Background

The National Statistics Centre (NSC) of the Lao Peoples Democratic Republic has conducted three expenditure and consumption surveys in the last decade. The first Lao Expenditure and Consumption Survey (LECS-I) was conducted in 1992/93. The second, LECS-II was conducted in1997/98. A third survey, LECS-III, was conducted in 2002/03. This technical report concerns the LECS-III survey.

LECS is a multi- purpose survey. Such surveys can be designed in various ways with emphasis on particular issues. In 1992/93 the LECS was combined with a large module of social indicators, Lao Social Indicator Survey (LSIS). The 1997/98 and 2002/03 versions focused on economic activities of the households. The objectives of the LECS are basically to provide,

- macro estimates for the National Accounts, both private consumption and household investments and income from agriculture and businesses
- the consumption structure (weighing system) for the Consumer Price Index (CPI)
- estimates of labor force
- statistics on access to services
- statistics on nutrition
- statistics on poverty and income distribution

The survey is conducted through interviews with households and village chairmen. The interviews are evenly spread over one full year. The survey also has a primary school module administered to school officials and teachers.

Sample design

The LECS-III is designed essentially as LECS-II with regard to sample design. Experiences from LECS-II have been used to fine-tune the sample design. The number of primary sampling units (PSU) has been increased and the sample size within PSU reduced, giving a somewhat smaller sample in terms of households.

The sample consists of 8100 households selected through a two-stage sample design. Villages serve as primary sampling units (PSU). The villages are stratified on eighteen provinces and within provinces on urban/rural sector. The rural villages are further stratified on villages with “access to road” and “no access to road”. In all, the village population was divided into 18 (provinces) x 3 (urban/rural classes) = 54 sampling strata.

The total first-stage sample consists of 540 villages. The sample is allocated to provinces approximately proportionally to the square root of population size according to population census. The PSUs are selected with a systematic probability proportionate to size (PPS) procedure in each province. Table 1 shows the sample allocation over strata.

Table 1: Number of sample villages in each stratum.

Province	Urban villages	Rural villages with access to road	Rural villages without access to road	Total
Vientiane C.	36	12	.	48
Phongsaly	3	6	15	24
Luangnamtha	4	11	9	24
Oudomxay	4	8	12	24
Bokeo	3	18	3	24
Luangprabang	4	19	13	36
Huaphanh	2	16	18	36
Xayabury	6	25	5	36
Xiengkhuang	5	8	11	24
Vientiane	4	29	3	36
Borikhamxay	5	11	8	24
Khammuane	6	26	4	36
Savannakhet	9	27	12	48
Saravane	3	12	21	36
Sekong	4	7	7	18
Champasack	6	27	3	36
Attapeu	2	9	7	18
Xaysomboun SR	1	11	.	12
Total	**107**	**282**	**151**	**540**

The households in the selected villages were listed prior to the survey. 15 households were selected with systematic sampling in each village, giving a sample of 8100 households.

Data collection

LECS III contains six modules:

- a diary to record household transactions,
- a household questionnaire
- a time use diary,
- a price collection form,
- a village questionnaire,
- a primary school questionnaire.

A large part of the household questionnaire remains the same as in previous surveys, except for some modifications in questions that didn't work well in LECS-2. Some topics, mainly housing, health, agriculture and time use, have been expanded. The household interview is consequently somewhat longer in LECS-3. Data on expenditure and consumption are collected for a whole month based on daily recording of all transactions. At the end of the month the household is asked about purchases of durable goods during the preceding 12 months. During the month each member of the household

should record the time use during a 24-hour period. The rice consumption of each member of the household is measured for one "yesterday" to get a more precise measure of intake at each meal for each person.

The village questionnaire is administered to the head of the village. The questionnaire covers roads and transport, water, electricity, health facilities, local markets, schools etc. The interviewers also conduct a primary school survey in the area. Interviews are made with the school principal and the teachers. The survey collects data on pupils, school facilities, management of the school, finances and sources of support. The principal and the teachers are also asked questions about the decision-making in the school.

