# NUTRIENT AND ENERGY FLOW IN KAMPUNG LUBUK KELUBI - ULU LANGAT, SELANGOR AND KAMPUNG LABOHAN DAGANG - KUALA LANGAT, SELANGOR.

AN ACADEMIC EXRCISE

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Tesis ini di-dedikasikan buat .....

* Aruah bapaku - yang sangat ku rindui,
* Ibunda - yang dikasihi,
* Kakak-kakak, adik-adik serta kedua nenekku di Ampang Jaya,
* Adek lelakiku yang tunggal - Man - dengan harapan sentiasalah kembali ke jalan Allah,
* Anak saudaraku - Farouk - yang menjadi penghibur kami seisi keluarga,

Dan istimewa sekali buat .....

* Onn - yang disayangi, kerana sentiasa mengambil berat terhadap diriku dan kejayaan tesisku ini.

xxxxxxxxxxxxxxx

What is life ?

Life is .....understanding humanity

.....knowing the hardships of MAN,

and helping them whenever I can !

- Z.A. -
First College,
University Malaya,
Kuala Lumpur.

# SINOPSIS

Kajian pengarang ini merupakan suatu kajian perbandingan mengenai pemakanan dan kegiatan-kegiatannya (nutrient and energy flow) di dua buah tempat dalam Negeri Selangor. Pertamanya di Kampung Lubuk Kelubi terletak dalam Daerah Ulu Langat dan keduanya ialah di Kampung Labohan Dagang dalam Daerah Kuala Langat.

Sebenarnya kajian ini adalah sebahagian dari projek penyelidikan Sungai Langat yang dijalankan oleh pensyarah-pensyarah dengan kerjasama penuntut-penuntut tahun tiga di Jabatan Antropologi/Sosiologi Universiti Malaya sessi tahun 1977/78, di mana pengarang hanya mengkhusus secara membandingkan keadaan di bahagian tengah dan bahagian Kuala Sungai Langat.

Amnya, kajian ini bertujuan untuk mengetahui samada ujud suatu pertalian di antara masyarakat dengan alam sekitar ataupun sebaliknya. Sehubungan dengan ini, pengarang juga ingin mendalami tentang keadaan pemakanan, umpamanya dalam hal "calorie-intake" dan kegiatan-kegiatan khususnya mengenai "energy-expenditure" masyarakat berkenaan. Dalam usaha ini, pengarang telah menjalankan pemerhatian berkenaan hal kerja-kerja seharian atau aktiviti-aktiviti harian yang dilakukan oleh penduduk-penduduk berkenaan, sambil itu melihat jenis-jenis makanan yang digunakan dan secara langsung membuat penilaian samada kadar pemakanan itu mencukupi atau tidak.

Dengan ini adalah diharapkan semuga, kajian permulaan ini bukan sahaja dapat memberi sedikit panduan kepada pengkaji-pengkaji lain, malah samasekali akan dapat membantu pihak-pihak berkenaan dalam usaha memperbaik keadaan tersebut di masyarakat berkenaan khususnya, serta di lain-lain tempat di Malaysia amnya.

## PENGHARGAAN

Di atas kerjasama yang diberikan, tunjuk-ajar, panduan dan bimbingan sepanjang usaha kajian saya ini, ingin saya mengucapkan serta melahirkan tanda terima kasih saya kepada pihak-pihak yang berkenaan di bawah ini.

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6. Jalaludin Ismail dan seisi keluarga di Kampung Lubuk Kelubi, Ulu Langat serta Pak Haji Samakun dan seisi keluarga di Kampung Labohan Dagang, Kuala Langat. - Kerana sudi menerima saya untuk tinggal bersama-sama mereka semasa saya menjalankan kerja-luar di kampung-kampung yang berkenaan.

7. Pegawai-pegawai Daerah Ulu Langat dan Kuala Langat kerana memberi kebenaran dan kemudahan-kemudahan tertentu untuk kajian ini.

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12. Hajjah Asiah serta Atok di Kampung Padang, Ulu Langat.

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Akhirnya saya merakamkan setinggi-tinggi penghargaan dan terima kasih kepada empat buah keluarga yang menjadi "responden" bagi kajian saya ini, serta mereka-mereka yang turut membantu dalam usaha menjayakan tesis ini.

PREFACE

This is a comparative study of nutrient and energy flow in two human populations in the Langat River Basin in Selangor State, West Malaysia. The communities selected for study are Kampung Lubuk Kelubi in Ulu Langat and Kampung Labohan Dagang in Kuala Langat. It is an ecological study dealing with the daily maintenance of life and activities in the villages, the general pattern of energy flow into, through and out of the population and the various types of foods consumed and the composition of the daily diet. This study is divided into five chapters.

Chapter One is the Introduction and consists of six major sub-headings namely:-

(i) The purpose of study;
(ii) theoretical background;
(iii) the scope of study;
(iv) the method of study with emphasis on participant-observation;
(v) the problems of study and
(vi) the limitations of data.

Chapter Two describes the study communities including their physical setting and the socio-economic characteristics of the sample households.

Chapter Three is a description and analysis of the daily nutrition and diet of the four sample households in Kampung Lubuk Kelubi and Kampung Labohan Dagang.

Chapter Four is a description and analysis of the daily activities and energy expenditure of the members of the four sample households in Kampung Lubuk Kelubi and Kampung Labohan Dagang. Lastly, Chapter Five is the conclusion and includes in it a comparison of energy intake and energy expenditure and also the recommendations and measures proposed by the author to improve the daily diet of the rural people in general.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Purpose of Study

The Study is one part of a large scale research project on the human ecology of the Sungai Langat Basin being carried but by several lecturers and students in the Department of Anthropology and Sociology of the University of Malaya. The specific topic dealt by the author is Nutrient and Energy Flow in two human communities in the basin, namely, Kampong Lubuk Kelubi which is in the middle portion of the Sungai Langat and Kampong Labohan Dagang which is at the lower banks of the Sungai Langat (see map).

The writer had several aims in carrying out this study. First and foremost this study or graduation exercise is for fulfilling the requirement of the Bachelor of Arts ( Honours ) Degree conferred by the University of Malaya and the department of Anthropology and Sociology of the Faculty of Arts and Social Sciences in particular.

Secondly, the study was done to find out the energetic status of the community in its ecosystem. Specifically, the writer wanted to know the nutritional status of the two populations and the adequacy of their calorie and protein intake in particular. Such data would allow assessment of the extent to which these populations are achieving the nutritional standard recommended by FAO ( Food and Agriculture Organisation ). Among the important thing about nutrition to be compared in the two communities are the kinds

of food items taken, the intake levels of selected nutrients (namely calories and proteins) by major food sources and to what extent the population are locally self-sufficient in nutrient production and to what extent they must import nutrients from external sources.

Another purpose of the study is to determine how much energy is spent by the community to get their food supply and also to find out what kind of activities are done by the people in the two places. The analysis of data on this aspect of energy is therefore aimed at measuring the utilisation of nutrients by the people and to find out how the people spend their time daily.

Thirdly, the study is for the purpose of widening the personal knowledge and experiences of the writer on the various aspects of human life especially in a rural community. It is hoped that this study will be useful to students and researchers interested in the relationship of society to the environment and particularly on the aspect of nutrient and energy flow.

## 1.2 Theoretical Background

This is an ecological study and by ecology is meant the study of the relation of organisms or group of organisms to their environment. The community of organisms and the functions together as an ecological system or ecosystem. The ecosystem is the basic functional unit in ecology, since it includes both organisms (biotic communities) and abiotic environment, each influencing the properties of the other and both necessary for maintenance of life as we have it on the earth. In ecology, the term population, originally coined to denote a group of

people, is broadened to include groups of individuals of any one kind of organism. Likewise, community in the ecological sense (sometimes designated as 'biotic community') includes all of the populations of different species occupying a given area. From an ecological perspective, populations can be defined by the extent to which people share and exploit a common set of environmental resources. The individuals in the population interact among themselves, generally in some co-operative manner by virtue of this sharing. Contemporary anthropologists often take an ecological approach to human culture variability. Each culture exists in an ecological niche, which consists of all the environmental factors surrounding the group and the ways in which the group exploits the environment. The necessity of adapting to some ecological niche provides direction to both physical and cultural evolution. Odum (1959:27), has defined the ecological niche as the functional role or status of the organism 'within its community and ecosystem resulting from the organism's structural adaptions, physiological responses, and specific behaviours'[1]. From the functional standpoint, an ecosystem may be conveniently analysed in terms of the following:-

1. Energy circuits
2. Food chains
3. diversity patterns in time and space
4. Nutrient (biogeochemical) cycles
5. Development and evolution
6. Control (cybernetics)

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[1] Donald L Hardesty - 'The human ecological niche' in (American Anthropologist volume 74) 1972.

For purposes of this study, I have chosen to focus on 'nutrient and energy flow' as my main theme. In human ecology in particular, the study of nutrition and energy flow are closely linked topics. Under nutrient or nutrition I have included the daily diet or foods consumed by the chosen community and within this my emphasis is on the daily calorie intake and protein intake for the whole household in particular. From this study of nutrient and energy flow, I hope to find out the relationship between the energy intake and the energy output of the people. By energy is meant the ability to do work. It is understood that energy is neither created nor destroyed; it is merely transformed. Cultural systems operate therefore only by harnessing energy in one form or another and by transforming it in the production of goods and services serving human needs.

The study of energy flow in human ecosystem is an especially important aspect of human ecology. Frederick Sargent II, in his book 'Human Ecology', has emphasised that a key element in human adaption to the environment in general is the use of energy.

Leslie White has advanced a basic 'law' of energy and cultural evolution. This law is based on the recognition that all cultures are composed of three general classes of phenomena: technology ( the means for harnessing energy ), social systems and ideology. Of these, technology is seen as primary and determines the content and form of the other two components, White's law reads as follows ' Other factors remaining constant culture evolves as the amount of energy harnessed per capita per year is increased, or as the

efficiency of the means of putting the energy to work is increased.'2

Leslie White then elaborated a theory of the evolution of culture based largely on energy utilization. In his view, the functioning of culture as a whole rests upon and is determined by the amount of energy harnessed and by the way in which it is put to work.'3 While White's law appears generally valid at the macro-level of analysis ( example primitive hunting and gathering bands are low energy societies while modern industrial societies are very high energy users ), social scientists have been slow to carry out the detailed micro-level studies of the energetics of particular functioning societies necessary for full testing of this proposition. Among the few available micro-energetic studies are 'The flow of Energy in an Agricultural Society' by Roy A Rappoport, '4 and 'The flow of energy in a hunting society' by W.B. Kemp '5.

The present study represents an initial effort to collect comparable data on energy and nutrient flow in rural Malaysian society. As such it is a necessary first step toward later comparative analysis of energetics and socio-economic development of the country.

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2. Marvin Harris - Rise of Anthropological Theory
3. John H.Bodley - Anthropology and Contemporary Human Problems - Cummings Publishing Company 1976
4. From Journal : Scientific American
   Volume 225 Year 1971
   Pages 116 - 122
5. From Journal : Scientific American -
   Volume 225 Year 1971
   Pages 104 - 115

1.3 Scope of Study

The study was carried out in two rural Malay communities: Kampong Lubuk Kelubi in Ulu Langat District and Kampong Labohan Dagang in Kuala Langat District in the state of Selangor. The total number of respondents or sample families for the study are two families in Kampong Lubuk Kelubi and another two families in Kampong Labohan Dagang. The sample families were chosen on the basis of their being average households in terms of economic status, that is they are neither very well off or very poor. They are also of a middle-ranged family size, that is the number of people in each household should approach the average for all households in the community. In addition to this, the head of the household must be staying and working in the area of study. It must be pointed out that the sample is very small and not a sufficient basis for generalisation even for the particular communities studied, but the writer would like to stress that this is basically a pilot study. The justification is that the writer is concerned with the quality of the information, not the quantity of it. The alternative way would be through interviews and asking people what they did, but this is not a very accurate method and in the writer's opinion in order to get as accurate an information as possible, it is better to get a smaller sample and really be very intimate and friendly with them. It also indicates the traditional anthropological way of studying man, that is through participant-observation, which is an intensive and detailed method of study started by Bronislaw Malinowski, one of the founding fathers of Social Anthropology.

This approach the writer chose for her research among these people, called participant-observation has been developed primarily by Anthropologists, who have traditionally focused their attention on relatively small, somewhat isolated communities. In contrast to research based on surveys, participant - observation entails the building of quite personal relationships between the researcher and the people being studied. In contrast to laboratory research the researcher has no control ( or at best, minimal control ) over social and cultural variables. Participant observers try to immerse themselves in the life of the community or group being studied, they constantly walk a tightrope between intense subjective involvement with their subjects as individuals who are becoming increasingly meaningful to them and a coolly dispassionate, scientific analytical view of the social life of the group that is the object of study.

Through this process of immersion, the researcher hopes to penetrate deeply into the maze of local social relationships and come to understand the worldview and social life of the group. With all these in mind, the writer would like to emphasize again that although the sample size taken is very small, nevertheless the very detailed and accurate information generated by this intensive method justifies the use of this methodology in a pilot study.

The aspects of nutrition dealt with in the study include the description of the daily pattern of food intake of the various food groups, the types and total amount of food consumed and the variation in the daily diet.

Other than this, the significance of fish from the river and the importance of free wild food to the diet is noted.

Under the aspect of energy budget, the energy intake or input and the energy output or energy expenditure is calculated and the data found are then compared to the standard energy requirements for the household. Thus energy requirements of the activities done and their costs at kilocalories per minute were noted down. Other calculations involved the number of hours each member of the household spent in each particular activity including rest in bed, working, eating, bathing, playing and others.

## 1.4 Study Methodology

This study was done during the long-term vacation and the total number of days spent on the field was about 40 days, that is from the 6th of April to the 15th of May, 1977. For the first few days of the fieldwork the writer spent her time in Kampung Padang (which is directly adjoining Kampung Lubuk Kelubi), to gain experiences in the normal daily lives of the rural community and to get to know the people more closely. Since the people living there had close interaction with those living in Kampung Lubuk Kelubi, the writer was thus able to find out some information on the general activities of the people in Kampung Lubuk Kelubi.

