PREFACE

This report presents results of the Lao Census of Agriculture 2010/11. It highlights the major findings of the census, featuring commentary and graphical presentations, as well as some summary tables. Results are shown for each province. The report is available in Lao and English as separate documents.

The Lao Census of Agriculture 2010/11 was the second agricultural census undertaken in Lao PDR; the first was conducted in 1998/99. Since the first census, there have been significant changes in the agricultural sector and these changes needed to be captured in another census.

The Lao Census of Agriculture 2010/11 covered the whole of Lao PDR, including all 143 districts in the country. The census had three components:

- **Village component**: a survey of all villages in the country to collect data from village heads on rural infrastructure and services.
- **Household component**: a survey of all households in Lao PDR to collect basic data on crops and livestock.
- **Sample farm household component**: a sample survey of 41,660 farm households to collect detailed data on agricultural production activities.

The census data collection was undertaken in March 2011. Crop data were collected in respect of the 2010 wet season and the 2010/11 dry season. The census methodology is outlined in Chapter 3.

This report presents only summary data from the Lao Census of Agriculture 2010/11. Further results are available on request and can be made available in hard copy or electronic form. For more information, contact the Centre for Statistics and Information, Department of Planning, Ministry of Agriculture and Forestry (phone 021 416556).

There are differences between the some census results shown in this report and data from other sources. This is mainly because of different data collection methodologies, but might also reflect data quality problems. For more information, see Section 3.11 on Page 22.

The Lao Census of Agriculture 2010/11 was undertaken under the overall control of the Agricultural Census Steering Committee, chaired by Mr Somsavat Lengsavad, Deputy Prime Minister. The work on the census was undertaken by the Agricultural Census Office, which was established in the Department of Planning of the Ministry of Agriculture and Forestry. The Department of Statistics of the Ministry of Planning and Investment provided technical assistance with this work.

I would like to thank all those who have contributed to the success of the census, especially members of the public who willingly participated in the census, without whose support and co-operation the census would not have been possible. The Government of Lao PDR is also appreciative of the support for the census provided through FAO by SDC and to other donors – IFAD, AusAID, AFD and GIZ – who supported the census data collection and processing. Financial assistance was also received from the Sustainable Natural Resource Management and Productivity Enhancement Project.

Vientiane, May 2012
Director-General
Department of Planning, Ministry of Agriculture and Forestry
Agricultural Census Office
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## LAO CENSUS OF AGRICULTURE 2010/11: RESULTS IN BRIEF

### Farm household characteristics

<table>
<thead>
<tr>
<th></th>
<th>1998/99</th>
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<tr>
<td><strong>Farm households</strong></td>
<td></td>
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<tr>
<td>No. of households ('000)</td>
<td>798</td>
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<tr>
<td>No. of farm households ('000)</td>
<td>668</td>
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<td>Farm households as percent of all households (%)</td>
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<tr>
<td>Rural households as percent of all households (%)</td>
<td>..</td>
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<tr>
<td>Farm population ('000)</td>
<td>4,058</td>
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<td>Average household size</td>
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### Area of land holdings

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<tr>
<td><strong>Area of agricultural land ('000 ha)</strong></td>
<td>976</td>
<td>1,623</td>
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<tr>
<td>Average area of holding (ha)</td>
<td>1.6</td>
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</tr>
<tr>
<td>Farm households by area of holding (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Less than 1 ha</td>
<td>36</td>
<td>22</td>
</tr>
<tr>
<td>• 1-2 ha</td>
<td>36</td>
<td>32</td>
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<td>• 2 ha and over</td>
<td>27</td>
<td>46</td>
</tr>
<tr>
<td>Average parcel size (ha)</td>
<td>0.77</td>
<td>0.90</td>
</tr>
</tbody>
</table>

### Area of agricultural land by main use ('000 ha)

- **Temporary crops**
  - 765 | 1,230 |
  - Left fallow | 112 | 198 |
  - Permanent crops | 81 | 168 |
  - Grazing land | 18 | 26 |

### Land tenure

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<tr>
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<th>2010/11</th>
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<td><strong>Land tenure (% of land area)</strong></td>
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<tr>
<td>• Owned</td>
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<td>93</td>
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<tr>
<td>• Other</td>
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### Rice cultivation

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<td><strong>Rice area planted by season ('000 ha)</strong></td>
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<td></td>
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<tr>
<td>• Wet season lowland</td>
<td>481</td>
<td>714</td>
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<tr>
<td>• Wet season upland</td>
<td>199</td>
<td>215</td>
</tr>
<tr>
<td>• Dry season</td>
<td>56</td>
<td>57</td>
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<td><strong>Rice growers by season ('000)</strong></td>
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<tr>
<td>• Wet season lowland</td>
<td>419</td>
<td>535</td>
</tr>
<tr>
<td>• Wet season upland</td>
<td>260</td>
<td>240</td>
</tr>
<tr>
<td>• Dry season</td>
<td>93</td>
<td>87</td>
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<tr>
<td><strong>Glutinous rice (% of rice area)</strong></td>
<td>93</td>
<td>92</td>
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<tr>
<td><strong>Improved varieties (% of growers)</strong></td>
<td>30</td>
<td>41</td>
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### No. of farm households growing other crops ('000)

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<th>2010/11</th>
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<td>Vegetables</td>
<td>233</td>
<td>317</td>
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<tr>
<td>Cassava</td>
<td>71</td>
<td>48</td>
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<tr>
<td>Sugar cane</td>
<td>22</td>
<td>13</td>
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</table>

