INTEGRATED HOUSEHOLD LIVING CONDITIONS SURVEY IN MYANMAR
(2009-2010)

TECHNICAL REPORT







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Technical Report

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WITH SUPPORT FROM:

MINISTRY OF NATIONAL PLANNING AND ECONOMIC DEVELOPMENT
NAY PYI TAW, THE REPUBLIC OF THE UNION OF MYANMAR

UNITED NATIONS DEVELOPMENT PROGRAMME
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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY BANGKOK, THAILAN

FOREWORD

The Integrated Household Living Conditions Assessment (IHLCA) project provides the Government of the Republic of the Union of Myanmar, the UN and other national and international stakeholders with statistical data for determining living conditions in the country. The first nation-wide survey was carried out in 2004-2005. This second survey, in addition to providing the most recent state of living conditions and poverty levels, also provides opportunities to make comparisons and trend analysis for contributing to well-informed, pro-poor decision making.

The overall survey design of the IHLCA-II was chosen to mirror the IHLCA-I, in order to secure comparability. For this reason almost half of the number of interviewed households was the same households as in 2004-2005, allowing for poverty dynamics analysis. The survey included a nationwide representative sample of 18,660 households. As in the first survey, all of the field work was divided into two rounds; the first round took place between December 2009 and January 2010 (after the harvest) and the second round from May 2010 onwards (before the harvest).

The survey has been undertaken in close cooperation with the Planning Department of the Ministry of National Planning and Economic Development (MNPED), the United Nations Children's Fund (UNICEF) and the Swedish International Development Cooperation Agency (Sida). The survey methodology and process follows international control standards and the project team has received extensive technical oversight and support from organizations such as the World Bank and Statistic Sweden, as well as from technical staff from UNICEF and UNDP. These partners have also monitored the survey process from design and methodology to data analysis.

Being one of the most comprehensive surveys on living conditions and poverty undertaken in Myanmar we trust that this statistical data will be useful and valuable for various purposes and a variety of stakeholders, and it is our hope that this will lead to well-informed planning and decision making and subsequent improvements in the well-being of the Myanmar population.

Bishow Parajuli

Resident Representative UNDP Myanmar

Daw Lai Lai Thein

Director General, Planning Department

ACKNOWLEDGEMENTS

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Additional contributions were made by the National Nutrition Center, the Department of Health Planning, the Yangon Institute of Economics, the Education Planning and Training Department, the Department of Labor, the Department of Agricultural Planning, the Settlements and Land Records Department, and the Department of Population.

Special thanks go also to the United Nations Development Programme (UNDP) for their support to the IHLCA surveys, more specifically Mr. Bishow Parajuli, United Nations Resident Coordinator and UNDP Resident Representative, Mr. Akbar Usmani, UNDP Senior Deputy Resident Representative, Mr. Sanaka Samarasinha, UNDP Deputy Resident Representative as well as U Min Htut Yin, Assistant Resident Representative, UNDP. Special thanks to Ms.Yoshimi Nishino, Chief, Social Policy and Planning, Monitoring and Evaluation Section, UNICEF and Mr. Jörgen Schönning, Counsellor, Sida for their keen interest and support for project activities.

TABLE OF CONTENTS

LIST OF ACRONYMS

CCA	Common Country Assessment
CSO	Central Statistical Organisation
IHLCA	Integrated Household Living Conditions Assessment
FAO	United Nations Food and Agriculture Organization
FERD	Foreign Economic Relations Department
GDP	Gross Domestic Product
HRD	Human Resource Development
IHLCA	Intergrated Household Living Conditions Assessment
ILO	International Labour Organisation
IMF	International Monetary Fund
ITU	IHLCA Technical Unit
MDG	Millennium Development Goals
MICS	Multiple Cluster Indicator Survey
MNPED	Ministry of National Planning and Economic Development
PD	Planning Department
S/R	State/Region
UNDP	United Nations Development Programme
WB	The World Bank
WHO	World Health Organisation
WSC	World Summit for Children
UNCCA	UN Common Country Assessment
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
WB	The World Bank
WHO	World Health Organisation
WSC	World Summit for Children

1. General

1.1 Introduction

The IHLCA Project Document was signed in December 2002. An Addendum was later approved covering the period 2008-2010.

Now, in order to provide the Government and international funding agencies with a reliable and up to date integrated assessment of all major aspects of household living conditions in Myanmar, the United Nations Development Programme (UNDP) and the Government of the Republic of the Union of Myanmar agreed on the implementation of a second round of the Integrated Household Living Conditions Assessment (IHLCA) in 2009-2010[1].

IHLCA-II is a nationwide quantitative survey of 18660 households with two rounds of data collection (December 2009/January 2010 and May 2010).

The IHLCA-II results have been used to prepare three separate reports:

Poverty Profile
MDG Data Report
Poverty Dynamics Report

In addition two supplementing reports have been prepared:

Technical Report (Survey Design and Implementation)
Quality Report

During the time span of the survey, a number of other related reports have been written covering areas of concern. The most significant of these are listed in the references.

The present Technical Report on Survey Design and Implementation should be used as a complement to the main reports, and as a record of the survey methodology and activities to serve planning and undertaking similar surveys in the future.

1.2 Overall objectives

Poverty reduction is a major factor in order to reach the Myanmar MDGs. Accurate statistical information about the living standards of the population and the extent of poverty is an essential instrument to assist the Government in diagnosing the problem, in designing effective policies for reducing poverty and in monitoring and evaluating the progress of poverty reduction.

Since economic progress most of the time is a precondition for social progress, economic statistics frequently have the center stage in attention. Main economic indicators such as GDP growth, inflation rate, unemployment rate, balance of payments may subsequently lead to governmental action that will affect economic conditions of all households and businesses in the economy.

IHLCA surveys should support the system of economic statistics that is the basis for modern National Accounts by providing much needed data on value added in household (informal sector) production. IHLCA data will make it possible to estimate the GDP share of private consumption from the use side or alternatively in terms of household production's share of the GDP from the production side.

[1] The Planning Department (PD) of the Ministry of National Planning and Economic Development (MNPED) is implementing the IHLCA in collaboration with the Central Statistical Organization(CSO), with the financial assistance of UNDP, UNICEF, Sida and the technical assistance of local and international experts.

A first principle for statistical system building is to look upon any survey as a follow-up of previous surveys to measure change over time as well as a preparation for future rounds of the survey. The information value of any survey *for the present* will increase the more it builds on previous rounds of the survey by enabling reliable comparisons over time to inform of progress made. The information value of any survey *for the future* will increase the more it sets a stable baseline for future surveys against which progress can be measured in a more reliable and relevant way. So obviously, there is a trade-off between a replication design of a new survey and a changed design for the benefit of the future.

A replication design should always be the preferred option for the living conditions modules in the previous surveys and a changed design an option to be considered for the measurement of the level and structure of household consumption and of household (informal sector) production.

Hence the IHLCA-II survey is a logical continuation of previous assessments of social and economic conditions and outcomes. On the basis of the results, it will be possible to better understand the situation of the population in relation to poverty, vulnerability and inequality. The information generated will allow for better planning of policies and programs for improving household living conditions.

To this extent the main objectives of the survey have been formulated:

- To obtain an accurate and holistic assessment of population well-being by measuring a number of indicators related to living conditions from an integrated perspective;
- To provide reliable and updated data for identifying different levels of poverty in order to help better focus programmatic interventions and prioritize budget allocations;
- To provide quantitative and qualitative data for better understanding the dimensions of well-being and poverty in Myanmar and the endogenous and exogenous factors behind the observed patterns and trends in living conditions;
- To provide baseline information for monitoring progress towards the achievement of the Millennium Development Goals and other national and international targets;
- To develop a rigorous and standardized methodology for establishing a framework for monitoring living conditions and conducting future time-trend analysis.

Given the breadth of information that was to be generated by the survey and the range of stakeholders involved in the project, there were also a number of secondary objectives including:

- The compilation of updated statistics for a series of indicators that were also addressed in previous surveys in Myanmar for comparative time-trend analyses on specific aspects of living conditions where appropriate;
- The compilation of precise statistics on the spatial distribution of poor and non-poor households for poverty mapping;
- For economic and social analysis, improved data for monitoring differentials in living conditions by urban-rural residence, gender and other population sub-groups;
- For policy and programmatic formulation, comprehensive data on the population's perceptions of living conditions, in particular prioritization in terms of their preferences to improve well-being and reduce poverty across regions of the country.

1.3 The IHLCA-I review findings

An independent review mission was undertaken in May 2009 in order to come up with recommendations on the implementation of IHLCA-II[2]. Meetings with stakeholders revealed data gaps that should be addressed in the questionnaires. The mission's understanding was that the produced reports were "interesting and useful". On the other side the data dissemination strategy was considered weak.

[2] RCC Mission Report to Myanmar, Integrated Household Living Conditions Assessment for Myanmar, May 2009

It was proposed that the IHLCA-II survey should incorporate questions related to the (additional) MDG targets:

- Working poor (employed people who are below poverty line)
- Family planning related information
- Contraceptives prevalence rate
- Antenatal care
- Use of bed nets
- Access to essential drugs
- Incidence of death related to certain diseases
- Awareness about HIV/AIDS
- ICT access (telephone, cellular phone, internet uses, etc)

The mission also recommended that UN agencies should build complementarities among different surveys, in particular MICS and IHLCA-II. Furthermore it was advised that thematic reports should be produced.

1.4 Scope of the survey

It was recognized that comparability between the IHLCA-I and IHLCA-II surveys must be ensured to the largest possible extent. To this end the modules and variables were retained and used in the design phase. Briefly this meant the following sets of indicators on nine main areas of social concern:

Module 1: Household Basic Characteristics;
Module 2: Housing;
Module 3: Education;
Module 4: Health;
Module 5: Consumption Expenditures;
Module 6: Household Assets;
Module 7: Labour and Employment;
Module 8: Business;
Module 9: Finance and Savings.

Population change at national, regional and local levels comes about through births, deaths, migration and family formation and dissolution. IHLCA surveys have registered the demographic characteristics of the population as to age, sex, marital status and migration. However, the household sample size will be too small to meet the needs for reliable estimates of births and deaths but will be large enough to capture the data on labor force by occupation and industry, and the school enrolment rates and educational levels of the population.

One way to get an overview of social statistics is to identify the broad sectors of social concern. Countries have implicitly agreed on what some of those concerns are in setting up universal agencies within the United Nations system. There is ILO for work, WHO for health, UNESCO for education and culture, FAO for food, Habitat for housing, IMF and World Bank for economic matters, UN itself for peace, etc. Most countries have ministries and policies that reflect these same concerns in their government structure.

Several of these international sector organizations have adopted lists of social concerns and recommended indicators to measure these concerns and which overlap to a large extent. They include, among others:

- The indicators of the MDG framework;
- The compendium of indicators for Human Resources Development (HRD)[3];

[3] Handbook on Human Resources Development Indicators, 2002, Department of Labour, Ministry of Labour and UNFPA, Yangon, 2003.

- The World Bank's list of World Development Indicators (WDI);[4]
- The UN Common Country Assessment (CCA) indicator framework[5];
- The Gender Stats (GS) database of gender-sensitive indicators[6];
- The World Summit for Children (WSC) indicators as monitored through the Multiple Cluster Indicator Surveys (MICS)[7]; and
- The Reproductive Health (RH) indicators for monitoring goals of the International Conference on Population and Development[8].

Myanmar is still a predominantly rural and agricultural society. The vast majority of the population get their subsistence in households as self-employed in agriculture. The level of living is determined by the household's command over labor and resources for own-production in terms of land and livestock for agricultural activities, equipments and tools for fishing, forestry and construction activities and income-earning activities in the informal and formal sector.

Data to calculate value added in household production have been obtained as well as labor force input for compilation of GDP from the production side in the National Accounts.

To understand poverty in Myanmar is to understand the reasons for low productivity in household production. IHLCA includes questions to capture household ownership of the material means of production. The guiding principle has been to include the items that make a difference for the productivity and production potential of the household.

Level and structure of household consumption determine the need satisfaction of the population. The low and fragile consumption level of most Myanmar households makes poverty, nutrition and food security into urgent social concerns. The survey captures household consumption including both bought and own-produced items for the poverty line calculations and provides data for the compilation of GDP from the expenditure side in the National Accounts.

Access to schooling and quality of schooling available is of great concern for the future of Myanmar. The modules on school enrolment and level of education used are in line with international recommendations.

Myanmar still has high mortality and high morbidity in infectious diseases. Vaccination and other preventive medical programs as well as access to medical care are important social concerns. The health module captures data for all household members age 5 and above. Illness is one of the potentially important causes of differences in productivity and poverty between households.

Myanmar's infrastructure is still weak. Improved infrastructure in transport and communication is needed to increase access to markets for agricultural and other products. This kind of data has mainly been captured in the village questionnaire.

Housing conditions, including access to drinking water and sanitation, has very high priority also as health and environmental concerns.

In Chapter 2.2 a list of the IHLCA modules is found while the questionnaires are presented in Supplement to Technical Report.

[4] World Development Indicators Database, World Bank, Washington, 2003

[5] Common Country Assessment Indicator Framework, United Nations Development Group, New York,1999

[6] Gender Stats: Database of Gender Statistics, World Bank, Washington, 2002.

[7] Monitoring National Programme of Action Goals through Multiple Indicator Cluster Survey 2000, Department of Health Planning, Ministry of Health and UNICE, Yangon.

[8] Reproductive Health Indicators for Global Monitoring, World Health Organization, Geneva, 2001.