For the specific study itself, that is for the first household to be covered, the writer shifted to Kampung Lubuk Kelubi. Here the method of study used was the participant-observation method, whereby the writer had to go to the sample household early in the morning (usually at about 6 o'clock) and keep a record of what every

individual member did throughout the day in the house. Besides this, the writer measured the amount of food taken for each meal and also had to record how many times a day they have their meals or snacks. The recording of the kind of activity of each individual member was written down at every ten minutes interval from about six o'clock in the morning to about seven o'clock in the night. After this time-limit, information was recorded through daily conversations with the members of the particular simple household.

This daily routine of recording how people spend their time and/what they do in the house was carried out on each of the four households chosen for the study and lasted for a period of seven days in each. The writer, however, did not have her meals with the sample households but had her meals with a different family nearby, which was also her place of study for the two weeks. This was planned so that the actual amount of food consumed by the sample household was not disturbed by the observer's presence. All food was weighed, using a small spring weighing scale, before it was cooked and the weight in grams was recorded.

The second method used in the study was that of informal interviews or conversations with the informants or respondents. These informal talks were found to be very useful since the writer was able to find out more about the work they do ( especially of the men who work very far from the house ) and besidesthis, she was able to find out about other kinds of activities done by the various members at other days of the month. Through daily conversations with the

members too, the writer gained the confidence of the people and thus came to be almost accepted as a member of the family itself. Because of this the writer also found her work to be easier since she had gained co-operation from the members of the family in particular and the people in general. Besides her informal talks with members of he sample household, the writer also spent some time with the general community in order to find out their attitudes and problems. Whenever she was free, the writer also helped in the chores and work of the members of the sample household, to show the people that she is very interested in the work they do.

Last but not least, the third method was that of a review of literature and this includes the reading of books, journals and articles that are relevant for the study. This wide reading of journals, reviews, books, etc. is very useful in order to get an over-all view of the subject matter or concepts used in the study Besides this, the writer was able to compare her study with those undertaken by the researchers on the related or specific topics of Nutrient and Energy Flow. Thus a large amount of the writer's time was spent in the library doing her research and reading for the study.

## 1.5 Problems encountered in the research

Any research unfailingly encounters many problems but despite the several problems faced, the writer is greatly thankful and greatful to everyone who have helped her in overcoming them and thus enable her to continue the study.

Firstly, the writer found out that developing the relationships that enable her to engage in participant - observation itself involves many levels of difficulty. One of the most relevant variables is the researcher's personality and public identity; his or her habits, values, standards, pet peeves, likes, dislikes, prejudices, orientation towards research, marital status and so forth. All these factors had to be taken seriously since they can affect the response of the people towards the writer. Therefore the writer tried as much as possible to follow the customs of the rural people and to be in their good books all the time so that they would have a good impression of her. The problem of course is that this process of adaption takes time.

Another variable that poses a difficulty in developing the relationships involved in participant - observation is the nature of the community itself. Since the local Malay culture is relatively closed to strangers coming to the village for the first time, the writer faced the problem of trying to win the hearts of the people so that she could be accepted into the community. However this difficulty was faced only at the beginning of the research since the community as a whole later were all very friendly and helpful to the writer. As mentioned by David E. Hunter and Phillip Whitten in 'The Study of Anthropology,' most field researchers come to see their period of participant - observation as one of the crucial episodes in their lives - a time when they had to confront fundamental questions of who they were, why they were engaged in what they were doing, and what they wanted to become. The second problem was shortage of time. Since the field work was

only done during the second year long vacation and in fact took only about five weeks, the writer was not able to have a large sample or spend more time with the various sample households.

Thirdly, problems were faced in the technical processing of data and also in the calculation and conversion of the various food and energy data into meaningful units. Calculation and the working out of food tables and activity thus took a considerable portion of the writer's time throughout her analysis of the report. The fourth problem was faced during the beginning of the study and that was the problem of selecting the sample family households for the study. This was due to the fact that most of the Malay people living in the area did not want their foods to be weighed or have outsiders recording what they did and thus they did not want to be selected as part of the sample for whatever purpose of study. However, through tactful explanation and with much patience and persuasion, the writer managed to have the four households that were willing to be selected as samples.

The fifth problem was the difficulty of recording the activities of every member of the family when they were not in the house. Thus information on these were recorded through conversations with the members themselves only after they had got back to the house. At times too, it was not possible for the writer to follow the head of the household in their exact place of work and to have a first-hand observation of the work they do since these places of work were quite far-off and isolated from the community. For example, one of the

respondents' main work was in the cutting and collection of bamboo from the deep jungle forests and thus the recording of the total number of hours he actually spent in cutting the bamboo was only a rough estimate since the writer could not follow the respondent into the jungle.

The sixth problem faced was in the meticulous task of weighing the amount of food prepared for each meal since sometimes small children of the families concerned interferred in the proceedings and thus the writer had to be patient and weigh several times to get the correct weight of the food. Furthermore it was difficult to calculate the exact amount of food consumed since the food wasted was usually all mixed together and put in a bowl. Thus only an average estimate of food consumed was calculated from the food weighed.

Finally, the writer faced the problem of explaining her work to the informants since they were quite unaware of the scientific significance of the study. This explanation had to be done slowly and with a great deal of patience, since most of the respondents were reserved in nature and did not like other people to measure the amount of food bought or consumed by the family.

## 1.6 Limitations of Data

Added to the difficulties and problems while undergoing the research study, the writer would also like to list a few limitations of the data found.

Firstly, as the writer's work was only over a fairly short time span this did not leave space for seasonal variation. Normally, there is

seasonal variation of the amount or type of food eaten and also probably different activities might be undertaken by the people at different times of the year. This therefore might affect the total nutrient energy flow of the community involved. For example during the fruit seasons, the larger intake of fruits such as 'durians, rambutans, mangosteens or langsats' would mean a greater than average amount of calories and proteins is added to the daily diet of the people. Then also in times of festivities such as on Hari Raya Day, Hari Raya Haji or on important occasions such as weddings or any religious ceremonies, the Muslims usually consume a lot of beef which is usually cooked in the form of 'rendang'. This total dish which includes a great amount of coconut oil, beef, chillies, onions, etc. thus increases the calorie and also protein intake of the people much above normal level and may partially compensate for their seeming average daily deficiency intake.

In addition to this the people might also take in various kinds of cakes or sweet biscuits during these times and again the daily diet is affected. During this period too, there is usually also an added list of activities for the people since a lot of work is involved in any ceremonies or important occasions. During the fruit seasons too, the writer found out that quite a number of the people including the respondents themselves, take time to collect the fruits and sell them by the road sides, in order to collect a considerable amount of money from the buyers ( most of whom are from the big towns or city of Kuala Lumpur ). Thus this side income of the people which increases the

daily total income might be kept either as savings or spent on food or daily necessities of the individual family. This therefore indirectly affect the total daily amount of food consumed by the people.

The second limitation is the fact that the presence of the writer in the particular family might change the daily habits of these people, either through their cooking, buying of food, normal activities or in any other aspect of their lives. For example the respondent might do two things in the presence of the outsider. First he might inflate his daily diet like buying extra food since he probably is shy of his family's poorness or secondly he might also reduce the total daily amount of food eaten in the hope that this presence on his part might come in useful that his family badly needed help from the writer or government. However neither response probably had significant effect on the data collected since the study of each family covered a period of seven days and any family probably cannot live in state of hypocrisy or false pretence for such a period. Furthermore, the writer made efforts to convince her informants that she was not a Government officer and thus it is better that the respondents act in their normal way.

The third limitation is brought up during the calculation of the data. This is because in estimating the expenditure of energy of any individual, larger errors are likely to arise from a failure to determine correctly the length of time spent in any activity of the people rather than in any assessment of the metbolic cost of that activity. As the writer has mentioned under the problems of study, one of the respondents works in the forests and thus

the amount of time he spends on work is estimated in the individual's total energy expenditure. Then again if the respondents are away from the house, the actual amount of their time spent in these outside activities is estimated by the writer.

Another limitation is the fact that very few studies on nutrition and energy expenditure has been done in Malaysia and therefore such data like the metabolic cost of the activity of infants or of individuals, according to their exact weight is not available for use as a guide in the basic calculations of the writer. The variability in the metabolic activity and thus energy expenditure between individuals of same ages, sizes and sex categories also presents another source of error since the general basis for the data is taken from the World Health Organisation and Food and Agriculture Organisation Reports and not every single activity of the respondents is available from here. Thus the writer had to use her estimation again in the assessment of the metabolic cost of the activity in the calculation of the energy expenditure of the various respondents.

CHAPTER TWO

BACKGROUND OF DATA

## 2.1 General description of Kampung Lubuk Kelubi and Kampung Labohan Dagang (the places of Study)

Kampung Lubuk Kelubi is a small village in Ulu Langat, Selangor and is about 19¾ miles from Kuala Lumpur. It is accessible by road and buses go through the area every half hour. The people therefore have easy transport to the city and generally to there to do their shopping for clothes, visit their relatives or for entertainment. Most of the young people too have shifted out of the village to work in other nearby towns or in Kuala Lumpur itself.

The land is generally flat and the occupation of the people thus include agricultural work like planting padi, maize or fruits like banas. Other than this, some of them work in the National Electricity Board or at the power station/Pangsoon (about two miles from the village) as labourers. The majority of the people here are Malays and originated from Minangkabau in Indonesia. They are generally categorised as rural folks and thus are quite poor. They speak Malay with the typical dialect of "Minang".

Kampung Labphan Dagang is a small village, off the main town of Banting in Kuala Langat, Selangor. The village is accessible by road and here also buses come in every half hour. Most of the people often go to Banting, the nearest town for their shooping or for entertainment.

The land is generally flat and most of them work in the coffee estates or as farmers. The majority of the people are Malays who origina-

ted from Java in Indonesia. They thus speak Malay with their typical dialect of "Jawa". Comparatively although these people are still categorised as rural, they are better off than the village folks of Kampung Lubuk Kelubi. This can be shown from the nutrition diet of the people in general and from this study by the writer, in particular.

## 2.2 Socio-economic characteristics of sample households in Kampung Lubuk Kelubi and Kampung Labohan Dagang

As mentioned earlier, the study in Kampung Lubuk Kelubi was done on two selected households. The first sample household or family consisted of six children and two parents. The head of the household is 85 years old while his wife is 45 years old. The children range in age from four to thirteen; the eldest being 13 years of age, the second child 12 years old, the third child eleven years old, the fourth 10 years old, the fifth 6 years old and the youngest only four years old. Only the third child is a boy and the other five are girls. These children, besides going to the government school also attends Quran lessons as part of their daily routine.

The head of the household work as a farmer in the village and supports his family by planting padi, maize and other vegetables such as peas, beans, bitter gourd and other leafy vegetables. In his work he is helped in the fields sometimes by his wife and children in tasks such as hoeing, planting, weeding and getting rid of pests in the padi and maize fields. The wife helps her husband usually after she has attended to the household chores such as washing and cooking and when the small children are in school. The children help only during weekends during their school-terms and daily during their school holidays. The family also has a fruit orchard of rambutans, durians and bananas and earn

a subsidiary income from this during the fruit seasons.

The second sample household in the same village is smaller and consists of only five persons, that is two parents and three children. The head of the household is 33 years old and his wife is 27 years old. Only two of the children are in school since the youngest is only about one year old. The eldest child is 8 years old and the second child is 7 years old. Of the three children, two are boys and the middle child is a girl. The two eldest children besides going to the National Type Government School in the morning, also attends Quran leasons in the afternoon just like the other children of the village.

The head of the household works in the forest, collecting bamboo which he cuts into small pieces to form joss-sticks which are mainly sold to the Chinese for cash. He gets up very early in the morning and by seven O'clock in the morning, he is on his way to the forests. Usually he goes there with his friends in teams of five, each one of them riding their own motorcycle. His wife does not go with him but only helps him in the cutting of the bamboo when he gets back home. The children also sometime help their father in the cutting of the bamboo into small pieces during the weekends. For his side-income, the head of the household sometimes collects wild foodstuffs from the forests such as "Petai" and other jungle fruits, but this is done mainly during the fruit season.

In Kampung Labohan Dagang, the first sample household consisted of two parents and six children. The head of the household is 36 years old while his wife is 31years of age. The children's ages range from one month to 17 years old and they consisted of two girls

and four boys. The children here also attends the National Type School and Quran lessons. The head of the household is a farmer and has his own small field or coffee and palm oil. Besides this, he also has his own fruit orchard or "Dusun". He also has his own plot of vegetable produce or garden near the house and in addition goats and fowl are also reared. His side income thus comes from the selling of chickens or their eggs and also sometimes from the selling of coconuts to the neighbours living in the community. His wife and children help him in these agricultural activities like gardening, collecting fruits and weeding whenever they are free especially during the weekends or holidays.

The second sample household in Kampung Labohan Dagang consisted of three children and two parents. The head of the household is 33 years old while his wife is 27 years old. The children's ages range from one year to ten years old, the eldest girl being 10 years old, the second - a boy (8 years of age) and lastly the baby girl of one year old. The two eldest children besides attending the National Type Government School, also attends Quran lessons daily at the Arabic School.

The head of the household is a farmer and works on a small field of coffee and palm oil. As an active member of UMNO and also of the Parent-Teachers Association, he often spends his leisure time by attending these meetings. His wife and children do not help him in the agricultural activities since she has to attend to the baby in the family and the children are too young to work in the fields.