### No. of farm households with permanent crops ('000)

<table>
<thead>
<tr>
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<th>2010/11</th>
</tr>
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<tr>
<td>Mango</td>
<td>152</td>
<td>188</td>
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<tr>
<td>Banana</td>
<td>109</td>
<td>70</td>
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<tr>
<td>Rubber</td>
<td>-</td>
<td>49</td>
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<td>Farm household characteristics</td>
<td>1998/99</td>
<td>2010/11</td>
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<td>-------------------------------</td>
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<td>---------</td>
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<tr>
<td><strong>Use of inputs (% of temporary crop growers)</strong></td>
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<td>Chemical fertilizers</td>
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<td>Organic fertilizers</td>
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<td>41</td>
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<tr>
<td>Pesticides</td>
<td>11</td>
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<tr>
<td><strong>Livestock and poultry ('000 of animals)</strong></td>
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<tr>
<td>Cattle</td>
<td>944</td>
<td>1,586</td>
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<tr>
<td>Buffaloes</td>
<td>992</td>
<td>774</td>
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<tr>
<td>Pigs</td>
<td>1,036</td>
<td>978</td>
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<tr>
<td>Local chickens</td>
<td>9,379</td>
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<tr>
<td>Ducks</td>
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<td>1,791</td>
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<td><strong>Number of farm households with livestock ('000)</strong></td>
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<td>Buffaloes</td>
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<td>Pigs</td>
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<tr>
<td>Local chickens</td>
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<td>488</td>
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<tr>
<td>Ducks</td>
<td>191</td>
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<td><strong>Average animals per livestock holding</strong></td>
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<td>Cattle</td>
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<tr>
<td>Local chickens</td>
<td>19.3</td>
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<tr>
<td>Ducks</td>
<td>7.1</td>
<td>8.4</td>
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<tr>
<td><strong>Use of vaccination (% of livestock holdings)</strong></td>
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<td>Cattle</td>
<td>36</td>
<td>56</td>
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<tr>
<td>Buffaloes</td>
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<td>60</td>
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<tr>
<td>Pigs</td>
<td>8</td>
<td>18</td>
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<td><strong>Farm machinery (% of farm households)</strong></td>
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<td>Owned two-wheel tractor</td>
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<td>Used two-wheel tractor</td>
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<td>Owned water pump</td>
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<tr>
<td>Used water pump</td>
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<td><strong>Number of farm households engaged in fisheries ('000)</strong></td>
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<td>Aquaculture</td>
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<td>68</td>
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<td>Capture fisheries</td>
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<td><strong>Farm labour</strong></td>
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<td>Farm occupations (% employed persons 15 &amp; over)</td>
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<td>Main occupation on holding but also did work off holding (% 15 &amp; over with main occupation on holding)</td>
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<tr>
<td>Farm households using outside labour (%)</td>
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<tr>
<td><strong>Sale of farm produce (% of farm households)</strong></td>
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<td>Main purpose for sale</td>
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<td>Sold some produce</td>
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### Characteristics of rural villages

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<th>Percent of rural villages, 2011</th>
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<td>Primary school less than 1 hour walk</td>
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<td>Dispensary or hospital less than 2 hours walk</td>
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<tr>
<td>Electricity available</td>
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<tr>
<td>Connected to electricity grid</td>
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<td>Safe water supply</td>
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<tr>
<td>Piped water supply available</td>
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<tr>
<td><strong>Agricultural infrastructure</strong></td>
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<td>Irrigation facilities</td>
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<td>Veterinary clinic</td>
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<td><strong>Agricultural conditions</strong></td>
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<td>UXO-affected agricultural land</td>
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<tr>
<td>2010 wet season dryer than normal</td>
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<tr>
<td>Recent years’ rainfall less than normal</td>
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<td>Recent years’ wet season later than normal</td>
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<td>Prone to flood</td>
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<td>Prone to drought</td>
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<td>Lack of land an agricultural constraint</td>
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<td>Lack of irrigation an agricultural constraint</td>
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<td>Lack of markets an agricultural constraint</td>
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<td>Contract farming in the village</td>
<td>16</td>
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<td>Living standards improved in last 2 years</td>
<td>86</td>
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CHAPTER 1
SUMMARY OF FINDINGS
KEY FARM HOUSEHOLD RESULTS

1.1 Farm households (*Tables A1.1-A1.3*)

Lao PDR continues to be a predominantly rural country, with 69% of households living in rural villages, including 85,000 households living in rural villages without road access.

In 2010/11, there were 783,000 farm households in the country. A farm household is a household engaged in agricultural production activities; that is, growing crops, raising livestock, or engaged in aquaculture (see Section 3.9).

Of the 783,000 farm households, 209,000 live in upland villages and 188,000 live in villages in plateau areas. In rural villages, 90% of households are farm households.

<table>
<thead>
<tr>
<th>Village type</th>
<th>Lowland</th>
<th>Upland</th>
<th>Plateau</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>95.1</td>
<td>20.2</td>
<td>32.6</td>
<td>147.8</td>
</tr>
<tr>
<td>Rural with road</td>
<td>263.6</td>
<td>150.4</td>
<td>142.3</td>
<td>556.3</td>
</tr>
<tr>
<td>Rural without road</td>
<td>27.2</td>
<td>38.8</td>
<td>12.7</td>
<td>78.8</td>
</tr>
<tr>
<td>Total</td>
<td>385.9</td>
<td>209.4</td>
<td>187.6</td>
<td>782.8</td>
</tr>
</tbody>
</table>

In 2010/11, the number of farm households was 115,000 higher than in 1998/99, an increase of 17%. However, the importance of agriculture has declined relative to other sectors, with increasing urbanization and alternative employment opportunities. In 2010/11, 77% of households in Lao PDR were farm households, compared with 84% in 1998/99.

The number of non-farm households in Lao PDR increased sharply between 1998/99 and 2010/11 – from 130,000 to nearly 240,000. Nearly 90,000 non-farm households live in Vientiane Capital; over 70,000 live in rural villages.

Agriculture continues to be the predominant livelihood in northern provinces, with 89% of households engaged in agricultural production in 2010/11. In Phongsaly, the percentage is as high as 96%, with only just over 1,000 non-farm households in the province.

In the south, only 71% of households in Champasack are farm households. In Attapeu, the percentage is 84%, down from 90% twelve years earlier.

In 2010/11, less than a third of households in Vientiane Capital were farm households, compared with a half in 1998/99. There were 5,800 fewer farm households in the Capital in 2010/11 than in 1998/99.

The last ten years in Lao PDR has seen a major shift from subsistence to market-oriented agriculture. In 1998/99, only 6% of farm households produced mainly for sale and now that figure has risen to 30%. This trend is most apparent in the north: 54% of farm households in Xayabury and 45% in Luangprabang produce mainly for sale.
Increasing numbers of subsistence farmers are marketing some farm produce, especially those living near towns and in border areas. In 2010/11, 71% of farm households sold some farm produce, compared with only 35% in 1998/99. Sale of farm produce is highest in northern provinces, especially Oudomxay, Luangprabang, Huaphanh and Xayabury. It is lowest in Borikhamxay, Khammuane and Savannakhet. In Xiengkhuang, 59% of farm households sell some livestock produce.

The increase in agricultural land is more than enough to meet the needs of an increasing population. For the farm population in Lao PDR, there was an average of 0.36 ha of agricultural land per person in 2010/11, compared with 0.24 ha in 1998/99. The figure was lowest in Huaphanh (0.20 ha per person).