1.5 Survey organisation

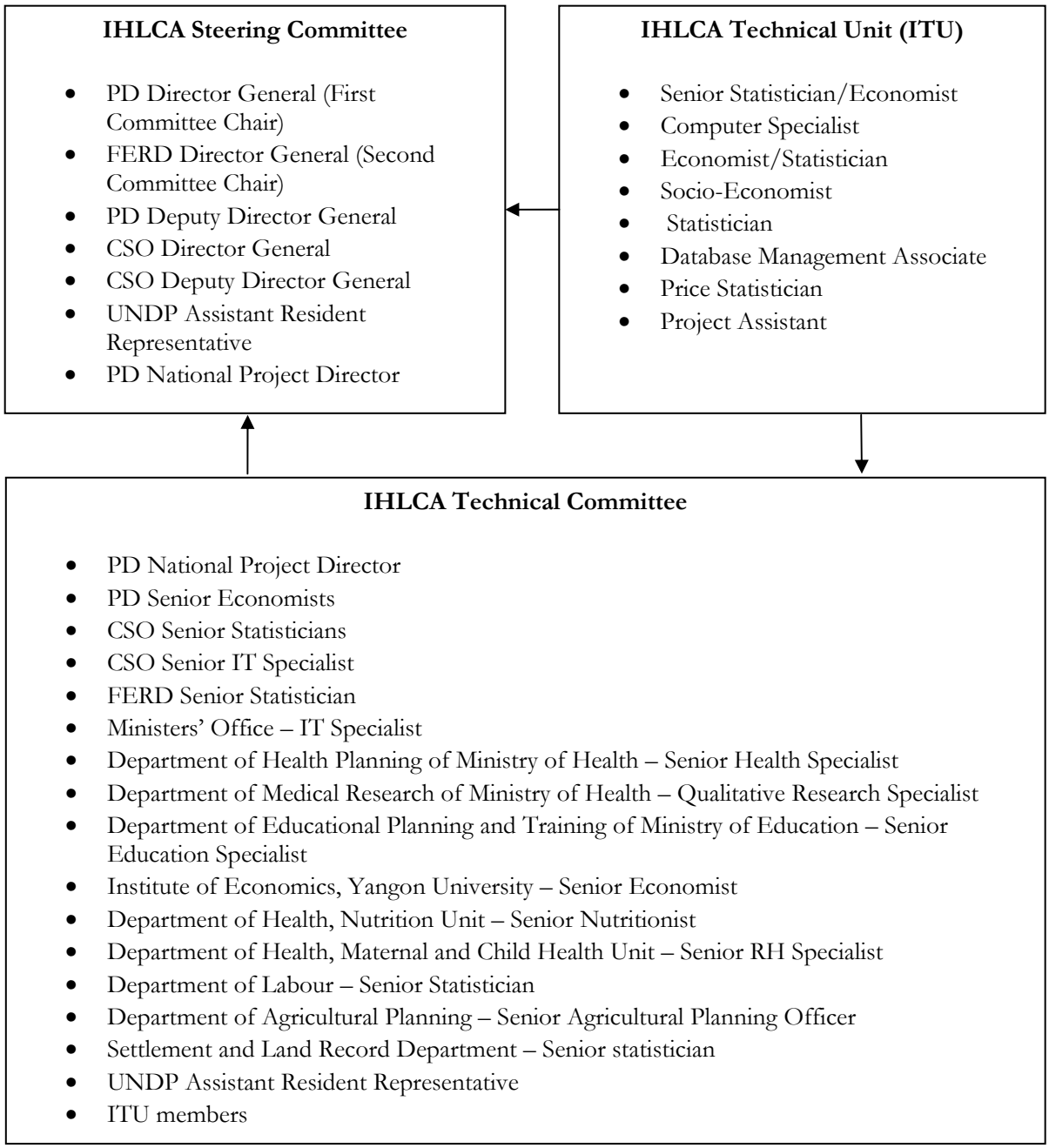
To ensure that all objectives of the IHLCA were reached, an institutional set-up was implemented which involved representatives of the various line ministries and other stakeholders for stimulating a sense of "survey ownership" so that the information provided was most useful and meaningful for policy and programmatic purposes, as well as researchers and technical experts so that the data gathered were as reliable and accurate as possible.

The **IHLCA Steering Committee** has been the executive committee whose mandate was to ensure that the major information needs of main data users are covered by the project; approve the IHLCA work plan and accompanying budget proposed by the Technical Committee; periodically review the project's development and address any unforeseen problems encountered; make decisions to ensure the smooth progress of the survey rounds; and contribute to a better dissemination and use of the IHLCA results for policy and programme development under the guidance and clearance of the Ministry of National Planning and Economic Development in collaboration with UNDP;

The **IHLCA Technical Committee** has been a consultative committee of national and international experts with practical experience in conducting surveys, and whose mandate was to report to the Steering Committee on methodological issues related to the IHLCA and offer recommendations to ensure the timely and cost-efficient production of reliable results.

The **IHLCA Technical Unit (ITU)** has been the operations team of national technical and project specialists. It was recruited by UNDP and PD with a mandate to implement activities according to the IHLCA work plan, including: administrative and technical support for carrying out day-to-day activities and training processes for survey fieldwork; etc. The ITU was headed by a technical adviser (senior economist/statistician) who helped with substantive technical issues and was reporting as well as answerable to the Technical Committee. As expected the ITU professional staff played an important role in the technical design and implementation of project activities.

Many of the group members were also involved in the IHLCA-I survey.



The survey organization was the same as for IHLCA-I with minor changes. The overall responsibility of the institutional set up was to plan, design and implement survey operations.

Other logistics included:

- Organization of the structure of fieldwork teams and deployment; purchase and distribution of field equipment (such as backpacks for carrying the questionnaires, protective raingear and footwear, equipment for anthropometric measurement, etc.);
- Organization of transportation and remuneration for the field teams;
- Organization of secure storage for the completed questionnaires;
- Organization of transfer and storage of the preliminary micro-datasets from the States/Regions offices to the central offices for processing.

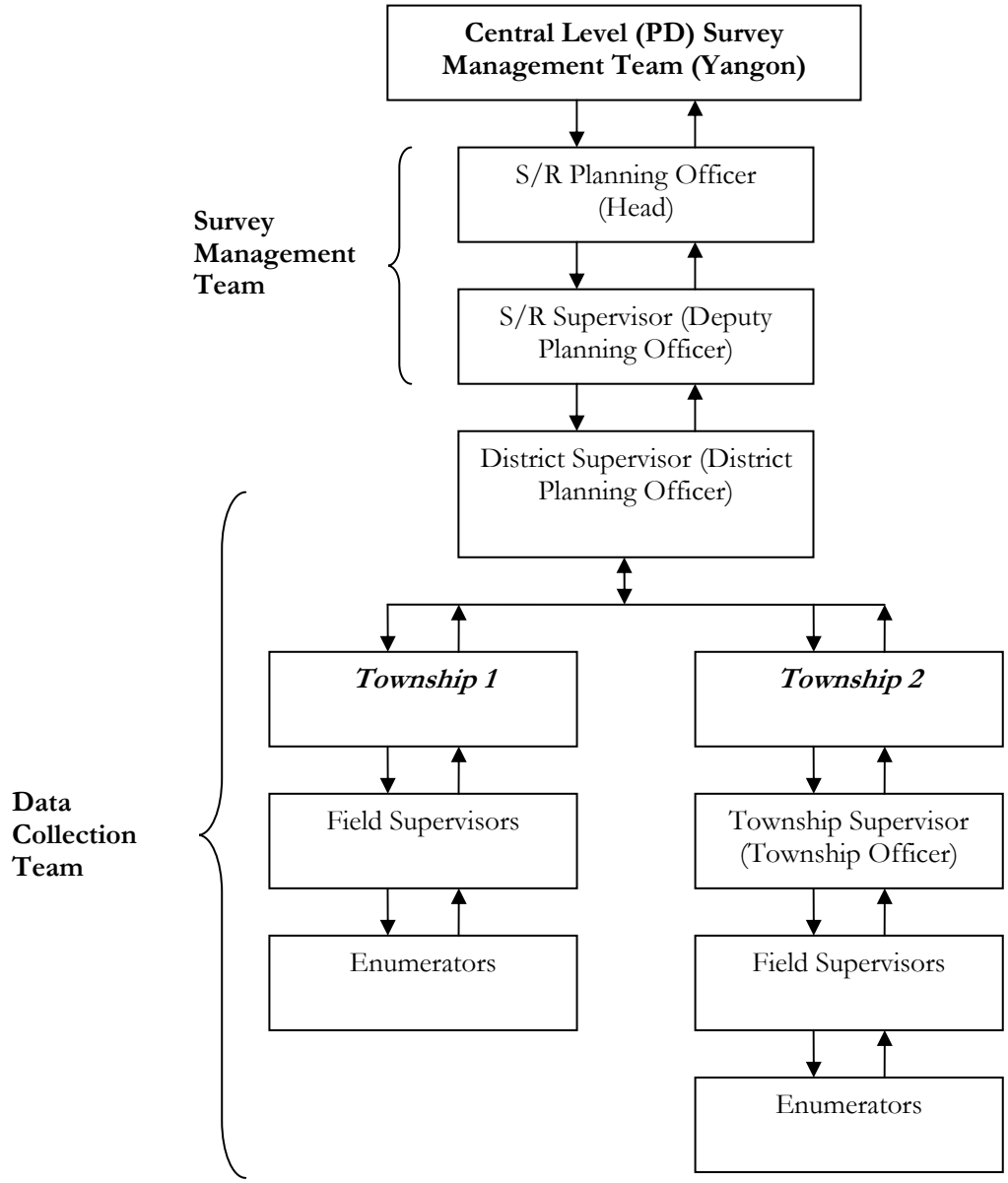
At State/Region level, survey staffs were divided into two categories:

- The survey management team at S/R level;
- The data collection team;
- The survey management team was made up of:
    - The S/R Planning Officer in charge (head);
    - The S/R Deputy Planning Officer (S/R supervisor).

The data collection teams were comprised of:

- District Planning Officers (District Supervisors);
- Township supervisor (Planning Officer);
- Field supervisors;
- Enumerators.

The diagram of the field organizational structure is shown below. This figure is for illustration purposes only. In some townships, the District Planning Officer acted as Township Supervisor.



2. Survey planning

2.1 Sampling design and weights

2.1.1 IHLCA-I findings

The experiences from the IHLCA-I survey were used as input in the survey planning. That includes the sampling scheme and questionnaire design.

The IHLCA-I sample was found to be of sufficient size to provide estimates on national level and state/region level by urban/rural. However, it was considered not possible to get useful estimates for the small and medium-sized districts. The confidence intervals would be rather wide even for the biggest districts. An example: estimating a proportion expected to be around 0.2 and the sample is 400 households then the confidence interval is 0.2 +/- 0.06, that is: (0.14 – 0.26). A design effect of 2.6 is assumed.

A thorough discussion on the pre-sampling issues is given in Pettersson (2009)[9].

2.1.2 Sampling design

The main focus of the IHLCA-II was to assess the changes in the living conditions of people in Myanmar since IHLCA-I. The national research team considered that the survey design, sampling units and other survey instruments therefore should be as similar as possible to those used in the IHLCA-I.

A stratified multi-stage sample design was used for the IHLCA-I survey with 62 districts as the strata. Given their special importance, Yangon City and Mandalay City were treated as separate strata. The selection plan in each stratum was as follows. Townships across all districts were used as first stage sampling units (FSU). The sampling frame for the first stage was an official list of townships with their estimated number of households in each district.

The estimated number of households in the excluded 45 townships and from other wards/village tracts represented 5% of the total population.

The second stage sampling unit (SSU) was the ward (urban) or village tract (rural) within the selected townships. The sampling frame for the second stage was the list of wards and villages in the selected townships along with their estimated numbers of households.

All wards and village tracts in each selected township within a particular district were grouped into urban/rural substrata. A predetermined number of wards/villages tracts were then drawn with PPES systematic random selection from those township frames.

A list of Townships, Wards and Village Tracts is found in ANNEX 2.

Listings of Street segments in selected wards (urban) and villages in selected village tracts (rural) with the number of households were made prior to the household survey. Moreover, the survey teams of supervisors drew sketch maps of the street segment inwards and villages prior to the data collection activities and selected the sample households in each community. With the predetermined path in the community on the sketch map and the sampling interval calculated using the total number of household and the fixed sample size, a unique systematic sample could then be drawn conforming to the random selection with a known selection probability.

[9] H. Pettersson. Review of the sampling methodology for the 2nd Integrated Household Living Conditions Assessment (IHLCA II). October 2009.

The IHLCA-II sample design is a modified IHLCA-I sample design which takes into account of changes in the sample frame since 2004 and retains a panel of 50% from IHLCA-I sample of households.

The same sample of areas (street segments and villages) as the IHLCA-I survey areas were kept. There are altogether 1555 areas. Within each area a sample of 12 households was selected. Six households from the 12 IHLCA-I household sample were selected randomly. An additional six households were selected from the "non-IHLCA-I households in the village or street segment. In some (fairly few) cases there were less than six old IHLCA-I households remaining in the village or street segment due to migration and other causes. In that case all remaining IHLCA-I households were included in the sample. If that was the case then the sample of non-IHLCA-I households were increased so the total sample from the village or street segment added up to 12.

The 50 % panel would allow for studies of gross changes (household dynamics) on a sufficiently large sample while at the same time we also make sure that changes in the population are taken into account.

The changes in the sampling frame since 2004 are described in ANNEX 2.

2.1.3 Sampling weights for estimation

The main issue for estimation was to compute the sampling weights. Since the sample of areas for IHLCA-II was the same as the same sample of areas for IHLCA-I the inclusion probabilities were the same for these areas as in IHLCA-I. So, for the first two stages of selection (townships and wards/village tracts) weights were retained.

The third stage weights differed from those in IHLCA-I. The third stage weight was the combined weight for the third and fourth stages of selection (selection of one street segment or village per ward/village tract and selection of 12 households per street segment or village). The two weights were combined into one because only one street segment or village per ward/village tract was selected.

For sampling and estimation details the reader is referred to ANNEX 1 and Pettersson (2010)[10].

2.2 Questionnaire design

The following survey questionnaires were used for the IHLCA survey[11]:

The **Household questionnaire,** administered at household level, included 9 modules covering different aspects of household living conditions:

Module 1: Household Basic Characteristics;
Module 2: Housing;
Module 3: Education[12];
Module 4: Health;
Module 5: Consumption Expenditures;
Module 6: Household Assets;
Module 7: Labour and Employment;
Module 8: Business;

[10] H. Pettersson. Estimation procedures for the 2nd Integrated Household Living Conditions Survey in Myanmar. April 2010.

[11] For IHLCA Survey questionnaires see Supplement to Technical Report.

[12] In section 3.2 on adult education and literacy, the basic literacy test version was only in Myanmar, so that non-Myanmar interviewees who could not read Myanmar and the following languages were classified as illiterate in the first round of IHLCA-I; Mon, Shan, Chin, Kachin, Kayah, Poe Kayin, Sakaw Kayin, Rakhine, Pao, Chinese, Hindi, Urdu, Tamil,Arabic and Bangali. The basic literacy test was translated into these languages and given to the respective survey teams to be used in the field operation in the second round of IHLCA-I and two rounds of IHLCA-II.

Module 9: Finance and Savings.

