

# TECHNICAL NOTES

## 1. METHODOLOGY

### Scope of the census

The Lao Agricultural Census, 1998/99, covered the whole of Lao PDR, including urban areas in Vientiane and elsewhere. The census covered only the agricultural activities of private households, carried out on their own or in partnership with other households. Agricultural activities undertaken by government organisations, businesses, etc. were excluded. People living in accommodation units, such as hostels, were also excluded.

The main statistical unit for the census was the agricultural holding, defined as an economic unit of crop and livestock production under single management (see later for definition).

### Sample and complete enumeration

The census was undertaken in two parts: a complete enumeration of all agricultural holdings in Lao PDR to collect some basic data about agriculture, and a sample survey of agricultural holdings to collect more detailed information. This report presents results of the sample component of the census.

### Sample design and selection

The sample was selected using two-stage sampling: a sample of villages was first selected, and then a sample of households was selected for inclusion in the census in each sample village. Agricultural holdings were identified by asking each sample household about their crop and livestock activities. In most rural districts, over 90 percent of households were agricultural holdings.

In most districts, a sample of 18 villages was taken, and about 18 households were selected in each sample village. Thus, about 320 sample households (or about 300 sample agricultural holdings) were sampled in each district. A smaller sample was taken in districts containing few villages or households. In the predominantly urban districts of Vientiane Municipality, about 400 households were sampled.

In each district, the sample of villages was selected using stratified systematic probability proportional to size (PPS) sampling. The list of villages was created by updating the villages from the 1995 Population Census. Villages were divided into urban and rural strata, with rural areas being sampled more heavily than urban areas because of their agricultural importance. Systematic PPS sampling was used in each stratum, with the number of households from the 1995 Population Census as the size measure and a geographical ordering of villages. Where household information from the 1995 Population Census was unavailable, such as newly created villages, equal probability sampling was used.

The sample of households in each sample village was selected using stratified systematic random sampling. In each village, the enumerator prepared a list of all households, with help from the village head. The households were divided into two strata based on the village head's assessment of whether or not the household had 0.02 ha or more of agricultural land. Households were listed geographically in each stratum and the sample was selected using systematic random sampling.

Altogether, 2,468 villages were selected in the sample. The total number of sample households was 42,000, or 37,000 agricultural holdings. The sample sizes by province are shown in Table A.

**Table A: Lao Agricultural Census, 1998/99: Sample Size by Province**

Province	No. of districts	No. of villages	No. of sample villages	No. of sample households	No. of sample holdings
Vientiane Municipality	9	489	145		
Phongsaly	7	611	126		
Luangnamtha	5	443	90		
Oudomxay	7	789	126		
Bokeo	5	379	86		
Luangprabang	11	1,182	197		
Huaphanh	8	859	144		
Xayabury	10	559	171		
Xiengkhuang	7	511	122		
Vientiane Province	10	530	177		
Borikhamxay	6	465	106		
Khammuane	9	801	162		
Savannakhet	15	1,543	270		
Saravane	8	726	144		
Sekong	4	254	70		
Champasack	10	906	180		
Attapeu	5	208	84		
Xaysomboun Special Region	5	129	68		
<b>TOTAL</b>	142	11,384	2,468		

In each district, the sample of villages for area measurement was selected as a random sub-sample of six sample villages (four or five if there were fewer sample villages). The sample of households for area measurement was a one in four random sub-sample of the sample households.

### Topics covered

The census questionnaires and statistical concepts used in the census were developed based on the guidelines given in *FAO Statistical Development Series No.5: Programme for the World Census of Agriculture 2000* (FAO 1996), taking into account the circumstances in Lao PDR. Extra emphasis was given to data on rice, because of its importance in Lao agriculture.

The primary reference period for the data collected in the census was the 1998/99 agricultural year, covering the 1998 wet season (May-October 1998) and the 1998/99 dry season (November 1998-April 1999). Livestock data refer to the day of enumeration.

## Census operations

The census data collection was undertaken from 22 February to 19 March 1999. Almost 1,200 enumerators were used (as well as the 2,200 used for the complete enumeration component). The enumerators were government staff from the district, including teachers. Ten-day training courses were held to teach enumerators how to do the census data collection. Field supervisors, appointed from the State Planning Commission and the Ministry of Agriculture and Forestry, trained the enumerators, supervised the field operations, and checked the completed census questionnaires.