### Table 1.3: Land use of farm households, 1998/99 and 2010/11

<table>
<thead>
<tr>
<th>Land use</th>
<th>Area ('000 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land</td>
<td></td>
</tr>
<tr>
<td>Land under temporary crops</td>
<td>976</td>
</tr>
<tr>
<td>Land temporarily fallow</td>
<td>765</td>
</tr>
<tr>
<td>Land under permanent crops</td>
<td>112</td>
</tr>
<tr>
<td>Meadows and pastures</td>
<td>81</td>
</tr>
<tr>
<td>Non-agricultural land</td>
<td></td>
</tr>
<tr>
<td>Forest and other wooded land</td>
<td>54</td>
</tr>
<tr>
<td>Other land</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>1,048</td>
</tr>
</tbody>
</table>

The total area of agricultural land in 2010/11 was 1.62 million hectares, compared with 976,000 ha in 1998/99. Thus, an additional 647,000 ha of land were brought under cultivation over the twelve-year period. The area under permanent crops more than doubled to 168,000 ha.

### 1.2 Land (Tables A1.4-A1.8)

The total area of agricultural land in 2010/11 was 1.62 million hectares, compared with 976,000 ha in
The 777,000 farm households with land in Lao PDR in 2010/11 averaged 2.4 ha in size. This compares with 1.6 ha in 1998/99. The average area of agricultural land per farm household was 2.1 ha in 2010/11, compared with 1.5 ha in 1998/99.

Farm sizes are highest in Savannakhet (3.1 ha) and lowest in Huaphanh (1.3 ha). For the country as a whole, 22% of farm households are less than 1 ha in size; 27% have 3 ha or more land. The largest 25% of farm households have well over half of the land; the smallest 40% have less than 15% of the land.

A typical farm in Lao PDR consists of two or three separate land parcels. Only 4% of farm households have more than five parcels. The average parcel size was 0.90 ha in 2010/11, compared with 0.77 ha in 1998/99. Land is most fragmented in the northern provinces. In Phongsaly, there is an average of 3.8 parcels per farm household with an average parcel size of 0.43 ha. In Sekong, there are 1.9 parcels per farm household and the average parcel size is 1.25 ha.

For farm households, 93% of land is operated under “owner-like” tenure. However, land rental has become more common: in 2010/11, 9% of farm households rented in some land, compared with only 5% in 1998/99. In 1998/99, most land was rented under share cropping arrangements (63%); this figure was only 21% in 2010/11.

The number of land holdings not operating any of their own land is increasing. In 1998/99, only 16,000 farm households did not own any land; this had risen to 46,000 by 2010/11.

A quarter of farm households in Vientiane Capital rent in some land. Land rental is also common in Oudomxay, Huaphanh, Xiengkhuang and Vientiane Province. Land rental is more common for small holdings: 18% of those of size less than 1 ha rent in land, compared with 6% for those size 1 ha or more.

### 1.3 Crops (Tables A1.9-A1.17)

In 2010/11, 1.23 million hectares of temporary crops were planted on 1.43 million hectares of arable land in Lao PDR. This represents a cultivation intensity of 86%, slightly lower than in 1998/99. Cultivation intensity was highest in Vientiane Capital and Champasack (each 99%) and lowest in Luangprabang (59%). Cultivation intensity is higher on small holdings.

### Rice

The predominant crop in Lao PDR is rice: 724,000 farm households grew rice in 2010/11, 71% of all households in the country. This is down from 77% in 1998/99.

The total area of rice planted in 2010/11 was 987,000 ha: 714,000 ha of wet season lowland rice, 215,000 ha of upland rice, and 57,000 ha of dry season rice. The most important rice growing provinces are Savannakhet (220,000 ha) and Champasack (101,000 ha).

The number of wet season rice growers increased from 607,000 in 1998 to 718,000 in 2010. There were 17,600 more wet season rice growers in Vientiane Province and 16,300 in Savannakhet. There were 1,800 fewer wet season rice growers in Vientiane Capital.

The average size of wet season rice holding increased over the twelve year period: from 1.12 ha in 1998 to 1.30 ha in 2010. Rice farms tend to be smaller in the north, averaging less than a hectare, compared with 1.5 ha in the rest of the country. The average in Savannakhet is 2.0 ha.

Upland rice is cultivated mainly under a rotating cultivation system. Of the 215,000 ha of upland rice,
rotating cultivation was used for an estimated 169,000 ha. There was an estimated 32,000 ha of rice grown using shifting cultivation.

In Northern Region, 57% of the rice crop is upland rice, compared with only 9% in the centre and 12% in the south. In Huaphanh, 30% of rice growers grow lowland rice only, 30% grow both lowland and upland rice, and 40% grow upland rice only.

The number of dry season rice growers fell between 1998/99 and 2010/11: from 93,000 to 87,000. There were 3,700 fewer dry season rice growers in Vientiane Capital; in Saravane, there were 2,000 more dry season rice growers. The average dry season rice grower in 2010/11 planted 0.65 ha of dry season rice. This was slightly up on the 1998/99 figure of 0.59 ha.

One in eight rice farmers plant a dry season rice crop, slightly down on twelve years ago. Nearly half the rice farmers in Vientiane Capital grow rice in the dry season. Elsewhere, the figure is much lower: in Savannakhet, only one in ten rice farmers plant a dry season rice crop.

Overall, 92% of rice grown in Lao PDR is of the glutinous variety. This percentage has changed little over the last twelve years. Non-glutinous rice is most common in Phongsaly and Luangnamtha, where it represents 39% of the rice crop.

In 2010/11, improved varieties accounted for 45% of rice planted in Lao PDR, compared with 29% in 1998/99. Improved varieties were most widely used in Champasack (82% of rice growers) and Savannakhet (74% of rice growers).

**Other temporary crops**

Cropping is becoming more diversified in Lao PDR. In 2010/11, there were 59,000 farm households not growing rice. In the north-west, increasing numbers of farmers are growing other crops such as vegetables in response to the opening up of new markets. In Phongsaly, there are 3,200 non-rice growing farm households, compared with only 700 in 1998/99.

After rice, maize is the most common temporary crop in Lao PDR. In 2010/11, there were 187,300 maize growers, who planted a total of 134,500 ha of maize, a five-fold increase in area planted from 1998/99. Maize is mainly grown in the north of the country. More than half of all farm households in Phongsaly, Oudomxay, Huaphanh and Xiengkhuang grow maize.

