11	Visiting Health Facilities	0.21	1.0%	0.13	1.0%
12	Visiting Pagoda	0.18	0.9%	0.20	1.5%
13	Social Visits	0.02	0.1%	0.01	0.1%
	Total	20.19	100%	13.28	100%

Table E: Trip Comparison between Good and Poor Accessibility Villages

No	Travel Activity	Travel Time per Household per Day			
		Good Accessibility		Poor Accessibility	
		Time	Percentage	Time	Percentage
1	Collecting Water	53 min	17.3%	47 min	9.8%
2	Fetching Firewood	20 min	6.5%	85 min	17.8%
3	Fishing	13 min	4.3%	100 min	20.9%
4	Cultivating Rice	86 min	28.1%	93 min	19.4%
5	Growing Vegetables	4 min	1.3%	10 min	2.1%
6	Growing Fruit	2 min	0.7%	2 min	0.4%
7	Raising Animals	35 min	11.4%	81 min	16.9%
8	Non Agricultural	25 min	8.2%	12 min	2.5%
9	Visiting Market	23 min	7.5%	16 min	3.3%
10	Attending School	34 min	11.1%	14 min	2.9%
11	Visiting Health Facilities	4 min	1.3%	7 min	1.5%
12	Visiting Pagoda	5 min	1.6%	10 min	2.1%
13	Social Visits	2 min	0.7%	2 min	0.4%
	Total (minutes/%)	306 min	100%	479 min	100%
	Total (hours/%)	5hrs 6min	100%	7hrs 59m	100%

Table F: Travel Time Comparison between Good and Poor Accessibility Villages

No	Travel Activity	Travel Distance per Household per Day			
		Good Accessibility		Poor Accessibility	
		Distance	Percentage	Distance	Percentage
1	Collecting Water	1798 m	7.95%	1150 m	4.91%
2	Fetching Firewood	1197 m	5.29%	3950 m	16.88%
3	Fishing	740 m	3.27%	5073 m	21.68%
4	Cultivating Rice	5564 m	24.59%	3962 m	16.93%
5	Growing Vegetables	153 m	0.67%	477 m	2.04%
6	Growing Fruit	51 m	0.23%	93 m	0.40%
7	Raising Animals	1743 m	7.70%	3668 m	15.68%
8	Non Agricultural Activities	4464 m	19.73%	810 m	3.46%
9	Visiting Market	2837 m	12.54%	2083 m	8.90%
10	Attending School	2501 m	11.05%	699 m	2.99%
11	Visiting Health Facilities	673 m	2.98%	722 m	3.09%
12	Visiting Pagoda	318 m	1.41%	499 m	2.13%
13	Social Visits	587 m	2.59%	212 m	0.91%
	Total (metres/%)	22626 m	100%	23398 m	100%

Table G: Travel Distance Comparison between Good and Poor Accessibility Villages

No	Travel Activity	Daily Number of Trips by Gender and Age Group						
		Male		Female		Children		Trip Total
		Number	%	Number	%	Number	%	
1	Collecting Water	4.0	39.2	5.4	52.9	0.8	7.9	10.2
2	Fetching Firewood	0.2	40.0	0.2	40.0	0.1	20.0	0.5
3	Fishing	0.4	57.1	0.2	28.6	0.1	14.3	0.7
4	Cultivating Rice	0.4	44.5	0.4	44.5	0.1	11.0	0.9
5	Growing Vegetables	0.3	37.5	0.5	62.5	0	0	0.8
6	Growing Fruit	0.1	33.3	0.2	66.7	0	0	0.3
7	Raising Animals	0.6	66.7	0.1	11.1	0.2	22.2	0.9
8	Non Agricultural Activities	0.2	40.0	0.3	60.0	0	0	0.5
9	Visiting Market	0.1	25.0	0.3	75.0	0	0	0.4
10	Attending School	0.1	14.3	0.1	14.3	0.5	71.4	0.7
11	Visiting Health Facilities	0.1	50.0	0.1	50.0	0	0	0.2
12	Visiting Pagoda	0.1	50.0	0.1	50.0	0	0	0.2
13	Social Visits	0	0	0	0	0	0	0
	Total (number/%)	6.6	40.5	7.9	48.5	1.8	11.0	16.3

