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Capacity Need Assessment Report

NiPN
National Information Platforms for Nutrition

Contents

Abbreviations

ArcGIS	Geographic information system for maps and geographic information
CDR	Centre for Development Policy Research.
DA	Data Analysis Unit
GIS	Geographical Information Systems
GSF	Global Support Facility
KOICA	Korea International Cooperation Agency
LESMIS	Lao Education and Sports Management Information System
LSB	Lao Statistics Bureau
MOES	Ministry of Education and Sports
MAF	Ministry of Agriculture and Forestry
MOH	Ministry of Health
NAIS	National Agri-Food Statistics System
NIER	National Institute for Economic Research
NIPN	National Information Platform for Nutrition
NC	Nutrition Centre
QGIS	A free and open-source cross-platform desktop geographic information system
R	A free software environment for statistical computing and graphics.
SPSS	Statistical Package for Social Sciences
STATA	A general-purpose statistical software package
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund

List of tables and graphs

Tables

Graphs

1. Introduction

1.1 Nutrition is the main development challenge in Lao PDR

The high prevalence of under-nutrition remains a major challenge in Lao PDR. Despite impressive gains in economic growth over the past decade, the Lao PDR has one of the highest rates of chronic malnutrition in Southeast Asia[1]. This under-nutrition threatens lives and national socio-economic development and is associated with reduced school enrolment, poses a challenge to the attainment of education targets, and has an impact on development [2]

Malnutrition leads to enormous economic and human costs in Lao PDR. Data from the Lao Social Indicator Survey (LSIS) 2011 suggests that nearly 2 million Lao citizens, mainly women and children, suffer some form of malnutrition – and, therefore, cannot achieve their full development potential, which has negative effects on overall human capital of the country. Every year, approximately US$197 million or 2.4% of GDP is lost due to under-nutrition.

The Lao PDR has over the years prioritized nutrition as a development issue and has been active at the global stage through the Scaling Up Nutrition Movement since 2011. The 2010-2015 National Nutrition Strategy and Plan of Action was the first multi-sectorial framework providing the direction for all those who should be critically involved in addressing under-nutrition. The updated National Nutrition Strategy to 2025 and Plan of Action to 2020 aim to strengthen multi-sectorial approach to nutrition and more explicitly, defines the interventions, approaches and institutional arrangements for achieving a more comprehensive action using a multi-sectorial convergent approach.

Through the concerted efforts of multiple stakeholders, stunting which is the result of chronic under-nutrition reduced from 44 percent in 2011 to 33 percent in 2017 (LSIS). In spite of this significant progress, there exists wide disparity of levels of stunting and intensity of child deprivations across the country, with poor and rural areas most affected. Stunting affects the linear growth and cognitive development of children. This impacts on learning outcomes and future earnings in adult life. Stunting reduction is a development priority for unleashing the unlimited potential of the next generation in Lao PDR. Similarly, Wasting and Overweight are also effect the potential grow of the children according to LSIS II the percentage of wasting and overweight were 9 percent and 3.5 percent respectively.

Nutrition remains one of the highest priorities of the Government of Lao PDR especially in view of the Least Development Country (LDC) graduation ambition and realization of SDG 2. The government of Lao PDR includes health and nutrition as one of its priority strategy in the National Socio economic development plan as well as establishing National Committee for Nutrition and together with the strong support from domestic and international development partners, the government was able to develop national nutrition strategy to 2025and plan of action 2016 - 2020 to promote nutrition with the focus on reducing under nutrition in Lao PDR (1)

[1] National Nutrition Strategy to 2025 and Plan of Action 2016-2020
[2] National Nutrition Plan of Action (2016-2020)

1.2 About NIPN in Lao PDR

National nutrition information systems are essential for assessing the current status and measuring changes in nutritional status of populations, tracking the progress of actions and prioritising efforts toward improving nutrition. An accurate assessment of the nutrition situation allows governments and their development partners to make evidence-based decisions with regards to nutrition policy and program development. Nutrition information is useful for advocacy, planning, budgeting, program design, and monitoring and evaluation.

The National Information Platforms for Nutrition (NIPN) is an international initiative of the European Commission with support from the United Kingdom Department for International Development and the Bill and Melinda Gates Foundation. This initiative is an integral part of the Government's nutrition programme, which is implemented jointly by EU Delegation and UNICEF in the context of their Partnership for Improved Nutrition in the Lao PDR in support of the National Nutrition Strategy (2015-2025) and Plan of Action (2016-2020).

The specific objective of the NIPN is to build the national capacity both at national and sub-national levels to manage, analyse information and data from all sectors at national and sub-national levels which have an influence on nutrition, to track progress, disseminate and use information to better inform the policies and strategic decisions.

Comprehensive data generated from the NIPN is expected to be the basis for the National Nutrition Committee's Annual Progress Report on the implementation of the National Nutrition Strategy and Plan of Action (NPAN)and monitoring and reporting of the 8th National Socio-economic Development Plan, Sustainable Development Goals and Scaling Up Nutrition movement. Knowledge products will feed into nutrition-related policy dialogue and progress monitoring in conjunction with the annual National Nutrition Forums, Round Table Meetings and review meetings.

1.3 Capacity need assessment in NIPN

NIPN aims to build long term capacities of key stakeholders involved in the national nutrition monitoring, evaluation and policy agenda. The first step in this process is to identify the current capacities of the national multi-sectoral stakeholders under the NIPN Data Analysis Unit: Ministry of Planning and Investment, Lao Statistic Bureau, Nutrition Centre, Ministry of Health, Ministry of Agriculture and Forestry and Ministry of Education and Sports.

Capacity need assessment process is the structured and participatory approach which involves three steps; identification of existing capacity, desired capacity and the gap between both of them.

The Capacity need assessment shall feed the development of Capacity Development Plan system strengthening to improve national nutrition monitoring, evaluation, research and policy decision making process.

Different types of capacity frameworks are used for capacity need assessment. The NIPN Capacity Framework helps to understand the breadth of capacities required for the optimal

implementation of a NIPN. The NIPN Capacity Framework consists of three levels: an individual, organizational and systematic.

The capacity building of government staff to analyse data, interpret analysis and report findings is key component of the NIPN initiative.

This Capacity Need Assessment focuses on identifying the training needs of the partners in the area of statistical data analysis, data visualization and Geographical Information Systems.

Generally, the Capacity Need Assessment in NIPN is considered broadly. It includes the capacity need assessment in policy analysis, communication and others at different levels in the hierarchy of capacity needs. In the NIPN Capacity Framework, the assessment of training needs mainly focused on individual level.