Photo 1: Part of the Langat River in Kg. Lubuk Kelubi

Photo 2: Corn-fields in Kg. Lubuk Kelubi

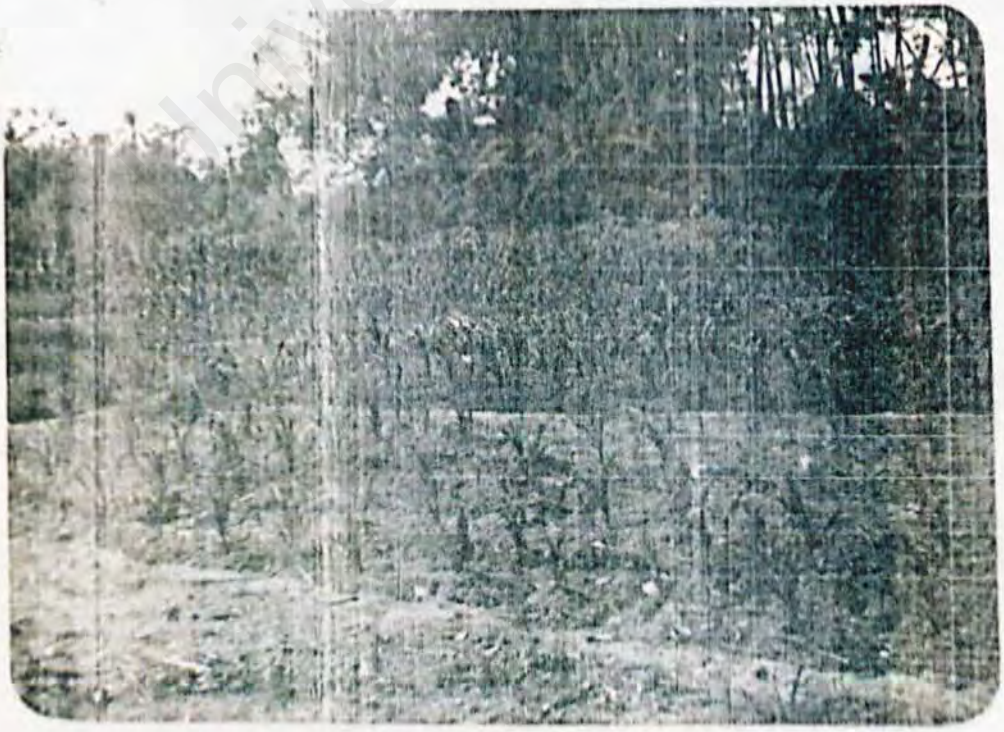

Photo 3:

female
ng seeds
ze and
d by her
st daughter
n in Kg.
Kelubi.

Photo 4:

female doing
gging at her
ece of land
n in Kg.
Kelubi.

**Photo 5:**

A young boy plucking
e fruits from an
-palm tree in
g. Labohan Dagang.

**Photo 6:** A young boy sorting out the coffee seeds into baskets - taken in Kg. Labohan Dagang

CHAPTER THREE

# DAILY NUTRITION AND DIET IN KAMPUNG LUBUK KELUBI AND KAMPUNG LABOHAN DAGANG, SELANGOR.

## 3.1 First household in Kampung Lubuk Kelubi, Ulu Langat.

The daily diet shows that it is quite poor since fish is eaten almost every day with rice and vegetables. Meat is a luxury item and is eaten only once a month or at the most twice in a month. Besides fish, the other common items eaten for the daily meals (as an alternative to fish) include prawns and shrimps or fresh cuttle-fish. The wife cooks one a day, usually in the morning and for the dinner at night, the food cooked in the mornings is usually just heated. Only the rice is cooked again for the dinner at night which is usually taken at about eight-thirty daily, when every body is at home. The family therefore have two main meals per day, excluding breakfast in the morning and tea in the afternoon. Breakfast is again a very light one and consists of either bread or biscuits with either tea or coffee. Tea in the afternoon usually consists of biscuits of "Kueh" - that is local cakes made from bananas, tapioca or sweet potatoes.

The daily total amount of food consumed is about 4328 grams while the daily total calories-intake is about 9699 calories. Lastly the daily total amount of protein-intake is about 273 grams. In this household, the greatest amount of food consumed daily comes from the "Cereals" and "Cereal Products" category, and this food type is also their major source of calories and proteins. Among the items under this category are rice (highly milled), rice flour, bread white and biscuits.

Among the favourite "local" fish eaten are that of ikan Merah,

ikan Tenggiri, ikan Benang and ikan Selar, while the favourite vegetables are bean sprouts, cucumber, mustard leaves, gourds and tomatoes. Under legumes and products, long beans is the chief item bought while the common fruits eaten are those of bananas. Lastly, within this family, hen's eggs are the most popular since the family rears a few hens and chickens. The most popular drink is that of black tea which is consumed together with sugar and sweetened, condensed milk daily for their breakfast or tea.

Most of the chief food items eaten are bought since the community as a whole does not grow padi and does not engage in fishing since the rivers are polluted. Therefore it was found that all the fish eaten were brought from a Chinese or Malay man who come to the village in a van and inside this van almost everything can be found. Leftover food is given to the fowl and poultry and about 300 grams of mixed rice and other leftover cooked food is discarded daily.

For a more detailed information on the distribution of the food composition in the daily intake, please refer to Table One.

3.2 Second household in Kampung Lubuk Kelubi

The daily diet is also very plain with rice, fish and vegetables as the regular meal for lunch or dinner. They have two main meals per day and here again the wife only cooks once a day, that is in the morning and for the dinner at night, the cooked food is just heated. Here again only the rice is cooked again. Meat or beef is only eaten once a month or sometimes once in five weeks. Other than fish, the family sometimeshave prawns, shrimps and cuttlefish on alternate days of the week.

The daily total amount of food consumed averages 2557 grams while the daily total calorie intake averages about 6623 calories. Lastly the daily total intake is 195 grams. The total amount of food consumed in a day according to the different food composition, the total daily calories intake in relation to the sources of it and the total daily amount of proteins consumed in relation to the food sources are again given in Table One (please see table).

The data in the table again shows that Cereals and Cereal Cereal Products are the greatest amount of food consumed and they are also the greatest supplier of proteins and calories. Among the items under this category include rice, bread and biscuits.

Among the local fish usually bought by the family include that of IKAN SELAR and IKAN KAYU while common vegetables consumed are impomea leaves or sayor kangkong, mustard leaves or sawi, spinach or bayam puteh, okra, lady fingers or kachang bende and lastly tomatoes. The chief item bought and eaten under legumes and Products is that of Kachang panjang or long beans. Most of the food items eaten by this family are also bought since little agriculture is done and fishing is absent because of the polluted rivers. This family also hardly takes any eggs, meat, starchy roots and tubers and thereby supply of calories and proteins from these is nil. The food items eaten are therefore bought from a Malay or Chinese man who comes in a van sellingfish, fruits, vegetables and other necessary food items.

The most popular drink within this family is black tea which is usually consumed with sugar and sweetened condensed milk daily for their breakfast and tea. Lastly, little amount of food is discarded

daily, as compared with the first household and here the total wasted is about 60 grams daily.

Table 1 - Data showing daily intake of the various foods in the first household and second household in Kampung Lubuk Kelubi

| Food Composition | First Household | | | Second Household | | |
|---|---|---|---|---|---|---|
| | Wt. consumed (in gm) | Caloric protein Content (in cal) | (in gm) | Wt. consumed (in gm) | Cal. Protein (in cal) | (in gm) |
| 1. Cereals & Cereal Products | 1634.6 (37.8%) | 5913.24 | 117.88 | 1438.00 (56.2%) | 4996.72 | 101.26 |
| 2. Starchy Roots and Tubers | 50 (1.2%) | 37.5 | 1 | - (0%) | - | - |
| 3. Legumes & Proteins | 174 ( 4% ) | 76.56 | 5.92 | 68 ( 2.7% ) | 29.92 | 2.32 |
| 4. Nuts and Seeds | 220 (5.1%) | 825 | 8.8 | 58 ( 2.3% ) | 217.5 | 2.32 |
| 5. Veg., Roots, | 630 (14.6%) | 141.66 | 6.64 | 286 (11.2%) | 67.64 | 6.34 |
| 6. Fruits | 580 (13.4%) | 474.4 | 6.72 | 56 ( 2.2%) | 26.88 | 0.44 |
| 7. Meats and Eggs | 208 ( 4.8%) | 423.36 | 29.64 | - ( 0% ) | - | - |
| 8. Fish & other seafoods | 527 (12.2%) | 697.9 | 91.38 | 488 (19.1%) | 728.54 | 79.02 |
| 9. Milk & Milk Prodicts | 32 ( 0.74%) | 105.6 | 2.9 | 16 (0.6%) | 52.8 | 1.4 |
| 10. Fats & Oils | 80 ( 1.8%) | 720 | - | 40 (1.6%) | 360 | - |
| 11. Condinents & Spices | 122 ( 2.8%) | 36.42 | 1.49 | 71 (2.8%) | 19.72 | 0.78 |

.../cont.

cont....

| Food Composition | First Household | | | Second Household | | |
|---|---|---|---|---|---|---|
| | Wt. consumed (in gm) | Caloric protein Content (in cal) | (in gm) | Wt. consumed (in gm) | Cal.Protein (in cal) | (in gm) |
| 12. Beverages | 10 (0.23%) | 5.8 | 1.4 | 6 (0.2%) | 3.5 | 0.8 |
| 13. Sugar & Syrups | 60.4 (1.4%) | 241.6 | - | 30 (1.2%) | 120 | - |
| Daily Grand Total | 4328 | 9699.04 | 272.77 | 2557 | 6623.22 | 194.68 |
| No. rounded up to whole no. | 4328 | 9699 | 273 | 2557 | 6623 | 195 |

* In brackets are the percentages of the food types to the total amount of food consumed in a day. For example in the first household - the total amount of the percentage of cereals and cereal products from the total amount of food consumed in a day is about (37.8%) and is calculated as follows:-

$$\left(\frac{\text{Amount of Cereals \& Cereal Products consumed}}{\text{Total Amount of Food Consumed Daily}}\right) \times 100$$

$$= \left(\frac{\text{Amount of Cereals \& Cereal Products consumed daily}}{\text{Total Amount of Foods Consumed Daily}}\right) \times 100$$

$$= \frac{1634.6}{4328} \times 100$$

$$= 37.8\%$$

3.3 First household in Kampung Labohan Dagang, Kuala Langat

The daily diet here shows that it is still a typical rural Malay one with fish, rice and vegetables as the common foods eaten for the main meals in the afternoon and at night. However in this family, the wife cooks twice in one day that is at about eleven thirty in the morning and again at five thirty in the afternoon. Quite often too, they eat "tempe" or soya beans (inoculated, fried) with their rice daily. Meat or beef in particular is only eaten once in a month and therefore is a luxury item.

The daily total amount of food consumed is about 5587 grams while the daily total of calories intake is about 13814 calories. The daily total of protein intake is 453 grams. As can be seen from the above, all the values are higher than both individual households in Kampung Lubuk Kelubi.

From Table 2, it can be seen that in this family too the greatest amount of food consumed is that of Cereals and Cereal products and they are in turn the largest supplier of calories and proteins for the family. Among the popular items eaten under this category are rice, bread, biscuits and rice noodles or mee-hoon.

With the exception of coconuts, ducks' eggs, bananas, chillies and topioca shoots, almost all the other items are bought. Among the types of local fish eaten are Ikan Parang, Ikan Kembung, Ikan Tamban, Ikan Tenggiri and Ikan Bilis. They are usually bought from a Malay man selling them. The vegetables consumed include cabbage, topioca shoots, been sprouts (green gram) or taugeh, cucumber and gourds. The favourite items under legumes and Products is that of french beans and soya beans (inoculated and

fried), In this family too, since they rear more ducks than hens, the ducks' eggs are more often eaten. Lastly, the favourite drink is coffee which is usually consumed together with sugar and sweetened condensed milk. The popularity of coffee is probably due to the fact that the head of the household has his own coffee plant in the garden close to the house. Food that is discarded is usually given to the ducks and hens and the total amount of food wasted each day is about 530 grams.

3.4 Second household in Kampung Labohan Dagang, Kuala Langat.

The daily diet is about the same as the first household in this village since there is still not much variation in the day-to-day menu. The faimily usually takes rice with fish, vegetables and quite often soya beans (that is inoculate and fried) or usually called locally as "tempe". As the size of this family is smaller than that of the first household in this village, the wife usually cooks only once in a day, they is at about ten-thirty in the morning. For the dinner at night, she just heats up the food she had already cooked in the morning and only cooks some fresh rice. This family has two main meals per day. Again in this family too, meat or beef is only eaten once in five weeks since the cost of these is much too high to be eaten daily or even once in week.

As can be seen from Table 2, the daily total amount of food consumed is about 3282 grams while the daily total amount of calories taken in is about 8700 calories. Thirdly, the daily total intake of proteins is about 230 grams.

Similarly in this household, Cereals and Cereal Products are the greatest items consumed and they are also the largest source of calories and proteins for the family. Among the items under this

Table 2 - Data showing daily intake of the various foods in the first household and second household in Kampung Labohan Dagang

| Food Composition | First Household | | | Second Household | | |
|---|---|---|---|---|---|---|
| | Wt. consumed (in gms) | Caloric content (in cal) | Intake of Protein (in gms) | Wt. consumed (in gms) | Caloric (in cal) | Protein (in gms) |
| . Cereals & Cereal Products | 2356 *(42.2%) | 7798.7 | 170.8 | 1542 *(47%) | 5443 | 11.3 |
| . Starchy Roots & Tubers | - (0%) | - | - | 62 (1.9%) | 46.5 | 1.24 |
| . Legumes & Products | 318 (5.7%) | 286.4 | 37.7 | 224 (6.8%) | 169.3 | 19.4 |
| . Nuts and Seeds | 159 (2.8% | 672.4 | 16.1 | 294 (9%) | 1102.5 | 11.8 |
| . Vegetables | 736 (13.2%) | 181.4 | 17.6 | 381 (11.6%) | 75 | 5 |
| . Fruits | 770 (13.8%) | 321 | 5.6 | 80 (2.4%) | 70.4 | 0.96 |
| . Meats and Eggs | 138 (2.5%) | 260.8 | 18.1 | 114 (3.5%) | 233.5 | 15.8 |
| . Fish and other seafoods | 678 (12.1%) | 1243.4 | 157.6 | 390 (11.9%) | 631.8 | 62.04 |
| . Milk and Milk Products | 34 (0.6%) | 112.2 | 3.1 | 17 (0.5%) | 56.1 | 1.5 |
| . Fats and Oils | 230 (4.1%) | 2070 | 0 | 74 (2.3%) | 666 | 0 |
| . Condiments & Spices | 91 (1.6%) | 32.1 | 1.1 | 52 (1.6%) | 15.9 | 0.64 |
| . Beverages | 13 (0.2%) | 29.4 | 1.6 | 7 (0.2%) | 10.7 | 0.9 |
| . Sugars & Syrups | 64 (1.1%) | 256 | 0 | 44.8 (1.4%) | 179.2 | 0 |
| Grand Daily Total | 5587 | 13263.8 | 429.3 | 3281.8 | 8699.9 | 230.48 |
| Number rounded up into whole numbers | 5587 grams | 13264 Calories | 429 grams | 3282 grams | 8700 Calories | 230 grams |

.../cont.