Table H: Daily Trip Frequency by Gender and Age Group

No	Travel Activity	Daily Travel Time by Gender and Age Group						
		Male		Female		Children		Total Time
		Time	%	Time	%	Time	%	
1	Collecting Water	18.8 min	38.0	25.9 min	52.3	4.8 min	9.7	49.5 min
2	Fetching Firewood	23.8 min	42.2	25.1 min	44.5	7.5 min	13.3	56.4 min
3	Fishing	41.5 min	67.4	14.8 min	24.0	5.3 min	8.6	61.6 min
4	Cultivating Rice	48.7 min	53.9	36.7 min	40.6	5.0 min	5.5	90.4 min
5	Growing Vegetables	3.1 min	41.9	4.1 min	55.4	0.2 min	2.7	7.4 min
6	Growing Fruit	1.0 min	54.7	0.8 min	43.7	0 min	1.6	1.8 min
7	Raising Animals	35.5 min	58.3	4.4 min	7.2	21.0 min	34.5	60.9 min
8	Non Agricultural Activities	12.4 min	70.0	4.9 min	27.7	0.4 min	2.3	17.7 min
9	Visiting Market	6.2 min	32.3	12.6 min	65.6	0.4 min	2.1	19.2 min
10	Attending School	4.7 min	20.9	0.8 min	3.6	17.0 min	75.5	22.5 min
11	Visiting Health Facilities	1.7 min	32.1	3.2 min	60.4	0.4 min	7.5	5.3 min
12	Visiting Pagoda	2.6 min	33.3	3.8 min	48.7	1.4 min	18.0	7.8 min
13	Social Visits	1.0 min	52.6	0.6 min	31.6	0.3 min	15.8	1.9 min
	Total (time/%)	201.0 min	50.0	137.7 min	34.2	63.7 min	15.8	402.4 min
	Total Time (hrs)	3 h 21.0m		2 h 17.7 m		1 h 3.7 m		6 h 42.4 m

Table I: Daily Travel Time by Gender and Age Group

No	Travel Activity	Daily Travel Distance by Gender and Age Group						
		Male		Female		Children		Total Distance
		Distance	%	Distance	%	Distance	%	
1	Collecting Water	549 m	38.3	748 m	52.1	138 m	9.6	1,435 m
2	Fetching Firewood	1,198 m	43.7	1,175 m	42.9	366 m	13.4	2,739 m
3	Fishing	2,178 m	68.7	747 m	23.6	243 m	7.7	3,168 m
4	Cultivating Rice	2,649 m	56.8	1,796 m	38.5	221 m	4.7	4,666 m
5	Growing Vegetables	138 m	41.2	188 m	56.1	9 m	2.7	335 m
6	Growing Fruit	41 m	54.7	33 m	44.0	1 m	1.3	75 m
7	Raising Animals	1,663 m	58.9	194 m	6.9	965 m	34.2	2,822 m
8	Non Agricultural Activities	1,972 m	81.6	425 m	17.6	19 m	0.8	2,416 m
9	Visiting Market	812 m	33.6	1,567 m	64.9	36 m	1.5	2,415 m
10	Attending School	530 m	35.5	70 m	4.7	891 m	59.8	1,491 m
11	Visiting Health Facilities	237 m	33.9	400 m	57.1	63 m	9.0	700 m
12	Visiting Pagoda	144 m	34.3	205 m	48.8	71 m	16.9	420 m
13	Social Visits	209 m	55.6	109 m	29.0	58 m	15.4	376 m
	Total (distance/%)	12,320 m	53.4	7,657 m	33.2	3,081 m	13.4	23,058 m