2. Objectives

The objective of Capacity Needs Assessment contributes to the NIPN project result area: "*Strengthened capacity to track progress in meeting national objectives to prevent under-nutrition and monitor nutrition investments"*.

Overall objective of Capacity Needs Assessment is to identify the training needs of the pratners in the area of statistical for data analysis, data visualization and GIS.

Specifically, the Capacity Need Assessment seeks to

- Identify the capacity of the staff of all selected agencies in the use of data analysis and visualisation software
- Identify the methods of data analysis used by agencies
- Identify the training needs requested by agencies in the area of data analysis and visualisation

3. Methodology and approach

3.1 Criteria for Capacity Need Assessment

The primary focus of this assessment is to determine the needs in capabilities of staff of the agencies to analyze and visualize the data on indicators and data obtained from the surveys. The target audiences of expected trainings on data analysis and visualization are the staff working mainly in planning and statistical departments of agencies and ministries of the NIPN Data Analysis Unit.

A training need exists when there is a gap between what is required for a person to perform competently and what he actual knows. A training needs assessment determines this gap and identifies what training is required to fill the gap.

One of the most important aspects of training is to know the skills and levels of knowledge of participants. The levels of the knowledge of participants in the area of data analysis and visualization will help to select the proper design of training course.

Specialists involved in data analysis and visualizations mainly face and deal with the development issues and problems that require certain skills. The knowledge of data analysis software tools and the knowledge of statistical methods of analysis are core skills to solve and answer the problems related to socio-economic development, particularly to nutrition issues.

The knowledge of statistical software tools consists of skills in the use of widely known statistical software such as STATA, SPSS and R soft. The skills in the producing maps are important for visualizing the results of analysis in the sub-regions. Widely known Geographical Information System Software are QGIS and ArcGIS.

The knowledge the methods of analysis of data are important in solving problems related socio-economic development. The main skills in data analysis that are widely known, and poplar are the knowledge of basic statistics, advanced statistics and methods used in “data science”. Data science includes the application of advanced models such as artificial intelligence, machine learning and data mining to analysis of socio-economic problems.

Taking into account that the main target group of the staff to be trained in data analysis and visualization are the personal of agencies working in planning and statistical units, and the target group mainly deals with the administrative data and row data obtained from surveys, the following approach and criteria were used for Capacity Need Assessment:

A. **Identify what skill the agency has.** The team explored the level of knowledge and skills of the staff of agencies in the use of data analysis and visualization software, and in the use of data analysis methods:

- The level of software usage for data analysis and visualization. In this criteria we focused in common software in field such as STATA, SPSS, R programming, ArcGIS, QGIS and other.
- The level of methodology implemented in data analysis task. Which separated into 3 level: basic statistic, advanced statistic and data science.

B. **Identify what training the agency needs.** We will identify the training needs of agency. The criteria in training needs of agencies will be focused in the training needs of agencies in the areas of Basic Statistics, Advanced Statistics, Data Visualization, GIS, The use of statistical soft R and other.

3.2 Main Steps of the Capacity Need Assessment

Main steps for implementing Capacity Need Assessment were discussed and agreed during technical meeting with participation of agencies included to the Steering Committee of NIPN initiative in Lao PDR.

Main steps of Capacity Need Assessment are as follows:

i. Identify and agree objectives of Capacity Need Assessment

The objectives of capacity need assessment and capacity development plan were developed by Data analysis unit to identify key objectives of this activity. Then the objective was reviewed by NIPN management team and discuss with different partners during monthly technical meeting to ensure the objectives were aligned with NIPN yearly capacity building plan as indicated in project proposal.

ii. Develop and agree methodology and criteria for Capacity Need Assessment

The methodology also developed by the data analysis unit, the methodology and criteria were also reviewed by NIPN management team and agree on the methodology about how the assessment will be conducted and what is the main criteria that need to follow.

iii. Identify and agree agencies to be visited for Capacity Need Assessment

The name of agencies that will be included in the capacity assessment and capacity development plan were identified based on the factors that, that agency is implementing nutrition specific and sensitive interventions as specified in the Nutrition strategy and plan of action document as well as the multi-sectoral approach by NIPN

iv. Prepare questionnaire for collection of information from agencies based on developed methodology.

After that, the questionnaire was prepared by the data analysis unit, for collect data from agencies. The questionnaire was developed based on the methodology and criteria and agreed by the NIPN management team.

v. Collect information from agencies.

To collect information from agencies, the data analysis unit arranged the visit to the office of agencies; most of the visit was targeting to the main department of those agencies that dealing with data, information system and statistics. During the discussion many questions were asked mainly based on the prepared questionnaire and some other questions related to data analysis unit interest and agency interest.

vi. Compile and analyze the information received from agencies

The questionnaires were filled by DA Unit during the interviews in agencies. Additionally, LSB filled the questionnaire and sent to DA unit. After received information from agencies was compiled and analyzed by DA unit.

vii. Prepare Report

The final step of conducting capacity need assessment and capacity development plan is writing the report. As mentioned above, the report consist of two main parts, the "capacity need assessment and capacity development plan" the report layout all findings of this activity in details.

3.3 Structure of Questionnaire

To collect information from agencies on data mapping and capacity need assessment, interview questionnaire to capture all requested information was prepared. Prepared questionnaire was discussed agreed during technical meeting with participation of agencies included to the Steering Committee of NIPN initiative in Lao PDR.

Questionnaire consists of 3 sections: General Information, Questions related to data mapping, Questions related to capacity needs assessment.

3.4 Identifying the government agencies for capacity need assessment

In the consultation with main coordinating agency - Centre for Development Policy Research and five other agencies were suggested for training need assessment:

1. Centre for Development Policy Research
2. Lao Statistics Bureau
3. Ministry of Education and Sports
4. Ministry of Agriculture and Forestry
5. Ministry of Health
6. Nutrition Centre

Suggested agencies for capacity need assessment were discussed and agreed during technical meeting with participation of agencies included to the Steering Committee of NIPN initiative in Lao PDR.

3.4.1 NIPN Steering Committee and its member

Government agencies included to the NIPN Steering Committee are Lao Statistics Bureau, The Ministry of Education and Sports, The Ministry of Agriculture and Forestry, The Ministry of Health, The Ministry of Health, Centre for Development Policy Research of Ministry of Planning and Investment and National Institute of Economic Research.