The price collection form is used by the interviewers to collect local prices on 121 commodities.

Table 2: Overview of the content of the LECS-III survey

Module	Contents	Data specified for:
Diary	All household transactions during sampled months. Transactions coded to consumption/expenditure, household business, agriculture and investment outlays	Household
Household questionnaire	Household composition Parents Education Labour force participation Victimization Nutrition Health check, measurements of heights and weights Possession of durables and assets values Housing conditions - household Construction activities - household Household business Agriculture - household Health – evaluation of health, use of health services, health seeking behavior, health costs Purchases and selling of durables during the last 12 months Income and transfers – by all members of household Borrowing and lending – by household	All household members Non-household member 6 years and above 10 years and above Household All household members Children 4 years and below Household Household Household By business Household All household members, costs for household Household All household members Household
Time use	Time spent recorded for a period of 24 hours in a sampled day for 22 activities	10 years and above
Prices	Prices for 92 basic goods and services recorded in nearest local market	
Village questionnaire	Data provided by village heads on situations in the village concerning: - demography - access to services - agriculture - general economic conditions - wages and prices	Village
Primary school module	Covers 470 primary schools in or close to the selected villages	Primary school

Field work

The statistical provincial offices were in charge of the field operations with supervision from NSC.

Data on expenditure and income were collected for a whole month based on daily notation of all transaction divided into consumption, agriculture production and household businesses. Interviews with household heads or other household members were held during various parts of the month. At the end of the month households were asked about purchases of durable goods, e.g. furniture, TV, cars, motorcycles, etc., during the preceding 12 months. In the middle of the month one 24 hour period was selected to record data on time use for all persons in the household ten years and above.

The measurement of daily consumption through a diary kept by the household puts a heavy burden not only on the households but also on the field interviewers. Many households, especially in the rural areas, need frequent support in the task of keeping the diary. In order to secure an acceptable quality in the data it has been deemed necessary to keep the interviewers in the village for the whole month rather than having the interviewers traveling to the villages for repeated interviews and follow-up. This decision is also supported by the fact that many villages, especially in the mountainous areas, are difficult to access (some villages require travel by foot for several days).

In LECS-1 and LECS-2 the fieldwork was done by teams of two interviewers in each village. For LECS-3 a single-interviewer design was considered. However, in the final analysis factors related to interviewers security and well-being weighed in favor of having two interviewers in the village.

The field staff consisted of 180 interviewers organized in 90 two-member teams. 36 supervisors from the provincial statistical offices and 10 central supervisors from head office supervised the teams.

Calculation of sampling weights

Household survey

The process of calculating weights is indicated in file *final weights.xls.* The weights for household *hij* were calculated as:

$$w_{hij} = \frac{M_h}{n_h \cdot M_{hi}} \cdot \frac{M^*_{hi}}{m_{hi}}$$

where:

M_h = number of households in stratum h according to village register

M_{hi} = number of households in village i in stratum h according to village register

M^*_{hi} = number of households in village i in stratum h according to survey listing

m_{hi} = number of households in the sample from village i in stratum h

m_{hi} is usually = 15 but in a few cases it is less than 15 due to nonresponse. To adjust for household nonresponse the weight w_{hij} is multiplied by $15/m^*_{hi}$ where m^*_{hi} = number of responding households in the village.

A calibration factor is calculated for each stratum. .

$$\frac{K_h}{\hat{K}_h}$$

where:

K_h = mid-survey population in stratum *h* according to official statistics

$\hat{K}_h$ = mid-survey population in stratum *h* estimated from the survey

Summary:

$$w_{hij} = \frac{M_h}{n_h \cdot M_{hi}} \cdot \frac{M^*_{hi}}{15} \cdot \frac{15}{m^*_{hi}} \cdot \frac{K_h}{\hat{K}_h}$$

hhweight =	First stage sampling weight	Second Stage Sampling weight	Adjustment for HH non-response	Calibration to known population totals

The final weights are stored in SQL-table *final weights*.