Census questionnaires were returned to the National Statistics Centre in Vientiane for processing. Data on the questionnaires were entered into the computer, computer checks on the data were made, and output tables were produced.

## 2. DEFINITIONS OF TERMS USED IN THE TABLES

A household is a group of people making common arrangements for food, shelter and other acts of daily living. A household usually consists of relatives such as a husband, a wife, children and parents, but sometimes includes unrelated people such as live-in household or farm workers. Household size is the number of persons who usually live in the household.

An agricultural holding (often referred to as a holding) is an economic unit of agricultural production under single management, comprising all livestock raised and all agricultural land operated, regardless of ownership. The Lao Agricultural Census, 1998/99 covered only those units that either:

- (i) operated 0.02 ha or more of agricultural land in the 1998 wet season or the 1998/99 dry season; or
- (ii) were raising 2 or more cattle or buffaloes, 5 or more pigs, or 20 or more poultry at the time of the census.

Only household units were included in the census. Agricultural activities undertaken by businesses, government organizations and other bodies were excluded.

Usually, an agricultural holding is the same as a household, but sometimes it consists of two or more households operating as a partnership. Status of holding refers to whether the holding is operated by a single household or by a partnership.

Purpose of production of the agricultural holding refers to how farm produce was used; in particular, whether any produce was sold, bartered or used for home consumption, as well as the main use of the farm produce.

Type of holding refers to whether the agricultural holding is a land holding or a livestock holding. A land holding is a holding that operated 0.02 ha or more of agricultural land in the 1998 wet season or the 1998/99 dry season. A livestock holding is a holding that is not a land holding; that is, it did not operate 0.02 ha or more of agricultural land, but raised 2 or more cattle or buffaloes, 5 or more pigs, or 20 or more poultry.

Agricultural land is all land that was used for growing any temporary or permanent agricultural crops in the 1998 wet season or the 1998/99 dry season, or that was temporarily fallow during that period.

Area of holding is the area of all agricultural and non-agricultural land operated by the agricultural holding. Non-agricultural land includes forest land, fish ponds, grazing land and wasteland, but excludes the household's house and surrounds. Non-agricultural land refers to land at the time of the census. A livestock holding has zero area of holding.

To operate land means to have management control over the growing of crops or other activities on that land. Thus, area of holding includes land owned and operated by the agricultural holding, as well as land operated by the holding but rented from someone else. However, it excludes land owned by the holding but rented out to someone else. Land operated by a holding includes land in the village in which the household lives, as well as land operated by that household in other villages, districts or provinces.

A parcel is any piece of land of one land tenure type entirely surrounded by land, water, forest, road, etc. not forming part of that holding. A land holding consists of one or more parcels. Two adjoining pieces of land of different tenure types are considered as two parcels.

Land tenure refers to whether land is owned, rented or operated on another basis. Owned land means land owned outright or in owner-like possession, such as land under perpetual or long-term lease, land operated without interruption for many years, or land given to a household on condition that it is used for personal agricultural purposes. Rented land means land rented from someone else (usually for a limited period) for cash or in-kind remuneration such as a share of the produce or exchange of services. Other land includes all land not owned or rented, such as squatter land, land not authorized for cultivation, or land borrowed from someone else. An agricultural holding may have land of different tenure types.

Land use refers to the main use of the agricultural holding's land during the 1998 wet season and the 1998/99 dry season. If permanent and temporary crops are grown as a mixture, the predominant crop is taken. Land under water during the wet season but used for growing temporary crops during the dry season is assigned to temporary crops.

Arable land is land that has been cleared and is capable of being used for growing temporary crops. Arable land includes land actually used for growing temporary crops in the 1998 wet season or the 1998/99 dry season, as well as fallow land. Arable land does not include land under permanent crops.

Fallow land is land normally used for growing temporary crops, but not so used during the 1998 wet season and the 1998/99 dry season. Land left idle for more than five years is not fallow. Land cultivated on a two- or three-year rotating basis is fallow if it was not cultivated in 1998 wet season and the 1998/99 dry season. Land abandoned altogether under shifting cultivation is not fallow.