Centre for Development Policy Research of Ministry of Planning and Investment is the main coordinating and implementing agency of NIPN initiative in Lao PDR. The role of Centre for Development Policy Research is to conduct the research on policies, strategies, master plans, mechanisms and measures to serve national, regional and local socio-economic development; present policy mechanisms for the implementation of socio-economic development plans, provide information on the implementation of national, regional and local development plans to the Ministry of Planning and Investment for consideration to submit to the Government of Lao PDR. Centre for Development Policy Research is comprised of 4 divisions: Division of

regional development and poverty policy research, Division of social and environmental policy research, Division of economic development policy research and Division of general affairs and information.

National Institute of Economic Research is the implementing agency of NIPN initiative in Lao PDR. National Institute for Economic Research is a research organization under the Government of Lao PDR, with a status equivalent to other institutes that are under the direct supervision of the Party Central Committee and the Government of Lao PDR. It conducts researches on Lao and international economies. NIER conducts researches on how to improve mechanisms and policies related to socio-economic situation in Lao PDR and provides information on researches conducted on economy for which scientific analysis has been carried out. NIER contributes to the provision of orientation for policies, strategic plans, master plans and the National Socio-Economic Development Plan. Institute provides economic advisory services and organizes training to enhance the economic knowledge of officials and researchers.

Lao Statistics Bureau is the main state agency for statistics in Lao PDR. Lao Statistics Bureau contains five departments: Department of Administration is a department, Department of Economic Statistics, Department of Social Statistics, Department of Data Service, Statistics Centres of Provinces, Vientiane Capital, Districts, Municipalities and Villages.

Department of Social Statistics represents Lao Statistics Bureau in NIPN Steering Committee. Department of Social Statistics is a department within the structure of LSB under supervision of Ministry of Planning and Investment, with the mandate to assist leadership of LSB in field of social and environment statistics in the national statistics system (vertically and horizontally) from the central level down to local levels, acts as the focal point in the data collection, production of official statistics and development of database of social and environment statistics of Lao PDR, and ensure the compliance with basic principles as in Article 5 of the Law on Statistics and Article 2 of Decree on Organisation and Operations of Lao Statistics Bureau.

The Ministry of Education and Sports is a central government organization responsible for education and sports in LAO PDR. The Ministry of Education and Sports contains administration and technical departments.

Administration departments are the follows: Cabinet of MOES, Department of Organization and Personnel, Department of Planning, Department of Finance, Department of Inspection, Department of External Relations, Lao National Commission for UNESCO, Internal Olympic Commission Relations Department and Technical Departments.

Technical departments are the follows: Department of Preschool and Primary Education, Department of Secondary Education, Department of Teacher Training, Department of Technical and Vocational Education, Department of Higher Education, Department of Non-Formal Education, Department of Physical and Art Education, Department of Students Affairs, Department of Elite Sports, Department of Sports for All, Research Institute for Education Sciences, Institute for Educational Administration Development, Education Standard and Quality Assurance centre, Private Education Advisory Council Office, Information and Communication Technology Centre for Education and Sports, The Information & Media Centre.

The Ministry of Agriculture and Forestry is comprised of several departments including the Department of Forest Inspection, the Permanent Secretary Office, the Department of Personnel, the Department of Inspection, the Department of Planning, the Department of Agriculture, the

Department of Livestock and Fisheries, the Department of Forestry and the Department of Irrigation.

It also encompasses the National Agriculture & Forestry Research Institute, the National Agriculture & Forestry Extension Service, 17 provincial Agriculture and Forestry Offices, and 139 District Agriculture and Forestry Extension Offices.

The Ministry of Health is a central government organization responsible for health in Lao PDR. The Ministry of Health is comprised of 10 departments and 13 centres. The departments are the follows: Department of planning and cooperation, Department of finance, Department of food and drug, Department of inspection, Department of personnel, Hygiene and Health Promotion Department, Department of Medicine, Department of Infectious Disease Control, Cabinet office, Department of Health Education.

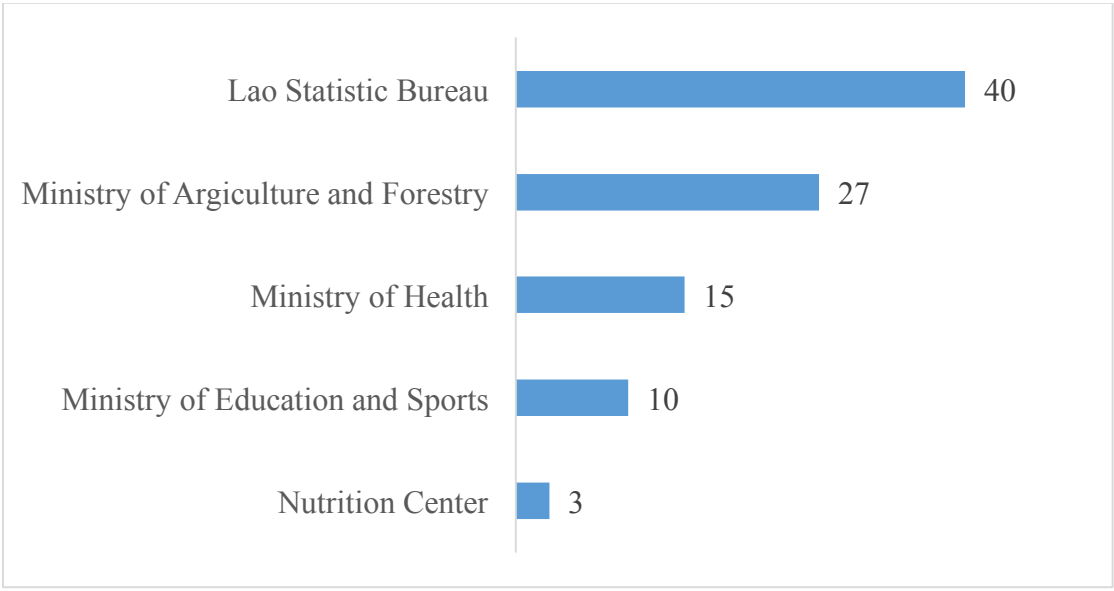
Nutrition Centre functions under the Ministry of Health. Nutrition Centre is the one of the centres of Ministry of Health. Nutrition Centre is comprised of 4 divisions: Administration, Promotion and Nutraceutical, Capacity building, Research and Monitoring division.

4. Results of Capacity Need Assessment

4.1 Specialists involved into data analysis related work

During the visits to the agencies, it became known that the people involved into data analysis are mainly the staff of planning and statistical divisions and department of agencies. The exception is Department of Social Statistics of LSB. All staff in Department of Social Statistics of LSB are involved to data analysis.