The **Community questionnaire**, administered to local key informants included 4 modules that aimed at providing general information on the village/wards where the survey was being undertaken and at reducing the length of the household interview. The questionnaire was only administered in the first round. Modules included in the Community questionnaire were:

Module 1.1: Village/Ward Infrastructure;
Module 1.2: Population;
Module 1.3: Housing;
Module 1.4: Labour and Employment
Module 1.5: Business Activities;
Module 1.6: Agricultural Activities;
Module 1.7: Finance and Savings;
Module 2: Schools
Module 3: Health facilities
Module 4: Pharmacies and Drug Stores

The **Community price questionnaire** which aimed at providing information on the prices of specific items in each village/ward surveyed. These prices were collected in case the quality of implicit prices calculated from the household survey was not satisfactory. Since there were no problems with implicit prices, community level prices were not used. The Community price questionnaire comprised of only one module.

The **Township Profile** questionnaire aimed at collecting administrative information about the Townships included in the survey. It was not used in the data analysis.

All final questionnaires were translated from English to Myanmar.

Depending on the nature of the information to be collected, different types of questions (current status and retrospective) were included in the survey instruments. For instance, current status questions were used to assess Housing condition and level of education and literacy. On the other hand, retrospective questions were also used to collect information on other items including household consumption expenditures. Thus one important issue was the reference period for specific consumption items. In order to minimize recall errors, different reference periods were used for different types of items. In particular, shorter periods were used for smaller items (such as 7days for frequently bought food items and 30 days for less frequently bought food items and non-food items), and longer periods for larger items (such as six months for bulky non-food items and equipment). All above was in line with IHLCA-I.

3. Field operations and training

3.1 Supervisor training and enumerator recruitment

Prior to the data collection activities for both rounds, training for supervisors was conducted. Sessions for Training of Trainers (TOT) for Round 1 operations took place respectively in Nay Pyi Taw from 19 October 2009 to 10 November 2009. 92 participants who will be township supervisors attended the training. The training included practical field pilot surveys for sampling and mapping as well as interviewing with the household questionnaires in villages of Tatkone township which is located near Nay Pyi Taw. These were followed by multiplier training sessions for enumerators in the respective States/Regions by the already trained trainers. At the end of TOT sessions a test was conducted to assess trainees, especially their understanding of the material taught. Average results of this test can be found in the table below.

Average results obtained by supervisors at the TOT session test

State/Region	Average marks obtained after R1 TOT training (19 October to 10 November 2009)
Kachin	59.2
Kayah	78.5
Kayin	51.3
Chin	73.0
Sagaing	63.9
Tanintharyi	50.5
Bago(E)	65.0
Bago(W)	70.3
Magway	76.0
Mandalay	69.6
Mon	59.7
Rakhine	53.6
Yangon	64.0
Shan(E)	63.0
Shan(S)	75.7
Shan(N)	62.6
Ayeyawady	69.9
NayPyiTaw Headquarter	77.1
Total	**66.0**

Testing of questionnaire was done in Thonegwa Township in Yangon Region in the last week of September, 2009 with the Yangon Region Planning Department personnel. After the test and judgment of the student's capability, the required number of interviewers were appointed.

Another issue relevant to the collection of quality data was cultural and gender sensitivity, particularly with regard to questions of a highly personal nature such as reproductive health. Field enumerators were recruited at the local level, in order to ensure that the interviews were conducted in the respondents' own language.

3.2 Enumerator training

In April and May 2010 another wave of training sessions took place in preparation for Round 2 operations from 25 March 2010 to 7 April 2010. The supervisor and enumerator trainings were conducted in one of the two townships in each district. The training of field enumerators took place during the period from 30 November 2009 to 11 December 2009. For Round II, training for both field supervisors and enumerators took place during the period 28 April 2010 to 5 May 2010. Enumerators during those sessions were given practical pilot tests.

The exams for trainers of supervisors and enumerators were quite high level, hence the grades obtained.

The table below provides a breakdown of number of trainees by State/Region and training session and round. In IHLCA-II R2 TOT training all township supervisors attended the TOT training to make the survey field operations more uniform and efficient.

Number of trainees by State/Region, training session and round

State/Region	IHLCA-II R1 TOT training 19-10-2009 to 10-11-2009	IHLCA-II R2 TOT training 25-3-2010 to 7-4-2010
Kachin	5	8
Kayah	2	2
Kayin	4	5
Chin	3	5
Sagaing	9	16
Tanintharyi	4	7
Bago(E)	3	5
Bago(W)	3	5
Magway	6	11
Mandalay	10	16
Mon	3	5
Rakhine	5	9
Yangon	7	9
Shan(E)	4	6
Shan(S)	3	4
Shan(N)	5	8
Ayeyawady	7	11
NayPyiTaw Headquarter	9	12
Total	**92**	**144**

3.3 Field operations

IHLCA-II entailed the same two-round data collection approach for monitoring household living conditions (now December 2009/January 2010 and May 2010) to ensure comparability. The reason behind were still valid: seasonal variations in household income, expenditure and consumption patterns should be captured. Also that a multiple round survey increases the level of confidence between enumerators and respondents, and helps increase respondents' memories thereby reducing recall errors.

Field Enumerators (776 in total) and field supervisors (168 in total) were organized into teams comprising on average 1 supervisor and 5 enumerators, and each team was supposed to have access to at least transportation. A detailed breakdown number of supervisors and enumerators by State/Region is given in the following table.

Field teams were also composed of at least one female and one male enumerator, so that respondents could be interviewed by a person of the same sex. As previously mentioned, strong literacy and mathematical skills were required for all field staff.

Number of supervisors and enumerators by State/Region

State/Region	Township Supervisors	Supervisors	Enumerators
Kachin	7	8	32
Kayah	1	1	6
Kayin	4	6	28
Chin	4	4	16
Sagaing	15	20	90
Tanintharyi	6	6	32
Bago (E)	4	8	36
Bago (W)	4	8	32
Magwe	10	15	70
Mandalay	15	22	102
Mon	4	7	32
Rakhine	8	12	56
Yangon	8	10	50
Shan (S)	3	5	26
Shan (N)	7	9	42
Shan (E)	5	7	30
Ayeyarwaddy	10	20	92
NayPyiTaw Headquarter			4
Total	**115**	**168**	**776**

The teams were also provided with the relevant set of questionnaires, necessary stationeries and equipment, and field measuring tools (Salter weighting scales).

Enumerators were essentially dealing with the administration of Household questionnaires. A subset of female enumerators were also be involved in the administration of the Community Price survey. Field supervisors were entirely in charge of the Community questionnaire. Finally, the Township Profile information was collected by the Township Officers.

The field work to be carried out by the Planning Department field staff concerning the households consisted of different operations, broken down into two rounds known as Round 1 and Round 2.

Round 1 activities started in December 2009 and lasted approximately one month, and Round 2 in May 2010 for also approximately one month duration.

<u>During Round 1</u>
All households in the sampled townships were listed;
Community and household information were collected.
Of the 12 households in IHLCA-I a sample of six (6) were retained and the remaining six households were sampled. If there were less than six households still in the village or street segment due to migration and other causes all remaining IHLCA-I households were included in the sample. If that was the case then the sample of non-IHLCA-I households were increased so the total sample from the village or street segment added up to 12.

<u>During Round 2</u>
The same sampled households as in Round I were re-visited; no new households were added. The main aim was to capture detailed information on seasonal variables.

3.4 Monitoring

Global supervision of the field work was undertaken by the ITU (4 staff members) and the Planning Department (115 township supervisors[13] and Steering Committee members). They fielded a number of visits to accessible States/Regions to check and make sure that the supervisors and their enumerators were performing their tasks according to the instructions given to them. For some areas they also maintained constant telephone contacts that were of great help, when various problems were encountered by the field staff.

A Survey Management team supervised field operations in each S/R. Coverage of all S/Rs at Central Level was limited to some extent due to accessibility. The Technical Unit focused on S/Rs where trainers had the lowest scores. When S/Rs were not accessible, supervision at the Central Level was done by means of phone communications and by a reporting system between the ITU and S/R supervisors.

[13] Two townships were dropped because of accessibility and security issues. Hence the number of township supervisors dropped to 115.

4. Data processing

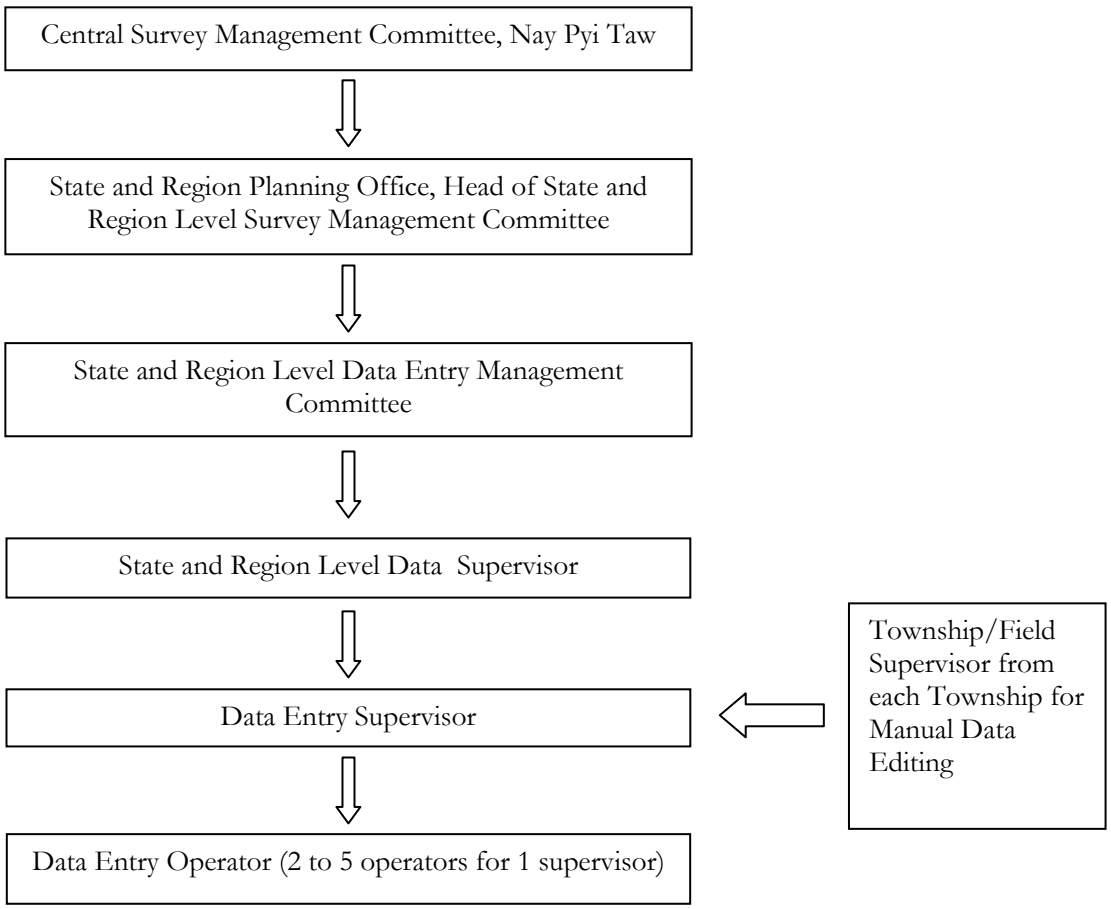
4.1 First assessment

With regard to potential non-sampling errors, when collecting information from the respondent it was important to plan for several controls: (i) immediately during the interview by the enumerator; (ii) after the interview during the review of the completed questionnaire by the field supervisor and before data entry; and (iii) during data entry. For instance, ranges for data on the monetary value of household expenditures were set, such as minimum and maximum acceptable prices for a given quantity of each major food and non-food item (based on independently obtained data of market prices). The appropriate ranges were verified during questionnaire pre-testing, and flagged during manual and automatic data editing. Thus strong literacy skills and qualifications in calculations and statistics were used as a basis for the selection of field enumerators and supervisors, as well as data entry operators (skills generally verified during the recruitment processes by means of written examinations).

4.2 Data management

For the data processing system, the organizational structure that was adopted is shown below:

Organizational structure for data processing



The table below gives the distribution of staff and associated computer equipment by State/Region.

Distribution of staff and associated computer equipment by State/Region

State/Region	Total Number of Supervisors	Total Number of Operators	Total Number of Computers
Kachin	2	6	6
Kayah	1	2	2
Kayin	2	6	6
Chin	1	4	4
Sagaing	4	17	17
Tanintharyi	2	6	6
Bago(E)	2	8	8
Bago(W)	2	7	7
Magway	3	13	13
Mandalay	5	20	20
Mon	2	6	6
Rakhine	3	10	10
Yangon	3	9	9
Shan(E)	2	6	6
Shan(S)	2	6	6
Shan(N)	3	9	9
Ayeyawady	4	17	17
Total	**43**	**152**	**152**

4.3 Training

Prior to data keying and processing activities, training sessions were organized for all data entry and processing staff. The table below provides a breakdown of staff by State/Region and training sessions.

Staff by State/Region and training sessions for data entry and processing staff

State/Region	IHLCA-II R1 TOT training 30-11-2009 to 12-12-2009	IHLCA-II R2 TOT training 03-05-2010 to 15-05-2010
Kachin	2	2
Kayah	2	2
Kayin	2	2
Chin	2	2
Sagaing	4	4
Tanintharyi	2	1
Bago(E)	2	2
Bago(W)	2	2
Magway	3	3
Mandalay	5	3
Mon	2	2
Rakhine	3	1
Yangon	3	2
Shan(E)	1	1
Shan(S)	2	2
Shan(N)	3	3
Ayeyawady	4	4
NayPyiTaw Headquarter	9	13
Total	**53**	**51**

At the end of the TOT trainings of Round 1 and Round 2, a test was administered to the trainees to assess their mastering of the material and provide additional training if necessary. The results of those tests are provided in the table below.

Average results of the TOT data processing training (round 1and 2)

State/Region	Average marks obtained after R1 TOT training (December 2009)	Average marks obtained after R2 TOT training (May 2010)
Kachin	91	88
Kayah	78	79
Kayin	80	89
Chin	88	93
Sagaing	92	92
Tanintharyi	89	88
Bago(E)	86	86
Bago(W)	71	88
Magway	93	86
Mandalay	89	85
Mon	77	91
Rakhine	74	90
Yangon	90	82
Shan(E)	84	85
Shan(S)	87	83
Shan(N)	84	87
Ayeyawady	87	92
NayPyiTaw Headquarter	75	84
Total Average	**85**	**86**

4.4 Data editing and coding

Overall editing and coding of the questionnaires received from the field was under the responsibility of the State and Region Level Data Entry Management Committee. The operations involved mainly:

- Checking and correcting for inconsistencies in the data;
- Identifying and correcting for outliers;
- Recoding of variables when necessary.