Temporary crops are crops with a less than one-year growing cycle. Land used for temporary crops in the land use tables refers to land on which temporary crops were planted in the 1998 wet season or the 1998/99 dry season. Area of temporary crops in the crop tables refers to the

area of crops planted in those two seasons. These two concepts are not the same: the area of temporary crops planted may be greater than the area under temporary crops because of double cropping. For mixed crops (that is, crops grown at the same time in a field as a mixture or inter-planted), the sum of the areas of the crops is the same as the area of the field. Crops grown in a particular season means that the main growing period for that crop was in that season. Crop area refers to planted area, not harvested area. Scattered temporary crops are those not planted in a systematic manner or sufficiently densely to permit the area to be measured, or are planted in a field of less than 100 square metres.

Rice data are shown according to land type, variety, rice type and maturity. Land type refers to whether it is lowland or upland. Upland refers to rice grown under dry land conditions, and includes land cultivated each year as well as shifting cultivation. Variety refers to whether it is local or improved. Improved varieties are those that the Ministry of Agriculture and Forestry has released as high yielding varieties or that farmers have acquired from Thailand or elsewhere, believing them to be high yielding varieties. Rice type refers to whether the rice is glutinous or non-glutinous. Maturity refers to whether the growing period is short (about three months), medium (about four months) or long (about five months).

Permanent crops are crops with a greater than one-year growing cycle, including fruit and nut trees, bananas, coffee, tea and cardamom. Data on permanent crops refer to the crops present on the day of enumeration. Permanent crops are grown either in a compact plantation or scattered. A compact plantation of permanent crops is where the trees/plants are planted in a systematic manner or sufficiently densely to permit the area to be measured. Scattered permanent crops are permanent crops not in a compact plantation. Crops planted in a field of less than 100 square metres are considered as scattered.

Temporary and permanent crops are shown in the tables classified by crop type. The classification is not a botanical one, but based on the main use of the crop. Thus, cabbages grown for human consumption are shown under “Vegetables”, whereas cabbages grown for animal feed are shown under “Other crops”. Crop data are shown in the tables for the main crop groups (rice, other cereals, roots and tubers, legumes, industrial crops, vegetables, other crops), as well as for specific crop types.

Grazing land is land used for the grazing of livestock, including cultivated and naturally grown pastures, and permanent and temporary pasture land. The reference period is the day of enumeration.

Forest land includes natural or planted timber tracts that have, or will have, value as wood, timber, other forest products or for protection. It includes forest tree nurseries and areas of bamboo. The reference period is the day of enumeration.

Other land in the land use tables includes land under water, land occupied by buildings, roads, land used for ornamental gardens, wasteland and other uncultivated land. The reference period is the day of enumeration.

Irrigation means purposely providing land with water, other than rain, for growing crops and includes both Government irrigation schemes and other informal methods of irrigation. Uncontrolled flooding of cropland by overflowing rivers is not irrigation. Data on irrigation refer to the 1998 wet season and the 1998/99 dry season.

Clearance of land refers to preparing land for the cultivation of agricultural crops.

Cultivation intensity is the sum of the areas of all temporary crops planted divided by the area of arable land, expressed as a percentage. For example, 1 ha of land used for growing 1 ha of wet season rice and 0.5 ha of dry season rice has cropping intensity of 150%.

Fertilizers are described as either mineral or organic. Mineral fertilizers are manufactured substances (usually through an industrial process) to supply nutrients to crops. Organic fertilizers are substances of organic origin, either natural or processed, used to provide nutrients to crops. The most common types of organic fertilizer are animal manure and compost. Data on fertilizers refer to their use in the 1998 wet season and the 1998/99 dry season.

Pesticides are substances used for controlling or eliminating pests that affect crops or livestock. They include insecticides, fungicides, fumigants, herbicides and rodenticides. Data on pesticides refer to their use in the 1998 wet season and the 1998/99 dry season.

Livestock refers to all animals and poultry raised mainly for agricultural purposes. To raise livestock means to have primary responsibility for looking after farm animals on a long-term basis and to make day-to-day decisions about their use. The number of livestock refers to the number of animals being raised by the agricultural holding on the day of enumeration.

Draught animals are those animals - usually cattle, buffaloes, horses and mules - used for ploughing, threshing, pulling carts, carrying loads, lifting water, and any other crop-related work on the holding in the 1998 wet season or the 1998/99 dry season.