There are 47,900 cassava growers in Lao PDR. The main cassava producing provinces are Borikhamxay, Vientiane Capital and Saravane. Cassava farms in

---

**Table 1.4: Temporary crops other than rice, 1998/99 and 2010/11**

<table>
<thead>
<tr>
<th>Crop type</th>
<th>No. of growers</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>149,900</td>
<td>187,300</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>19,600</td>
<td>10,200</td>
</tr>
<tr>
<td>Cassava</td>
<td>71,000</td>
<td>47,900</td>
</tr>
<tr>
<td>Yam</td>
<td>8,900</td>
<td>3,800</td>
</tr>
<tr>
<td>Mung bean</td>
<td>3,100</td>
<td>2,600</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>22,400</td>
<td>13,000</td>
</tr>
<tr>
<td>Groundnut</td>
<td>21,400</td>
<td>28,500</td>
</tr>
<tr>
<td>Soybean</td>
<td>4,800</td>
<td>6,900</td>
</tr>
<tr>
<td>Sesame</td>
<td>19,000</td>
<td>25,700</td>
</tr>
<tr>
<td>Cotton</td>
<td>9,300</td>
<td>1,100</td>
</tr>
<tr>
<td>Tobacco</td>
<td>18,400</td>
<td>14,800</td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td>88,200</td>
<td>105,900</td>
</tr>
<tr>
<td>Watermelon</td>
<td>11,000</td>
<td>7,500</td>
</tr>
<tr>
<td>Chili</td>
<td>127,500</td>
<td>126,200</td>
</tr>
</tbody>
</table>

1. Area excludes crops planted in plots of less than 100 sm.
the Capital average 4.3 ha in size; elsewhere, they average 0.3 ha.

The area under sugar cane more than doubled between 1998/99 and 2010/11. There are now 13,000 sugar cane producers in Lao PDR, including 2,800 in Phongsaly and 2,100 in Luangnamtha.

Vegetable crops are also common in Lao PDR, often planted in small kitchen gardens or on river banks. In 2010/11, 317,100 farm households grew some vegetables; this represents 41% of all farm households, compared with 35% in 1998/99. The most commonly grown vegetables are chili, cabbage, cucumber, onion and melons. There were 2,000 ha of watermelons planted in 2010/11.

Groundnut (28,500 growers), tobacco (14,800 growers) and sesame (25,700 growers) are other important temporary crops in Lao PDR. The area planted to sesame rose sharply between 1998/99 and 2010/11 to 9,900 ha.

**Permanent crops**

Coffee has been the most important permanent crop, mainly grown on the Bolaven Plateau and in other southern provinces. In 2010/11, there were 25,200 coffee growers in Lao PDR, with 45,900 ha of coffee planted. This is an increase of 11% in area over the previous twelve years. There are 29,200 ha of coffee in Champasack and 10,000 ha in Saravane.

<table>
<thead>
<tr>
<th>Crop type</th>
<th>No. of growers</th>
<th>1998/99</th>
<th>Area (ha)</th>
<th>2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana</td>
<td>109,000</td>
<td>70,400</td>
<td>13,400</td>
<td>9,300</td>
</tr>
<tr>
<td>Mango</td>
<td>152,000</td>
<td>187,600</td>
<td>3,800</td>
<td>3,300</td>
</tr>
<tr>
<td>Papaya</td>
<td>23,000</td>
<td>14,000</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>Pineapple</td>
<td>25,900</td>
<td>12,200</td>
<td>2,300</td>
<td>2,100</td>
</tr>
<tr>
<td>Tamarind</td>
<td>68,000</td>
<td>76,500</td>
<td>1,500</td>
<td>1,000</td>
</tr>
<tr>
<td>Coffee</td>
<td>23,700</td>
<td>25,200</td>
<td>41,200</td>
<td>45,900</td>
</tr>
<tr>
<td>Tea</td>
<td>1,700</td>
<td>6,300</td>
<td>500</td>
<td>2,500</td>
</tr>
<tr>
<td>Coconut</td>
<td>109,100</td>
<td>110,700</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>Cardamom</td>
<td>6,100</td>
<td>13,300</td>
<td>5,200</td>
<td>6,400</td>
</tr>
<tr>
<td>Rubber</td>
<td>100</td>
<td>49,000</td>
<td>-</td>
<td>66,500</td>
</tr>
</tbody>
</table>

1. Area excludes crops planted in plots of less than 100 sm.

In recent years, the development of the rubber industry has been a feature of the agricultural sector. There was almost no rubber in Lao PDR at the time of the last agricultural census in 1998/99; by 2010/11, there were 49,000 farm households growing rubber and 66,500 ha under rubber plantations. Most rubber is in the north, especially in Phongsaly, Luangnamtha and Oudomxay. Those three provinces account for 59% of the total rubber area. In Luangnamtha, well over half the farm households are growing rubber.

Fruit trees are common in Lao PDR, but are usually only scattered trees, rather than plantations. The most common fruit trees are mango, banana, jackfruit and tamarind. There are just over two million mango trees in the country.

**Figure 1.6: Rubber growers, 2010/11**

Irrigation (Tables A1.18-A1.19)

Irrigation means purposely providing land with water, other than rain, for agricultural purposes. In the Lao Census of Agriculture 2010/11, farm households were asked about whether they used irrigation for their crops during the 2010 wet season and the 2010/11 dry season. This included irrigation through Government irrigation schemes as well as other irrigation facilities.
In all, 22% of the 1.62 million hectares of agricultural land was irrigated during 2010/11. A total of 192,000 ha of rice were irrigated during 2010/11; 15% of the wet season rice crop was irrigated in 2010.

Table 1.6: Area of rice ('000 ha) by use of irrigation, 1998/99 and 2010/11

<table>
<thead>
<tr>
<th></th>
<th>1998/99</th>
<th>2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet season rice</td>
<td>680</td>
<td>930</td>
</tr>
<tr>
<td>Irrigated</td>
<td>206</td>
<td>135</td>
</tr>
<tr>
<td>Not irrigated</td>
<td>473</td>
<td>795</td>
</tr>
<tr>
<td>Irrigated dry season rice</td>
<td>56</td>
<td>73</td>
</tr>
</tbody>
</table>

1.5 Livestock (Tables A1.20-A1.26)

Cattle are becoming increasingly important in Lao PDR. Buffaloes are kept for use as draught animals, especially in the south, but, with increasing farm mechanization, their numbers are declining. Pig raising is prevalent in upland areas. Many households raise a few chickens or ducks.