Table J: Daily Travel Distance by Gender and Age Group

No	Travel Activity	Daily Number of Trips by Season				
		Dry Season		Wet Season		Trip Average
		Number	%	Number	%	
1	Collecting Water	13.8	69.7	6.6	51.6	10.2
2	Fetching Firewood	0.6	3.0	0.4	3.1	0.5
3	Fishing	0.4	2.0	1.0	7.8	0.7
4	Cultivating Rice	0.2	1.0	1.6	12.5	0.9
5	Growing Vegetables	1.2	6.1	0.4	3.1	0.8
6	Growing Fruit	0.4	2.0	0.2	1.6	0.3
7	Raising Animals	1.0	5.1	0.8	6.3	0.9
8	Non Agricultural Activities	0.6	3.0	0.4	3.1	0.5
9	Visiting Market	0.4	2.0	0.4	3.1	0.4
10	Attending School	0.8	4.0	0.6	4.7	0.7
11	Visiting Health Facilities	0.2	1.0	0.2	1.6	0.2
12	Visiting Pagoda	0.2	1.0	0.2	1.6	0.2
13	Social Visits	0.0	0.0	0.0	0.0	0
	Total (number)	19.8		12.8		16.3

Table K: Daily Trip Frequency by Season

No	Travel Activity	Daily Travel Time by Season				
		Dry Season		Wet Season		Average Travel Time
		Time	%	Time	%	
1	Collecting Water	66.4 min	17.0	32.6 min	7.9	49.5 min
2	Fetching Firewood	61.2 min	15.7	51.6 min	12.4	56.4 min
3	Fishing	51.2 min	13.1	72.0 min	17.4	61.6 min
4	Cultivating Rice	42.8 min	11.0	138.0 min	33.3	90.4 min
5	Growing Vegetables	10.4 min	2.7	4.4 min	1.1	7.4 min
6	Growing Fruit	3.0 min	0.8	0.6 min	0.1	1.8 min
7	Raising Animals	65.8 min	16.9	56.0 min	13.5	60.9 min
8	Non Agricultural Activities	24.2 min	6.2	11.2 min	2.7	17.7 min
9	Visiting Market	22.8 min	5.8	15.6 min	3.8	19.2 min
10	Attending School	25.0 min	6.4	20.0 min	4.8	22.5 min
11	Visiting Health Facilities	6.4 min	1.6	4.2 min	1.0	5.3 min
12	Visiting Pagoda	7.6 min	1.9	8.0 min	1.9	7.8 min
13	Social Visits	3.2 min	0.8	0.6 min	0.1	1.9 min
	Total (time)	390.0 min		414.8 min		402.4 min

Table L: Travel Time by Season

No	Travel Activity	Daily Travel Distance by Season				
		Dry Season		Wet Season		Average Travel Distance
		Distance	%	Distance	%	
1	Collecting Water	2,068 m	8.3	802 m	3.8	1,435 m
2	Fetching Firewood	3,198 m	12.8	2,280 m	10.8	2,739 m
3	Fishing	2,690 m	10.7	3,646 m	17.3	3,168 m
4	Cultivating Rice	3,458 m	13.8	5,874 m	27.9	4,666 m
5	Growing Vegetables	484 m	1.9	186 m	0.9	335 m
6	Growing Fruit	122 m	0.5	28 m	0.1	75 m
7	Raising Animals	3,188 m	12.7	2,456 m	11.7	2,822 m
8	Non Agricultural Activities	3,188 m	12.7	1,644 m	7.8	2,416 m
9	Visiting Market	2,928 m	11.7	1,902 m	9.0	2,415 m
10	Attending School	1,674 m	6.7	1,308 m	6.2	1,491 m
11	Visiting Health Facilities	938 m	3.7	462 m	2.2	700 m
12	Visiting Pagoda	434 m	1.7	406 m	1.9	420 m
13	Social Visits	666 m	2.7	86 m	0.4	376 m
	Total (distance)	25,036 m		21,080 m		23,058 m

Table M: Daily Travel Distance by Season

No	Travel Activity	Weight Transported by Season			
		Dry Season		Wet Season	
		Weight	%	Weight	%
1	Collecting Water	221.1 kg	91.7%	105.4 kg	88.3%
2	Fetching Firewood	18.1 kg	7.5%	10.6 kg	8.9%
3	Fishing	1.9 kg	0.8%	3.4 kg	2.8%
	Total	241.1 kg	100%	119.4 kg	100%