4.5 Data entry

In order to continually monitor the quality of the information being collected and correct any potential discrepancies as soon as possible, entry and validation of incoming data for the quantitative survey were conducted at the PD states/regions offices, and then transferred to PD Central Level Office. The raw micro-datasets for all states/regions were then aggregated and processed at the national level by PD staff under the supervision of the Technical Unit at PD Central Level Office in Nay Pyi Taw.

Each shift of data entry team consisted of 1 Shift Coordinator, 1 team consisting of 1 to 5 Supervisor(s) and 1 Control Clerk. One data entry supervisor had to manage 2 to 5 data entry operators.

On each shift, there was at least one assistant director from the State/Region level responsible for the overall coordination. This person was referred to as the (First or Second) Shift Coordinator (SC). Problems that Supervisors could not resolve were brought to the attention of the SC. Check-out of batches from the Central Storage Area was also done by the SC.

The Supervisors dedicated their time to monitoring the activity of the 2 to 5 Keyers (this includes Verifiers as well) in their team, and answering any questions about the keying process or other substantive procedures. They also established and entered filenames and initial geographic codes for each batch assigned to a Keyer, to ensure their accuracy.

One Control Clerk carried out the administrative functions for the teams. This included assigning batches to a Keyer, tracking error rates, and all other record keeping tasks. Due to lack of staff from some State/Region, most of the Shift Coordinator and supervisor shared the responsibility of the Control Clerk's task.

Each Keyer was given a two-digit identification number. All monitoring and record-keeping activity used the Keyer's identification number.

Equipment

The Keying Operation had the following components:

- One computer for each Keyer
- computers for use by the Control Clerks, Supervisors, or Shift Coordinator;
- 1-2 printers, connected to the above computers
- one copy machine
- Uninterruptible Power Supply for each computer set
- Stand by generator

Software application

CSPro 4.0 was installed on all computers; however on the computers for use by the Keyers, the CSPro 4.0 icon was removed, as one did not want to give easy access to the software by the Keyers in the event they attempted to modify the data entry application. Instead, an icon was placed on the desktop, linked to invoke CSEntry with the proper data entry application. The PFF files were suitably set up by the Supervisor.

Once the Keyer had completed their Batch, the Control Clerk copied the Keyer's data and log files. The system placed one copy of the data file in a "safe" directory on the server, one that was used strictly as an archive of work done. A second copy was to be placed on the server in a working directory, where it was be later copied to another Keyer's machine for verification.

4.6 Reference data files

The intention is to consolidate data from both IHLCA surveys into a database. Today all data files rest in ordinary file formats (CSPro, SPSS) on desktop computers and CDs and are therefore facing the following major problems:

1. Data are vulnerable to unintentional change or even destruction. There is no good backup system at hand and workstations are not always properly secured.
2. Data integrity is low. There is no clear system that informs of the latest valid versions of data file, meaning that future users may arrive at different results even when using the same set of programs.
3. Rules for data ownership and responsibilities are not sufficient.

With a database system in place these problems are addressed. It is suggested that the system to be developed in the beginning of 2011 should be developed in Yangon and mirrored in Nay Pyi Taw. Data will then be propagated between these systems and a reference database will be available with clear rules for database administrators and users.

5. Reporting

There are three major reports in the making based on survey results:

1. Poverty Profile Report
2. MDG Data Report
3. Poverty Dynamics Report

The present Technical Report with Supplement and a separate Quality Report support the main reports giving needed information on survey activities and other survey metadata, and will assist in interpretation of the results.

It is planned for a dissemination round when the reports are approved. The first activities will be a seminar arranged in NayPyiTaw for stakeholders/users where the survey and its results are presented. A set of thematic reports will also be written. It has still to be decided what they should comprise and who will be responsible.

A dissemination strategy will also be formulated. An important part of the strategy is how to make data accessible/available to users where a database solution will facilitate.

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ANNEX 1. Sampling design and estimation procedures

Sampling design

IHLCA-I

A stratified multi-stage sample design was used for the IHLCA-I survey with 62 strata which are all districts in the country. Given their special importance, Yangon city and Mandalay city which are not districts were treated as separate strata.[14] The first stage unit (FSU) is 'township', with 'ward/village tract' as second stage units (SSU), 'Street segment/village(s)' as third stage unit (TSU) and the 'household' as the last stage unit (LSU).

The selection plan in each stratum was as follows. 1) The sampling frame for the first stage was an official list of townships with their estimated number of households[15] in each district. 2) Two townships were selected with probability proportionate to estimated size with replacement (PPESWR). In other words, if a township was selected twice, the selected township was then assigned two times the sample size. Due to frame quality problems and other considerations (transport, security) a number of townships were left out of the sampling frame[16] before the draw. 3) The estimated number of households in the excluded 45 townships and from other wards/village tracts represented an estimated number of 343,130 households with a total estimated population of 1,787,708.

The sampling frame for the second stage was the list of wards and village tracts in the selected townships along with their estimated numbers of households.

All wards and village tracts in each selected township within a particular district were grouped into urban/rural substrata. 'Ward' is classified as 'urban' and 'Village Tract' as 'rural', A predetermined number of wards/village tracts were then drawn with PPES systematic random selection from these township frames.

A list of Townships, Wards and Village Tracts with number of Households by District is found in ANNEX 2.

As some wards and village tracts are quite large (in terms of number of households in urban areas and land size in rural areas), logistically it would have been difficult to interview the 12 households selected randomly within each ward and village tract.

Therefore, for each selected ward or village tract, a frame consisting of the list of all streets or villages was built. From those lists, one street segment (a street in a ward) or village was selected with PPES systematic selection method.

Finally, the fourth stage involved listing all households in the selected street segment/village and selecting 12 households by circular systematic random selection. The number of households per cluster in the final stage had been fixed at 12 households.

Listing of households in streets segments in urban ward areas and village tracts in rural areas were made prior to the household survey. Moreover, the survey teams of supervisors drew sketch maps of the street

[14] The two cities are usually treated as separate strata in household surveys conducted by CSO and there is a special interest in the social and economic conditions of these cities. 7 townships were selected in Yangon City.

[15] The measure of estimated size to be used for all stages of the sampling procedure was the number of households in 2002 as reported by the Population Department.

[16] The townships that were excluded were identified by the Planning Department.

segments in wards and villages prior to the data collection activities and selected the sample households in each community. With the predetermined path in the community on the sketch map and the sampling interval calculated using the total number of households and the fixed sample size, a unique systematic sample could then be drawn conforming to the random selection with a known selection probability.

Since the households were selected in clusters, the effect of clustering on the outcome variables was expected. The plan was to compensate for that by multiplying the sample size by the design effect (deft), which depended upon the intra-class correlation within the cluster and the cluster size. In this survey the deft was taken as 2.6 based on precision and cost factor considerations from previous surveys.

The computations were done as follows. The level of precision at the union level was taken as 2 % of the true value of national household consumption expenditure (based on analysis of results from the *Household Income and Expenditure Survey, CSO)* apart from a chance of 1 in 20 and the design effect was taken as 2.6. The total sample size at the national level was thus initially determined at 18888 households.

This overall sample of households was then allocated to the 62 districts proportionately to the square root of the estimated number of households in the given district. The square root of number of households was taken as size to prevent allocating large number of sample households to districts where large cities or townships were situated. Lauk Kai township in Lauk Kai district and Maing Ton township in Maing Sat district were found to be inaccessible after the sample had been drawn. Lauk Kai district had only one sample township 'Lauk Kai', so dropping Lauk Kai township reduced the total number of districts from 62 to 61 after sample selection. Hence the final total number of sampled households was 18660, after dropping Lauk Kai and Maing Ton townships from the final sample.

Two sample townships were selected in each district with PPESWR selection method. The district sample was further allocated into the two sample townships proportionately to the square root of the number of households of the sample townships. The township household sample was allocated to urban sub-stratum and rural sub-stratum in the national ratio 1:3. This gave a fairly good representation of urban and rural households in the selected sample. The number of wards or village tracts to be selected was determined by dividing the allocated number of households by 12.

A sub-sample of 12 households was selected from each selected street segment and from each selected village. Systematic random sampling was used in both cases to draw the households, based on the prior independent listing of all households in each selected street segment and village. The list of selected sample townships with number of selected wards /villages in population and sample are given in ANNEX 2.

IHLCA-II

The IHLCA-II sample design is a modified IHLCA-I sample design which takes into account of changes in the sample frame since 2004 and retains a panel of 50% from IHLCA-I sample households.

The IHLCA-II survey kept the same sample of areas (street segments and villages) as the IHLCA-I survey areas. There are altogether 1555 areas. Within each area a sample of 12 households was selected. Six households from the 12 IHLCA1household sample were selected randomly. An additional six households were selected from the "non-IHLCA-I households in the village or street segment. In some (fairly few) cases there were less than six old IHLCA-I households remaining in the village or street segment due to migration and other causes. In that case all remaining IHLCA-I households were included in the sample. If that was the case then the sample of non-IHLCA-I households were increased so the total sample from the village or street segment added up to 12. The 50 % panel will allow for studies of gross changes (household dynamics) on a sufficiently large sample while at the same time we also make sure that changes in the population are taken into account.

Changes and replacements

Many changes in the sample frame occurred during the 5 year period since IHLCA-I frame was constructed in 2004. Some significant changes and the procedures used for handling these changes are described as follows.

Some of the townships selected for the IHLCA-I survey were heavily affected by the cyclone *Nargis*. Two of the four sample townships in the Ayeyarwady Region are severely affected by the cyclone (Bogalay and Laputta townships). Damage assessment in nine sample villages in Laputta and two sample villages in Bogalay indicates that the damage is so severe in these villages that it is not possible to conduct the survey in the villages. These 11 villages were replaced by villages of comparable status in terms of houses, livelihood and occupation from the same village tract or from nearby villages tracts.

A list of original sample villages and replacements is found in ANNEX 2.

Changes over time in administrative subregions (township, wards, village tracts, villages) had to be dealt with. The boundaries of the sampled units may have changed since the sample was drawn in 2004. The general principle was as far as possible to use the units as they were defined in 2004. For example; if the sampled village had been split into two villages both villages were considered "the sampled unit", i.e. trying to keep the same area as in 2004. If the sampled village had been merged with another village only the part of the new village that covered the area of the old village was considered as "the sampled unit".

A special case of what is discussed in the previous paragraph was when new villages had been formed in the village tract. The number of households in these villages was included when the number of households to 2009 level in the selected village tract (to be used for the new third stage weight) was updated.

Sampling weights and estimation

The sample of areas for IHLCA-II was the same as the same sample of areas for IHLCA-I. The same inclusion probabilities are for these areas as in IHLCA-I. So, for the first two stages of selection (townships and wards/village tracts) the same weights as in IHLCA-I are kept.

The third stage weights differ from those in IHLCA-I. The third stage weight is actually the combined weight for the third and fourth stages of selection (selection of one street segment or village per ward/village tract and selection of 12 households per street segment or village). It is possible to combine the two weights into one because only one street segment or village per ward/village tract is selected. The third stage weights in the IHLCA-II sample will then become:

$$\frac{\textit{(The number of households in the selected ward/VT in 2009)}}{\textit{(2 * number of sampled households in the ward/VT)}}$$

The sampled households in a ward/VT come from two separate sampling frames. The first sampling frame is the list of households that were included in the IHLCA-I survey. The other sampling frame is the list of households not included in the IHLCA-I survey in the street segment or village.

In almost all wards/VT:s six households from each sampling frame remain. In that case the household weights are equal for all the 12 selected households in the ward/VT. In a few cases the sample of old households is less than six. In these wards/VT:s there are different weights for the old and new households.

A *total* is estimated from the sample by the following estimator:

$$\hat{Y} = \sum_{i=1}^{ND} \sum_{j=1}^{nts_i} \sum_{k=1}^{nwvt_{ij}} \sum_{m=1}^{nhh_{ijkl}} w_{ijklm} * y_{ijklm}$$

where

nts_i = number of townships selected in district (=2,except in Yangon)

$nwvt_{ij}$ = number of selected wards or village tracts in township *ij*

nhh_{ijkl} = number of selected and interviewed households in *ijkl*:th ward /segment or village(=12 in most cases)

w_{ijklm} = sample weight for selected and interviewed *ijklm*:th household

y_{ijklm} = value of the study variable for *ijklm*:th household

The final weight for an urban household is

$$W_{ijklm} = \frac{NHH_i}{nts_i * NHH_{ij}} * \frac{NWHH_{ij}}{nw_{ij} * NWHH_{ijk}} * \frac{XWHH_{ijk}}{nhh_{ijkl}}$$

where

NHH_i = total number of households in district *i* as given by PD frame

NHH_{ij} = total number of households in township *ij* as given by PD frame

$NWHH_{ij}$ = total number of households in urban part of the township *ij* as given by PD frame

$NWHH_{ijk}$ = total number of households in ward *ijk* as given by PD frame

$XWHH_{ijk}$ = total number of households in ward *ijk* as given by the listing operation in the field

The final weight for a rural household is

$$W_{ijklm} = \frac{NHH_i}{nts_i * NHH_{ij}} * \frac{NVTHH_{ij}}{nvt_{ij} * NVTHH_{ijk}} * \frac{XVTHH_{ijk}}{nhh_{ijkl}}$$

where

NHH_i = total number of households in district *i* as given by PD frame

NHH_{ij} = total number of households in township *ij* as given by PD frame

$NVTHH_{ij}$ = total number of households in rural part of the township *ij* as given by PD frame

$NVTHH_{ijk}$ = total number of households in village/tract *ijk* as given by PD frame

$XVTHH_{ijk}$ = total number of households in village/tract *ijk* as given by the listing operation in the field

A ratio is estimated by

$$\hat{R} = \frac{\hat{Y}}{\hat{X}}$$

where $\hat{X}$ is estimated in the same way as $\hat{Y}$.

The weights for IHLCA-II are calculated by adjusting the "old" weights from IHLCA-I in the following way:
For the urban sample:

$$w_{ijklm}^{2009} = w_{ijklm}^{2004} * \frac{nhh_{ijkl}^{2004}}{XWHH_{ijk}^{2004}} * \frac{XWHH_{ijk}^{2009}}{2 * nhh_{ijkl}^{2009}}$$

and likewise for the rural sample.