Table 1.7: Main livestock and poultry types, 1999 and 2011

<table>
<thead>
<tr>
<th>Livestock type</th>
<th>Farm h’holds with ('000)</th>
<th>No. of livestock ('000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1999</td>
<td>2011</td>
</tr>
<tr>
<td>Cattle</td>
<td>208</td>
<td>297</td>
</tr>
<tr>
<td>Buffaloes</td>
<td>322</td>
<td>226</td>
</tr>
<tr>
<td>Pigs</td>
<td>328</td>
<td>306</td>
</tr>
<tr>
<td>Goats</td>
<td>26</td>
<td>43</td>
</tr>
<tr>
<td>Local chickens</td>
<td>487</td>
<td>488</td>
</tr>
<tr>
<td>Com. chickens</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ducks</td>
<td>191</td>
<td>213</td>
</tr>
</tbody>
</table>

Cattle numbers increased by two-thirds between 1999 and 2011, with 38% of all farm households in Lao PDR now raising cattle, up from 31% twelve years earlier. Less than 1% of cattle are improved breed. Only 10% of households raising cattle did so for draught purposes. Cattle herd sizes are increasing: the average cattle holding in 2011 had 5.3 cattle, compared with 4.5 in 1999.

Cattle raising is now common in both lowland and upland areas, and has become increasingly important in the centre: in 2011, 50% of farm households in Central Region were raising cattle, up from 37% in 1999. Herd sizes are also bigger in the centre, averaging 5.7 animals. Cattle raising is especially prominent in Xiengkhuang, where 62% of farm households in the province are raising cattle.

Over 60% of cattle are aged two years or more; amongst these, females outnumber males by more than three to one. Calves make up only 13 percent of cattle numbers.

In 1999, nearly half of the farm households in Lao PDR had buffaloes. By 2011, this figure had fallen to less than a third. Of farm households with buffaloes, 36% raise buffaloes for draught purposes; 37% raise buffaloes for meat. Nearly half of those with buffaloes have only one or two animals.

In the south, 41% of farm households are raising buffaloes, compared with 59% twelve years ago. In Vientiane Capital, where the use of farm machinery is highest, only 6% of farm households have buffaloes.

Nearly 60% of buffaloes are aged three years or over; amongst these, there are 3.5 females for every male. Calves make up only 7% of buffalo numbers.

Pig raising is still a major livestock industry but its growth appears to be waning. Fewer households were raising pigs in 2011 than in 1999. Pig numbers fell slightly over this period. In all, 61% of upland farm households raise pigs, compared with only 28% of lowland farm households. The average number of pigs kept in 2011 was 3.2, the same as in 1999. Over 60% of those raising pigs keep only one or two pigs; only 5% have 10 or more pigs.

In 2011, 62% of farm households kept local chickens, compared with 73% in 1999. Local chicken numbers fell by over 700,000 between 1999 and 2011. However, the number of commercial chickens rose by 359,000 over that period. More than two-thirds of the commercial chickens are in...
Vientiane Capital. Of the adult local chickens, 37% were layers.

In 2011, 27% of farm households kept ducks, a similar rate to 1999. Between 1999 and 2011, duck numbers rose by a third to 1.8 million. Nearly 60% of ducks are broilers.

There are also 63,000 other poultry, mainly turkeys and geese.

Livestock producers in Lao PDR are now using better animal health practices. Vaccination rates increased sharply between 1998/99 and 2010/11: from 36% to 56% for cattle, from 48% to 60% for buffaloes and from 8% to 18% for pigs.

Vaccination of cattle and buffaloes is less common in the north: in Oudomxay, only 27% vaccinated their cattle, compared with 70% in Khammuane. However, the north is showing the most significant improvements in vaccination. The vaccination rate for cattle in Oudomxay more than doubled between 1998/99 and 2010/11.

The vaccination rate for pigs in the north is similar to the rest of the country. As in 1998/99, the lowest pig vaccination rate in 2010/11 was in Huaphanh (8% compared with 2% twelve years previously). In Phongsaly, the pig vaccination rate increased from 3% to 17% over the twelve-year period.

The majority of livestock producers feed their animals on natural pasture, fodder crops such as maize, or crop by-products such as rice straw. Less than 2% have improved pasture grasses.

### 1.6 Farm practices (Tables A1.27-A1.29)

A significant feature of farm practices in Lao PDR is the increasing farm mechanization. The percent of farm households using a tractor increased three-fold between 1998/99 and 2010/11. Over a third of all farm households now own a two-wheel tractor, compared with only 7% twelve years before.

The most mechanized farms are in central provinces along the Mekong, where well over 80% use a two-wheel tractor. Use of farm machinery is still rare in upland farming in the north: only 25% of Phongsaly farm households use a tractor. Tractors are used less commonly on small holdings.

Farmers are increasingly using chemical fertilizers. In 2010/11, 42% of temporary crop growers used chemical fertilizer, compared with 29% twelve years earlier. More than half of crop growers in Southern and Central Provinces used chemical fertilizer. Only 16% did so in Northern Provinces.

Chemical fertilizers are often used in conjunction with organic fertilizers such as manure: 63% of those using chemical fertilizer also use organic fertilizer. In 1998/99, 59% of temporary crop growers used no fertilizer at all; by 2010/11, this had fallen to 43%.
For rice, chemical fertilizer is often used in conjunction with improved seeds. Of those rice growers using improved seeds in 2010/11, 67% applied some chemical fertilizer, compared with 27% of those using a local rice variety.

Only 17% of land holdings used pesticides in 2010/11, up from 11% in 1998/99.

In March 2011, 104,000 farm households had some agricultural credit, 13% of all farm households. More than a quarter of farm households in Oudomxay have agricultural credit. More than half of all credit was obtained without collateral; 61% of the rest used the household’s land as collateral.

In all, 55% of agricultural credit was obtained through public banks and 40% through Village Development Funds. Credit is mainly used to buy crop inputs (51%) or to buy farm animals (30%). Only 16% is used credit to buy farm machinery. In the north, credit is more likely to be used for livestock purposes: in Luangprabang, 59% used credit to buy livestock, 25% to buy crop inputs and 14% to buy livestock inputs.

The bigger the farm, the more likely it is to have credit: 16% of those of size 3 ha or more have credit compared with 8% of those with less than 0.5 ha of land. Large holdings are more likely to receive credit from banks; small holdings are more likely to receive credit from Village Development Funds.