Table N: Daily Weight Transported by Season

Appendix 8
Survey Questionnaire
Household Travel Demand Survey Form

Puok District, Siem Reap Province, Kingdom of Cambodia

April/May 2000

Socioeconomic Team

International Labour Organisation (ILO) & Ministry of Rural Development (MRD)

Commune Name:

Village Name:

Accessibility Ranking:

Date of Interview:

Interviewer's Name:

Form Number:

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I. General Household Information

Family Name:

Interviewee's Name:

Interviewee's Age:

Interviewee's Sex:

Number of Adults in Household:

Number of Children in Household:

--	--

Sex										
Age										

Main Source of Income of Household:

--	--

Number and Type of Means of Transport:

Type				
Number				

Wealth Ranking of Household:

--	--

II. Description of Daily Activities (“time diary”)

Please describe your daily activities:

A. A typical day in the dry season (i.e. yesterday):

Time	Activities	Remark
4:00 AM		
5.00 AM		
6.00 AM		
7.00 AM		
8.00 AM		
9.00 AM		
10.00 AM		
11.00 AM		
12.00 AM		
1.00 PM		
2.00 PM		
3.00 PM		
4.00 PM		
5.00 PM		
6:00 PM		
7.00 PM		
8:00 PM		
9:00 PM		
10.00 PM		

Please describe your daily activities:

B. A typical day in the wet season:

Time	Activities	Remark
4:00 AM		
5.00 AM		
6.00 AM		
7.00 AM		
8.00 AM		
9.00 AM		
10.00 AM		
11.00 AM		
12.00 AM		
1.00 PM		
2.00 PM		
3.00 PM		
4.00 PM		
5.00 PM		
6:00 PM		
7.00 PM		
8:00 PM		
9:00 PM		
10.00 PM		

III. Structured Interview

1. Do you go out to collect water?

Yes

☐

No

☐

If no, please go to question 2.

1.1 In the dry season?

Yes

☐

No

☐

If no, please go to question 1.2

- a) Where do you go to get it? _____
- b) What type of water source? _____
- c) What is the distance to the water source? _____ metres
- d) How long does it take to get there? _____ minutes
- e) How do you get there? by _____
- f) What type of container do you use? _____
- g) How do you carry the container? _____
- h) What route do you usually take? _____

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

i) How many persons usually collect water every day?	j) Usually how many times per day does each of you need to go there?	k) How many litres does one transport per time?
Adult male No ☐		
Adult female No ☐		
Children under 15 No ☐		

l) Do you encounter any problems carrying out this activity?

1.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 2.

- a) Where do you go to get it? _____
- b) What type of water source? _____
- c) What is the distance to the water source? _____ metres
- d) How long does it take to get there? _____ minutes
- e) How do you get there? by _____
- f) What type of container do you use? _____
- g) How do you carry the container? _____
- h) What route do you usually take? _____

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

i) How many persons usually collect water every day?	j) Usually how many times per day does each of you need to go there?	k) How many litres does one transport per time?
Adult male No		
Adult female No		
Children under 15 No		

l) Do you encounter any problems carrying out this activity?

2. Do you go out to fetch firewood?

Yes

No

If no, please go to question 3

2.1 In the dry season?

Yes

No

If no, please go to question 2.2

a) Where do you fetch it?

b) What is the distance to that place?

----- metres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

Walking

Bike

Moto

Oxcart

Koyun

Car

Motorised Boat

Boat

Other:

e) If walking, how do you carry the firewood?

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually fetch firewood every day?		h) Usually how many times does each of you need to go there?	i) How many kilogrammes does one transport per time?
Adult male	No ☐		
Adult female	No ☐		
Children under 15	No ☐		

j) Do you encounter any problems carrying out this activity?

2.2 In the wet season?

Yes ☐ No ☐

If no, please go to question 3

- a) Where do you fetch it? -----
b) What is the distance to that place? ----- metres
c) How long does it take to get there? -----hours-----minutes
d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun
☐ Car ☐ Motorised Boat ☐ Boat ☐ Other:.....