Day correction factors (*daycorr*) have been calculated. The factors are =1 for most households and > 1 for households which have not reported for the whole month. If a household has diary records during a number of days that is less than the total number of days in the month, the household is checked. If the last day of recording is the last or next to last day of the month it is considered OK and the household get the factor = 1. If the last day of recording is at least three days before the end of the month, the remaining days of the month are considered as days with missing data and the factor assigned to the household is the total number of days in the month divided by the number of days having diary records.

A new variable is created: *diarywgt=daycorr*hhweight*. This is the household weight to be used for estimations of diary.

In the master data set a second set of weights – *popweight* - are included. The *popweight* is equal to the household weight (*hhweight*) multiplied by the number of household members.

Variation in household sampling weights

Due to poor measures of size

Due to calibration

Village survey

The village weights have been calculated as:

$$w_{hij} = \frac{M_h}{n_h \cdot M_{hi}}$$

In the master data set a second set of weights – *popweight* - are included. The *popweight* is equal to the village weight multiplied by the total population in the village.

Correction for unit non-response in the village survey

Three villages are missing in the village survey. This was taken care of by re-weighting. The sampling weights in province 8, 10 and 11 have been adjusted to compensate for the non-response.

Data entry checks, editing, imputation

Range and consistency checks

The data entry program had some built-in range checks but most of the checks were done in batch-mode. A large number of range checks and some consistency checks were designed in a Visual Basic program.

A special problem was the checks of the values of expenditures and consumption recorded in the diary. The values in Kip are often large numbers with many trailing zeroes. A common mistake during the data entry is to enter one zero too much or too less. Some obvious errors of this type can be detected in the range checks, especially when the Kip value is very high. In some cases it was also possible to detect errors by relating the values to the recorded quantity. However, also the quantities contain errors that make them difficult to use as checks.

The *Time Use Diary* contained a lot of errors due to the use of the 12-hour time notation used in the diary. The data entry staff was supposed to convert the data to the 24-hour time notation at the data entry stage but that was not done correctly in many cases. A rather tedious and time-consuming consistency check and correction of a large number of records had to be done.

Correcting food consumption for households with no rice consumption in the diary

There are 50 households that have not reported any consumption of rice in the diary but have reported daily consumption of rice in the nutrition module. This could of course be true if the household has made a bulk purchase in the month preceding the survey month. It was, however, decided to impute rice consumption for these households for the poverty calculations (as was made in the LECS-II).

Correction for double-counting of rice

Some households have misunderstood the instructions and recorded both purchases and daily consumption of purchased rice. Corrections of the most obvious cases have been made in the database.

The following diary entries are deleted in the database:

- All entries where *itemid* = 1 and *kind* = 2 and kip≤ 15,000
- All entries where *itemid* = 2 and *kind* = 2 and kip≤ 20,000
- All entries where *itemid* = 127 and *kind* = 2 in households where the total number of such entries is >26 and the total value of *itemid* 1 is ≥ 80,000

Housing: Model for imputing values on rent

Approximately 1000 households have non-response or unreasonably low values on estimated annual rent (p9s1q2). A regression model has been developed relating rent to a number of quality characteristics. The data file is *housing_regression3.sav* located in folder *Data processing/ other modules*. Syntax is in *housing_regression.sps* and output in *housing_regression3.spo* . The result of the regression is presented in table 1.