For IHLCA-II, there is an additional complexity in the last stage of sampling due to the separate selection of old IHLCA-I households (for the panel analysis) and new households. The standard procedure called for a selection of six households out of the 12 old IHLCA-I households and a selection of six households out of the "non-IHLCA-I households in the village or ward segment. In some (fairly few) cases there were less than six old IHLCA-I households remaining in the village or ward segment due to migration and other causes. In that case all remaining IHLCA-I households were included in the sample. If that was the case then the sample of non-IHLCA-I households was increased so that the total sample from the village or ward-segment added up to 12.

Thus there will be two household samples within each ward-segment and village. In most cases they had six households each. In those cases the factor $2 * nhh_{ijkl}^{2009}$ in the denominator became 12 for all sample households in the village or ward-segment. If there were less than six IHLCA-I households in the sample – e.g only four - then eight non-IHLCA-I households were selected. In that case different weights for the IHLCA-I and non-IHLCA-I households are the result. The factor $2 * nhh_{ijkl}^{2009}$ becomes 8 for the IHLCA-I households and 16 for the non- IHLCA-I households.

A detailed explanation for sampling weights for the fourth stage of the IHLCA-II sample is given in Pettersson (2010).

Altogether 11 IHLCA-I villages were replaced due to damages from the Nargis cyclone. These villages were replaced by villages of comparable status in terms of houses, livelihood and occupation from the same village tract or from nearby village tracts. In the case where the new village was from the same village tract the usual calculation still applies. The same calculation can be used also in the case where the replacement village is located in another village tract but, of course, $XVTHH_{ijk}^{2009}$ is now the number of households in the new village tract (and $XVTHH_{IJK}^{2004}$ is the number of households in the old village tract).

An estimate of the variance of a ratio is:

$$\text{var}\left(\hat{R}\right) = \frac{1}{\hat{X}^2}\sum_{i}^{ND}\left[\text{var}\left(\hat{Y}_i\right) + \hat{R}^2\,\text{var}\left(\hat{X}_i\right) - 2\hat{R}\,\text{cov}\left(\hat{Y}_i, \hat{X}_i\right)\right]$$

where

$$\text{var}\left(\hat{Y}_i\right) = \frac{1-f_i}{nts_i - 1}\left[nts_i \sum_{j=1}^{nts_i} y_{ij}^{'2} - y_i^{'2}\right]$$

$$\text{var}\left(\hat{X}_i\right) = \frac{1-f_i}{nts_i - 1}\left[nts_i \sum_{j=1}^{nts_i} x_{ij}^{'2} - x_i^{'2}\right]$$

$$\text{cov}\left(\hat{Y}_i, \hat{X}_i\right) = \frac{1-f_i}{nts_i - 1}\left[nts_i \sum_{j=1}^{nts_i} y_{ij}^{'} x_{ij}^{'} - y_i^{'} x_i^{'}\right]$$

$$y'_{ij} = \sum_{k=1}^{nwvtij} \sum_{m=1}^{nhh_{ijkl}} w_{ijklm} y_{ijklm} = \sum_{k=1}^{nwvtij} y'_{ijk}$$

$$x'_{ij} = \sum_{k=1}^{nwvtij} \sum_{m=1}^{nhh_{ijkl}} w_{ijklm} x_{ijklm} = \sum_{k=1}^{nwvtij} x'_{ijk}$$

$$y_i^{'} = \sum_{j=1}^{nvsti} y_{ij}^{'}$$

$$x_i^{'} = \sum_{j=1}^{nvtij} x_{ij}^{'}$$

The above formulae are valid for estimating totals, averages, proportions and their sampling variances for a particular state/region. The formulae for estimating union parameters are the same by adding all districts viz. adding up to TD instead of ND.

ANNEX 2. Sampling frame and selection

List of Townships, Wards and Village Tracts with number of Households by District

Sr	S/R Code	S/R Name	District Code	District Name	No. of TS	Urban		Rural		Total	
						No. of Wards	No. of HHs	No. of VTs	No. of HHs	No. of W/VTs	No. of HHs
1	1	Kachin	1	Putao	1	7	1,345	15	9,026	22	10,371
2			2	Ban Maw	4	31	9,044	171	38,302	202	47,346
3			3	Myitkyina	2	29	21,808	67	20,288	96	42,096
4			4	Moe Nyin	3	21	12,140	86	39,352	107	51,492
		Kachin Total			**10**	**88**	**44,337**	**339**	**106,968**	**427**	**151,305**
5	2	Kayah	2	Loi Kaw	1	13	6,429	13	8,578	26	15,007
		Kayah Total			1	13	6,429	13	8,578	26	15,007
6	3	Kayin	1	Pha An	4	25	16,320	254	136,326	279	152,646
7			2	Kaw Ka Yeik	1	11	6,593	53	25,022	64	31,615
8			3	Myawaddy	1	5	3,202	15	5,034	20	8,236
		Kayin Total			6	41	26,115	322	166,382	363	192,497
9	4	Chin	1	Pha Lamm	3	16	6,662	173	21,980	189	28,642
10			2	Min Dat	2	9	2,520	109	12,728	118	15,248
		Chin Total			5	25	9,182	282	34,708	307	43,890
11	5	Sagaing	1	Ka Lay	3	11	15,244	138	57,430	149	72,674
12			2	Ka Thar	6	31	13,951	232	84,217	263	98,168
13			3	Kham Tee	2	5	3,276	104	23,732	109	27,008
14			4	Sagaing	3	26	16,458	177	73,767	203	90,225
15			5	Tamu	1	12	7,659	21	6,696	33	14,355
16			6	Mon Ywar	8	48	42,680	360	170,026	408	212,706
17			7	Maw Lite	2	4	2,489	68	18,440	72	20,929
18			8	Shwe Bo	8	35	25,522	492	205,566	527	231,088
		Sagaing Total			33	172	127,279	1,592	639,874	1,764	767,153
19	6	Tanintharyi	1	Kaw Thaung	2	18	9,408	37	12,642	55	22,050
20			2	Dawei	4	32	16,816	136	61,677	168	78,493
21			3	Myeik	4	27	21,204	87	65,796	114	87,000
		Tanintharyi Total			10	77	47,428	260	140,115	337	187,543
22	7	Bago (E)	1	Bago	8	88	73,447	441	245,916	529	319,363
23			2	Taungoo	6	55	25,712	255	160,247	310	185,959
		Bago (E) Total			14	143	99,159	696	406,163	839	505,322
24	8	Bago (W)	1	Pyay	6	36	34,249	285	131,267	321	165,516
25			2	Tharyarwaddy	8	63	33,356	399	185,407	462	218,763
		Bago (W) Total			14	99	67,605	684	316,674	783	384,279
26	9	Magwe	1	Gan Gaw	3	7	2,742	207	36,221	214	38,963
27			2	Pakokku	5	33	26,509	327	162,557	360	189,066
28			3	Magwe	6	65	53,058	333	189,999	398	243,057
29			4	Minbu	5	21	10,783	297	101,875	318	112,658
30			5	Thayat	6	33	17,786	378	113,444	411	131,230
		Magwe Total			25	159	110,878	1,542	604,096	1,701	714,974
31	10	Mandalay	0	Mandalay city	5	86	154,805			86	154,805

Sr	S/R Code	S/R Name	District Code	District Name	No. of TS	Urban		Rural		Total	
						No. of Wards	No. of HHs	No. of VTs	No. of HHs	No. of W/VTs	No. of HHs
32			1	Kyauk Se	4	23	11,847	277	97,958	300	109,805
33			2	Nyaung U	1	16	7,708	75	34,208	91	41,916
34			3	Pyin Oo Lwin	5	26	35,659	216	92,249	242	127,908
35			4	Myin Chan	5	49	28,491	360	169,536	409	198,027
36			5	MDY other TS	2	10	14,117	100	48,654	110	62,771
37			6	Meik Hti Lar	4	31	29,366	259	116,883	290	146,249
38			7	Ya Me Thin	5	29	28,289	322	180,733	351	209,022
		Mandalay Total			31	270	310,282	1,609	740,221	1,879	1,050,503
39	11	Mon	1	Maw La Myaing	6	54	63,571	197	137,168	251	200,739
40			2	Tha Hton	4	19	21,714	183	101,537	202	123,251
		Mon Total			10	73	85,285	380	238,705	453	323,990
41	12	Rakhine	1	Kyauk Phyu	4	25	8,324	172	75,971	197	84,295
42			2	Sittwe	8	68	41,112	549	170,815	617	211,927
43			3	Maung Taw	2	18	8,577	175	92,125	193	100,702
44			4	Than Dwe	3	15	8,951	147	50,252	162	59,203
		Rakhine Total			17	126	66,964	1,043	389,163	1,169	456,127
45	13	Yangon	0	Yangon city	31	505	650,563	32	25,740	537	676,303
46			9	YGN other TS	13	137	86,870	598	257,937	735	344,807
		Yangon Total			44	642	737,433	630	283,677	1,272	1,021,110
47	14	Shan (S)	1	Loi Lin	1	8	6,053	19	12,209	27	18,262
48			2	Taunggyi	10	123	56,785	230	168,767	353	225,552
		Shan (S) Total			11	131	62,838	249	180,976	380	243,814
49	15	Shan (N)	1	Larshio	4	29	22,773	175	49,898	204	72,671
50			2	Kyauk Me	6	38	17,623	249	91,333	287	108,956
51			3	Mu Se	3	39	16,013	172	45,469	211	61,482
52			4	Lauk Kai	1	9	1,859	37	8,060	46	9,919
53			5	Kun Lon	1	5	770	25	7,407	30	8,177
		Shan (N) Total			15	120	59,038	658	202,167	778	261,205
54	16	Shan (E)	1	Maing Sat	2	14	2,375	37	7,806	51	10,181
55			2	Kyain Ton	3	13	11,578	77	30,416	90	41,994
56			3	Maing Phyat	1	3	732	22	2,525	25	3,257
57			4	Tarchilake	1	13	5,144	13	13,313	26	18,457
		Shan (E) Total			7	43	19,829	149	54,060	192	73,889
58	17	Ayeyarwaddy	1	Pathein	7	48	50,971	519	231,853	567	282,824
59			2	Phyarpon	4	36	23,382	298	130,689	334	154,071
60			3	Myaung Mya	5	52	24,164	488	218,819	540	242,983
61			4	Maupin	4	43	20,410	235	145,485	278	165,895
62			5	Hinthada	6	48	38,608	371	221,961	419	260,569
		Ayeyarwaddy Total			26	227	157,535	1,911	948,807	2,138	1,106,342
Grand Total					**279**	**2,449**	**2,037,616**	**12,359**	**5,461,334**	**14,808**	**7,498,950**

List of selected sample townships with number of wards/Villages in population and sample by district

	Identification Particular						Population				Sample					
Sr. No	S/R Code	S/R Name	District Code	District Name	TS Code	TS Name	No. of Wards	Ward HHs	No. of VTs	VT HHs	No. of Wards	Ward HHs	No. of VTs	VT HHs	Total WVTs	Total HHs
1	1	Kachin	1	Putao	201	Putao - 1	3	574	7	4,329	2	24	4	48	6	72
2					202	Putao - 2	4	771	8	4,697	2	24	5	60	7	84
3			2	Ban Maw	10	Man Si	4	882	40	9,333	2	24	6	72	8	96
4					160	Ban Maw	10	3,855	48	10,741	2	24	7	84	9	108
5			3	Myitkyina	130	Waing Maw	1	2,880	37	11,814	1	12	4	48	5	60
6					180	Myitkyina	28	18,928	30	8,474	2	24	6	72	8	96
7			4	Moe Nyin	90	Moe Kaung	10	4,458	34	11,320	1	12	4	48	5	60
8					150	Moe Nyin	5	4,814	37	20,619	2	24	6	72	8	96
9	2	Kayah	2	Loi Kaw	41	Loikaw - 1	6	3,636	6	3,662	2	24	4	48	6	72
10					42	Loikaw - 2	7	2,793	7	4,916	2	24	5	60	7	84
11	3	Kayin	1	Pha An	40	Thantaung	5	843	58	11,633	2	24	7	84	9	108
12					70	Pha An	8	11,583	91	70,054	6	72	17	204	23	276
13			2	Kaw Ka Yeil	61	Kaw Ka Yeil	7	4,977	27	12,085	2	24	6	72	8	96
14					62	Kaw Ka Yeil	4	1,616	26	12,937	2	24	5	60	7	84
15			3	Myaw addy	11	Myaw addy -	3	1,742	7	2,585	2	24	5	60	7	84
16					12	Myaw addy -	2	1,460	8	2,449	2	24	4	48	6	72
17	4	Chin	1	Pha Lamm	30	Hakha	6	2,892	30	4,563	2	24	4	48	6	72
18					90	Tee Tain	4	1,800	55	10,200	2	24	6	72	8	96
19			2	Min Dat	50	Ma Tu Pi	5	1,278	63	7,348	2	24	5	60	7	84
20					80	Min Dat	4	1,242	46	5,380	2	24	4	48	6	72
21	5	Sagaing	1	Ka Lay	70	Ka Lay	5	12,519	41	35,235	3	36	10	120	13	156
22					90	Min Kin	3	662	61	14,948	2	24	6	72	8	96
23			2	Ka Thar	240	Kaw Lin	6	3,132	47	18,544	4	48	11	132	15	180
24					360	Wun Tho	4	2,170	38	9,784	3	36	8	96	11	132
25			3	Kham Tee	40	Home Ma Lin	2	1,203	76	20,157	2	24	7	84	9	108
26					300	Khan Tee	3	2,073	28	3,575	1	12	3	36	4	48
27			4	Sagaing	180	Sagaing	18	11,963	81	38,980	4	48	11	132	15	180
28					320	Mayung	4	1,397	48	17,093	2	24	7	84	9	108
29			5	Tamu	81	Tamu - 1	4	5,552	7	1,945	2	24	5	60	7	84
30					82	Tamu - 2	8	2,107	14	4,751	2	24	4	48	6	72
31			6	Mon Ywar	280	Yin Mar Pin	4	983	42	20,612	3	36	10	120	13	156
32					290	Mon Ywar	24	33,275	57	31,105	6	72	17	204	23	276