- e) If walking, how do you carry the firewood? -----
f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many persons usually fetch firewood every day?		h) Usually how many times does each of you need to go there?	i) How many kilogrammes does one transport per time?
Adult male	No ☐		
Adult female	No ☐		
Children under 15	No ☐		

j) Do you encounter any problems carrying out this activity?

3. Do you go fishing?²⁰

Yes

☐

No

☐

If no, please go to question 4

3.1 In the dry season?

Yes

☐

No

☐

If no, please go to question 3.2

a) Where do you go fishing?

b) What is the distance that place?

----- metres

c) How long does it take to get there?

----- hours----- minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) If walking, how do you carry the fish?

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually go fishing every day?			h) Usually how many times does each of you need to go there?		i) How many kilogrammes does one transport per time?
Adult male	No	☐			
Adult female	No	☐			
Children under 15	No	☐			

j) Do you encounter any problems carrying out this activity?

3.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 4

a) Where do you go fishing?

b) What is the distance that place?

----- metres

c) How long does it take to get there?

-----hours----- minutes

²⁰ This includes ponds/lakes/rivers (includes also looking for crabs in the rice field).

d) How do you get there?

☐ Walking
 ☐ Bike
 ☐ Moto
 ☐ Oxcart
 ☐ Koyun
☐ Car
 ☐ Motorised Boat
 ☐ Boat
 ☐ Other:.....

e) If walking, how do you carry the fish?

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually go fishing every day?		h) Usually how many times does each of you need to go there?		i) How many kilogrammes does one transport per time?
Adult male	No ☐			
Adult female	No ☐			
Children under 15	No ☐			

j) Do you encounter any problems carrying out this activity?
.....

4. Do you cultivate rice? Yes ☐ No ☐

If no, please go to question 5

4.1 In the dry season? Yes ☐ No ☐

If no, please go to question 4.2

a) Where do you go to cultivate rice?

b) What is the distance to the rice field? metres

c) How long does it take to get there? ----hours-----minutes

d) How do you get there?

☐ Walking
 ☐ Bike
 ☐ Moto
 ☐ Oxcart
 ☐ Koyun
☐ Car
 ☐ Motorised Boat
 ☐ Boat
 ☐ Other:.....

e) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

f) How many persons usually go to the rice field?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

4.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 5

a) Where do you go to cultivate rice?

b) What is the distance to the rice field?

----- metres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

f) How many persons usually go to the rice field?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

5. Do you grow vegetables? **Yes** ☐ **No** ☐

If no, please go to question 6

5.1 In the dry season? **Yes** ☐ **No** ☐

If no, please go to question 5.2

- a) Where do you grow vegetables? -----
 b) What is the distance to that place? ----- metres
 c) How long does it take to get there? -----hours-----minutes
 d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun
☐ Car ☐ Motorised Boat ☐ Boat ☐ Other:.....

e) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

f) How many persons usually go there?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

5.2 In the wet season? **Yes** ☐ **No** ☐

If no, please go to question 6

- a) Where do you grow vegetables? -----
 b) What is the distance to that place? ----- metres
 c) How long does it take to get there? -----hours-----minutes
 d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun
☐ Car ☐ Motorised Boat ☐ Boat ☐ Other:.....

e) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

f) How many persons usually go there?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

6. Do you grow fruit?

Yes

☐

No

☐

If no, please go to question 7

6.1 In the dry season?

Yes

☐

No

☐

If no, please go to question 6.2

a) Where do you grow fruit?

b) What is the distance to that place?

----- metres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

f) How many persons usually go there?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

6.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 7

a) Where do you grow fruit?

b) What is the distance to that place?

----- metres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

f) How many persons usually go there?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

7. Do you raise animals?

Yes

☐

No

☐

If no, please go to question 8

7.1 In the dry season:

- a) Where do you raise animals? _____
- b) What is the distance to that place? _____ metres
- c) How long does it take to get there? _____hours_____minutes
- d) How do you get there? by_____
- e) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

f) How many persons usually go there?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

7.2 In the wet season:

- a) Where do you raise animals? _____
- b) What is the distance to that place? _____ metres
- c) How long does it take to get there? _____hours_____minutes
- d) How do you get there? by_____
- e) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

f) How many persons usually go there?		g) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

h) Do you encounter any problems carrying out this activity?