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Footnote (*): In brackets are the percentages of the food types to the total amount of food consumed in a day. For example the daily percentage of cereals and cereal products from the total amount of food consumed in a day for the first household is about 42.2%. This is calculated as follows:-

$$\left(\frac{\text{Amount of Cereals and Cereal Products consumed daily}}{\text{Total amount of food consumed daily}}\right) \times 100$$

$$= \frac{2356}{5587} \times 100 \quad = \quad 42.2\%$$

Footnote (®): To this total is added 550 calories because the woman in this family is in a period of lactation. This amount of 550 calories is as recommended by the suggested daily dietary intake of Peninsular Malaysia - 1973, compiled by the Department of Social and Preventive Medicine of the University of Malaya.

Therefore, the daily total intake of Calories for this particular family increases to 13814 Calories. (This has been noted down by the writer at the introduction of the daily nutrition for this family under section 3.3)

Footnote (+): Similarly, to this total is added 24 grams because the woman is in a period of lactation. This again is taken from the suggested daily dietary intake of Peninsular Malaysia - 1973. Therefore the daily total intake of proteins for this family increases to 453 grams.

category of foods include rice, bread, rice flour, wheat flour and biscuits.

The types of 'local' fish eaten by this family include Ikan Merah, Ikan Selar, Ikan Parang and Ikan Kembong. Their favourite legumes and products are french beans, long beans, soya bean curd or "towhu" and soya beans (inoculated and fried) or "tempe". This family also eats a lot of vegetables like cucumber, brinjals, gourds and tapioca shoots. The most popular fruit eaten is bananas while the favourite drinks are coffee and tea and these are usually consumed together with sugar and sweetened and condensed milk. Since the family rears a few ducks, these ducks' eggs are quite often eaten for their breakfast. Other than these ducks' eggs, coconuts, chillies, tapioca shoots and coffee, all the other food items are bought. This is because the head of the household does not engage in padi-growing or fishing and also little agriculture is done. In this family too, wasted food is discarded and the daily total amount of about 80 grams is usually given to the ducks they rear.

3.5 Comparison of amount of food intake in the two households in Kampung Lubuk Kelubi and the other two household in Kampung Labohan Dagang

Calculations from the data in both household in Kampung Lubuk Kelubi (See Tables One and Three) will show that the average daily total amount of food consumed in a day in both households is about 3443 grams, while the average daily total calorie-intake is about 8161 calories. Lastly the average daily total of the intake of proteins in both households is about 234 grams.

Meanwhile, calculations from the data in both households in Kampung Labohan Dagang (See Tables Two and Four) shows that the average

daily total amount of food consumed is 4434 grams, the average daily total calorie-intake is about 11257 calories. Lastly, the average daily total intake of proteins is about 342 grams.

Compared with the two households in Kampung Lubuk Kelubi, both households in Kampung Labohan Dagang can be said to be better off since the total of its average daily food consumed, the total of the average daily calorie-intake and lastly of its total average daily intake of proteins, are all relatively higher than the total average of the respective food intake in both households in Kampung Lubuk Kelubi. (For simplicity, please see tables five and six).

Table 3 - Data showing total daily intake and average daily intake of the various foods in both households in Kampung Lubuk Kelubi

| Food Composition | Total Daily Intake | | | Average Daily Intake | | |
|---|---|---|---|---|---|---|
| | Wt. Consumed (in gm) | Caloric (in Cal) | Protein (in gm) | Wt. Consumed (in gm) | Caloric (in Cal) | Protein (in gm) |
| Cereals and Cereal Products | 3072.6 | 10909.96 | 219.14 | 1536.3 | 5454.98 | 109.6 |
| Starchy Roots and Tubers | 50 | 37.5 | 1 | 25 | 18.75 | 0.5 |
| Legumes and Products | 242 | 106.48 | 8.24 | 121 | 53.24 | 4.12 |
| Nuts and Seeds | 278 | 1042.5 | 11.12 | 139 | 521.25 | 5.56 |
| Vegetables-Roots, shoots, bulbs & tubers | 916 | 209.3 | 12.98 | 458 | 104.65 | 6.49 |
| Fruits | 636 | 501.28 | 7.16 | 318 | 250.64 | 3.58 |
| Meats and Eggs | 208 | 423.36 | 29.64 | 104 | 211.68 | 14.82 |
| Fish and other Seafoods | 1015 | 1426.4 | 170.4 | 507.5 | 713.2 | 85.2 |
| Milk and Milk Products | 48 | 158.4 | 4.3 | 24 | 79.2 | 2.15 |
| Fats and Oils | 120 | 1080 | 0 | 60 | 540 | 0 |
| Condiments and Spices | 193 | 56.14 | 2.27 | 96.5 | 28.07 | 1.13 |
| Beverages | 16 | 9.3 | 1.2 | 8 | 4.65 | 0.6 |
| Sugars and Sweets | 90.4 | 361.6 | 0 | 45.2 | 180.8 | 0 |
| Grand Daily Total | 6885 | 16322.26 | 467.45 | 3442.5 | 8161.13 | 233.72 |
| Number rounded into whole numbers | 6885 grams | 16322 Calories | 467 grams | 3443 grams | 8161 Calories | 234 grams. |

Teble 4 - Data showing total daily intake and average daily intake of the various foods in both households in Kampung Labohan Dagang

| Food Composition | Total Daily Intake | | | Average Daily Intake | | |
|---|---|---|---|---|---|---|
| | Wt. Consumed (in gm) | Caloric (in cal) | Protein (in gm) | Wt. consumed (in gm) | Caloric (in cal) | Protein (in gm) |
| 1. Cereals and Cereal Products | 3898 | 13241.7 | 282.1 | 1949 | 6620.9 | 141.05 |
| 2. Starchy Roots and Tubers | 62 | 46.5 | 1.24 | 31 | 23.25 | 0.62 |
| 3. Legumes & Products | 542 | 455.7 | 57.1 | 271 | 227.9 | 28.55 |
| 4. Nuts & Seeds | 453 | 1774.9 | 27.9 | 226.5 | 887.5 | 13.95 |
| 5. Vegetables-Roots, Shoots, bulbs & tubers | 1117 | 256.4 | 22.6 | 558.5 | 128.2 | 11.3 |
| 6. Fruits | 850 | 391.4 | 6.56 | 425 | 195.7 | 3.28 |
| 7. Meats and Eggs | 252 | 494.3 | 33.9 | 126 | 247.2 | 16.95 |
| 8. Fish and other seafoods | 1068 | 1875.2 | 219.64 | 534 | 937.6 | 109.82 |
| 9. Milk & Milk Products | 51 | 168.3 | 4.6 | 25.5 | 84.2 | 2.3 |
| 10. Fats and Oils | 304 | 2736 | 0 | 152 | 1368 | 0 |
| 11. Condiments & Spices | 143 | 48 | 1.74 | 71.5 | 24 | 0.87 |
| 12. Beverages | 20 | 40.1 | 2.5 | 10 | 20.1 | 1.25 |
| 13. Sugars & Sweets | 108.8 | 435.2 | 0 | 54.4 | 217.6 | 0 |
| Grand Daily Total | 8868.8 | 21963.7 | 659.78 | 4434.4 | 10981.85 | 329.89 |
| Number rounded up into whole numbers | 8869 grams | 21964 calories | 660 grams | 4434 grams | 10982 calories | 330 grams |

Table 5 - Data showing daily total amount of food consumed, daily total calories-intake and daily total intake of Proteins in both households in Kampung Lubuk Kelubi, Ulu Langat.

| Household in Lubuk Kelubi | Total Daily Intake | | |
|---|---|---|---|
| | Wt. of food consumed (in gm) | Calories-intake (in Cal) | Intake of proteins (in gm) |
| A. First household | 4328 | 9699.04 | 272.77 |
| B. Second household | 2557 | 6623.22 | 194.68 |
| Daily Total in both households | 6885 | 16322.26 | 467.45 |
| Therefore average daily total in both households in Kg. Lubuk Kelubi | 3442.5 grams. | 8161.13 Calories. | 233.72 grams. |

Table 6 - Data showing daily total amount of food consumed, daily total calories-intake and daily total intake of proteins in both households in Kampung Labohan Dagang, Kuala Langat.

| Household in Labohan Dagang | Total Daily Intake | | |
|---|---|---|---|
| | Wt. of food consumed (in gm | Calories-intake (in Cal) | Intake of Proteins (in gm) |
| A. First household | 5587 | 13814 | 453 |
| B. Second household | 3281.8 | 8699.9 | 230.48 |
| Daily Total in both households | 8868.8 | 22513.9 | 683.48 |
| Therefore average daily total in both households in Kg. Labohan Dagang | 4434.4 grams | 11256.95 Calories | 341.74 grams |

# CHAPTER FOUR

## DAILY ACTIVITY AND ENERGY EXPENDITURE IN KAMPONG LUBUK KELUBI AND KAMPONG LABOHAN DAGANG

### 4.1. Basis for calculation of data :-

Before describing the various types of activities in the four households, two in Kampong Lubuk Kelubi and two in Kampong Labohan Dagang, I would like to give a brief introduction or discussion on the activity component in calorie requirements and the method used in calculating the actual energy expenditure for the head of the household, his wife and children.

The actual energy expenditure involves the collection of two independent sets of data :-

a). the time spent by individuals in separate activities, and

b). the metabolic cost of each activity, expressed in calories per minute.

To collect the first of these requires no more equipment than a watch and a notebook. To obtain data on the metabolic cost of different activities, I have used the information on the calorie cost of many activities published by Passmore, R. and Durhin,

J.V.G.A. in "Human Energy Expenditure"(1) and also from data published by WHO abd FAO series. These data were then used in drawing up the tables for the daily expenditure of energy.

The many different specific activities have been grouped for purposes of analysis into three main categories namely Rest in bed, Working Activities and Non-Occupational Activities - which includes activities such as eating, bathing, dressing, praying, watching television, looking after the children or just sitting and talking.

This classification into just three main types of activities is done since energy from food is used up by the body for three main purposes :- firstly to maintain the processess of living, such as heartbeat and the circulation of blood, breathing and maintenance of body temperature. The energy needed for these processess, when the subject is at complete rest and no physical work is being done, is called the basal or metabolism. Secondly, for everyday activities, example standing, eating, moving and dressing. Thirdly, for performance of muscular work (virtually

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(1) Article from Physiological Reviews - Journal volume 35, 1955, pages 801 - 839.

no extra energy above basal level is required for mental work).

Rest in bed :-

The calorie expenditure during sleep is easily estimated or measured. It usually approximates to the basal metabolic rate (B.M.R.) The basal metabolic rate used is a little over 1kcal. per minute for the man (about 1.08 kcal. per minute) and a little under 1 kcal. per minute (about 0.90 kcal. per minute) for the woman.

Working Activities:-

With respect to the assessment of energy expenditure at work, attention may be drawn to the following points. To determine the expenditure of a whole day at work, it is necessary to know the time spent at each activity undertaken and also the energy cost of each activity. The exact times spent in the principal activities were accurately recorded and later calculation of the calorie requirements were based on the classification, put forward by Christensen (2), as shown below, see Table 7, and also again from the WHO and FAO series.

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(2) Christensen, E.H. Physiological valuation of work in the Nykroppa Iron works.

Table 7 - Table showing energy expenditure rate in relation to intensity of muscular work.

| | | |
|---|---|---|
| 1. | Less than 2.5 Kcal./min. | - Very light |
| 2. | 2.5 to 4.9 cal./min. | - light |
| 3. | 5.0 to 7.4 cal/min. | - moderate |
| 4. | 7.5 to 9.9 cal/min. | - heavy |
| 5. | More than 10 cal./min. | - very heavy |

Non-Occupational Activities

Man's expenditure of just over 1 Kcal. per minute merely keeps him alive. He needs additional energy every time be moves . For this, the following values were used in the calculation of the total energy expended for the different kinds of activity. The values are approximate and appropriate for a normal man, they are given in Kcal. per minute.

| | Kcalorie per minute |
|---|---|
| Sitting | 1.4 |
| Standing | 1.7 |
| Washing, dressing, etc. | 3.5 |
| Waliing slowly | 3 |
| Walking moderately fast | 5 |
| Walking up and down stairs (overall figure) | 9 |
| Washing dishes | 1.7 |

Again, the other metabolic rates of energy expenditure for other kinds of activities were taken from the WHO and FAO series.

4.2 - Daily activity and energy expenditure in the first household in Kampong Lubuk Kelubi.

In this family, the head of the household does mostly agricultural work such as weeding, digging holes, putting in the seeds, replanting, sowing, etc. He is therefore said to have done moderate work which falls under the category of 5.0 - 7.4 kcal./min. From the calculations, it was found that he works for approximately 6 hours daily, rests in bed for a total of 8 hours 40 minutes and for the rest of the day, that is for a total of 9 hours 20 minutes, he spends his time in non-occupational activities such as chit-chatting (with his wife and children or with friends in the mosque), eating, bathing, dressing. He does no domestic work at all and he works on every day of the week.