	Identification Particular						Population				Sample					
Sr. No	S/R Code	S/R Name	District Code	District Name	TS Code	TS Name	No. of Wards	Ward HHs	No. of VTs	VT HHs	No. of Wards	Ward HHs	No. of VTs	VT HHs	Total WVTs	Total HHs
33			7	Maw Lite	50	Maw Lite	2	1,315	28	5,888	1	12	4	48	5	60
34					160	Paung Pyin	2	1,174	40	12,552	2	24	6	72	8	96
35			8	Shwe Bo	130	Wet Let	3	1,834	69	34,460	5	60	15	180	20	240
36					250	Kant Ba Lu	5	3,079	86	37,753	5	60	14	168	19	228
37	6	Tanintharyi	1	Kaw Thaung	30	Kaw Thaung	13	7,621	18	6,357	2	24	6	72	8	96
38					60	Bote Pyin	5	1,787	19	6,285	1	12	4	48	5	60
39			2	Dawei	80	Yay Phyu	8	1,625	34	15,214	3	36	8	96	11	132
40					100	Laung Lon	4	1,057	41	20,687	3	36	9	108	12	144
41			3	Myeik	10	Mayik	12	16,455	22	18,219	3	36	10	120	13	156
42					40	Pa Law	9	3,543	26	17,274	3	36	8	96	11	132
43	7	Bago (E)	1	Bago	60	Nyaung Lay	11	13,112	49	32,099	6	72	17	204	23	276
44					70	Daik Oo	7	3,281	44	36,259	5	60	16	192	21	252
45			2	Taungoo	80	Yay Thar Sh	6	2,315	52	27,884	4	48	11	132	15	180
46					130	Phyu	10	6,157	61	43,311	5	60	14	168	19	228
47	8	Bago (W)	1	Pyay	10	Thegon	4	1,971	49	21,628	4	48	11	132	15	180
48					30	Shwetaung	3	4,334	48	25,838	4	48	13	156	17	204
49			2	Tharyarwad	50	Moe Nyo	5	2,104	37	22,262	5	60	14	168	19	228
50					100	Gyo Bin Gau	10	4,830	49	20,793	5	60	14	168	19	228
51	9	Magwe	1	Gan Gaw	50	Gan Gaw	4	2,212	71	17,850	2	24	7	84	9	108
52					60	Hti Lin	2	759	71	7,651	2	24	5	60	7	84
53			2	Pakokku	140	Pauk	4	1,187	67	24,159	3	36	10	120	13	156
54					200	Pakokku	15	18,283	55	45,140	5	60	16	192	21	252
55			3	Magwe	90	Nat Mauk	7	2,562	73	34,110	4	48	13	156	17	204
56					180	Magwe	14	16,078	61	47,457	6	72	17	204	23	276
57			4	Minbu	150	Pwint Phyu	4	1,029	52	27,542	3	36	9	108	12	144
58					230	Salin	6	1,837	102	36,879	4	48	11	132	15	180
59			5	Thayat	100	Sin Paung W	3	1,431	46	17,903	4	48	12	144	16	192
60					220	Kan Ma	4	1,244	52	13,195	3	36	10	120	13	156
61	10	Mandalay	0	Mandalay cit	50	Chan Mya Th	13	31,896			15	180			15	180
62					290	Mahar Aung	18	35,373			16	192			16	192
63			1	Kyauk Se	100	Sint Kai	4	1,384	48	21,297	3	36	10	120	13	156
64					160	Ta Dar Oo	3	2,068	61	23,056	3	36	10	120	13	156
65			2	Nyaung U	91	Nyaung Oo -	12	6,246	60	27,924	3	36	8	96	11	132
66					92	Nyaung Oo -	4	1,462	15	6,284	1	12	4	48	5	60
67			3	Pyin Oo Lwi	10	Moe Gote	5	16,072	30	15,559	3	36	10	120	13	156

Sr. No	Identification Particular						Population				Sample					
	S/R Code	S/R Name	District Code	District Name	TS Code	TS Name	No. of Wards	Ward HHs	No. of VTs	VT HHs	No. of Wards	Ward HHs	No. of VTs	VT HHs	Total WVTs	Total HHs
68					280	Matayar	5	3,432	83	33,709	4	48	11	132	15	180
69			4	Myin Chan	30	Myin Chan	19	15,167	66	32,325	4	48	13	156	17	204
70					200	Kyauk Pa Ta	12	7,030	109	45,617	5	60	14	168	19	228
71			5	MDY other T	60	Patheingyi	1	2,070	58	27,972	2	24	7	84	9	108
72					180	Amara Pura	9	12,047	42	20,682	3	36	8	96	11	132
73			6	Meik Hti Lar	110	Wun Tw in	6	4,785	69	30,463	4	48	10	120	14	168
74					240	Meik Hti Lar	14	17,478	58	32,064	4	48	12	144	16	192
75			7	Ya Me Thin	70	Le Way	6	4,015	65	36,032	5	60	14	168	19	228
76					260	Pyaw Bw e	8	4,642	75	32,940	5	60	13	156	18	216
77	11	Mon	1	Maw La Mya	30	Yay	9	4,476	28	36,173	5	60	15	180	20	240
78					100	Thanphyu Za	15	8,572	26	16,279	4	48	12	144	16	192
79			2	Tha Hton	20	Bee Lin	4	3,344	49	22,802	3	36	9	108	12	144
80					60	Paung	4	5,028	50	36,624	4	48	12	144	16	192
81	12	Rakhine	1	Kyauk Phyu	10	Yan Bye	6	1,943	51	18,488	3	36	8	96	11	132
82					50	Kyauk Phyu	10	4,244	54	27,296	3	36	10	120	13	156
83			2	Sittw e	90	Sittw e	32	22,620	30	12,658	5	60	15	180	20	240
84					140	Rathetaung	4	1,254	88	19,835	4	48	12	144	16	192
85			3	Maung Taw	40	Maung Taw	11	5,537	97	54,472	3	36	10	120	13	156
86					100	Buthitaung	7	3,040	78	37,653	3	36	9	108	12	144
87			4	Than Dw e	20	Taung Gote	4	4,125	50	19,193	3	36	8	96	11	132
88					80	Gw a	3	1,360	34	11,388	2	24	6	72	8	96
89	13	Yangon	0	Yangon city	110	Pabandan	11	6,509			4	48			4	48
90					180	Lanmadaw	12	7,678			4	48			4	48
91					250	Thingangyun	38	35,988			9	108			9	108
92					310	North Okkala	19	78,823			14	168			14	168
93					350	Tharketa	19	47,162			11	132			11	132
94					430	Mingalar Tau	20	19,003			7	84			7	84
95					440	Dagon Myoth	26	19,843			7	84			7	84
96			9	YGN other T	80	Than Lyin	17	11,417	28	19,285	5	60	16	192	21	252
97					270	Taik Kyee	20	11,888	73	32,866	6	72	19	228	25	300
98	14	Shan (S)	1	Loi Lin	171	Loi Lin - 1	4	2,884	11	6,698	2	24	5	60	7	84
99					172	Loi Lin - 2	4	3,169	8	5,511	2	24	4	48	6	72
100			2	Taunggyi	50	Pe Kon	7	2,584	12	8,793	3	36	9	108	12	144
101					220	Taunggyi	37	29,502	25	30,816	7	84	20	240	27	324

Sr. No	Identification Particular						Population				Sample					
	S/R Code	S/R Name	District Code	District Name	TS Code	TS Name	No. of Wards	Ward HHs	No. of VTs	VT HHs	No. of Wards	Ward HHs	No. of VTs	VT HHs	Total WVTs	Total HHs
102	15	Shan (N)	1	Larshio	120	Tan Yann	10	3,890	49	14,976	2	24	7	84	9	108
103					130	Larshio	12	16,572	76	20,426	3	36	9	108	12	144
104			2	Kyauk Me	110	Thi Paw	11	3,565	67	19,510	3	36	10	120	13	156
105					190	Naung Cho	6	2,316	35	16,942	3	36	9	108	12	144
106			3	Mu Se	30	Kut Kaing	16	5,792	69	20,605	3	36	8	96	11	132
107					210	Nam Kam	4	3,501	44	11,861	2	24	6	72	8	96
108			4	Lauk Kai	21	Lauk Kai - 1(*	6	1,668	27	6,189						
109					22	Lauk Kai - 2(*	3	191	10	1,871						
110			5	Kun Lon	91	Kun Lon - 1	3	482	11	3,505	2	24	4	48	6	72
111					92	Kun Lon - 2	2	288	14	3,902	2	24	5	60	7	84
112	16	Shan (E)	1	Maing Sat	10	Maing Ton(*)	8	1,405	10	2,973						
113					40	Maing Sat	6	970	27	4,833	2	24	5	60	7	84
114			2	Kyain Ton	50	Kyaing Ton	9	11,214	33	19,596	3	36	9	108	12	144
115					70	Maing Kat	2	299	16	4,701	1	12	4	48	5	60
116			3	Maing Phyat	61	Maing Phyat -	2	346	11	1,254	2	24	4	48	6	72
117					62	Maing Phyat -	1	386	11	1,271	2	24	5	60	7	84
118			4	Tarchilake	21	Tarchilake - 1	6	4,133	7	9,903	2	24	6	72	8	96
119					22	Tarchilake - 2	7	1,011	6	3,410	1	12	4	48	5	60
120	17	Ayeyarwaddy	1	Pathein	90	Pathein	15	28,087	52	25,471	6	72	18	216	24	288
121					120	Kangyidaunt	7	2,690	73	26,249	5	60	13	156	18	216
122			2	Phyarpon	140	Bogalay	9	6,219	75	37,828	4	48	12	144	16	192
123					190	Kyaik Lat	6	6,148	87	32,095	4	48	11	132	15	180
124			3	Myaung Mya	180	Mawlamyaing	13	5,787	101	40,824	5	60	14	168	19	228
125					250	Laputta	10	5,325	50	47,092	5	60	15	180	20	240
126			4	Maupin	30	Maupin	12	8,560	76	47,653	5	60	14	168	19	228
127					230	Nyaung Don	10	4,294	44	29,103	4	48	11	132	15	180
128			5	Hinthada	170	Hintada	21	22,148	103	61,077	6	72	18	216	24	288
129					260	Zalun	5	5,190	66	35,201	4	48	12	144	16	192
							1,097	**933,913**	**5,508**	**2,475,592**	**462**	**5,544**	**1,093**	**13,116**	**1,555**	**18,660**

(*)Lauk Kai and Ming Ton townships were found to be inaccessible after the sample had been drawn leading to the final situation whereby Lauk Kai district was dropped all together but Maing Ton district lost one of its two townships.

List of original sample villages in IHLCA-I and replaced villages in IHLCA-II

Sr No	Township	Original sample villages		Replaced village	
		VT name	Village name	VT name	Village name
	Laputta				
1		Sar Kyin	Sar Kyin	La But Taloke(N)	La But Taloke(N)
2		Kan Bet	Set Gyi Su	Gon Nyin Tan	Leik Thit
3		Be Toot	Htone Bu Kya Pine	Kokko	Ka Nyin Kwin
4		Ye Dwin Gone	Ye Dwin Gone	Ka Ka Yan	Ka Ka Yan
5		Hlwa Zar	Hlwa Zar	Baing Daunt Chaung	Bo Kone
6		Sar Chet	Tak Pan Kone Gyi	Sar Chet	Boe Thin Kone
7		Da Ni Seik	Pain Ne Kone (E)	Da Ni Seik	Pain Ne Kone
8		Hlaing Phone	Hlaing Phone Ywama	Hlaing Phone	Yay Tagar
9		Tha Bukone	Ping Htaung Kwin	Tha Bukone	Tha Bukone
	Bogalay				
1		Ma Gu	Ma Gu (2)	Aye Ywar	Auk Magyi Chaung
2		Tha Zin Kone	Phoe Hlaing Chaung/ Mai Taw Su	Mya Thein Tan	Mya Thein Tan

Annex 3. Data entry procedures

The following CSPro 4.0 data entry options were reviewed by the ITU to determine which settings to use:

Initial settings

Require the <Enter> key? This determined whether or not the Keyer will need to hit the <Enter> key after entering data for each field. It was decided that the <Enter> key not be required, as it added to the number of keystrokes an operator must key. During training use of this feature was emphasized.

Can force out-of-range? Whether or not the Keyer could force an out-of-range value to be entered. If not all variable definitions were up-to-date in the dictionary, then the Keyer would be allowed to enter the value shown on the questionnaire. Traditionally the most difficult code lists to maintain are location, occupation, and industry codes. Since most code lists were complete, Keyers were not allowed to force a value.

Enter operator ID. If this was selected, the Keyer had to enter a non-blank value as their identification number before the system would allow them to begin entry. This option was to be selected, as its Operator Identification numbers would be assigned, and they should use these during data entry.

Miscellaneous considerations

In keying estimates, a six-hour shift was envisioned. As entering data was tedious and rather dull, six hours was the maximum shift duration. Keyers were given several breaks during their work day. A half-hour "lunch" break, and two 15-minute breaks before and after this lunch were allowed.
A similar schedule was established for the second shift. To ensure a smooth transition between shifts, the second shift usually started 30 minutes after the first shift ends. This gave first shift Keyers time to wrap up their tasks before second shift Keyers arrive. It also allowed time for the First and Second Shift Coordinators to consult on any problems that have had occurred (hardware, software, etc.).

Control forms

Several control forms were prepared to facilitate control of the data entry phase. An attempt was made to keep the number of reports to a desirable minimum.

It was agreed that at least a full week of training was needed for the keying staff. Due to attrition, illness, performance rates, etc., the need would arise for personnel to function as both Keyers and Verifying Keyers; therefore, both phases were thoroughly explained and tested to all staff members.

For the training period, copies of some of the actual questionnaires were used and distributed as examples. To ensure a full test of the Keyers' abilities, the ITU chose questionnaires with the following features:

- questionnaires with few questions answered;
- questionnaires with most questions answered;
- questionnaires where coded items had been revised by the Verifying Coder (i.e., both the original Coder's choice is written, as well as the Verifying Coder's response)
- questionnaires with more than 10 people in the household (i.e., 2-3 questionnaires per household)
- questionnaires from special places

In this way the ITU/PD were able to better judge whether the Keyers had learned their duties.
A keying guide was given to each Keyer during the training session, which was theirs to keep for the duration of the keying operation. It was a step-by-step guide, showing detailed instructions on how to progress through the questionnaire. Screen snapshots of the data entry system were included where appropriate to facilitate the Keyer's understanding of the program.

For the training operation, ITU paired up the Keyers. Each would key their data file, then verify their partner's data file. At no time ITU did not allow a Keyer verifying their own work.

File naming

As mentioned above, one Batch at a time was to be assigned to a Keyer. Therefore, for each Batch the Keyer created a new file. In an effort to keep the file name meaningful, yet short, the following file naming convention was adopted: MMMSSSPPP.dat

MMM represented the District number.
SSS represented the Township number.
PPP is the Batch number. Again, the original Batch number will be retained.

If a file was later verified, the filename was appended with the letter 'v' to indicate it is a verified file.

File locations

As far as the individual operator workstations were concerned, folders were maintained, one for each District. Within each of these District folders, one folder each was created for the first and second shift.