8. Are you involved in non – agricultural activities? Yes ☐ No ☐

If no, please go to question 9

8.1 In the dry season? Yes ☐ No ☐

If no, please go to question 8.2

- a) What type of work is it? _____
 b) Where do you do this? _____
 c) What is the distance to that place? _____ metres
 d) How long does it take to get there? _____hours_____minutes
 e) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun
☐ Car ☐ Motorised Boat ☐ Boat ☐ Other:.....

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually go there?		h) Usually how many times does each of you need to go there?	
Adult male	No ☐		
Adult female	No ☐		
Children under 15	No ☐		

i) Do you encounter any problems carrying out this activity?

8.2 In the wet season? Yes ☐ No ☐

If no, please go to question 9

- a) What type of work is it? _____
 b) Where do you do this? _____
 c) What is the distance to that place? _____ metres
 d) How long does it take to get there? _____hours_____minutes

e) How do you get there?

☐ Walking
 ☐ Bike
 ☐ Moto
 ☐ Oxcart
 ☐ Koyun
☐ Car
 ☐ Motorised Boat
 ☐ Boat
 ☐ Other:.....

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many persons usually go there?		h) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

i) Do you encounter any problems carrying out this activity?

9. Do you visit a market?

Yes

☐

No

☐

If no, please go to question 10

9.1 In the dry season?

Yes

☐

No

☐

If no, please go to question 9.2

a) Where do you go to the market?

b) What is the distance to that market?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐ Walking
 ☐ Bike
 ☐ Moto
 ☐ Oxcart
 ☐ Koyun
☐ Remorque
 ☐ Car
 ☐ Motorised Boat
 ☐ Boat
☐ Other:.....

e) How much do you spend for that trip?

-----Riel

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many persons usually go there?		h) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

i) Do you encounter any problems carrying out this activity?

9.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 10

a) Where do you go to the market?

b) What is the distance to that market?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Remorque

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) How much do you spend for that trip?

-----Riel

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many persons usually go there?		h) Usually how many times does each of you need to go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

i) Do you encounter any problems carrying out this activity?

10. Does any of the children attend school? Yes ☐ No ☐

If no, please go to question 11

10.1 In the dry season? Yes ☐ No ☐

If no, please go to question 10.2

10.1.A Do they attend primary school? Yes ☐ No ☐

If no, please go to question 10.1.B

a) Where is the school?

b) What is the distance to that school?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun

☐ Remorque ☐ Car ☐ Motorised Boat ☐ Boat

☐ Other:.....

e) How much do you spend for that trip?

----- Riel

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many children (and possible accompanying adults) go there?		h) Usually how many times does each of you need to go there?
Children under 15	No ☐	
Adult male	No ☐	
Adult female	No ☐	

i) Do you encounter any problems carrying out this activity?

10.1.B Do they attend secondary school? Yes ☐ No ☐

If no, please go to question 10.1.C

a) Where is the school? -----

b) What is the distance to that school? ----- kilometres

c) How long does it take to get there? -----hours-----minutes

d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun

☐ Remorque ☐ Car ☐ Motorised Boat ☐ Boat

☐ Other:.....

e) How much do you spend for that trip? ----- Riel

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many children (and possible accompanying adults) go there?		h) Usually how many times does each of you need to go there?
Children under 15	No ☐	
Adult male	No ☐	
Adult female	No ☐	

i) Do you encounter any problems carrying out this activity?

10.1.C Does anyone attend high school? Yes ☐ No ☐

If no, please go to question 10.2

- a) Where is the school?
- b) What is the distance to that school? kilometres
- c) How long does it take to get there?hours-----minutes
- d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun

☐ Remorque ☐ Car ☐ Motorised Boat ☐ Boat

☐ Other:.....

e) How much do you spend for that trip? Riel

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons go there?			h) Usually how many times does each of you need to go there?
Children under 15	No	☐	
Adult male	No	☐	
Adult female	No	☐	

i) Do you encounter any problems carrying out this activity?

.....

10.2 In the dry season?

Yes ☐ No ☐

If no, please go to question 11

10.2.A Do they attend primary school?