Table 3: Regression results housing. Dependent variable: Log(rent)

	Factor	Regr coefficient	t-value	Probability	Est value on factor
	(Constant)	11.27971	296.48	0	79198
	Size in square m	0.001036	5.28	< 0.0001	
Area	Urban	0.533263	13.71	< 0.0001	1.70
	Rural				1.00

Wall	Bricks, concrete	0.994476	18.49	< 0.0001	2.70
	Unburnt bricks, wood	0.340541	10.74	< 0.0001	1.41
	Other				1.00
Roof	RMODERN	0.50235	13.74	< 0.0001	1.65
	Other				1.00
Floor	FMODERN	0.413085	10.61	< 0.0001	1.51
	Other				1.00
Toilet	TMODERN	0.439998	3.79	0.000152	1.55
	TNORMAL	0.522449	16.32	< 0.0001	1.69
	Other				1.00
Region	Vientiane	0.228002	4.13	< 0.0001	1.26
	North	-0.12956	-3.98	< 0.0001	0.88
	South	-0.16189	-4.38	< 0.0001	0.85
	Central				1.00

Sampling errors

Standard errors and confidence interval have been calculated for the most important estimates.

Design effects and rates of homogeneity (roh)

Measurement errors

The interviewers spent a lot of time in the households assisting the respondents in their task of recording all transactions relating to the household as well as household businesses and agricultural operations. There are reasons to believe that this tedious and time-consuming work improved the quality of the responses. There is anecdotal evidence that the frequent visits to the household by the interviewer in many cases established a relaxed and trustful relation between the parties. It also gave the interviewers ample time to sort out the often-complicated relations between household consumption and household production in agriculture or household businesses.

Checks against external information

A few checks of quality were made. The estimates of rice consumption from the survey was checked against external agricultural production data and found to agree reasonably well.

Livestock

Planted areas

Respondent fatigue

A check on consumption levels between the first and the second two-week diary period was also made. Table 4 shows the proportion of entries over the two half parts of the month. The expected proportions are 49.3 and 50.7 if we assume an entirely even pattern over all days in the month (the proportions differ from 50% because the second period is slightly longer).

Table 4: Percent distribution of number of entries over first and second half of the month

Item group	Days 1 - 15	Days 16 - end of month
Food expenditure	50.4	49.6
Consumption of own produced food	49.6	50.4
Clothing and footwear	51.4	48.6
Housing	49.7	50.3
Household utensils and operations	50.4	49.6
Medical care	50.6	49.4
Transport and communications	51.5	48.5
Education	50.5	49.5
Personal care	51.2	48.8
Recreation	50.6	49.4
Alcohol and tobacco	50.0	50.0
Others	50.1	49.9
Total	**49.9**	**50.1**

Three item groups - clothing and footwear, transport and communications and personal care - seem to have a somewhat higher proportion of entries during the first half month. The other item groups have proportions fairly close to the expected proportion.

The fact that there were very small differences in consumption on aggregate level between the first and the second two-week diary period raises the question whether a shorter diary period might be sufficient to capture the consumption.

The average number of entries in the diary per household was 150 in LECS-III and 145 in LECS-II.

Table 5: Average number of entries of food items in the diary

Itemgroup	LECS2	LECS3
Rice	2.2	2.2
Other cerals and bread	4.7	3.5
Meat	6.5	6.1
Fish	4.7	4.3
Milk, cheese and eggs	1.2	1.3
Oils and fats	0.5	0.4
Vegetables and potatoes	11.9	11.1
Fruits	2.5	2.2
Sugar and sweets	2.7	2.4
Non-alcoholic beverage coffee & tea	2.6	1.9
Other food	4.2	3.5
Meals	5.6	4.2
Own produced rice	21.5	24.3
Own produced other grains	0.4	0.5
Own produced meat	3.8	7.5
Own produced fish	12.7	9.7
Own produced fruits	1.3	1.6
Own produced vegetables	27.2	27.0
Other own produced	3.4	3.2
Total number of food entries	**119.6**	**117.0**

Interviewer effects

Riceballs in Khammuan and Savannakhet provinces.

Brief comments on measurement problems in some variables

Wages, salaries