His wife helps in agricultural tasks for a period of 3 hours daily, rests in bed for a total of 8 hours 30 minutes and for a total of 12 hours 30 minutes, she spends her time in non-occupational activities, most of which is taken by domestic work such as washing dishes and clothes, looking after the children, cooking and sweeping or looking after the house. Most of her domestic

work can be said to fall under the category of light work at 2.5 - 4.9 kcalories per minute.

In this family, the older four children attend the national-type government school on weekdays and also attend Quran lessons daily for about two hours. On week-ends they help their parents in the agricultural activities by helping in light tasks such as cutting up vegetables like green beans and peas and driving away the birds from the fields on padi or maize. The children seldom sleep in the daytime and during the day they either read books, play, watch television, help their parents, go to school or spend their time in the basic necessary activities of bathing, dressing and eating. The number of hours spent in the different activities including their energy expenditures are given in detail in Tables 9, 10, 11, 12 and 13.

Table 8 - Data showing daily expenditure of energy of head of household and his wife - (first household) in Kampung Lubuk Kelubi.

| Activity | Male - Head of household Age: 85 | | | Female-wife Age: 45 | | |
|---|---|---|---|---|---|---|
| | Hrs | Mins | Calories | Hrs | Mins | Calories |
| 1. Rest in bed | | | | | | |
| Night sleep | 7 | 30 | 486 | 7 | 30 | 405 |
| Day sleep | 1 | 10 | 75.6 | 1 | - | 54 |
| 2. Working Activities | | | | | | |
| i) at 6.2 Kcal/min. | 3 | - | 1116 | i) 1hr at 3.5 Kcal/min | - | 210 |
| ii) at 4 Kcal/min | 3 | - | 720 | ii) 2hr at 2.5 Kcal/min | - | 300 |
| 3. Non-Occupational Activities | | | | | | |
| i) sitting activities like looking after baby, | | | | 2 | 10 | 149.5 |
| ii) chit-chatting with friends, wife and children | 3 | 20 | 284.95 | | | |
| iii) bathing, dressing and praying | 3 | 45 | 787.5 | 3 | 40 | 770 |
| iv) eating | 2 | 10 | 180.7 | 2 | 10 | 149.5 |
| v) domestic work like washing dishes and clothes, cooking/or sweeping the house. | - | - | - | 4 | 30 | 675 |
| Total | 24hrs. | - | 3650.75 calories | 24hrs. | - | 2713 calories |

Table 9 - Data showing daily energy expenditure of daughter-first household in Kampung Lubuk Kelubi.

Girl: Age 13

| Activity | Average for Weekday (Schooling days) | | | Average for Weekend (Non-school days) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins. | Kcalories | Hrs. | Mins | Kcalories |
| A. Rest in bed | | | | | | |
| 1. Night sleep at 0.8 Kcal/min | 6 | - | 288 | 8 | - | 384 |
| B. Miscellaneous Activities | | | | | | |
| 1. Eating at 1.4 Kcal/min | 2 | - | 168 | 2 | - | 168 |
| 2. Bathing, dressing and praying at 3.0 Kcal/min. | 2 | 30 | 450 | 3 | 20 | 600 |
| 3. Reading/Quran Lessons at 1.4 Kcal/min | 1 | 30 | 126 | 1 | 20 | 112 |
| 4. Housework at 3 kcal/min | 4 | - | 720 | 4 | 30 | 810 |
| 5. Schooling (to and for and also at school) at 1.4 Kcal/min. | 8 | - | 672 | - | - | - |
| 6. Working activities e.g. - like going to the fields and helping their parents at 3 Kcal./min. | - | - | - | 2 | 40 | 480 |
| 7. Sitting activities e.g. rest or chit-chatting or just sitting and watching T.V. at 1.4 Kcal./min. | - | - | - | 2 | 10 | 182 |
| Total | 24hrs. | - | 2424 calories | 24hrs. | - | 2736 calories |

Therefore daily average caloric expenditure:

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(2424 \times 5) + (2736 \times 2)}{7}$$

$$= \frac{12120 + 5472}{7}$$

= 2513.142 calories.

TABLE 10 - Data showing daily energy expenditure of daughter - first household in Kg. Lubuk Kelubi

Girl: Age 12

| Activity | Average for Weekday (school day) Hrs | Min. | KCalorie | Average for Weekend ( non-school day) Hrs. | Mins. | Kcalorie |
|---|---|---|---|---|---|---|
| A. Rest in bed Night sleep at 0.8 Kcal/min. | 8 | 50 | 424 | 8 | 40 | 416 |
| B. Miscellaneous activities: | | | | | | |
| 1. eating at 1.4 Kcal/min | 1 | 40 | 140 | 2 | 30 | 210 |
| 2. bathing, dressing at 3.0 Kcal/min | 1 | 40 | 300 | 2 | 10 | 390 |
| 3. housework at 3.0 Kcal/min | 1 | 20 | 240 | 1 | 20 | 240 |
| 4. Schooling (to and fro and in school) | 6 | 30 | 546 | - | - | - |
| 5. Reading/Quran lessons at 1.4 Kcal/min | 2 | - | 168 | 2 | - | 168 |
| 6. Working activities e.g. helping the parents in the fields. | - | - | - | 3 | 10 | 570 |
| 7. Sitting activities like resting and chit-chatting or watching TV | 2 | - | 168 | 4 | 10 | 350 |
| T O T A L | 24 hrs | | 1986 calories | 24 hrs | | 2344 calories |

Therefore daily average caloric expenditure

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7} = \frac{(1986 \times 5) + (2344 \times}{7}$$

$$= \frac{14618}{7} = 2088.285 \text{ calories.}$$

TABLE 11 - Data showing daily energy expenditure of son - first household in Kampong Lubuk Kelubi.

Boy: Age 11

| Activity | Average for Week-day (School day) | | | Average for Week-end (Non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalorie | Hrs | Mins. | Kcalorie |
| A. Rest in bed Night sleep at 0.8 Kcal/min. | 9 | - | 432 | 9 | - | 432 |
| B. Miscellaneous Activities | | | | | | |
| 1. eating at 1.3 Kcal/min | 1 | 40 | 130 | 2 | 30 | 195 |
| 2. Bathing & dressing at 2.5 Kcal/min | 1 | 30 | 225 | 1 | 40 | 250 |
| 3. reading & Quran lessons at 1.3 Kcal/min | 2 | 20 | 182 | 1 | - | 78 |
| 4. Chores like sweeping the lawn and going to the field-working activities | - | - | - | 4 | 20 | 650 |
| 5. Schooling at 1.3 Kcal/min | 6 | 30 | 507 | - | - | - |
| 6. Sitting activities like resting and watching Tv at 1.3 Kcal/min | 2 | 10 | 169 | 2 | 30 | 195 |
| 7. Playing at 1.5 Kcal/min | 1 | 30 | 135 | 3 | - | 270 |
| T O T A L | 24 hrs | | 1780 Calorie | 24 hours | | 2070 Calorie |

Therefore daily average caloric expenditure

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7} = \frac{(1780 \times 5) + (2070 \times 2)}{7}$$

$$= \frac{(8900 + 4140)}{7} = \frac{13040}{7} = 1862.857 \text{ calories.}$$

Table 12 - Data showing daily energy expenditure of daughter - first household in Kampung Lubuk Kelubi.

Girl: Age 10

| Activity | Average for Weekday (School day) Hrs. | Mins | Kcalorie | Average for Weekend (non-school day) Hrs. | Mins | Kcalorie |
|---|---|---|---|---|---|---|
| A. Rest in bed Night sleep at 0.8 Kcal/min | 9 | - | 432 | 9 | 30 | 456 |
| B. Miscellaneous Activities | | | | | | |
| 1. eating at 1.0 Kcal/min | 2 | - | 120 | 2 | 40 | 160 |
| 2. bathing and dressing at 2.5 Kcal/min | 1 | 30 | 225 | 1 | 50 | 275 |
| 3. reading and Quran lessons at 1.0 Kcal/min | 2 | - | 120 | 1 | 30 | 90 |
| 4. housework like washing dishes and cutting up fruits at 2.5 Kcal/min | - | - | - | 2 | - | 300 |
| 5. Schooling at 1.2 Kcal/min | 6 | 20 | 456 | - | - | - |
| 6. sitting activities like resting or watching TV at 1.0 Kcal/min | 2 | 10 | 130 | 3 | 50 | 230 |
| 7. playing at 1.3 Kcal/min | 1 | - | 78 | 2 | 40 | 208 |
| Total | 24 | - | 1561 Calories | 24 | - | 1719 Calories |

Therefore daily average caloric expenditure

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7} = \frac{(1561 \times 5) + (1719 \times 2)}{7}$$

$$= \frac{7805 + 3438}{7} = \frac{11243}{7}$$

= 1606.142 calories

Table 13 - Data Showing daily energy expenditure of daughter - first household in Kampung Lubuk Kelubi.

(Daily averages for last two children that are not schooling)

| Activity | Girl : Age 6 | | | Girl : Age 4 | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalorie | Hrs. | Mins | Kcalorie |
| A. Rest in bed Night sleep at 0.8 Kcal/min | 9 | 30 | 456 | 9 | 30 | 456 |
| B. Miscellaneous Activities | | | | | | |
| 1. Eating at 1.0 Kcal/min | 2 | 30 | 150 | 2 | 30 | 150 |
| 2. Bathing and dressing at 2.3 Kcal/min | 1 | 50 | 253 | 1 | 50 | 253 |
| 3. Reading and Quran lessons at 1.0 Kcal/min | 2 | - | 120 | 2 | - | 120 |
| 4. Working activities - helping their parents in the field at 2.3 Kcal/min | 1 | 40 | 230 | 1 | 30 | 207 |
| 5. Sitting activities - resting and watching T.V. 1.0 Kcal/min | 3 | 50 | 230 | 3 | 40 | 220 |
| 6. Playing at 1.2 Kcal/min | 2 | 40 | 192 | 3 | - | 216 |
| Total daily | 24 hrs. | - | 1631 calories | 24 hrs. | - | 1622 calories |

4.3 Daily activity and energy expenditure in the second household in Kampung Lubuk Kelubi.

The head of the household earns his living by collecting bamboo from the forest. He therefore does heavy work at 7.5 - 9.9 Kcalorie per minute. He usually works on every day of the week, that is from Monday to Sunday, with the exception of Friday. This is because on Friday he has to attend the compulsory Friday prayer at noon and since he works quite far from his house, the best way is to take the day off. He gets up very early in the morning and by 7 o'clock in the morning, he is on his way to the forests. However he goes there by motorcycle and excluding the time he takes for resting in between the heavy work, his over-all rate of work can be said to be not more than 5 Calories per minute. Daily he works for approximately 7 hours 10 minutes, rests in bed for 8 hours and does non-occuptional activities for a total of 8 hours 50 minutes. He does no domestic work at all.

His wife helps him in the cutting up of the bamboo into long thin strands for the final product of joss-sticks and daily does this for a period of about 2 hours 10 minutes. This can be classified as moderate work at 5 - 7.4 Kcalorie per minute. Other than this she does light work, most of which is domestic work such as

washing dishes and clothes and cleaning

for a total of 8 hours

cover -

In this family, the older two children normally attend the national-type government school on weekdays, that is from Monday to Friday. Since they are still young, they do not help their parents much but instead spend a great deal of their time playing with the other children in the neighbour-hood. The children in this household generally do not sleep during the day but they have enough of night sleep since they sometimes sleep for a total of about 11 hours during the night.

For a more detailed information on the energy expenditure of the different activities of the children, please see Tables 15, 16 and 17.

Table 14 - Data showing daily expenditure of energy of head of household and his wife - second household in Kampung Lubuk Kelubi.

| Activity | Male-Head of household Age : 40 | | | Female-wife Age : 33 | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Calories | Hrs. | Mins | Calories |
| A. Rest in bed | | | | | | |
| Night sleep | 7 | 10 | 464.4 | 7 | | 378 |
| Day sleep | - | 50 | 54 | 1 | 10 | 63 |
| B. Working activities | | | | | | |
| 1. At 8.4 Kcal/min | 2 | - | 1008 | 1) 1hr at 3.5 Kcal/min. | | 210 |
| 2. At 4 Kcal/min | 5 | 10 | 1240 | 2) 1hr 10 min at 2.5 Kcal/min | | 175 |
| C. Non - Occuptional Activities | | | | | | |
| 1. Sitting activities, chit-chatting with friends and watching T.V. | 2 | 35 | 215.45 | - | - | - |
| 2. Looking after baby | | | | 3 | 25 | 235.75 |
| 3. Eating | 2 | 10 | 180.7 | 2 | 10 | 149.5 |
| 4. Bathing, dressing and praying | 3 | 5 | 857.5 | 3 | 25 | 717.5 |
| 5. Domestic work | - | - | - | 4 | 40 | 700 |
| Total | 24 hrs. - | | 4020.05 Calories | 24 hrs. - | | 2628.75 Calories |

Table 15 - Data showing daily energy expenditure of son - second household in Kampung Lubuk Kelubi.

Boy : Age 8

| Activity | Average for Weekday (School-day) | | | Average for Weekend (non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalorie | Hrs. | Mins | Kcalorie |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 10 | 10 | 488 | 11 | 10 | 536 |
| 2. Day sleep at 0.8 Kcal/min | - | 50 | 40 | 2 | - | 96 |
| B. Miscellaneous activities | | | | | | |
| 1. Bathing & dressing at 2.5 Kcal/min | 2 | 30 | 375 | 2 | 20 | 375 |
| 2. Eating at 1.3 Kcal/min | 2 | - | 156 | 1 | 50 | 143 |
| 3. Playing at 1.4 Kcal/min | 1 | 40 | 140 | 5 | - | 420 |
| 4. Sitting activities at 1.3 Kcal/min | - | 40 | 52 | 1 | 30 | 117 |
| 5. Schooling at 1.3 Kcal/min | 6 | 10 | 481 | - | - | - |
| Total | 24 hrs. - | | 1732 calories | 24 hrs. - | | 1687 Calories |

Therefore daily average Calorie expenditure

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1732 \times 5) + (1687 \times 2)}{7}$$

$$= \frac{(8660 + 3374)}{7}$$

$$= \frac{12034}{7}$$

= 1719.142 Calories

Table 16 - Data showing daily energy expenditure of daughter - second household in Kampung Lubuk Kelubi.