All necessary files (CSPro 4.0 data entry application files, etc) were copied onto each workstation.

To prevent loss of data due to file corruption, accidental deletion, etc, three copies of each file were maintained. Therefore, in addition to file left on the Keyer's workstation, two copies should be kept on the server. One file was copied to the "working" directory—files there were further processed through the structure and consistency edits, etc. In addition to the above, nightly backups of the system were to be run.

However, each time a data file was modified (keyed, verified, edited), an original version of the file was maintained.

Separate folders were maintained for each District, as this facilitated further processing of the files.

Movement of Batches

To begin the Keying operation, the First-Shift Coordinator retrieved the coded Batches for the first-priority District from the Central Storage Area (CSA).

Once checked out of the CSA, the Batches were brought to the keying area's Local Storage Area (LSA). The LSA was in a central location, easily accessible to all Control Clerks. It was used for the following purposes:

- to store the Batches arriving from the CSA, awaiting selection by the Control Clerks;
- to store keyed Batches awaiting verification by other teams; and
- to store verified Batches that are awaiting transport back to the CSA.

Between the two phases of initial entry and verification, the Batches were not to be physically returned to the CSA. However, as the Storage Clerk was registering Batch assignment, the data could be entered into the Tracking System if desired.

Batch processing indicator and assignment of batches

To facilitate handling of the Batches through the various stages, it was decided that a mark be made on the Batch box to indicate it had completed a specific stage.

For the first week of operation, the Keying Teams concentrated on keying only. The verification operations were not to begin until the two shifts had built up a backlog of at least 10 Batches.

Initially, each Control Clerk would select 5 Batches from the LSA, in sequence, and will assign one Batch to each member of the two keying teams under the Clerk's supervision. When assigning a Batch to a Keyer, the Control Clerk registered the transfer on a general check-out log sheet as well as the individual

Keyer's log sheet. Batches were listed sequentially on the Forms to facilitate location of a Batch if ever required.

At the end of the each shift, the Control Clerks returned all completed (i.e., verified or not destined for verification) Batches to the CSA. The Control Clerk also reported the status of work completed to the Shift Coordinator.

Verification

Upon Batch assignment to the Keyer, the Supervisor created the file for the Batch, using the naming conventions explained in previous section. The Supervisor also entered the geographic identification codes for the Batch in advance (i.e., State/Region, District, Township, Ward/ Village Tract, Urban/Rural and Ward segment and Village code). After that the Keyer would then assume keying responsibilities.

A keying instruction guide was given to each Keyer during training. In it, the method for processing was clearly explained.

The Verification process started when a suitable number of Batches had been keyed (approximately after the first week of operation). Three fourth of the keying member were to continue to work on keying and one fourth of the keying member were to begin working on 100% verification.

When a Verifier completed verification of a Batch, the Verifier returned the Batch to the Control Clerk. The Control Clerk then performed the tasks outlined.

As the keying operation progressed, the Shift Coordinators monitored the progress of keying relative to verification. If the backlog of Batches awaiting verification started to decrease, then the Verification Team was switched back to keying, until there was a sufficient number of Batches awaiting verification to occupy an entire Keying Team.

Using the log file statistics, the Supervisor reviewed individual Keyer's statistics to determine when their work would switch to a sample basis. It was generally adopted that a Keyer completed at least two weeks of data processing task with sequential batches below the error rate before allowing their work to be reviewed on a sample basis.

Determining an error rate was difficult, as it depended greatly on the legibility of enumerator and coder responses, the accuracy of the Coder's work (i.e., not assigning an invalid code to a question), and the correctness of the CSPro 4.0 dictionary definitions that have been assigned to each item (i.e., the valid range for each variable).

If the error rate of a verified batch fell below the acceptable level (2%), then the work of that Keyer was to return to 100% verification until four sequential batches had been entered with an acceptable error rate. If the error rate was especially high or consistently above the desired error rate, the Supervisor was to determine the source of the keying error.

If the higher error rate was attributable to poor handwriting, making reading difficult for the Keyer(s), then the higher error rate needed to be accepted for the Batch in question. Further, if the poor penmanship was concentrated primarily with the coders' entries, then this had be brought to the attention of the Coding Supervisor for correction.

On the other hand if the higher keying rate was due to Keyer inattention or continued difficulty with their assignment, retraining was necessary.

For all of the S/Rs 100% verification was done to ensure high quality data.

A reasonable error rate had to be determined. It was recognized that the rate will most likely change, being slightly higher at the beginning of the operation, but lower after the operation has been underway a month or so and the staff has learned their tasks reasonably well.

A good starting number was the lowest error rate encountered during the training operation (2%); hopefully it was found that some Keyers had error rates of only 1-2 percent. However, at no time the error rate was not to exceed five percent; a good keying operation should have a 2-2½ percent overall correction rate. If a file's error rate does exceeded five percent, the file was discarded and rekeyed.

The error rate was determined as follows. Suppose Person 1 keyed an entire Batch's data. Person 2 verified it. If Person 2 corrected 3% of Person 1's work, then Person 1 was said to have a 3% error rate.

Annex 4. Consumption aggregates and poverty lines

This Annex is divided into four sections. **Section A** explains the methodology used for the estimation of each component of the consumption aggregate. **Section B** presents how the consumption aggregate was adjusted to take into account household composition and household size. **Section C** presents how the consumption aggregate was adjusted for differences in prices across regions. **Section D** presents how the poverty lines were estimated.

Section A. Construction of the consumption aggregate

The consumption expenditures included in the estimation of the consumption aggregate are:

1. Food consumption expenditures;
2. Non-food consumption expenditures, excluding rent expenditures;
3. Rent expenditures.

After estimating health expenditures and durable goods user rates, it was decided not to include these two items in the estimation of the consumption aggregate. This is discussed below in more details.

Consumption expenditures were first calculated for each round separately and then merged for final poverty analysis.

Food consumption expenditures

Food consumption data was collected using Module 5 of the household questionnaire. More specifically from:

Section 5.1:
Food consumption expenditures in the last 7 days for food items purchased on a regular basis:

- Pulses, beans, nuts and seeds;
- Meat, dairy products, eggs;
- Fish and other seafood;
- Roots and tubers;
- Vegetables;
- Fruits;
- Spices and condiments;
- Other food products.

Section 5.2:
Other food consumption expenditures in last 7 days for other food items purchased on a regular basis:

- Alcoholic beverages;
- Food and beverages taken outside home.

Section 5.3:
Food consumption expenditures in the last 30 days for food items purchased on a less regular basis:

- Rice and cereals;
- Oil and fats;
- Milk products;
- Other food items (tea, coffee, sugar, etc.).

For sections **5.1** and **5.3**, the following information was collected:

- The quantity and the value of each food item purchased in cash;
- The quantity of each food item obtained in kind through barter or received as gifts, loans, wage or payment; and
- The quantity of each food item consumed from home production.

For section **5.2**, the following information was collected:

- The quantity and the value of each food item purchased in cash;
- The quantity of each food item obtained in kind through barter or received as gifts, loans, wage or payment.

The following steps were involved in the calculation of food consumption expenditures:

a) For food consumption in kind (gifts-barter-loan, home consumption), the quantities of each item acquired were valued using implicit prices derived from:
   - Purchase value of the item divided by the quantity purchased by household j for this item if the household purchased this item in cash;
   - The median price for this item in the same township area (rural/urban) if this item was not purchased in cash by the household, but has been purchased by at least five households in township area. If less than five households purchased the item in cash in the township area, median price at district area level was used. If there were not enough cases at district level, median price at S/R area level was used and so on.

b) Calculating total food consumption expenditures per year:
   - Calculating total food quantity of each item acquired by each household and in kilogram: In this stage, the local measurement units used in the questionnaire were converted into international unit, kilograms[17].
   - Total quantities of each food item were calculated by summing the quantity of each food item purchased in cash, the quantity acquired through barter, gifts and loans, and the quantity consumed from home production.
   - Converting total quantity of each item acquired by each household on a yearly basis. This was done by multiplying quantity of each item acquired by 52 in the case of items in Sections 5.1 and 5.2 and by 12 in the case of items in Section 5.3.
   - Multiplying total quantity of each item acquired per year by its implicit price to get the total value of each item acquired by each household.
   - Calculating total food consumption expenditures by summing up the yearly value of all food items acquired by the household.

Non-food consumption expenditures

Non-food consumption expenditures data was collected using Module 5 of the household questionnaire. More specifically from:

Section **5.4**: Non-food consumption expenditures in the last 30 days:

- Energy for household use;
- Water;
- Personal apparel;
- Medicines/drugs (including traditional medicine);
- Local transport (daily travel);
- Other non-food items (telephone services, cigarettes, entertainment, etc.).

[17] The detailed conversion table is presented in Appendix 5 of the Technical Report Appendices.

Section **5.5**: Non-food consumption expenditures in the last 6 months:

- Clothing and other apparel;
- Home equipment;
- House rent and repair;
- Health (including traditional medicine);
- Education;
- Travel/trips (overnight travel);
- Other (household worker services, etc.).

For sections **5.4** and **5.5**, the following information was collected:

- The value of each non-food item purchased in cash;
- The value of each non-food item obtained in kind through barter or received as gifts, loans, wage or payment.

The following steps were involved in the calculation of non-food consumption expenditures:

- Selecting non-food items to be included in the calculation of non-food consumption expenditures. Since rental value was estimated separately, it was decided to drop expenditures on house rent and repair from the calculation of non-food consumption expenditures. Estimation of rental value will be discussed below. Medicines/drugs and other health expenditures were also not included in the calculation of non-food consumption expenditures and will be discussed below. Finally, gold and jewelry were taken out of non-food consumption expenditures since they are mostly savings, not expenditures.
- Calculating total value of each non-food item acquired by adding the value of each non-food item purchased in cash and the value of each item acquired through barter or received as gift, loan, wage or payment.
- Converting total value of each item acquired by each household on a yearly basis. This was done by multiplying the value of each item acquired by 12 in the case of items in Sections 5.4 and by 2 in the case of items in Section 5.5.
- Calculating total non-food consumption expenditures by summing up the yearly value of all food items acquired by the household.

Rental value

The housing expenditures to be considered in total household consumption expenditures are the yearly user costs, best approximated by rental value, which is measured in the following way:

Calculating actual rent: The actual monthly rental value could be obtained directly from the housing module (Module 2) of the questionnaire if the household actually paid a rent for the dwelling.

Estimating monthly rental value: If the household owned the dwelling or did not own but was not paying rent for the dwelling, the households were asked to estimate the monthly rental value of their dwelling. This estimate could be obtained directly from the questionnaire.

Regression estimate of rental value: If the household could not estimate the rental value of the dwelling, regression estimates were derived using housing characteristics, S/R and area (urban/rural) as independent variables[18], and actual rent or estimated rental value as dependent variable from round 1 of

[18] Independent variables were: area, building material for outer wall, building material for floor, building material for roof, access to safe drinking water, access to sanitation facility, access to garbage disposal service, access to electricity.

the survey[19]: Rental value was estimated using multiple regression analysis. The following steps were involved:

First, multiple linear regressions were run for each S/R using the backward method in order to select significant independent variables to be used for estimation. The model summaries generated in SPSS, together with the degree of significance of coefficients of independent variables were checked to select final independent variables for each S/R to be included in the regression.
For each S/R, selected independent variables were used to estimate the coefficients of each independent variable using the enter method. The regression model for each S/R was used to estimate the rental value for each household.

The yearly rental value was estimated by multiplying rental value by 12.

Durable goods user cost

Even though user cost was calculated, it was finally decided not to include it in the non-food consumption expenditures after noticing that an important number of items had a negative depreciation rate, resulting in negative user costs. This is due in part to current import restrictions which result in increasing prices of durable goods in time[20].

Health expenditures

Although data on health expenditures was collected in the non-food consumption sections of Module 5, it was decided not to include health expenditures in the consumption aggregate. Health expenditures are most often a reaction to a shock and do not usually improve household welfare. In fact, many households will have to go into debt to pay for health expenditures[21]. The elasticity of health expenditures being quite low (0.993), it was decided not to include health expenditures in the consumption aggregate[22].

Total non-food consumption expenditures

Total non-food consumption expenditures were calculated by adding non-food consumption expenditures and rent expenditures.

Section B. Adjusting for household composition and household size

In order to be able to compare consumption expenditures across households, it is important to correct for household composition and household size (economies of scale). Correction for household composition takes into account that usually children will consume less than adults in a household.

[19] Rental value was estimated using round 1 data since data on dwelling characteristics was only collected in the first round.

[20] This can be observed in the value of used cars which can have higher or equal values than new cars.

[21] This is shown by the high proportion of households that borrowed money for health reasons. Health was the reason for borrowing for 8.5% of loans in the first round and 11% of loans in the second round (see Vulnerability Profile).

[22] Deaton, A. and S. Zaidi (2002) *Guidelines for Constructing Consumption Aggregates for Welfare Analysis*, LSMS Working Paper 135, World Bank, Washington, D.C

Children have lower caloric needs, their clothes are usually cheaper and they have more restricted list of items which they consume[23]. This adjustment is done by using adult equivalent scales[24].

Economies of scale come from the fact that some goods and services consumed by the household have a "public goods" aspect to them, whereby consumption by any one member of the household does not necessarily reduce the amount available for consumption by another person within the same household. Housing is an important household public goods, as well as durable items like televisions, or even bicycles or cars, which can be shared by several household members at different times[25].

The household adult equivalent scales were calculated for each round separately. Two scales were calculated: one for food consumption expenditures (AEF) and another one for non-food consumption expenditures (AENF).

For food consumption expenditures by adult equivalent, the formula is:

$$(1) \qquad AEF_j = \left(MA_j + \alpha_1 FAj + \alpha_2 Cj\right)^{\theta}$$

where:

AEF_j : Number of adult equivalents for food consumption expenditures in household j;
MA_j : Number of male adults (15+ years) in household j;
FA_j : Number of female adults (15+ years) in household j;
C_j : Number of children (0-14 years) in household j;
α_1 : Food cost of a female adult relative to that of a male adult;
α_2 : Food cost of a child relative to that of a male adult;
θ : Elasticity of adult equivalents with respect to effective size (between 0 and 1). $(1 - \theta)$ measures the extent of economies of scale.

Based on nutritional norms and on Deaton and Zaidi's (2002)[26], α_1, α_2 and θ were set to 0.9, 0.7 and 0.9 respectively.