Graph 1. The number of specialists involved into data analysis by agencies



Nutrition Centre consists of 4 divisions: Administration, Promotion and Nutraceutical, Capacity building, Research and Monitoring. Total number staff is 22 personals. 3 staff from Research and Monitoring are involved into data analysis related work.

Ministry of Health has two divisions under the department of Planning and Cooperation: (1) Division of Planning and Investment and (2) Division of Health information. Both divisions are involved to data analysis and are comprised of 15 staffs.

The Ministry of Education and Sports has an Education and Sports Statistics Centre which operates under the department of Planning of the Ministry of Education and Sports. An Education and Sports Statistics consists of 20 staffs, including 16 specialists for information and statistics.

The Ministry of Agriculture and Forestry has two divisions: Statistics and Planning. Both divisions are under the Planning and Investment department of The Ministry of Agriculture and Forestry. Statistics and Planning divisions are involved into data analysis. The total numbers of staff in Statistics and Planning divisions are 27 staffs.

Department of Social Statistics of Lao Statistics Bureau has 40 staffs. As mentioned above all staff of Department of Social Statistics of Lao Statistics Bureau are involved to data analysis related work.

4.2 Existing skills of the staff of agencies in the use of data analysis and visualization software

The information about the skills and levels of knowledge of the staff agencies are important for selecting the proper design of training programme and course. The use of data analysis and visualisation software is one of the focus areas of Capacity Needs Assessment. Capacity Needs Assessment identifies the skills that agency has in the use of data analysis software and the levels of the staff in the use of data analysis and visualisation software.

During the visit to the agencies, the data analysis unit team and the staff from CDR had the discussion with staff of agencies on the question reflected in questionnaire. It was evident that many agencies use the widely known statistical and visualisation software such as STATA, SPSS, QGIS and ArcGIS.

- ✓ Nutrition Centre mostly uses Microsoft Excel for the data analysis and producing graphs and visualisations. Nutrition Centre uses KOBO toolbox for data collection purposes.
- ✓ Division of Planning and Investment and Division of Health information of The Ministry of Health use STATA and SPSS for data analysis related work. ArcGIS software is used for producing maps and related visualisations.
- ✓ Statistics Centre within the Ministry of Education and Sports mainly uses STATA and SPSS for data analysis purposes. QGIS is used for producing mapping visualizations.
- ✓ Statistics and planning divisions of The Ministry of Agriculture and Forestry uses SPSS, MS Excel and Access for processing and analysing data. QGIS is used for producing maps and related visualisations.
- ✓ Department of Social Statistics of Lao Statistics Bureau widely uses STATA and SPSS software. The use of R soft is limited within organizations. ArcGIS software is used for mapping and producing mapping type visualizations.

Graph 2. The use of software by type and agencies

Agency	Statistical Software				GIS Software		
	R	STATA	SPSS	Other	Arc GIS	QGIS	Other
Nutrition Center				Excel, KOBO			
MOH							
MOES							
MAF							
MAF				Excel, Access			
Department of Social Statistics, LSB							

The following conclusions may be considered from the graph 2:

- SPSS is the first popular software used by agencies; the second popular software used by agencies is STATA.
- Most agencies (4 out of 5) use GIS software.
- Nutrition Centre does not use the software that is specifically designed for data analysis.
- Department of Social Statistics of Lao Statistics Bureau uses the most variety of software (R, SPSS, STATA, ArcGIS)

The levels of staff in the use of data analysis and visualisation software are important for the organization capability to producing trustworthy analyses and solving data related problem in organization. The levels of staff in the use of data analysis and visualisation software is the one of the dimensions of skills considered by Capacity Need Assessment. Prepared questionnaire collects information on the level of staff in the use of data analysis and visualisation software.

During the meetings in the agencies devoted to Data Mapping and Capacity Need Assessment, the data analysis unit team and the staff from CDR collected information on the level of skills of the staff in the use data analysis and visualisation software.

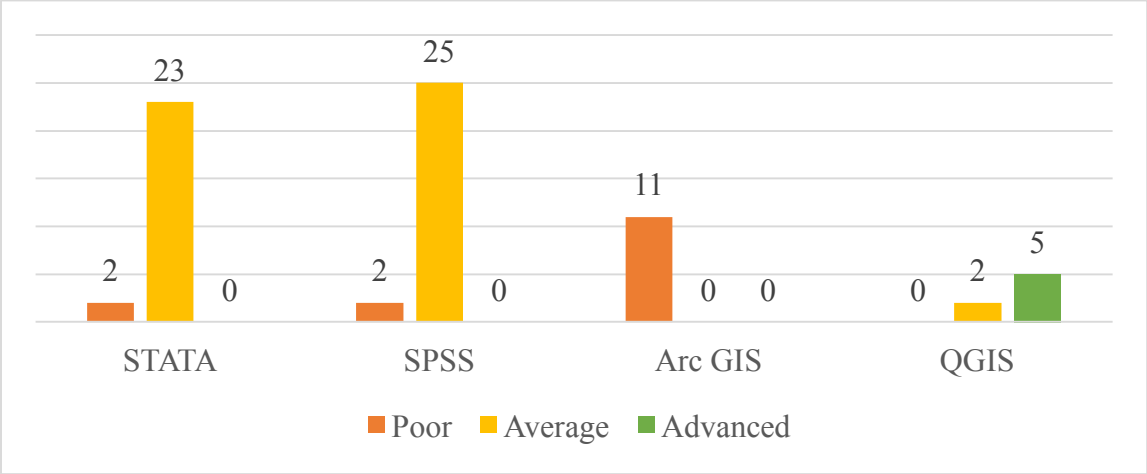
The results of the collected information are presented the table 2 and graph 3. Table 2 shows information about the number of staff by the level of skills and by the type of software and by agencies.

Table 1. The number of staff by the level of skills and by the type of software and by agencies

Agencies	Level	STATA	SPSS	ArcGIS	QGIS
Nutrition Centre	Advanced				
	Average				
	Poor	**2**	**2**		
MOH	Advanced				
	Average	**4**	**4**		
	Poor			**1**	
MOES	Advanced				**3**
	Average	**5**	**5**		
	Poor				
MAF	Advanced				**2**
	Average		**2**		**2**
	Poor				
Department of Social Statistics of LSB	Advanced				
	Average	**14**	**14**		
	Poor			**10**	

- Most agencies have the staff with average level of knowledge in the use of SPSS and STATA.
- Capacity of the Nutrition Centre in the use of data analysis and visualisation software is very limited. Nutrition Centre does not have the staff with the average or advanced level in the use of data analysis and visualisation software.
- Capacity of agencies in the use of ArcGIS is weak (only two agencies have the staff with poor level)
- Capacity of agencies in the use of QGIS is higher than in the use of ArcGIS, Two agencies has the staff with average and advanced levels
- Ministry of Agriculture and Forestry has very limited staff in the use of data analysis tools

Graph 3. Total number of staff in all agencies by level of skills and by type of software



As seen from the graphs and tables above, a most staff have average capacity in the use of STATA and SPSS. Regarding GIS software for mapping and related visualisations, the staff has more capacity in the use of QGIS comparing ArcGIS.