Girl : Age 7

| Activity | Average for Weekday (Schoold day) | | | Average for Weekend (non-school day) | | |
|---|---|---|---|---|---|---|
| A. Rest in bed | Hrs. | Mins | Kcalorie | Hrs. | Mins | Kcalorie |
| 1. Night sleep | 11 | 10 | 536 | 11 | 10 | 536 |
| 2. Day Sleep at 0.8 Kcal/min | - | - | - | 1 | 50 | 88 |
| B. Miscellaneous activities | | | | | | |
| 1. Bathing and dressing at 2.3 Kcal/min | 1 | 40 | 230 | 2 | 10 | 299 |
| 2. Eating at 1.0 Kcal/min | 1 | 30 | 90 | 1 | 50 | 110 |
| 3. Playing at 1.3 Kcal/min | 2 | - | 156 | 4 | 20 | 338 |
| 4. Sitting activities at 1.0 Kcal/min | 1 | 40 | 100 | 2 | - | 120 |
| 5. Schooling at 1.1 Kcal/min | 6 | - | 396 | - | - | - |
| 6. Housework - helping mother like washing clothes and looking after baby brother | - | - | - | - | 40 | 48 |
| Total | 24 hrs. - | | 1508 calories | 24 hrs. - | | 1539 calories |

Therefore daily average calories expenditure

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1508 \times 5) + (1539 \times 2)}{7}$$

$$= \frac{(7540 + 3078)}{7} = \frac{10618}{7}$$

$$= 1516.857 \text{ Calories}$$

Table 17 - Data showing daily energy expenditure of son - second household in Kampung Lubuk Kelubi.

Boy : Age 1

| Activity | Daily Average. Hrs. | Mins | Kcalorie |
|---|---|---|---|
| **A. Rest in bed** | | | |
| 1. Night Sleep | 11 | 10 | 536 |
| 2. Day sleep at 0.8 Kcal/min | 4 | - | 192 |
| **B. Miscellaneous Activities** | | | |
| 1. Bathing and dressing at 0.8 Kcal/min | 1 | 20 | 64 |
| 2. Eating at 0.8 Kcal/min | 2 | 40 | 128 |
| 3. Sitting activities at 0.8 Kcal./min | 3 | 40 | 176 |
| 4. Playing at 0.8 Kcal/min | 1 | 10 | 56 |
| **Total** | 24 hrs. | - | 1152 calories |

4.4 Daily Activity and energy expediture in the first household in Kampung Labohan Dagang

The head of the household works as a peasant and does agricultural work on every day of the week, mainly in his own garden near the house or field of coffee, a few distance away from the house. The total hours spent on working activities in a day is 7 hours 10 minutes and he can be said to be doing moderate work. The total number of hours he rests in bed in a day is 8 hours and for the rest of the day, that is for a total of about 8 hours 50 minutes, he is engaged in non-occupational activities. He also does some domestic work like washing the clothes on weekdays and this is probably due to the fact that his wife has just given birth and also the children are all schooling on these days. Therefore he helps in some of the domestic work while his wife attends to the baby.

His wife rests in bed for a total of 9 hours 20 minutes and for the rest of the day she is engaged in non-occupational activities for a total of about 14 hours and 40 minutes, most of which is taken by her domestic chores. She does not help her husband at all and this is probably so because she is still too weak to do heavy work - since she has just given birth to a baby boy.

The older five children besides attending the national - type government school on weekdays, also attend Quran lessons as part of their daily routine. Since their time is spent in school on weekdays, the children are only free to help their parents on weekends. The girls have different tasks from the boys since they usually helptheir mother in the washing of clothes and dishes and looking after the baby, while the boys help their father in the plucking of coconuts, the cutting

Table 18 - Data showing daily expenditure of energy of head of household and his wife - first household in Kg. Labohan Dagang.

| Activity | Male - Head of Household | | | Female - Wife | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalorie | Hrs. | Mins | Kcalorie |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 7 | 10 | 464.4 | 8 | 10 | 441 |
| 2. Day sleep | - | 50 | 54 | 1 | 10 | 63 |
| B. Working activities | | | | | | |
| 1. 6.2 Kcal/min | 2 | - | 744 | - | - | - |
| 2. 4 Kcal/min | 5 | 10 | 1240 | - | - | - |
| C. Non-Occupational activities | | | | | | |
| 1. Sitting activities - sitting and talking | 2 | 10 | 180.7 | - | - | - |
| 2. Looking after baby | - | - | - | 4 | 50 | 335.5 |
| 3. Eating | 2 | 40 | 222.4 | 2 | 10 | 149.5 |
| 4. Bathing, dressing and praying | 3 | - | 630 | 2 | 30 | 525 |
| 5. Domestic work eg. washing clothes, washing dishes, cooking, sweeping the home | 1 | - | 186 | 5 | 10 | 775 |
| Total | 24 hrs.- | | 3721.5 Calories | 24 hrs. - | | 2287 Calories |

Cont. from page 53.

up of firewood, looking after the goats and also helping in the coffee fields. The total number of hours spent in the different activities and the energy expenditure of each activity are given in Tables 19, 20, 21, 22 and 23.

Table 19 - Data showing energy expenditure - first household in Kampung Labohan Dagang.

Boy : Age 17

| Activity | Average for Weekday (School day) Hrs. | Mins | Kcalorie | Average for Weekend (non-school day) Hrs. | Mins | Kcalorie |
|---|---|---|---|---|---|---|
| A. Rest in bed | | | | | | |
| 1. Night Sleep | 6 | 10 | 296 | 8 | - | 384 |
| 2. Day sleep at Kcal/min | 1 | 50 | 88 | - | 50 | 40 |
| B. Miscellaneous activities | | | | | | |
| 1. Bathing and dressing at 4.0 Kcal/min | 1 | 50 | 440 | 2 | 30 | 600 |
| 2. Eating at 1.5 Kcal/min | 1 | 40 | 150 | 2 | - | 180 |
| 3. Sitting activities at 2.0 Kcal/min | 1 | 30 | 180 | 3 | 10 | 380 |
| 4. Reading at 1.5 Kca./min | 2 | - | 180 | 2 | 20 | 210 |
| 5. Playing at 1.9 Kcal/min | 1 | 40 | 190 | 3 | 30 | 399 |
| 6. Schooling at 1.5 Kcal/min | 7 | 20 | 660 | - | - | - |
| 7. Working activities - helping father at garden-ing, etc. | - | - | - | 1 | 40 | 350 |
| Total | 24hrs. | - | 2184 Calories | 24 hrs. | - | 2543 Calories |

Therefore daily average caloric expenditure

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(2184 \times 5) + (2543 \times 2)}{7} = \frac{(10920 + 5086)}{7} = \frac{16006}{7}$$

= 2286.571 Calories.

Table 20 - Data showing daily energy expenditure of daughter - first household in Kampung Labohan Dagang.

Girl : Age 15

| Activity | Average for Weekday (School day) | | | Average for Weekend (non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalories | Hrs. | Mins | Kcalories |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 7 | 10 | 344 | 8 | - | 384 |
| 2. Day sleep at 0.8 Kcal/min | - | - | - | 1 | - | 48 |
| B. Miscellaneous Activities | | | | | | |
| 1. Bathing and dressing at 3.0 Kcal/min | 1 | 20 | 240 | 2 | 20 | 420 |
| 2. Eating at 1.4 Kcal/min | 1 | 50 | 154 | 1 | 40 | 140 |
| 3. Sitting activities eg. resting and watching T.V. at 1.4 Kcal/min | 2 | 10 | 182 | 3 | 20 | 280 |
| 4. Reading at 1.4 Kcal/min | 2 | - | 168 | 2 | 30 | 210 |
| 5. Schooling at 1.4 Kcal/min | 7 | 30 | 630 | - | - | - |
| 6. Housework like washing dishes and sweeping kitchen and cooking | 2 | - | 360 | 5 | 10 | 930 |
| Total | 24 hrs. | - | 2078 Calories | 24 hrs | - | 2412 Calories |

Therefore average daily caloric expenditure:-

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(2078 \times 5) + (2412 \times 2)}{7} = \frac{(10390 + 4824)}{7} = \frac{15214}{7}$$

= 2173.428 Calories.

Table 21 - Data showing daily energy expenditure of son - first household in Kampung Labohan Dagang.

Boy : Age 12

| Activity | Average for Weekday (School day) | | | Average for Weekend (non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalories | Hrs. | Mins | Kcalories |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 8 | 10 | 392 | 10 | 10 | 488 |
| 2. Day sleep | 1 | - | 48 | 1 | - | 48 |
| B. Miscellaneous Activities | | | | | | |
| 1. Bathing & dressing at 2.5 Kcal/min | 1 | 30 | 225 | 1 | 30 | 225 |
| 2. Eating at 1.3 Kcal/ min | 1 | 55 | 149.5 | 2 | 10 | 325 |
| 3. Sitting activities like chit-chatting with friends or watching T.V. at 1.3 Kcal/min | 3 | - | 234 | 1 | 50 | 143 |
| 4. Reading at 1.3 Kcal/ min | 1 | 15 | 97.5 | 1 | - | 78 |
| 5. Schooling at 1.3 Kcal/min | 7 | 10 | 559 | - | - | - |
| 6. Playing at 1.8 Kcal/ min | - | - | - | 5 | 10 | 558 |
| 7. Working activities - helping father in the fields, at 3.0 Kcal/min | - | - | - | 1 | 10 | 210 |
| Total | 24 hrs. | - | 1705 Calories | 24hrs. | - | 2075 Calories |

Therefore average daily caloric expenditure:-

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1705 \times 5) + (2075 \times 2)}{7} = \frac{(8525 + 4150)}{7} = \frac{12675}{7}$$

= 1810.714 Calories

Table 22 - Data showing daily energy expenditure of daughter - first household in Kampung Labohan Dagang.

Girl : Age 10

| | Activity | Average for Weekday (School day) Hrs. | Mins | Kcalories | Average for Weekend (non-school day) Hrs. | Mins | Kcalories |
|---|---|---|---|---|---|---|---|
| A. | Rest in bed | | | | | | |
| 1. | Night sleep | 9 | 10 | 440 | 10 | - | 480 |
| 2. | Day sleep at 0.8 Kcal/min | - | - | - | - | - | - |
| B. | Nicellaneous Activities | | | | | | |
| 1. | Bathing and dressing at 2.3 Kcal/min | 1 | - | 138 | 1 | 10 | 161 |
| 2. | Eating at 1.0 Kcal/ min | 1 | 30 | 90 | 2 | 30 | 150 |
| 3. | Sitting activities at 1.0 Kcal/min | 3 | 30 | 210 | 4 | 20 | 260 |
| 4. | Playing at 1.3 Kcal/min | 1 | 10 | 91 | 1 | 40 | 130 |
| 5. | Housework like washing dishes at 2.5 Kcal/min | 1 | 0 | 150 | 3 | 10 | 475 |
| 6. | Schooling at 1.2 Kcal/min | 6 | 40 | 480 | - | - | - |
| 7. | Reading at 1.0 Kcal/ min | - | - | - | 1 | 10 | 70 |
| | Total | 24 hrs. - | | 1599 Calories | 24 hrs.- | | 1726 Calories |

Therefore average daily caloric expenditure:-

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1599 \times 5) + (1726 \times 2)}{7} = \frac{(7995 + 3452)}{7} = \frac{11447}{7}$$

= 1635.285 Calories.

Table 23 - Data showing daily energy expenditure of sons - first h in Kampung Labohan Dagang.

(i) Boy : Age 7

| Activity | Average for Weekday (School day) | | | Average for Week (non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalories | Hrs. | Mins | Kcalo |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 9 | 10 | 440 | 11 | 10 | 536 |
| 2. Day sleep at 0.8 Kcal/min | - | - | - | - | - | - |
| B. Miscellaneous Activities | | | | | | |
| 1. Bathing and dressing at 2.4 Kcal/min | 1 | - | 144 | 1 | - | 144 |
| 2. Eating at 1.2 Kcal/ min | 2 | 10 | 156 | 1 | 50 | 132 |
| 3. Sitting activities at 1.2 Kcal/min | 2 | 50 | 204 | 4 | - | 288 |
| 4. Playing at 1.3 Kcal/ min | 2 | 10 | 169 | 5 | 10 | 403 |
| 5. Schooling at 1.2 Kcal/ min | 6 | 40 | 480 | - | - | - |
| 6. Reading at 1.2 Kcal/ min | - | - | - | - | 50 | 60 |
| Total | 24 hrs. - | | 1593 Calories | 24 hrs. - | | 1563 Calori |

Therefore average daily caloric expenditure:-

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1593 \times 5) + (1563 \times 2)}{7} = \frac{(7965 + 3126)}{7} = \frac{11091}{7}$$

= 1584.428 Calories.

(ii) Total daily energy expenditure of last child - Age ; one monti

= 24 hrs. x 0.8 Kcal/minute

= 20 x 60 x 0.8

4.5 Daily activity and energy expenditure in the second household in Kampung Labohan Dagang.

The head of the household is a peasant and works for the least number of hours, that is about 3 hours and 40 minutes daily. He does moderate work and works on every day of the week including weekends. He rests in bed for a total of 9 hours 30 minutes daily and does non-occupational activities for a total of 10 hours and 50 minutes daily. As he is an active member of UMNO and the Parent-Teachers' Association, his leisuretime is sometimes spent in the regular meetings or projects. He does no domestic work at all.

His wife rests for a total of 8 hours 40 minutes and apart from this she spends another 15 hours 20 minutes daily doing non-occupational activities. She does not help her husband in the fields since she has to attend and look after the children especially the youngest baby.

In this family, the older two children attend the national-type government school on weekdays and also attend Quran lessons for at least 3 hours daily. Since they are still young, they do not help their parents much but instead spend a great deal of their time watching television or playing with other neighbourhood children. The total number of hours of sleep is about 11 hours daily and this includes both night-sleep and day-sleep.