Farmers in Lao PDR receive agriculture-related information from a variety sources. The most common sources of information are other farmers (55% of farm households) and the media, especially television (52%) and radio (43%).

1.7 Farm population (Tables A1.30-A1.31)

In March 2011, the farm population in Lao PDR was 4.5 million, an increase of 443,000 since the previous agricultural census in March 1999. This represents an increase of 0.9 percent per year, compared with an estimated population growth rate of 2.1% for Lao PDR as a whole over the same period\(^1\). This reflects the increasing importance to the Lao economy of non-agricultural sectors.

Farm household sizes are decreasing in line with lower fertility rates. The average size of farm households was 5.7 in 2011, compared with 6.1 in the previous agricultural census in 1999 and 5.8 for all private households in the Population and Housing Census 2005.

The sex ratio (number of males per 100 females) for farm households is 101.1, higher than for the general population. This may reflect different immigration patterns for men and women in farm households. The sex ratio is high in the north and most of the centre, but low in the south.

The dependency ratio (ratio of population aged 0-14 and 65 and over to the population aged 15-64 years) for farm households was 0.60 in 2011. This is consistent with the decreasing dependency ratio observed in the Population and Housing Census 2005. The dependency ratio for farm households is highest in Sekong, Saravane and Huaphanh.

1.8 Farm labour (Tables A1.32-A1.35)

In Lao PDR, most farm labour is still provided by household members, but the use of outside labour is increasing: 45% of farm households used outside labour in 2010/11, up from 26% in 1998/99. Of those employing outside labour, 56% do so on a labour exchange basis; 57% employ outside labour for cash payment, compared with 50% in 1998/99. Payment with farm produce is not common.

There are major differences across regions in the use and payment of outside labour. In the north, use of outside labour is more common (58% of farm households) but cash payment is less common (35%). In the south, only 25% of farm households used outside labour and it was generally on a cash basis (73%). As would be expected, larger holdings more commonly use outside labour; also, they are more likely to pay in cash.

1 Source: Population and Housing Census 2005.
The demand for outside labour is highest at the time of planting and harvesting the main rice crop. In the north, the peak labour demand is in June/July and November. Some labour is also needed in March-May to help with land preparation in upland areas. In the centre and south, the highest demand for labour is in June-August and November-December.

In 2011, there were 3.57 million people aged 10 years and over living in farm households. Of these, 2.72 million were usually employed in 2010/11. Most of those had a farming occupation, usually working on their own family farm. Only 109,000 worked in paid agricultural work. Only 325,000 had a non-farm occupation.

Table 1.9: Composition of household farm labour, 2010/11

<table>
<thead>
<tr>
<th></th>
<th>'000</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm population 10 years and over</td>
<td>3,569</td>
<td>100</td>
</tr>
<tr>
<td>Total doing some work on holding</td>
<td>2,655</td>
<td>74</td>
</tr>
<tr>
<td>Main job work on holding</td>
<td>2,286</td>
<td>64</td>
</tr>
<tr>
<td>Other main job but some work on holding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main job own non-farm business</td>
<td>69</td>
<td>2</td>
</tr>
<tr>
<td>Main job farm employee</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>Main job other employee</td>
<td>47</td>
<td>1</td>
</tr>
<tr>
<td>Not usually employed: some work on holding</td>
<td>216</td>
<td>6</td>
</tr>
</tbody>
</table>

There are now more alternative employment opportunities in rural areas and many people have secondary jobs. In 1998/99, only 24% of the farm population aged 15 years and over with main job work on own holding did some other work. By 2010/11, this had increased to 40%. Many work in other family businesses; 249,000 work as non-farm employees.

Farm work is seasonal and does not usually provide “full-time” work: only 11% of those aged 10 years and over with main job work on own holding worked 9-12 months a year on the family farm; 45% work for only 3-6 months. Caring for livestock usually requires less than an hour a day.

Men and women both provide labour for rice growing. Land preparation work is more likely to be performed by men. Both men and women work on transplanting and harvesting tasks.

Figure 1.10: Farm population by main economic activity, 2010/11

Only 36% of the farm population aged 10-14 were usually employed in 2010/11. The remaining 369,000 were students, unemployed or otherwise not employed. Of these, a quarter did some work on the family farm.

For the farm population aged 15 years and over, 84% were usually employed in 2010/11. Of these, 89% were employed in a farm occupation, down from 92% in 1998/99. There was little difference between males and females. Over 95% of the employed farm population aged 15 years and over in Sekong and Saravane have a farm occupation.

Household members mainly working off the holding also provide some farm labour during peak planting and harvesting periods. For persons aged 10 years and over, 152,000 usually employed in another job and 216,000 usually not employed also do some work on the family farm. This is on top of the 2.29 million mainly employed on the family farm.
1.9 Farm management (Table A1.36-A1.37)

In the previous agricultural census, the “agricultural holder” was defined as the main person responsible for managing farm operations. For the Lao Census of Agriculture 2010/11, households reported on the primary decision makers for the farm operations. This could be one or two persons.

Two-thirds of farm households reported that the farm operations were jointly managed. This was usually by husband and wife. More than 80% of single-management holdings were managed by men.

There are 51,300 agricultural holdings operated entirely by women, either solely or as co-holders. These are more likely to produce for their own use and have other sources of income. They are less likely to have livestock or engage in fishing.

1.10 Fisheries (Table A1.38)

Fishing is an important secondary activity for many farm households as a source of extra income or to supplement the family’s food supply.

In 2010/11, 68,200 farm households in Lao PDR were engaged in aquaculture, up from 55,500 in 1998/99. Usually, fish are cultivated in ponds. One in four farm households in Huaphanh and one in five in Xiengkhuang practise aquaculture.

Two thirds of farm households in Lao PDR engage in capture fisheries. Of these, 92% fish in rivers, 40% in lakes and 37% in rice fields. Capture fisheries is widespread around the country: in Phongsaly in the far north, 79% of farm households fish; in Attapeu in the far south, 74% of farm households fish.