The following conclusions may consider from the graph 3:

- The mostly used software for data analysis and visualisation among selected agencies are STATA and SPSS
- A most of the staff of agencies has the "average" level in the use of STATA and SPSS.
- The skills of the staff of all agencies in the use of ArcGIS are at "poor" level
- The skills of the staff of all agencies in the use of QGIS are at "average" and "advanced" levels.

4.3 Existing skills of the staff of agencies in the use of methods of analysis

Capacity Need Assessment looks for the information about the type of data analysis methods used in the agencies and their frequency. The complexities of existing data analysis methods are various. Some of the methods are basic such as descriptive statistics and other, some are advanced such as regression, clustering and others. The level of the methods of data analysis and their frequency in the organization gives information about the level of the staff. The level of the staff in the use of data analysis methods is the important capability of organization in dealing and solving the data related problem.

Information about the use of data analysis methods are captured in the questionnaire. Questionnaire requires the information about the use of the types of methods of analysis in the agency and their frequency.

The meetings devoted to Data Mapping and Capacity Need Assessment were held in the offices of agencies. Data analysis unit together with staff from CDR collected the information on the use of data analysis methods:

- Nutrition Centre regularly uses the basic descriptive statistics methods for calculation means and medians.

- Division of Planning and Investment and Division of Health Information of The Ministry of Health very often uses the basic statistics methods for calculation of means and median other.
- Sports Statistics Centre within the Ministry of Education and Sports use regularly the basic descriptive statistics methods for calculation of means and medians and rarely the advanced statistical methods. Regression analysis are rarely used from advanced methods.
- Statistics and planning divisions of the Ministry of Agriculture and Forestry very often uses the basic statistic calculation such as calculation of means and medians. The agency regularly uses the methods of advanced statistics such as regression and clustering. Some of the staffs as the part of the Pilot project in Savannakhet province used advanced technic of big data in the analysing the satellite images.
- Department of Social Statistics of Lao Statistics Bureau regularly uses the basic statistics methods and rarely advanced statistic methods.

Graph 4. The use of different methods of analysis by agencies

Agencies	Basic Statistics	Advanced Statistics	Data Science
Nutrition Centre			
Ministry of Health			
Ministry of Education and Sports			
Ministry of Agriculture and Forestry			
Lao Statistics Bureau			

Rarely Regularly Very often

The results of the interviews on the use of data analysis methods are shown in Graph 4:

- All agencies use regularly the basic statistic methods. This indicates that there is regular demand for the use of basic statistics in all agencies.
- Since the staff of all agencies use the basic statistic methods, the staff of all agencies has the skills in the basic statistics. The basic statistic methods are mostly used for calculation of means and medians.
- Advanced statistics methods are used rarely in the most agencies. The Ministry of Agriculture and Forestry uses advanced statistics methods regularly.

4.4 Training Needs of Agencies

According to the developed methodology, training needs of agencies are identified during the interview of each agency:

Nutrition Centre identified the immediate training need in Z-score calculation, since Nutrition Centre is preparing the progress report on malnutrition to submit to the government. For the long term, Nutrition Centre identified the training needs in the areas of basic statistics and advanced statistics, data visualization, GIS, R software and website creation.

Division of Planning and Investment and Division of Health Information of The Ministry of Health identified the training needs on basic statistics, advanced statistic, data visualization and GIS.

Statistics Centre within the Ministry of Education and Sports identified the training needs in the areas of advanced statistics, data visualisation and the use of statistical soft R.

Statistics and planning divisions of The Ministry of Agriculture and Forestry requested the trainings in the areas of basic and advanced statistics, data visualisation and the use of statistical soft R. Statistics and planning divisions of The Ministry of Agriculture and Forestry mentioned that there is the need in the basic statistics for 219 staff at province level.

Department of Social Statistics of Lao Statistics Bureau requested the trainings in the areas of basic and advanced statistics, data visualisation and GIS.

The results of interview are shown below in table format (Table 3) and as the graph (Graph 3)

Table 2. Number of staff requested for trainings by agencies and types of trainings

Agency	Basic Statistics	Advanced Statistics	Data Visualization	GIS	The use of statistical soft R	Website preparation
Nutrition Centre	10	10	10	10	10	2
MOH	9	9	9	9	-	-
MOES		7	3	-	5	-
MAF	4	10	25	-	20	-
Department of Social Statistic, LSB	8	27	8	27	-	-
Total	31	63	55	46	35	2

The following conclusions may be considered from above table and graph on the training need of the agencies by agencies and type of trainings:

- All agencies, except Sports Statistics Centre within the Ministry of Education and Sports, requested training on the Basic Statistics. Total number of staff from agencies are 31 persons.
- All agencies requested training on Advanced Statistics and Data Visualization. Total number of staff from agencies is 63 and 55 persons accordingly.
- Three agencies (NC, MOH, LSB) requested training on GIS. Total number of staff from three agencies is 46.
- Three agencies (NC, MOES, MAF) requested training on Soft R. Total number of staff from three agencies is 35.
- Nutrition Centre requested training on website preparation for 2 staff.

5. Findings and observations of Capacity Need Assessment

5.1 Findings and observations

Having implemented the developed and agreed methodology, Capacity Need Assessment achieved its objectives and expected results.

The finding and observations related to expected results are given further.

1. The capacity of the staff of all selected agencies in the use of data analysis and visualisation software identified. The main findings and observations in this area are as follows:

- SPSS is the first popular software used by agencies; the second popular software used by agencies is STATA.
- Most agencies (4 out of 5) use GIS software.
- Nutrition Centre does not use the software that is specifically designed for data analysis.
- Department of Social Statistics of Lao Statistics Bureau uses the most variety of software (R, SPSS, STATA, ArcGIS)
- Most agencies have the staff with average level of knowledge in the use of SPSS and STATA.
- Capacity of the Nutrition Centre in the use of data analysis and visualisation software is very limited. Nutrition Centre does not have the staff with the average or advanced level in the use of data analysis and visualisation software.
- Capacity of agencies in the use of ArcGIS is weak (only two agencies have the staff with poor level)
- Capacity of agencies in the use of QGIS is higher than in the use of ArcGIS, two agencies has the staff with average and advanced levels
- Ministry of Agriculture and Forestry has very limited staff in the use of data analysis tools
- A most of the staff of agencies has the “average” level in the use of STATA and SPSS.
- The skills of the staff of all agencies in the use of ArcGIS are at “poor” level
- The skills of the staff of all agencies in the use of QGIS are at “average” and “advanced” levels.