Yes ☐ No ☐

If no, please go to question 10.2.B

- a) Where is the school?
- b) What is the distance to that school? kilometres
- c) How long does it take to get there?hours-----minutes
- d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun

☐ Remorque ☐ Car ☐ Motorised Boat ☐ Boat

☐ Other:.....

e) How much do you spend for that trip? ----- Riel

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many children (and possible accompanying adults) go there?			h) Usually how many times does each of you need to go there?
Children under 15	No	☐	
Adult male	No	☐	
Adult female	No	☐	

i) Do you encounter any problems carrying out this activity?

10.2.B Do they attend secondary school? Yes ☐ **No** ☐

If no, please go to question 10.2.C

a) Where is the school?

b) What is the distance to that school?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐ Walking ☐ Bike ☐ Moto ☐ Oxcart ☐ Koyun

☐ Remorque ☐ Car ☐ Motorised Boat ☐ Boat

☐ Other:.....

e) How much do you spend for that trip? ----- Riel

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many children (and possible accompanying adults) go there?		h) Usually how many times does each of you need to go there?
Children under 15	No ☐	
Adult male	No ☐	
Adult female	No ☐	

i) Do you encounter any problems carrying out this activity?

10.2.C Does anyone attend high school?

Yes

☐

No

☐

If no, please go to question 11

a) Where is the school?

b) What is the distance to that school?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Remorque

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) How much do you spend for that trip?

----- Riel

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons go there?		h) Usually how many times does each of you need to go there?
Children under 15	No ☐	
Adult male	No ☐	
Adult female	No ☐	

i) Do you encounter any problems carrying out this activity?

11. Do you visit health facilities? Yes ☐ No ☐

If no, please go to question 12

11.1 In the dry season? Yes ☐ No ☐

If no, please go to question 11.2

a) Which facility(s) do you visit?

☐	In-village Pharmacy	☐	Hospital
☐	Kruu Khmer	☐	Private Clinic
☐	Traditional Midwife	☐	Pharmacy outside Village
☐	Health Center	☐	Other:.....

	b) Where is it located?	c) What is the distance to that facility?
<i>Pharmacy (in-village)</i>		
<i>Kruu Khmer</i>		
<i>Traditional Midwife</i>		
<i>Health Center</i>		
<i>Hospital</i>		
<i>Private Clinic</i>		
<i>Pharmacy (out-village)</i>		
<i>Other</i>		

	d) How long does it take to get there?	e) How do you get there?	f) How much do you spend for that trip?
<i>Pharmacy (in-village)</i>			
<i>Kruu Khmer</i>			
<i>Traditional Midwife</i>			
<i>Health Center</i>			
<i>Hospital</i>			
<i>Private Clinic</i>			
<i>Pharmacy (out-village)</i>			
<i>Other</i>			

	g) How many persons did go there?			h) How many times did you go there?		
	Adult male	Adult female	Children under 15	Adult male	Adult female	Children under 15
<i>Pharmacy (in-)</i>						
<i>Kruu Khmer</i>						
<i>Traditional Midwife</i>						
<i>Health Center</i>						
<i>Hospital</i>						
<i>Private Clinic</i>						
<i>Pharmacy (out-)</i>						
<i>Other</i>						

i) What route do you usually take?

<i>Facility</i>	<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>
<i>Pharmacy (in-)</i>						
<i>Kruu Khmer</i>						
<i>Traditional Midwife</i>						
<i>Health Center</i>						
<i>Hospital</i>						
<i>Private Clinic</i>						
<i>Pharmacy (out-)</i>						
<i>Other</i>						

j) Do you encounter any problems carrying out this activity?

11.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 12

a) Which facility(s) do you visit?