For other information regarding the children's energy expenditure please refer to Tables 25 and 26.

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..../cont.

cont./.....

Miscellaneous footnotes:-

1. For a more detailed information on the activities and daily expenditure of energy of all the heads of households and their wives, please see Tables 8 and 14 - for households in Kampung Lubuk Kelubi, Ulu Langat Selangor and Tables 18 and 24 - for households in Kampung Labohan Dagang, Kuala Langat, Selangor.

2. The children activity tables for both households in both villages are given, following the above.

3. The expenditure rates for the various activities for the men and women were based on the data from WHO (World Health Organisation) and FAO (Food and Agriculture Organization) series, while.

4. For the children, the expenditure rates were taken from the article "Human Energy Expenditure" by R. Passmore and J.V.G.A. Durnin in Physiological Review.

5. However, some adaptations were made here and there since some of the data for the exact activity or for the required age-group and their exact weight were not available from the above references.

6. Since there is not much difference in activities done on week-days and weekends for the heads of households and their wives in both villages, the averages for the daily expenditure of energy were not separated when the writer compiled them in the various tables. That is activities done on weekends activities done on weekdays were not separated, but just taken from the seven-day total and dividing it by seven.

7. However, for the children that are schooling, the calculations for the energy expenditure were separated since on weekdays, a large portion of the day or almost one-third of the day is spent in schools while on weekends, the schools are closed and the children normally help their parents on these days.

8. Calculations for the energy expenditure of infants of one year and below were generally based on the rate of 0.8 Kcalorie per minute for all types of activities since the actual accurate metabolic cost of the different activities for infants were not available from any source.

Table 24 - Data showing daily energy expenditure of head of household and his wife - second household in Kampung Labohan Dagang.

| | Activity | Male - head of household ( Age : 33 ) Hrs. | Mins | Kcalories | Female - Wife ( Age : 27 ) Hrs. | Mins | Kcalories |
|---|---|---|---|---|---|---|---|
| A. | Rest in bed | | | | | | |
| 1. | Night sleep | 7 | 10 | 464.4 | 7 | 20 | 396 |
| 2. | Day sleep | 2 | 20 | 151.2 | 1 | 20 | 72 |
| B. | Working Activities | | | | | | |
| 1. | At 6.2 Kcal/min. | 1 | - | 372 | - | - | - |
| 2. | At 4 Kcal/min. | 2 | 40 | 640 | - | - | - |
| C. | Non-Occupational Activities | | | | | | |
| 1. | Sitting Activities like watching T.V., | 2 | 20 | 194.5 | 1 | 30 | 103.5 |
| 2. | looking after baby | 2 | 30 | 208.5 | 3 | 30 | 241.5 |
| 3. | Sitting and talking | 1 | 10 | 97.3 | - | - | - |
| 4. | Eating | 2 | 20 | 194.6 | 2 | 20 | 161 |
| 5. | Bathing, dressing and praying | 2 | 30 | 525 | 3 | - | 630 |
| 6. | Domestic work - cooking, washing, sweeping | - | - | - | 5 | - | 750 |
| | Total | 24 hrs. - | | 2847.5 calories | 24 hrs. - | | 2354 calories |

Table 25 - Data showing daily energy expenditure of daughter - second household in Kampung Labohan Dagang.

Girl : Age 10

| Activity | Average for Weekday (School day) | | | Average for Weekend (non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalories | Hrs. | Mins | Kcalories |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 9 | 10 | 440 | 9 | 50 | 472 |
| 2. Day sleep | - | - | - | 2 | - | 96 |
| B. Miscellaneous Activities | | | | | | |
| 1. Bathing and dressing at 2.3 Kcal/min. | 1 | 10 | 161 | 1 | - | 138 |
| 2 Eating at 1.0 Kcal/min. | 1 | 40 | 100 | 2 | 10 | 130 |
| 3. Sitting activities like watching T.V. and looking after baby brother at 1.0 Kcal/min. | 1 | 10 | 70 | 3 | 20 | 200 |
| 4. Homework or reading/ schoolwork at 1.0 Kcal/min. | 1 | - | 60 | 1 | - | 60 |
| 5. Schooling | | | | | | |
| i) National School | 6 | 10 | 444 | - | - | - |
| ii) Arabic School and Quran lessons at 1.2 Kcal/min. | 3 | 40 | 264 | - | - | - |
| 6. Housework like washing dishes and clothes at 2.5 Kcal/min. | - | - | - | 1 | 50 | 143 |
| 7. Playing at 1.3 Kcal/min. | - | - | - | 1 | 50 | 143 |
| Total | 24 hrs. - | | 1539 Calories | 24 hrs. - | | 1664 Ca |

Therefore average daily caloric expenditure:-

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1539 \times 5) + (1664 \times 2)}{7} = \frac{(7695 + 3328)}{7} = \frac{11023}{7}$$

= 1574.714 Calories

Table 26 - Data showing daily energy expenditure of son and daughter - second household in Kampung Labohan Dagang.

(i) Boy : Age 8

| Activity | Average for Weekday (School day) | | | Average for Weekend (non-school day) | | |
|---|---|---|---|---|---|---|
| | Hrs. | Mins | Kcalories | Hrs. | Mins | Kcalories |
| A. Rest in bed | | | | | | |
| 1. Night sleep | 9 | 10 | 440 | 9 | 50 | 472 |
| 2. Day sleep at 0.8 Kcal/min. | - | - | - | 2 | - | 96 |
| B. Miscellaneous activities | | | | | | |
| 1. Bathing and dressing at 2.4 Kcal/min. | 1 | - | 144 | 1 | 10 | 168 |
| 2. Eating at 1.2 Kcal/min. | 1 | 50 | 132 | 2 | 20 | 168 |
| 3. Sitting activities like watching T.V. at 1.2 Kcal/min | 2 | 10 | 156 | 3 | 50 | 276 |
| 4. Schooling | | | | | | |
| i) National School | 6 | 10 | 444 | - | - | - |
| ii) Arabic School and Quran lessons at 1.2 Kcal/min. | 3 | 40 | 264 | | | |
| 5. Playing at 1.3 Kcal/min | - | - | - | 4 | 50 | 377 |
| Total | 24hrs. | - | 1580 Calories | 24hrs. | - | 1557 Calories |

Therefore daily average caloric expenditure:-

$$= \frac{(\text{Weekday average} \times 5) + (\text{Weekend average} \times 2)}{7}$$

$$= \frac{(1580 \times 5) + (1557 \times 2)}{7} = \frac{(7900 + 3114)}{7} = \frac{11014}{7}$$

= 1573.428 Calories.

(ii) Total daily energy expenditure of last child - girl - one year old

= 24 hrs x 0.8 Kcal./minute = 24 x 60 x 0.8

= 1152 Calories.

# CHAPTER FIVE

## COMPARISON OF ENERGY INTAKE AND ENERGY EXPENDITURE:

### 5.1 Analysis of energy intake and energy expenditure in the four sample households.

Generally it was found that in all four households, the energy expenditure was greater than the energy intake. That is to say, the members of the household take in very little food (with caloric content), but they do a lot of work and are involved in activities that require heavy expenditure of energy. It is not surprising therefore to find that the members of all the households are quite thin and this is especially the case among the children. Their weights (see figure one) also show that they are slightly underweight and this may reflect that they are a bit on the undernourished side.

In comparative terms however, both households in Kampung Labohan Dagang are much better off since the difference between their levels of energy expenditure and energy intake in less than in the case of the households in Kampung Lubuk Kelubi. Futhermore, both households in Kampung Labohan Dagang take in an absolutely greater amount of calories than their counterparts in Kampung Lubuk Kelubi. The above findings can be supported by the data in figure 2 and it can be said that in all four households, although the members are thin, they are however very hardworking and very active people.

Figure 1 - Data showing ages and weights of members of the sample households.

| Members of Household | Kampung Lubuk Kelubi. First Household Age (year) | Weight (kg) | Second Household Age (year) | Weight (kg) | Kampung Labohan Dagang. First Household Age (year) | Weight (kg) | Second Household Age (year) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| 1. Head of household | 85 | 39 | 33 | 62 | 36 | 60 | 33 | 56 |
| 2. Wife | 45 | 59 | 27 | 56 | 31 | 52 | 27 | 51 |
| 3. First child | 13 | 38 | 8 | 43 | 17 | 52 | 10 | 26 |
| 4. Second child | 12 | 26 | 7 | 17 | 15 | 49 | 8 | 19 |
| 5. Third child | 11 | 21 | 1 | 9 | 12 | 34 | 1 | 7 |
| 6. Fourth child | 10 | 19 | - | - | 10 | 28 | - | - |
| 7. Fifth child | 6 | 16 | - | - | 7 | 19 | - | - |
| 8. Sixth child | 4 | 13 | - | - | 1 mth | 4 | - | - |

Figure 2 - Data showing energy expenditure and energy intake in the four households in Kampung Lubuk Kelubi and Kampung Labohan Dagang.

| | Kampung Lubuk Kelubi. Family 1 Family size: 8 | Family 2 Family size:5 | Kampung Labohan Dagang. Family 1 Family size: 8 | Family 2 Family size: |
|---|---|---|---|---|
| Energy expenditure | 17687.176 Calories | 11036.799 Calories | 16650.926 Calories | 9501.642 Calories |
| Energy Intake | 9699 Calories | 6623 Calories | 13814 Calories | 8700 Calories |
| Energy Deficit | 7988.176 Calories | 4413.79 Calories | 2836.926 Calories | 801.642 Calories |

The writer would like to explain here for the great energy deficit in all the four households. It may be due to the fact that she had probably underestimated the amount of food eaten by the children when they were in school. This was because she could not attend the schools since they were quite far from the sample households and thus the writer could not possibly be at two places at the same time to record the daily activities of the people at every ten-minute interval. In the case of the head of the second household in Kampung Lubuk Kelubi whose work was in the forests, it was impossible for the writer to keep an account of his activities or the amount of food eaten. The total amount of food eaten was therefore underestimated again.

Another reason for the great energy deficit was that the writer had probably overestimated the metabolic costs for the various activities in her calculations. Furthermore the use of the basis of data from the WHO and FAO series may not be very suitable to our Malaysian standards. It is therefore very necessary that we have our own Malaysian rates for the various activities and also various age-groups. Only then will a study on the energy expenditure of any community be accurate.

The accuracy achieved in this pilot study was also limited by the various data collection problems mentioned in chapter one and the limitations of the food table itself. For example the chief drawback is that each figure in the compilation of the food table can only be taken as an "average" of the analyses of a limited number of samples of each food. Other problems are analyses of foods may be on a "as purchased" basis or on "edible portions" only and nutrient

contents of foodstuffs may change on processing or cooking. Then the calorie values of diets can be calculated fairly accurately from food tables for most purposes, the error being about 10 per cent. However, the margin of error may be too large for most metabolic studies.

As mentioned in the first chapter, the survey was only for seven days and the average daily intake for this short period might not be near the average taken over a longer period of time. Furthermore, in comparing the calculated quantity of nutrients and the amounts actually consumed, there was probably some disparity due to losses in cooking, wastage and the like. These losses were difficult to estimate accurately.

Lastly, as pointed out by Marr (1971) in his book — "Individual Dietary Surveys", using the family or household as a unit, has its limitations. The actual distribution of food in a household may not be equitable. Even if the household as a unit appears to consume enough food, in actually certain members may eat more than their daily requirements and some less. In short, the results of a food consumption survey, based on the household as a unit, cannot be validly correlated with nutritional assessment which is oriented to the individual.

## 5.2 Average energy intake per consumer unit or average calorie per consumer unit.

The second important finding is that the average energy intake per consumer unit or average calorie per consumer unit in all four households was less than the required calories per consumer unit as recommended by the daily dietary intakes for West Malaysia which was compiled by the Department of Social and Preventive Medicine, Faculty of Medicine of the University of Malaya.

One consumer unit equals the caloric consumption of a middle-aged adult male. Women and children generally require lesser quantities of calories and hence are equivalent to partial consumer units. However for pregnant or nursing mother the quantity is equal to one consumer unit of the adult male, and for adolescents it is generally a bit more than one consumer unit of the adult male.

For example a family consisting of one adult male, one adult female and four small children thus has a caloric requirement equivalent to 3¼ standard consumer units. The calculation is shown below:-

| | | |
|---|---|---|
| 1 adult male | - | 1 unit |
| 1 adult female | - | ¼ unit |
| 4 small children | - | (4 x ½) unit |
| Therefore total : | | 3¼ standard consumer units. |

Again, as compared with the households in Kampung Lubuk Kelubi, both households in Kampung Labohan Dagang are better off since the total of the calories per consumer unit in these households is greater than those in Kampung Lubuk Kelubi. The calories per consumer unit for each household is equal to,

$$\frac{\text{Total Calories Intake}}{\text{Total Consumption Units}}$$

and the result was then compared with the required and the calories per consumer unit for each household which as shown in Figure 3, differs from one household to another.

Figure 3 - Energy Intake or calories per consumer unit for each household in Kampung Lubuk Kelubi as compared with the required energy intake or calories per consumer unit for each different household.

(i) First household in Kg. Lubuk Kelubi.

Calories per consumer unit as found from research

$$= \frac{\text{Total Cal. intake of h.hold}}{\text{Total Consumer Units.}}$$

$$= \frac{9699}{9.55} = 1015.6 \text{ Calories per consumer units.}$$

Calories per consumer unit - Standard requirements.

$$= \frac{\text{Required total Cal' intake of household}}{\text{Total Consumer units.}}$$

$$= \frac{17138}{9.55} = 1794.6 \text{ Calories per consumer unit.}$$

Therefore there was a shortage of about 779 Calories per consumer units in the first household in Kampung Lubuk Kelubi. Similarly in the second household in Kampung Lubuk Kelubi:

(ii) Calories per consumer unit as found from research is

$$= \frac{\text{Total Calories Intake of household}}{\text{Total Consumer Units}}$$

$$= \frac{6623}{3.31}$$

$$= 2000.9 \text{ Calories per consumer unit.}$$

Required Calories per consumer units.

$$= \frac{\text{Required Total Calories Intake of household}}{\text{Total Consumer Units}}$$

$$= \frac{11104}{3.31}$$

$$= 3354.7 \text{ Calories per consumer unit.}$$

Again there was a shortage of about 1353.8 Calories per consumer unit in the second household in Kampung Lubuk Kelubi.