2. The methods of data analysis used by agencies identified. The main findings and observations in this area are as follows:

- All agencies use regularly the basic statistic methods. This indicates that there is regular demand for the use of basic statistics in all agencies.
- Since the staff of all agencies use the basic statistic methods, the staff of all agencies has the skills in the basic statistics. The basic statistic methods are mostly used for calculation of means and medians.
- Advanced statistics methods are used rarely in the most agencies. The Ministry of Agriculture and Forestry uses advanced statistics methods regularly.

3. The training needs requested by agencies in the area of data analysis and visualisation identified. The main findings and observations in this area are as follows:

- All agencies, except Sports Statistics Centre within the Ministry of Education and Sports, requested training on the Basic Statistics. Total number of staff from agencies is 31 persons.
- All agencies requested training on Advanced Statistics and Data Visualization. Total number of staff from agencies is 63 and 55 persons accordingly.
- Three agencies (NC, MOH, LSB) requested training on GIS. Total number of staff from three agencies is 46.
- Three agencies (NC, MOES, MAF) requested training on Soft R. Total number of staff from three agencies is 35.
- Nutrition Centre requested training on website preparation for 2 staff.

6. Capacity Development Plan

6.1 Comparison of current needs and exiting skills of agencies

As mentioned form 4.2 and 4.4 above, regarding the existing skills of the staff of agencies and the current needs for training of each agency are varies. Most of them need the training to improve their existing skills to the higher level including statistical analysis, statistical software usage and data visualization rather than acquire new skills. As can be seen from graph 5 above, most of agencies use basic statistics as their main analysis method, they rarely use advanced statistics or data science. Therefore, together with other factors based on our findings from capacity needs assessment it shown that, the current needs of their capacity building is training for basic statistics as evidence shown in graph 4 and table 1.

The current training needs identified from capacity needs assessment, also corresponded to the existing skills of the staffs in each agency, because their existing skills level for most of the staffs from each agency are ranging between basic to intermediate level, only one agency having the knowledge in advanced level of statistics and data science. But they are rarely used in their analysis work (as indicated by the key findings above). However, in order to improve their capacity in the future, higher level of training for statistics also required such as: advanced statistics, data visualization and data science. Those training topics were also identified and requested by the agencies during the interview and the respond to the questionnaires during the conducting of the capacity needs assessment activity.

Based on those findings and factors, the capacity development plan was developed specifically to meet the actual needs, to improve existing skills to higher level and enhance their statistics capacity of each agency.

6.2 Capacity development plan based on current needs and exiting skills of agencies

The Capacity Development Plan is prepared based on the current need and existing skills of agencies and the number of staff provided by the agencies for different type of trainings combined with the key findings from capacity needs assessment. This plan was discussed and agreed upon NIPN management team and partners during monthly meeting including the content of the training and duration of the training.

The current needs of agencies were identified during the interviews in the agencies. The agencies identified the frequency of the use of different level methodologies of analysis. As it seen form Table 5 below, and Ministry of Health including Nutrition Centre do not use advanced statistics. During the discussion in these agencies, it was not reported that there is current demand on advanced statistics.

Prepared capacity development plans include 3 types of trainings: basic, advanced statistics, Introduction to Data Visualization and GIS. The program of trainings was designed based on the observation of skills of the staff during Capacity Need Assessment. See annexes 1, 2 and 6.

As mentioned above, the program of training for basic statistics was designed taking into account that most agencies have staff with knowledge of basic statistics, but their knowledge limited to using only calculation of means and medians. The program covers the learning of the basic statistical concept.

Table 3. The use of different methods of analysis by agencies and the number of staff requested by agencies for trainings on basic and advanced statistics

Agencies	Basic Statistics	Advanced Statistics	Data Science
Nutrition Centre	10		
Ministry of Health	9		
Ministry of Education and Sports		7	
Ministry of Agriculture and Forestry	4	10	
Lao Statistics Bureau	8	27	

	Rarely		Regularly		Very often

Table 4. Capacity development plan based on the current needs and existing skills.

Months	Regular 2.5 hours trainings (during monthly meeting)	Intensive training courses			Additional training		
	Basic Statistics and Elements of visualisation	Basic statistics	Advanced statistics	Introduction to Data Visualization and GIS	Training on nutrition	Training on STATA	Training on data quality assurance
	Total 20 hours	20 hours	15 hours	15 hours	-		-
		4 Days	3 days	3 days	-		-
		Number of participants	Number of participants	Number of participants	Number of participants	Number of participants	Number of participants
1st	2.5 hours				15		
2nd	2.5 hours	15				15	
3d	2.5 hours		22				
4th	2.5 hours			25			
5th	2.5 hours	16					
6th	2.5 hours		22				
7th	2.5 hours			25			
8th	2.5 hours						15
	20 hours	**31**	**44**	**50**	**15**		**15**

The trainings on advanced statistic and Introduction to data visualization and GIS are introductory. Program on GIS part is mainly focused on visualizing the indicators in the form of maps and consist of mainly creating thematic maps. Thematic maps are maps of distribution of indicators by regions in the form bar chart, pie chart, shading with different color ranges and others.

Capacity development plan based on the current needs and existing skills is shown in above table.

The Capacity development plan based on the current needs and existing skills: Regular 2.5 hour trainings during monthly meeting and Intensive training courses. Regular 2.5 hour trainings during monthly meeting cover only basic statistics and elements of data visualisation.

The capacity building plan will also include two additional trainings: The first training is the topic of general understanding of nutrition to improve the knowledge of NIPN core team on general nutrition. The second training is data quality assurance which identified by GFS during webinar with NIPN technical team which the team considered that, it is very important for agency to understand the data quality check processes and technics because the data quality plays an important role in research and analysis that will be conducted by agencies in the future, the quality of the data directly influence the result of the research. Therefore, it is important for agency to have sufficient knowledge in this topic.

7. Annexes

Annex 1. Questionnaire for meeting with partners to conduct data mapping and capacity need assessment.