Fishing is usually carried out for the household’s own consumption. Only about a thousand aquaculture producers have aquaculture as the main source of income. A third sell some aquacultural products. There are about 6,000 farm households with main source of income capture fisheries, while another 111,000 sell some capture fisheries products.

| Table 1.10: Number of farm households engaged in fisheries activities by type, 2010/11 |
|---------------------------------------------------------------|---|
| No. of farm households                                      | 782.8 |
| No. engaged in aquaculture                                  | 68.2 |
| Main source of income aquaculture                            | 1.0  |
| Other main source of income                                   | 67.2 |
| Sold some aquacultural produce                               | 21.3 |
| Did not sell any aquacultural produce                         | 45.8 |
| No. engaged in capture fisheries                             | 526.3|
| Main source of income capture fisheries                      | 5.9  |
| Other main source of income                                   | 520.3|
| Sold some capture fisheries produce                          | 111.2|
| Did not sell any capture fisheries produce                    | 409.1|

1.11 Forestry (Tables A1.39-A1.40)

Forest land is widely exploited in Lao PDR: 69% of farm households exploit public forest land. Most of those use the forest as a source of wood for fuel. Non-timber food products are also important: 49% of all farm households collect fruit and vegetables from the forest; 55% collect mushrooms from the forest.

Forestry activities are common in upland areas: 78% of upland farm households exploit public forests, compared with 64% in lowland areas. In the north, 86% of farm households in Phongsaly and 81% in Luangprabang exploit public forests. Nearly three-quarters of all farm households in Phongsaly collect some food products from the forest.

Forestry activity on the household’s own land is not common. In 2010/11, forest land on agricultural holdings amounted to 122,300 ha. Only 12% of farm households have some forest land on their holding.

Forest products often provide a source of income for farm households. Overall, 44,200 farm households reported that forestry was their main source of income. Over 200,000 farm households sold some forestry products from public forest land.
CHAPTER 2
SUMMARY OF FINDINGS
VILLAGE INFRASTRUCTURE

2.1 General

In March 2011, there were 8,662 villages in Lao PDR, compared with 11,251 at the time of the last agricultural census in March 1999. There were 1,362 urban villages and 7,300 rural villages.

Of the rural villages, there were 6,031 with road access and 1,269 without road access. The average rural village with road access consisted of 10 households; the average size of rural villages without a road was 68 households.

Also, 2,651 rural villages were in lowland areas, 2,908 were in upland areas, and 1,741 were classified as plateau or mixture of land types.

<table>
<thead>
<tr>
<th>Province</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>457</td>
<td>3,144</td>
<td>3,601</td>
</tr>
<tr>
<td>Phongsaly</td>
<td>52</td>
<td>489</td>
<td>541</td>
</tr>
<tr>
<td>Luangnamtha</td>
<td>37</td>
<td>319</td>
<td>356</td>
</tr>
<tr>
<td>Oudomxay</td>
<td>49</td>
<td>422</td>
<td>471</td>
</tr>
<tr>
<td>Bokeo</td>
<td>35</td>
<td>248</td>
<td>283</td>
</tr>
<tr>
<td>Luangprabang</td>
<td>160</td>
<td>623</td>
<td>783</td>
</tr>
<tr>
<td>Huaphan</td>
<td>28</td>
<td>693</td>
<td>721</td>
</tr>
<tr>
<td>Xayabury</td>
<td>96</td>
<td>350</td>
<td>446</td>
</tr>
<tr>
<td>Centre</td>
<td>731</td>
<td>2,699</td>
<td>3,430</td>
</tr>
<tr>
<td>Vientiane Capital</td>
<td>263</td>
<td>227</td>
<td>490</td>
</tr>
<tr>
<td>Xiengkhuan</td>
<td>69</td>
<td>443</td>
<td>512</td>
</tr>
<tr>
<td>Vientiane Province</td>
<td>87</td>
<td>419</td>
<td>506</td>
</tr>
<tr>
<td>Borikhamxay</td>
<td>56</td>
<td>267</td>
<td>323</td>
</tr>
<tr>
<td>Khammuan</td>
<td>111</td>
<td>476</td>
<td>587</td>
</tr>
<tr>
<td>Savannakhet</td>
<td>145</td>
<td>867</td>
<td>1,012</td>
</tr>
<tr>
<td>South</td>
<td>174</td>
<td>1,457</td>
<td>1,631</td>
</tr>
<tr>
<td>Saravane</td>
<td>31</td>
<td>574</td>
<td>605</td>
</tr>
<tr>
<td>Sekong</td>
<td>20</td>
<td>213</td>
<td>233</td>
</tr>
<tr>
<td>Champasack</td>
<td>101</td>
<td>542</td>
<td>643</td>
</tr>
<tr>
<td>Attapeu</td>
<td>22</td>
<td>128</td>
<td>150</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>1,362</td>
<td>7,300</td>
<td>8,662</td>
</tr>
</tbody>
</table>

2.2 General infrastructure (Tables A2.1-A2.4)

Infrastructure in Lao PDR is rapidly improving alongside economic development. As would be expected, urban areas have better infrastructure than rural areas. Lowland areas also have better infrastructure than upland and plateau areas.

In March 2011, 87% of all villages in Lao PDR were within an hour’s walk of a primary school and 62% were within a two-hour walk of a dispensary or hospital. One in six have a rice bank and 44% have a Village Development Fund.

Many rural villages still lack basic infrastructure, especially in more remote areas. Whereas 96% of urban areas have some electricity supply, only 70% of rural villages with road access and 39% of rural villages without road access have electricity. Rural villages often rely on small-scale generation facilities. Only 16% of rural villages without a road are connected to the national electricity grid; 20% use a hydro-generator.

Most urban villages (80%) have access to safe water, compared to 43% of rural villages with road access and only 20% of villages without road access.

Safe water is much less common in villages in the north (19%), compared with 59% in the centre and 75% in the south. A similar discrepancy exists in upland areas: only 18% of upland villages have safe water compared with 75% of lowland areas. Nearly half of all rural villages use a river, stream or dam as a source of household water, and over a third use water from a rainwater tank.

2 Safe water is piped water or a protected well/borehole.
People in many rural villages still face transport problems. Nearly 3,000 villages in the country – a third of all villages – do not have year-round road access to the district centre. As many as 55% of upland villages do not have year-round road access.

Generally, infrastructure in Phongsaly is poorer than other provinces. Only 11% of villages in that province are connected to the electricity grid and only 23% have safe water supply. Only 34% of villages have year-round road access. Two thirds of villages are more than two hours walk away from a dispensary or hospital.

Nearly 900 villages in Lao PDR have been resettled in the last ten years, including one in five upland villages. Resettlement has been highest in Oudomxay where more than 120 villages (a quarter of all villages) have been resettled in the last 10 years. Current planning provides for the resettlement of over 300 villages in the future.