Use of vaccination means administering an animal with a substance to control or eliminate disease during the 12 months prior to the census. Vaccination is shown as being used for a given type of animal even if only some animals of that type had been vaccinated or if the vaccination was not up-to-date.

Agricultural machinery used refers to whether the given machinery was used for agricultural purposes during the 1998 wet season or the 1998/99 dry season. Machinery used may or may not be owned by the agricultural holding. Machinery means farm equipment driven by electricity, petrol/diesel engines, batteries, wind or water, or equipment used with such devices (such as tractor-driven ploughs). It does not include hand or animal operated equipment such as animal-pulled ploughs and hand sprayers. Agricultural machinery owned refers to whether the holding owned any of the given type of machinery on the day of enumeration.

Aquaculture is the raising of fish in captivity, as opposed to natural fishing in rivers, lakes, etc. Aquaculture data refer to facilities present on the day of enumeration. Other fishing refers to all fishing other than aquaculture. Data on other fishing refer to activities undertaken by the holding in the 12 months prior to the census.

The agricultural holder is the person exercising management control over the operations of the agricultural holding.

An economically active person is one whose main activity during the previous 12 months involved doing economic work, such as working on the family farm, working in a paid job, running a family business, etc. A person is not economically active if he/she was not mainly engaged in economic work during the previous year (such as students, retired persons and home-makers).

A person's main occupation is the activity he/she spent most time on during the previous 12 months.

Work on own holding means any agricultural work done on the household's own holding during the 1998 wet season and the 1998/99 dry season, including cultivating, sowing, weeding or harvesting of crops, and looking after livestock. A person may do work on the holding even though his/her main occupation is not an agricultural worker.

Off-holding work is any economic work, other than work on own holding, undertaken in the 12 months prior to the census. Paid agricultural work means farm work on someone else's holding, for which the person received some direct payment in the form of money or farm produce. It does not include farm labour provided free or work done in exchange for labour. Non-agricultural work is any economic work other than paid agricultural work, including work in a paid non-agricultural job and work in a family business. A person may do both paid agricultural and non-agricultural work.

Unpaid agricultural work means farm work undertaken on someone else's holding in the 12 months prior to the census, including work in exchange for labour and labour provided free.

Duration of crop work means the number of months during the 1998 wet season and the 1998/99 dry season in which the person did any crop-related work on the holding, regardless of the number of hours or days of work done. Duration of livestock work is the average daily time spent on livestock activities.

Outside labour means the employment of people, other than household members, to do paid or unpaid agricultural work on the holding during the 1998 wet season and the 1998/99 dry season. Type of payment refers to how outside labourers were paid. A holding may have more than one type of payment method.

### **General notes on the tables**

The data presented in the tables are subject to sampling errors. There may be minor discrepancies between sums of component items and totals because of rounding. The symbol “-” in a table means that the figure is nil or negligible (less than one half of the unit indicated).

## **3. COMPARABILITY OF DATA WITH OTHER SOURCES**

Land and crop area data given in the tables may not be consistent with data from other sources because:

- The census only covers the household sector.

- Land and crop data in the census for a district or province refer to the land operated by households living in the district or province, not the land located within the district or province.
- Sometimes, a piece of land is operated by one household in the wet season and another household in the dry season and is therefore counted twice in the area data.
- Area data exclude the land of those households who do not have 0.02 ha of agricultural land or sufficient livestock to be included in the census. This should have little effect on crop-related data. However, it could affect data on non-agricultural land, such as forests and fish ponds, because a household may have a large area of such land but no agricultural land or livestock.
- Crop area data exclude scattered crops and crops grown in very small plots (less than 100 square metres). Many households grow vegetables or other crops on very small plots, and therefore this could be significant.

Data on livestock numbers given in the tables may not be consistent with data from other sources because:

- The census only covers the household sector.
- Livestock data in the census for a district or province refer to the animals raised by households living in the district or province, not the animals in the district or province.
- The census livestock data refer to the number of animals on the day the household was enumerated in the census: some time between 22 February and 19 March 1999.
- The census only covers livestock raised by agricultural holdings; this excludes households with just a few animals and little or no agricultural land.