Background information of NIPN

The overall objective of the National Information Platform for Nutrition (NIPN) initiative is to contribute to the global reduction of stunting (chronic undernutrition) in alignment with the World Health Assembly 2025 targets. The specific objective of the NIPN is to build the national capacity both at national and sub-national levels to manage, analyse information and data from all sectors at national and sub-national levels which have an influence on nutrition, to track progress, disseminate and use information to better inform the policies and strategic decisions.

NIPN creates an opportunity to bring all existing nutrition related information and data from all sectors together and analyse to support the development of evidence-based policies and programmes to improve human nutrition. The Government of Lao PDR, and in particular the National Nutrition Committee Secretariat acknowledges the need for strengthening a nutrition information system that can generate quality data timely, perform analyses, track progress against set actions and use it for policy development, expanding political commitment and allocating more public funding for nutrition initiatives.

The NIPN is expected to be an important platform and to have a major role to play in informing nutrition programming and policy in the future. The function of a National Information Platform for Nutrition is to inform policies and programmes for improving human nutrition in Lao PDR by bringing together and analysing information and data from all sectors that can influence nutrition such as health, agriculture, food security, education, water, sanitation and social protection. The NIPN is conceived to strengthen the capacity of government bodies, such as national statistics or planning institutes or departments.

Objectives of data mapping and capacity gap assessment

- Mapping of data by sectors aims to identify relevant nutrition related data and indicators collected routinely by the different sectors and published in existent information platforms such as DHIS 2, EMIS, LaoInfo and others.

- Capacity need assessment aims to identify the training needs of the partners in the area of statistical data analysis, data visualization and GIS.

General Information

1. The name of agency _____

2. Total number of staff _____

3. Total number of specialists in the main functional area of your agency _____

Questions for mapping of data by sectors

1. Please share the list of all indicators that your agency collects through established routine system level highlighting the source, level (country, province, district etc.) and periodicity of collection (yearly, every half year, quarterly etc.)

2. Please share the list of surveys together with report and questioner of survey that your agency conducted or conducts periodically highlighting the level of representations (country, province etc.) and periodicity of survey.

3. Please share the definition of indicators and data formats used for storing and exchanging data and indicators.

Questions for capacity need assessment

1. What kind of software do the staff of your organization use for data analysis and visualizations?

Type of software	**Yes/No**
Statistical software	
R	
STATA	
SPSS	
Other soft, please specify	
GIS software	
Arc GIS	
QGIS	
If other soft, please specify	

2. Please indicate the number of staff with "advanced", "average" and "poor" skills in the use of data analysis and visualizations software.

Type of software	**Number of staff with "advanced" skills**	**Number of staff with "average" skills**	**Number of staff with "poor" skills**
Statistical software			
R			
STATA			
SPSS			
If other soft, please specify			
GIS software			
Arc GIS			
QGIS			
If other soft, please specify			

3. Please identify what kind of statistical methods that the staff of your organization have used for data analysis.

Methods	How many times
Descriptive statistics (calculation of means, moda, medians, confidence intervals, estimation of parameters, testing hypothesis and other)	
Advanced statistics (Regression, Clustering, Principal Component Analysis, other)	
Data science (Neural Networks, Fuzzy classification and other)	
If any other methods, please specify	

4. Please identify capacity building needs.

Type of training	Number of people that needs training	Other comments
Basic Statistics		
Advanced Statistics		
Data Visualization		
GIS		
The use of statistical soft R		
If other, please specify		

Annex 2. List of key persons met during the meetings on Data Mapping and Capacity Need Assessment

Nutrition Centre

- Dr. Chandavone Phoxay, Director of Nutrition Centre
- Dr. Souphaxay Khamphanthong, Technical of research and surveillance Division.
- Mr. Maikho Vongxay, Technical of research and surveillance Division.

Ministry of Health (Department of Planning and Cooperation)

- Dr. Southanou Nanthanontry, Director of Planning and Investment Division
- Mr. Samaykham, DHIS2 Team
- Mr. Viengthong Jongvaseu, DHIS2 Team

Ministry of Education (Statistic Center, Department of Planning)

- Mr. Maaly Vorabouth, Deputy Director General of Planning Department, Director General of ESSC
- Mr. Bounphanh Phimmachan, Deputy head of education and sports statistic and mapping section

Ministry of Agriculture (Statistic Center, Department of Planning and Finance)

- Ms. Vivanh Souvannamethy, Director of Center for agricultural statistics
- Ms. Monthong Keochansy, Technical officer of Center for agricultural statistic

Lao Statistic Bureau

- Ms. Thirakha Chanthalanouvong, Director General of Social Statistic Department
- Mr. Vilaysouk, Deputy director of Social Statistic Department
- Mr. Somsamay, Technical Officer

Annex 3. Program for 4 day training on Basic Statistics

Participants will learn statistical concepts: event, random event, probability, random variable, distribution function, density distribution function, mean, median, mode, variance, standard deviation, confidence interval, confidence probability, percentile, quantile, quartile, correlation.

Participants will learn basic data manipulations and working with tables: Type of data, one way table, two way tables, frequencies, summaries, grouping by variables. Joining tables,

transforming tables from wide to long and vice versa. Sub-setting of rows and columns. Dropping and keeping variables, dropping and keeping observations.

Participants will learn create basic graphs and visualizations: Simple plots with one and two variables: line plots, dot plots, bar and pie charts, scatter plots and box plots.

Day 1

Session 1. Overview of course. Basic concepts: Event, set of events, sample space. Probability of event and set of events. Estimation of probabilities. Table structure, categorical, factor, nominal and continuous variables. Simple plots (introduction).

Session 2. Distribution functions for random variables, Density Distribution function for random variables. Producing frequency tables. Producing plots of distribution functions and related plots.

Session 3. Mean, median, variance, standard deviation. Calculation of mean, variance, standard deviation of normal distribution. Producing tables for mean, median, variance, standard deviation. Producing multiple line and dot plots.

Day 2.

Session 1. Discrete distribution (Binomial and Poisson distribution). Density and distribution function for discrete variables. Mean, variance and standard deviation for discrete distributions. Sub-setting of tables. Creating bar plots for variables and group of variables.

Session 2. Normal and related distribution function for random variables (chi-squared, t – distribution, F –distribution). Statistical tests for normality. Transformation of variables, Z- scores. Creating summary tables. Plotting functions.

Session 3. Median, percentiles, quantiles and quartiles of random variables. Distribution and density distribution function of two variables. Correlation and covariance of two variables. Creating tables with statistical summaries. Plotting variables and summary statistics.