Following this, are the data for both household in Kampong Labohan Dagang in Kuala Langat and this will be shown in Figure 4.

Figure 4 - The energy intake or calories intake per consumer unit in both households in Kampung Labohan Dagang as compared with the required calories intake per consumer units in each household.

(i) First household:-

| Calories per consumer unit as found from research | Calories per consumer unit - Standard requirements. |
|---|---|
| = Total Calories Intake / Total Consumer Units. | = Total Required Calories intake / Total Consumer Units. |
| = 13814 / 6 | = 16582 / 6 |
| = 2302.3 Calories per consumer units. | = 2763.7 Calories per consumer units. |

As can be seen from the above, there was a shortage of about 461.4 Calories per consumer units in Household One. The results for household2is shown below:-

| (ii) Calories per consumer unit as found from research | Calories per consumer unit - Standard requirements. |
|---|---|
| = Total Calories Intake / Total Consumer Units | = Total Required Calories Intake / Total Consumer Units. |
| = 8700 / 3.51 | = 9057 / 3.51 |
| = 2478.6 Calories per consumer Units. | = 2580.3 Calories per consumer units. |

Therefore there was a shortage of about 101.7 Calories per consumer units in household Two.

Footnote:

Based on the above data, the author noted that in all households the total calories intake as found from the research done were all less than the required total calories intake which was calculated from the Working Table of Required Daily Dietary Intake for West Malaysia, as published by the Department of Social and Preventive Medicine of the University of Malaya. Because of this it was also found out that the calories per consumer units for each household here also less than the required calories per consumer units. However, comparatively, both households in Kampung Labohan Dagang have an overall total of calories per consumer unit that is almost double that of both households in Kampung Lubuk Kelubi. This is shown in Figure 5.

Figure 5 - Comparison of total calories per consumer units in Kampung Lubuk Kelubi and Kampung Labohan Dagang.

| Both Households (lubuk Kelubi) | Both Households (labohan Dagang) |
|---|---|
| Total Calories Intake = 16322 | Total Calories Intake = 22514 |
| Total Consumer Units = 12.86 | Total Consumer Units = 9.51 |
| - Calories per Consumer Units | - Calories per Consumer Units |
| = 1269.2 | = 2367.4 |

The greater total in both households in Kampung Labohan Dagang is probably due to the larger intake of cereals and cereal products namely rice and also a larger intake of legumes and products; vegetables - roots shoots bulbs and tubers, milk and milk products, fats and oils, beverages and sugars and syrups here. These food groups especially contain a larger caloric content and thus as shown in Tables 27 and 28, the total weight consumed and the caloric content of these food groups for both households in Kampung Labohan Dagang shows the difference in total when compared with both households in Kampung Lubuk Kelubi. The reason for the above which the author noted down during her participant-observation in both villages was that the wives in both households in Kampung Labohan Dagang cook food twice a day that is in the morning and in the evening, whereas the wives in both households in Kampung Lubuk Kelubi only cook once a day with the exception of cooking rice which they cook twice in a day.

5.3 Protein/Calories per cent.

Next is the calculation of the protein/Calories percentage. According to Dr. Teoh from the Department of Social and Preventive Medicine of the University of Malaya, the recommended percentage for a household is between 12 to 14%. The calculation of the protein/calories percentage is equal to calories derived from proteins devided by the total metabolizable energy, multiplied by a hundred.

Mathematically, Protein/Calories %

$$= \frac{\text{(Calories derived from Proteins)}}{\text{Total metabolizable Energy}} \times 100$$

$$= \frac{(e \times 4)}{f} \times 100, \text{ where}$$

e = total weight of Proteins; and

f = total calories intake.

The total of this in all four households is shown in figure 6, and the result shows that only the first household in Kampung Labohan Dagang (total of about 13.1 Protein/Calories %) is within the recommended range, whereas for both households in Kampung Lubuk Kelubi, the percentages is slightly less than the recommended range. The least percentage figure was found in the second household in Kampung Labohan Dagang with only about 10.6 protein/Calories percentage.

Figure 6 - Data showing Protein/Calories percentage in all four households in both villages.

| | Kampung Lubuk Kelubi | Kampung Labohan Dagang |
|---|---|---|
| First Household | Protein/Calories % = | Protein/Calories % = |
| | Calories derived for proteins x 100 / Total metabolizable energy | Calories derived for proteis x 100 / Total metabolizable energy |
| | $= \frac{e \times 4}{f} \times 100$ | $= \frac{e \times 4}{f} \times 100$ |
| | $= \frac{273 \times 4}{9699} \times 100$ | $= \frac{453 \times 4}{13814} \times 100$ |
| | = 11.3 Protein/Calories % | = 13.1 Protein/Calories % |
| Second Household | Protein/Calories % = | Protein/Calories % |
| | Calories derived for proteins x 100 / Total metabolizable energy | Calories derived for proteins x 100 / Total metabolizable energy |
| | $= \frac{e \times 4}{f} \times 100$ | $= \frac{e \times 4}{f} \times 100$ |
| | $= \frac{195 \times 4}{6623} \times 100$ | $= \frac{230 \times 4}{8700} \times 100$ |
| | = 11.8 Protein/Calories % | = 10.6 Protein/Calories % |

Footnote: The total weight in grams of Protein-intake is shown in Table 29 and in order to get the calories derived from proteins, this weight must be multiplied by 4.

Table 27 - Food types and their weight consumed in both Kampung Lubuk Kelubi and Kampung Labohan Dagang.

| Food Type | Kampung Lubuk Kelubi | | Kampung Labuhan Dagang | |
|---|---|---|---|---|
| | Family 1 (grams) | Family 2 (grams) | Family 1 (grams) | Family 2 (grams) |
| 1. Cereals and Cereal Products | 1634.6 | 1438 | 2356 | 1542 |
| 2. Starchy Roots and Tubers | 50 | - | - | 62 |
| 3. Legumes and Products | 174 | 68 | 318 | 224 |
| 4. Nuts and Seeds | 220 | 58 | 159 | 294 |
| 5. Vegetables - Roots shoots, bulbs | 630 | 286 | 736 | 381 |
| 6. Fruits | 580 | 56 | 770 | 80 |
| 7. Meats and Eggs | 208 | - | 138 | 114 |
| 8. Fish and other seafoods | 527 | 488 | 678 | 390 |
| 9. Milk and milk prosucts | 32 | 16 | 34 | 17 |
| 10. Fats and Oils | 80 | 40 | 230 | 74 |
| 11. Condiments and Spices | 122 | 71 | 91 | 52 |
| 12. Beverages | 10 | 6 | 13 | 7 |
| 13 Sugars and syrups | 60.4 | 30 | 64 | 44.8 |
| Grand Daily Total | 4328 gms. | 2557 gms. | 5587 gms. | 3282 gms. |

Table 28 - Caloric content of food types in both Kampong Lubuk Kelubi and Kampung Labuhan Dagang. (Daily intake in calories)

| Food Type | Kampung Lubuk Kelubi | | Kampung Labuhan Dagang | |
|---|---|---|---|---|
| | Family 1 | Family 2 | Family 1 | Family 2 |
| 1. Cereals and Cereal Products | 5913.24 | 4996.72 | 7798.7 | 5443 |
| 2. Starchy Roots and Tubers | 37.5 | - | - | 46.5 |
| 3. Legumes and Products | 76.56 | 29.92 | 286.4 | 169.3 |
| 4. Nuts and Seeds | 825 | 217.5 | 672.4 | 1102.5 |
| 5. Vegetables | 141.66 | 67.64 | 181.4 | 75 |
| 6. Fruits | 474.4 | 26.88 | 321 | 70.4 |
| 7. Meats and Eggs | 423.36 | - | 260.8 | 233.5 |
| 8. Fish and other seafoods | 697.9 | 728.54 | 1243.4 | 631.8 |
| 9. Milk and milk products | 105.6 | 52.8 | 112.2 | 56.1 |
| 10. Fats and Oils | 720 | 360 | 2070 | 666 |
| 11. Condiments and Spices | 36.42 | 19.72 | 32.1 | 15.9 |
| 12. Beverages | 5.8 | 3.5 | 29.4 | 10.7 |
| 13. Sugars and syrups | 241.6 | 120 | 256 | 179.2 |
| Grand Daily Total | 9699 Cal. | 6623 Cal. | 13264 Cal. + 550 = 13814 Cal. | 8700 Cal. |

Footnote: * + 550 (because of lactation)

Table 29 - Daily Intake of proteins from food types in both Kampung Lubuk Kelubi and Kampung Labohan Dagang. (Weight in grams)

| Food Type | Kampung Lubuk Kelubi | | Kampung Labuhan Dagang | |
|---|---|---|---|---|
| | Family 1 | Family 2 | Family 1 | Family 2 |
| 1. Cereals and Cereal Products. | 117.88 | 101.26 | 170.8 | 111.3 |
| 2. Starchy Roots and Tubers | 1 | - | - | 1.24 |
| 3. Legumes and Products | 5.92 | 2.32 | 37.7 | 19.4 |
| 4. Nuts and Seeds | 8.8 | 2.32 | 16.1 | 11.8 |
| 5. Vegetables | 6.64 | 6.34 | 17.6 | 5 |
| 6. Fruits | 6.72 | 0.44 | 5.6 | 0.96 |
| 7. Meats and Eggs | 29.64 | - | 18.1 | 15.8 |
| 8. Fish and other seafoods | 91.38 | 79.02 | 157.6 | 62.04 |
| 9. Milk and Milk Products | 2.9 | 1.4 | 3.1 | 1.5 |
| 10. Fats and Oils | 0 | 0 | 0 | 0 |
| 11. Condiments and Spices | 1.49 | 0.78 | 1.1 | 0.64 |
| 12. Beverages | 1.4 | 0.8 | 1.6 | 0.9 |
| 13. Sugars and syrups | 0 | 0 | 0 | 0 |
| Grand Daily Total | 273 gms. | 195 gms. | 429.3 gms + 24* = 453 gms. | 230 gms. |

Footnote: * +24 grams (because of lactation)

## 5.4 Socio-economic and socio-cultural determinants of the dietary pattern of the rural communities in Kampung Lubuk Kelubi and Kampung Labohan Dagang.

As in other communities, there are various socio-economic and socio-cultural determinants of the dietary pattern of the rural communities in Kampung Lubuk Kelubi and Kampung Labohan Dagang. Among the socio-economic factors are the family food supply, livestock, foods purchased and sources of income while the socio-cultural factors influencing the dietary pattern include that of meal patterns, food preparation or cooking practices, food taboos, food preferences, food ideology and lack of knowledge of the nutrient values of various foodstuffs.

For example in the first households in Kampung Lubuk Kelubi and Kampung Labohan Dagang; since the fathers plant some vegetables in the gardens near the house, these vegetables may add to the total family food supply and may also affect the daily dietary pattern of the families. Because of this, the author found out that the total amount of vegetables consumed in both these families is greater when compared with the second households in both Kampung Lubuk Kelubi and Kampung Labohan Dagang (see table 27). This is because both these second families do no plant any vegetable produce in their gardens.

The raising of livestock is also another socio-economic factor influencing the type of food consumed. For example in Kampung Lubuk Kelubi the author found out that most of the people raise more chickens than ducks and as a result, the people here in Kampung Lubuk Kelubi (including households one and two) consume more hen's eggs. This difference in

consumption between hens and ducks also affect the total caloric and protein-intake of the families in both villages since one hen's egg has about 162 calories and 12.8 grams of protein (see Appendix 4), while that of one duck's egg the caloric content and protein value is greater, being 189 and 13.1 respectively. Therefore the author found that in Kampung Labohan Dagang, since the people (including households one and two) consume more of the ducks' eggs that hens' eggs, this partly explains for the greater total of calories-intake and proteins-intake in both families here that that of both households in Kampung Lubuk Kelubi.

This is especially true since the consumption of eggs in the diet of both families in Kampung Labohan Dagang is also a very important food item and is regularly eaten by the members of the families. Lastly, in all the Muslim families in both villages, Islamic religious customs prohibit eating of pork and therefore there is little or no consumption of items derived from pigs. This is an important socio-cultural factor in both villages which affects the food consumption patterns of all the households.

## 5.5 Conclusion and recommendations

In conclusion, the author would like to point out that since each household in both villages was found to be taking in little food and thereby less calories and protein calories per cent, it would be best that more efforts including research and survey reports be done in similar rural communities or other communities in other areas so that various projects or aids can be put in to help the rural communities as a whole especially in their daily dietary intakes to achieving a more well-balanced diet, eating more nourishing foods and lastly to balance out their energy input and energy output.

Other necessary measures may include programs to increase food production and food consumption, recommendations to change and improve their food consumption pattern and the encouragement to consume more of the foods which are locally produced, freely available and which can be eaten by all household members such as tapioca, sweet potatoes, leafy vegetables and others. This together with some supplementary feeding, would serve as an emergency measure to control the existing Protein-Calorie Deficiency. Specific measures to improve the food supply of the communities may include aids and development in the field of agriculture and education. Intensive health education should be undertaken with the teaching of, among other things, the nutritive values of various foods with emphasis on those locally produced and available to all families. As a further check or control, family planning units and mother and child health services could be improved. This is to relieve the strain of too quickly rising population by making family planning available to all on request without charge.

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ABBREVIATIONS

| | | |
|---|---|---|
| WHO | - | World Health Organisation |
| FAO | - | Food and Agriculture Organisation |
| Kg | - | Kampung |
| % | - | Percentage |
| Cal. | - | Calorie |
| Wt. | - | Weight |
| Amt. | - | Ammount |
| Cal./min. | | Calorie per minute |