☐

In-village Pharmacy

☐

Hospital

☐

Kruu Khmer

☐

Private Clinic

☐

Traditional Midwife

☐

Pharmacy outside Village

☐

Health Center

☐

Other:.....

	b) Where is it located?	c) What is the distance to that facility?
<i>Pharmacy (in-village)</i>		
<i>Kruu Khmer</i>		
<i>Traditional Midwife</i>		
<i>Health Center</i>		
<i>Hospital</i>		
<i>Private Clinic</i>		
<i>Pharmacy (out-village)</i>		
<i>Other</i>		

	d) How long does it take to get there?	e) How do you get there?	f) How much do you spend for that trip?
<i>Pharmacy (in-village)</i>			
<i>Kruu Khmer</i>			
<i>Traditional Midwife</i>			
<i>Health Center</i>			
<i>Hospital</i>			
<i>Private Clinic</i>			
<i>Pharmacy (out-village)</i>			
<i>Other</i>			

	g) How many persons did go there?			h) How many times did you go there?		
	Adult male	Adult female	Children under 15	Adult male	Adult female	Children under 15
<i>Pharmacy (in-)</i>						
<i>Kruu Khmer</i>						
<i>Traditional Midwife</i>						
<i>Health Center</i>						
<i>Hospital</i>						
<i>Private Clinic</i>						
<i>Pharmacy (out-)</i>						
<i>Other</i>						

i) What route do you usually take?

<i>Facility</i>	<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>
<i>Pharmacy (in-)</i>						
<i>Kruu Khmer</i>						
<i>Traditional Midwife</i>						
<i>Health Center</i>						
<i>Hospital</i>						
<i>Private Clinic</i>						
<i>Pharmacy (out-)</i>						
<i>Other</i>						

j) Do you encounter any problems carrying out this activity?

12. Do you visit a pagoda?

Yes

☐

No

☐

If no, please go to question 13

12.1 In the dry season?

Yes

☐

No

☐

If no, please go to question 12.2

a) Where is the pagoda located? -----

b) What is the distance to that pagoda? ----- kilometres

c) How long does it take to get there? ----- --hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Remorque

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) How much do you spend for that trip? -----Riel

f) What route do you usually take?

In-village	Village 1	Village 2	Village 3	Village 4	Village 5	Village 6

g) How many persons usually go there?		h) Usually how many times does each of you there?	
Adult male	No ☐		
Adult female	No ☐		
Children under 15	No ☐		

i) Do you encounter any problems carrying out this activity?

12.2 In the wet season?

Yes

☐

No

☐

If no, please go to question 13

a) Where is the pagoda located?

b) What is the distance to that pagoda?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Remorque

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) How much do you spend for that trip?

-----Riel

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually go there?		h) Usually how many times does each of you there?	
Adult male	No ☐		
Adult female	No ☐		
Children under 15	No ☐		

i) Do you encounter any problems carrying out this activity?

13. Do you make social visits (outside village)?

Yes

☐

No

☐

13.1 In the dry season?

Yes

☐

No

☐

If no, please go to question 13.2

a) Where do you go?

b) What is the distance to that place?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Remorque

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) How much do you spend for that trip?

-----Riel

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually go there?		h) Usually how many times does each of you go there?
Adult male	No ☐	
Adult female	No ☐	
Children under 15	No ☐	

i) Do you encounter any problems carrying out this activity?

13.2 In the wet season?

Yes

☐

No

☐

a) Where do you go?

b) What is the distance to that place?

----- kilometres

c) How long does it take to get there?

-----hours-----minutes

d) How do you get there?

☐

Walking

☐

Bike

☐

Moto

☐

Oxcart

☐

Koyun

☐

Remorque

☐

Car

☐

Motorised Boat

☐

Boat

☐

Other:.....

e) How much do you spend for that trip?

-----Riel

f) What route do you usually take?

<i>In-village</i>	<i>Village 1</i>	<i>Village 2</i>	<i>Village 3</i>	<i>Village 4</i>	<i>Village 5</i>	<i>Village 6</i>

g) How many persons usually go there?			h) Usually how many times does each of you go there?
Adult male	No	☐	
Adult female	No	☐	
Children under 15	No	☐	

i) Do you encounter any problems carrying out this activity?

Thank you very much for your time & cooperation!

The **Socio Economic Series** is an initiative of the *Ministry of Rural Development* (MRD) and the *Upstream Project of the International Labour Organisation* (ILO). It comprises a series of studies that measure the potential impacts arising from investments in rural transport infrastructure.

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