Day 3

Session 1. General population. Sample. Sample mean and median, sample variance, Sample standard deviation. Interval estimation. Confidence interval and confidence probability. Joining tables. Box plots.

Session 2. Confidence interval for sample mean. Normal distribution and t- distribution for calculation of confidence intervals for mean. Confidence interval for proportions. Normal distribution and Binomial for calculation confidence interval for proportions. Plotting distribution functions combined with histogram.

Session 3. Empirical distribution function, histogram. Rare events and random variables for rare events. Interval estimation of mean of variables for rare events. Table transformation from long to wide form. Plotting multiple graphs of variables grouped by factors.

Day 4.

Session 1. Calculation of sample size for surveys. Formula based on normal distribution and its simplification. Methodology of calculation of sample size based on exact distribution function. Sample weights. Adding weights to the tables. Summary tables with weights.

Session 2. Correlation of two variables, correlation coefficient. Correlation Matrix for multiple variables. The Spearman's Rank Correlation Coefficient.

Session 3. Using histogram for analysis of distribution of variables. Using scatter plots, line and other plots for analysis of variables.

Session 4. Working on exercise by analyzing real survey data to learn and understanding analysis steps and technic for participants to familiar with survey data analyzing.

Annex 4. Program for 3 day training on Advanced Statistics

Participants will learn: Testing hypothesis for decision making and estimation of risks. Parametric one sample and two sample tests. Non- parametric tests. Regression analysis. Linear and non-linear regression models. Visualizing and plotting models for data analysis. Classification and clustering. Hierarchical cluster models. Plotting dendrogram visualizations. Cluster analysis stopping rules for identifying the number of classes. Principal component analysis for reducing the dimension of all variables.

Day 1

Session 1. Testing hypothesis for decision making. Significance level. Power of test. Estimation of risks. Parametric one sample and two sample tests.

Session 2. Non- parametric tests. Non-parametric one sample and two sample tests. Sign test. Wilcoxon rank-sum test, Kolmogorov – Smirnov test.

Session 3. Application of testing hypothesis for checking the data quality.

Day 2

Session 1. Regression analysis. Linear regression. R-squared. Tests for assessing quality of regression. Visualizing and plotting linear models for data analysis.

Session 2. Logistic regression. Non - linear regression models. Visualizing and plotting nonlinear models. Assessing quality of nonlinear models.

Session 3. Application of linear and non-linear regression models for surveys (LSIS 2)

Day 3

Session 1. Classification and clustering. Overview of classification and clustering. Metric space and distance. Different type of distance. Distance for continuous variables, distances for ordered variables. Scatterplot matrix for visualizing variables and clustering.

Session 2. Clustering models. Hierarchical cluster models and analysis. Plotting dendrogram visualizations. Cluster analysis stopping rules for identifying the number of classes

Session 3. Principal component analysis, reducing the dimension of all variables. Transforming variables. Understanding eigenspace and eigenvector variables.

Session 4. Identify, compare, and resolve data quality problems, evaluate dataset for quality, accuracy and data cleanup.

Annex 5. Program for 3 day training on Introduction to Data Visualization

Participants will learn: Tools for data visualization, base graph and lattice packages, graphs with one variable, graphs with two variables, working with different color palette, adjusting titles, legend, labels, exporting graph in different formats, graphical parameters, and functions for creating plots in base and lattice packages. Creating and modifying of lay-outs of maps. Creating bar and pie chart type thematic maps for indicators at province and district levels. Enhancing layouts of thematic maps.

Day 1

Session 1. Overview of the course. Tools for data visualization - base package functions for creating plots. Overview of lattice package functions for creating plots. Scatterplots using base and lattice packages.

Session 2. Scatter plot with base package. Function for graphical parameters. Adding titles and labels. adding grid, adding legend, scatterplot for multiple groups. Scatterplot for factor levels and groups, using lattice package.

Session 3. Bar charts with base packages. Using colors for plots. Different color palette, referencing colors, changing colors for bar charts, adding confidence interval to bar chart. Adjusting titles and labels of bar chart. Bar chart for factor levels and groups, using lattice package.

Day 2

Session 1. Plotting a line from x and y points with base package. Adjusting axis's scale and labels. Changing the type, width, color of a line. Combining line and point type of plots. Changing type and color of point labels. Adding vertical or horizontal lines. Line and point type of plots for factor levels and groups, using lattice package.

Session 2. Creating a box plot with base package. Creating a box plot for each factor level. Adjusting margin of plots and background color of plot areas. Creating a histogram, adding a density estimate to a histogram, making multiple histograms from grouped data.

Session 3. Creating normal quantile-quantile plots, tree map plot, graphing a function, adding smoother plot. Saving plot in different formats to a file.

Day 3

Session 1. Mapping tools for development. Interface of GIS software. Understanding of coordinate systems. Geographical and projected coordinate systems. Vector and raster data formats. Uploading vector layers and modifying layer features. Attribute table of vector features. Adding labels to the map. Modifying labels. Joining Excel tables to attribute tables.

Session 2. Creating bar and pie chart type thematic maps for indicators at province and district levels. Creating and modifying layout of thematic maps.

Session 3. Creating shading type thematic maps with the different range of values. Combing shading type thematic maps with bar and pie chart map. Modifying and enhancing layout of thematic maps.

Annex 6: Literature

1. NIPN Proposal for Lao PDR -7 Dec 2017_Final
2. Detailed Work Plan for 2019. National Institute for Economic Research and Ministry of Planning and Investment (DIC, CDR, LSB)
3. Multiple Overlapping Deprivation Analysis on Stunting among children under 5 years, Lao PDR
4. Capacity Assessment Methodology User's Guide. UNDP. Capacity Development Group. Bureau for Development Policy. November 2008
5. Capacity Needs Assessment. The roadmap to capacity development. A capacity needs assessment process. Peter Stephen and Ronnakorn Triraganon. Regional Community Forestry Training Centre for Asia and the Pacific (RECOFTC). July 2009
6. Potter, C and Brough, R. Systemic Capacity Building: A Hierarchy of Needs. Health Policy and Planning 2004;
7. https://www.regional-tvet-conference-laos.org/en/article/22.the-lao-ministry-of-education-and-sports.html
8. https://scalingupnutrition.org/share-learn/planning-and-implementation/information-systems-for-nutrition/
9. http://www.nipn-nutrition-platforms.org/NIPN-Guidance-Notes
10. http://www.nipn-nutrition-platforms.org/Data-landscape-exercise