For non-food consumption expenditures by adult equivalent, the formula is:

$$(2) \qquad AENF_j = \left(A_j + \alpha Cj\right)^{\theta}$$

with:

$AENF_j$ number of adult equivalents for non-food expenditures in household j;
A_j number of adults (15+ years) in household j;
C_j number of children (0-14 years) in household j;
α non-food cost of a child relative to that of an adult;
θ elasticity of adult equivalents with respect to effective size (between 0 and 1).
$(1 - \theta)$ measures the extent of economies of scale.

[23] BHAS (2002), Welfare in Bosnia and Herzegovina, 2001 : Measurement and Findings, State Agency Statistics (BHAS), Republika Srpska Institute of Statistics (RSIS), Federation of BiH Institute of Statistics (FIS), World Bank.

[24] A more simplistic approach is to use per capita consumption expenditures where consumption expenditures are simply divided by total household size without regard to household composition.

[25] Deaton, A. and S. Zaidi (2002) *Guidelines for Constructing Consumption Aggregates for Welfare Analysis*, LSMS Working Paper 135, World Bank, Washington, D.C.

[26] Deaton, A. and S. Zaidi (2002) *Guidelines for Constructing Consumption Aggregates for Welfare Analysis*, LSMS Working Paper 135, World Bank, Washington, D.C.

Following Deaton and Zaidi's (2002)[2] recommendation, α: and θ are set to 0.3 and 0.9 respectively.

Calculating nominal food consumption expenditures in adult equivalent per year
Total yearly food consumption expenditures were adjusted by dividing total food consumption expenditures per year by AEF for each household to get aggregated nominal food consumption expenditures in adult equivalent per year.

Calculating nominal non-food consumption expenditures in adult equivalent per year
Total non-food consumption expenditures per year were adjusted by dividing total non-food consumption expenditures per year by AENF for each household to get aggregated nominal non-food consumption expenditures in adult equivalent per year.

Calculating total nominal consumption expenditures in adult equivalent per year
Total nominal consumption expenditures in adult equivalent per year for each household were calculated by adding total nominal food consumption expenditures in adult equivalent per year and total nominal non-food consumption expenditures in adult equivalent per year to get the consumption aggregate or total nominal consumption expenditures in adult equivalent per year.

Section C. Adjusting for differences in prices across regions

To be able to compare household consumption expenditures across regions, it is necessary to take into account differences in prices across regions. To convert nominal consumption expenditures per year per adult equivalent into normalized consumption expenditures per year per adult equivalent for each household, it is necessary to deflate nominal household expenditures per year per adult equivalent by a price index called the Paasche price index (PPI). The PPI reflects both variations in prices and quantities consumed across space and time. A PPI was calculated for each household for both rounds separately.

The PPI is calculated using the following formula:

$$(3) \qquad PPI_j = \frac{p^j * q^j}{p^o * q^j} = \left(\sum_i w_{ij} * \left(P_i^0 / P_i^j \right) \right)^{-1}$$

with:

PPI_j Paasche's price index for household j;
p^j vector of prices paid by household j;
p^o vector of prices paid by the reference household (median prices at Union level);
q^j vector of quantities consumed by household j.
w_{ij} budget share of food item i in total food expenditures per adult equivalent per year for household j
P_i^0 implicit reference price of item i
P_i^j implicit price of item i paid by household j
i food item number

The following steps involved in the calculation of PPI:

Calculating the budget share of each food item for each household:
The budget share of each food item for household j, (wij) was calculated by dividing the consumption expenditure on food item acquired by the household per year per adult equivalent by total nominal food consumption expenditures of the household per year per adult equivalent.

Calculating the reference price of each food item at Union level:
The reference price for food item i is the median price at Union level in the first round[27].

Calculating the PPI for each household j:
According to the formula, first the weighted price of each food item for household j was calculated by multiplying its budget share by the reference price and dividing by the implicit price. Then, the weighted price of each food item for household j was summed up at the household level to get the inverse of the PPI_j. Finally, the PPI for each household j was obtained by reversing the inverse of PPI.

Nominal consumption expenditures per year per adult equivalent were normalized by multiplying total nominal consumption expenditures per year per adult equivalent for each household by its PPI to get total normalized consumption expenditures per year per adult equivalent.

Section D. Determination of poverty lines

The general approach followed in this survey is the 'cost of basic needs' method[28]. To provide a more comprehensive perspective on poverty, two poverty lines were calculated:

Food Poverty Line (FPL), based on minimum food expenditure. Minimum food expenditure is the amount of Kyats necessary to pay for a consumption basket that will satisfy caloric requirements of household members;

Poverty line (PL), based on (i) minimum food expenditures to satisfy caloric requirements (ii) plus reasonable non-food expenditure to meet basic needs. The food expenditure component of the PL is the FPL. The non-food expenditure component of the PL is calculated as a proportion of the FPL based on the share of non-food expenditures over food expenditures for those households whose total expenditures are around the poverty line.

Determination of the Food Poverty Line
The Food Poverty Line (FPL) was derived in four (4) steps:

Step 1: Selecting the reference household for each survey round;

Step 2: Calculating the caloric requirements of the representative household (calories per adult equivalent per year) for each survey round;

Step 3: Establishing a food consumption basket that reflects annual caloric requirements and food consumption patterns for the representative household (kilos per adult equivalent per year) for each survey round;

Step 4: Valuating the normative food consumption basket chosen for each survey round (Kyats per adult equivalent per year).

Step 1: Selecting a reference household for each survey round
The reference household was the average of consumption expenditures of households in the second quartile of normalized total consumption expenditures per adult equivalent. The number of male adults, female adults, and children, and total (household size) in the reference household was then calculated.

[27] First round median price at Union level were used for the calculation of PPIs in both rounds so that both rounds would be comparable.

[28] Ravallion, M. (1998) *Poverty Lines in Theory and Practice*, LSMS Working Paper 133, World Bank, Washington, D.C.

Step 2: Calculating caloric requirements of the reference household for each survey round
Nutritional caloric norms vary depending on age, gender, and type of activity (the latter being related to location: rural or urban areas).

Nutritional caloric norms[29]

Calories per day	Rural	Urban
Male adult	2800	2200
Female adult	2450	2050
Child (<15)	1800	1800

Based on the composition by age, gender and location of the reference household, the total caloric needs were then calculated for this reference household by:

- Multiplying the size of each population category (male adults, female adults, and children) by the weighted caloric requirement per day in the table above.
- Summing over all population categories to get household weighted caloric requirements per day.
- Dividing by the reference household size (in adult equivalent) to get the minimum caloric requirement per day, which is estimated at 2304 calories per adult equivalent per day for first round and at 2295 calories for second round.

Step 3: Establishing a reference food consumption basket that reflects annual caloric requirements per adult equivalent and food consumption patterns for the reference household for each survey round
The average quantity of each food item consumed by the reference household (households in the second quartile) in kg per adult equivalent per year was calculated, and then average quantities were multiplied by the caloric content of each food item per kg to get total caloric intake for the reference household by adult equivalent per year[30].

An adjustment factor was calculated by dividing the caloric norm for the reference household by adult equivalent per day divided by the total caloric intake for the reference household.

Quantities of each food item in kg per adult equivalent per year were then multiplied by the adjustment factor to get required quantities of each food item in the reference food basket.

Step 4: Valuation of the reference food consumption basket for each survey round
Each food item in the reference food consumption basket was valued by multiplying the adjusted quantity by the median implicit price at Union level (from round 1).

Values over all food items in the reference food consumption basket were then summed to get the Food Poverty Line (FPL) in Kyats per adult equivalent per year for each round separately[31].

The average FPL of both rounds was then calculated to get the merged FPL.

Food poverty lines (Kyats per adult equivalent per year as of December 2010and May 2011)

Round	FPL
Round 1	273,747
Round 2	276,233
Both rounds merged	274,990

[29] National Nutritional Center, Department of Health, Ministry of Health, The Republic of the Union of Myanmar
[30] See Appendix 6 of the Technical Report Appendices.
[31] For the reference food baskets refer to Appendix 7 of the Technical Report Appendices.

Determination of the Poverty Line

The Poverty Line (PL) or General Poverty Line was derived in three (3) steps:

Calculating total normalized food and non-food consumption expenditures per year per adult equivalent for both rounds merged, as well as total normalized consumption expenditures per year per adult equivalent. This is done by adding yearly expenditures from round 1 and yearly expenditures from round 2 and by dividing by 2.

Step 1: Estimating the budget shares for food and non food consumption expenditures for the reference household (for both rounds merged);

Step 2: Estimating normative minimum non-food expenditures for the PL (for both rounds merged);

Step 3: Calculating the Poverty line (both rounds merged).

*Step 1: Estimating the budget shares for food and non food consumption expenditures for the reference household (both rounds merged)*Food consumption expenditures for the households were computed on a yearly basis and normalized (divided by household adult equivalent). These normalized expenditures were then compared to the food poverty line. If the expenditure was within ± 10% of the poverty line, the average food and non food shares of those households were then calculated.

Step 2: Estimating normative minimum non-food expenditures for the PL (both rounds merged)
The normative minimum non food consumption expenditures per adult equivalent per year were calculated as: Non food expenditures (both rounds merged) = FPL * average non food share (both rounds merged)/average food share (both rounds merged).

Step 3: Calculating the Poverty line (both rounds merged)
The PL per adult equivalent per year is equal to the sum of the Food Poverty Line (FPL) (both rounds merged) and of normative minimum non food consumption expenditures per adult equivalent per year (both rounds merged).

Poverty lines (both rounds merged)

1) A Food Poverty Line was calculated as the average of the first round FPL and the second round FPL. The FPL is normalized, i.e., presented in Kyats per adult equivalent per year as of November 2004.

2) The PL was then calculated by adding the normative minimum non food consumption expenditures per adult equivalent per year.

Food, non food and poverty lines (both rounds merged) (Kyats)

	Poverty lines (Kyats)
Food Poverty Line	274,990
Non Food Poverty Line	101,161
Poverty Line	376,151

Section E. Monetary poverty measurement

Three monetary poverty indicators were calculated:
1. P_0, or Poverty Incidence;
2. P_1; or Poverty Intensity; and
3. P_2; or Poverty Severity;

P_0, Poverty Incidence

Food poverty: P_0 is the proportion of individuals whose normalized consumption expenditures per adult equivalent are lower than the Food Poverty Line.

Poverty: P_0 is the proportion of individuals whose normalized consumption expenditures per adult equivalent are lower than the Poverty Line.

The calculation method of P_0 is the same for food poor households and poor households. The formula refers to food poor:
If household j total consumption expenditure per adult equivalent per year is lower than the FPL, then household j is classified as food poor, otherwise non-food poor.

$$P_0 = \frac{\sum_{j=1}^{f} w_j * M_j}{\sum_{j=1}^{k} w_j * M_j}$$

where

P_0 Food Poverty Headcount in the analysis area;

f number of food poor individuals (individuals that belong to food poor households) in the analysis area;

k number of individuals (individuals that belong to all households) in the analysis area;

w_j sampling weight of household j in the analysis area;

M_j size of household j (number of individuals, not adult equivalents) in the analysis area;

P_1, Poverty Intensity

P_1 indicates the depth of poverty. It multiplies P_0 by the poverty gap, i.e. the average shortfall from the poverty line. As such, it is a combined measure of the extent and the depth of poverty. The calculations are the same for food poor and poor. The formula refers to food poor.

$$P_1 = P_0 \frac{1}{\sum_{j=1}^{f} w_j * M_j} \sum_{j=1}^{o} w_j * M_j * \left(\frac{z_o - y_j}{z_o} \right)$$

where

P_1 Poverty Intensity in the analysis area;

P_0 Poverty Gap in the analysis area;

k number of individuals (individuals that belong to all households) in the analysis area;

w_j sampling weight of household j in the analysis area;
M_j size of household j (number of individuals, not adult equivalents) in the analysis area.
o number of poor individuals (individuals that belong to poor households) in the analysis area;
z_o OPL per adult equivalent in the analysis area;
y_j normalized consumption expenditures per adult equivalent of household j in the analysis area;

P_2, Poverty Severity

P_2 is poverty incidence multiplied by the squared poverty gap. The effect is to give proportionally more weight to households which are further away from the poverty line. Accordingly, P_2 may be interpreted as a combined indicator of the extent of poverty and inequality among the poor. The formula applies to food poor but is the same for poor.

$$P_2 = \frac{1}{\sum_{j=1}^{k} w_j * M_j} \sum_{j=1}^{o} w_j * M_j * \left(\frac{z_o - y_j}{z_o} \right)^2$$

where
P_2 Poverty Severity in the analysis area;
k number of individuals (individuals that belong to all households) in the analysis area;
w_j sampling weight of household j in the analysis area;
M_j size of household j (number of individuals, not adult equivalents) in the analysis area.
o number of poor individuals (individuals that belong to poor households) in the analysis area;
z_o OPL per adult equivalent in the analysis area;
y_j normalized consumption expenditures per adult equivalent of household j in the analysis area.

Share of poorest quintile in consumption

The Share of poorest quintile in consumption indicates the proportion of national consumption expenditures going to the 20% poorest households (the ones that are farthest from the poverty line).

$$S_{20} = \frac{\sum_{j=1}^{q} w_j * TOTEXPN_j}{\sum_{j=1}^{k} w_j * TOTEXPN_j}$$

With:
S_{20} share of poorest quintile in consumption in the analysis area;
q number of households in the first quintile of normalized consumption expenditures per adult equivalent per year in the analysis area;

k number of households in the analysis area;
w_j sampling weight of household j in the analysis area;
$TOTEXPN_j$ total normalized consumption expenditures of household j per adult equivalent per year in the analysis area.

Contribution of each S/R to Union level poverty

The Contribution of each S/R to Union level poverty is calculated as:

$$C_{SR} = \frac{\sum_{j=1}^{n_{SR}} w_j * M_j}{\sum_{j=1}^{U} w_j * M_j} * \frac{P_{0SR}}{P_{0U}}$$

where:
C_{SR} contribution of each S/R to Union poverty;
n_{SR} number of sampled households in S/R;
U number of sampled households in Union;
w_j sampling weight of household j in the analysis area;
M_j size of household j (number of individuals, not adult equivalents) in the analysis area.
P_{0SR} Poverty Headcount Index in each S/R;
P_{0U} Poverty Headcount Index in Union

The indicators presented above enable us to measure monetary poverty based on household expenditures. But poverty is much more than just monetary poverty. It also includes many other aspects such as access to social services like education and health, employment and business opportunities, access to means of production like agricultural equipments, etc. In order to cover all aspects of poverty, a number of key results indicators (KRIs) were also calculated using IHLCA survey data. These KRIs were also used to characterize the poor in Myanmar

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