2.3 Agricultural infrastructure

Very few rural villages have a permanent market. However, a third have a temporary market used to sell agricultural produce. Phongsaly (18%), Huaphanh (19%) and Sekong (13%) have the fewest agricultural produce markets. Agricultural produce markets are twice as common in lowland areas than upland areas.

Few rural villages have an agricultural input shop or a shop selling agricultural machinery. However, there is a petrol station in 28% of rural villages, including 18% of upland villages and 15% of villages without road access.

There are credit facilities in 44% of rural villages. Public banks are present in 17% of rural villages, including 14% of upland villages. There are few private banks in rural areas.

Village Development Funds are used for credit purposes in 32% of rural villages, including 26% of upland villages. Nearly 60% of rural villages in Bokeo have a Village Development Fund, compared with only 14% in Sekong.

A quarter of village heads in rural areas reported that there is some form of traditional or community fisheries management programme in the village.
2.4 Irrigation *(Tables A2.6, A2.9)*

Nearly half of the rural villages in Lao PDR have some irrigation facilities. Irrigation facilities are most common in Xayabury, where 74% of rural villages had some irrigation facilities. In Attapeu, only 15% of rural villages had irrigation facilities.

About 17% of rural villages have a permanent weir and 29% have a temporary weir. Only 7% have a pump scheme. In Xayabury, 42% of rural villages have a permanent weir and 62% have a temporary weir. Weirs are more common in the north.

![Figure 2.5: Irrigation infrastructure in rural villages, 2011](image)

2.5 Climate and natural disasters *(Tables A2.13-A2.14)*

During the Lao Census of Agriculture 2010/11, the enumerators asked village heads for their overall assessment of changes in weather patterns. For rural areas, 79% reported that recent wet seasons have been drier than 10 years ago; 73% felt that the rains were coming later than they used to.

The geographical dimensions of this will need to await more detailed analysis of the data. However, there may be more positive rainfall perceptions in certain central provinces in the Mekong valley – especially Vientiane Capital, Vientiane Province and Xayabury – and in Sekong where 22% of village heads in rural areas felt that recent wet seasons had been better than before.

There is a widespread perception around the country that farmers are at risk from natural disasters. Over 80% of heads of rural villages reported that the village was prone to natural disaster: 31% were prone to flooding and 70% were prone to drought conditions. Moreover, the majority felt that such episodes occurred every one to two years.

The Central Region is most prone to flooding – 40% of rural villages, compared with 24% in the north and 31% in the south. Drought problems were more commonly reported in the Southern Region – 88% of villages, compared with 67% in the north and 65% in the centre. Attapeu is prone to both flood (69% of villages) and drought (88% of villages).

Two thirds of rural villages report that farmers are prone to pest attack, including over 80% of villages in the south.

![Figure 2.6: Rural villages prone to flood and drought, 2011](image)

2.6 Environment *(Table A2.9)*

There is some rotating or shifting cultivation practised in two-thirds of rural villages around the country. Rotating cultivation is found in 53% of rural villages and shifting cultivation is found in 18% of rural villages. Nearly three quarters of rural upland villages have rotating cultivation and 29% have shifting cultivation. In Luangprabang, 95% of rural villages practise rotating or shifting cultivation.
In the census, village heads in rural villages were asked for their general assessment of the degree of soil degradation in the village. About 30% indicated that some soil degradation was present; 9% considered it moderate or severe. In Sekong, 55% of rural villages reported soil degradation: 11% considered it severe and 24% considered it moderate.

2.7 Socio-economic conditions (Table A2.7)

During the census, enumerators asked village heads whether they considered that living standards in the village had improved over the previous two years. This was a subjective assessment only.

Over 80% of village heads in rural areas felt that living standards had improved over the previous two years. This perception tended to be more prominent in central provinces. Southern provinces tended to be less positive. In Sekong, only 55% of rural villages reported improved living standards. Lowland areas were slightly more likely to report improving conditions that upland areas.

2.8 Agricultural marketing (Table A2.10)

The agriculture sector in Lao PDR is becoming increasingly market oriented. Most rural villages reported farmers selling some agricultural produce. Sale of agricultural produce was highest in the north (94% of rural villages), compared with 87% in the centre and 84% in the south.

Farming is solely subsistence in 15% of rural upland villages. A third of rural villages in Sekong and Attapeu have solely subsistence agriculture.

In 33% of rural villages, farmers sell agricultural produce in the local village market. In 54% of villages, farmers sell though a broker in the village and 71% sell through a broker in another village.

Contract farming is present in 14% of villages. Contract farming is common in the north: over half of Huaphanh villages have contract farming.

2.9 Agricultural constraints (Tables A2.9, A2.11)

During the census, village heads in rural areas were asked about the main constraints or problems faced
by farmers in the village. Problems were widely reported. The most common problem is lack of irrigation (59% of villages). Lack of vaccination was reported as a constraint by 40% of villages. This is a major problem in upland areas. Low commodity prices were also often mentioned.

Over 1,100 rural villages in Lao PDR – one in six rural villages – have agricultural land affected by UXO. The worst affected provinces are Xiengkhuang (54% of villages) and Sekong (58%). The total area of agricultural land affected by UXO in all areas (urban and rural) is estimated at over 170,000 ha.

![Figure 2.9: Agricultural constraints/problems reported by rural villages, 2011](image-url)
CHAPTER 3
TECHNICAL NOTES ON
LAO CENSUS OF AGRICULTURE 2010/11

3.1 Organizational arrangements

The Lao Census of Agriculture 2010/11 was undertaken under the overall control of the Agricultural Census Steering Committee, which was chaired by Mr Somsavat Lengsavad, Deputy Prime Minister. The work on the census was undertaken by the Agricultural Census Office (ACO), which was established in the Department of Planning of the Ministry of Agriculture and Forestry (MAF). The Department of Statistics (DoS) of the Ministry of Planning and Investment provided technical assistance with this work.

3.2 Outline of census methodology

The Lao Census of Agriculture 2010/11 covered the whole of Lao PDR, including urban areas in Vientiane and elsewhere. The census covered private households only. Agricultural activities of institutional units such as government farms, private companies and schools were excluded.

The census had three components:

- **Village component**: a survey of all villages in the country to collect data from village heads on rural infrastructure and services.
- **Household component**: a survey of all private households in Lao PDR to collect basic data on crops and livestock.
- **Sample farm household component**: a sample survey of 41,660 farm households to collect detailed data on agricultural activities.

3.3 Topics covered in the census

The census was developed based on the guidelines given in *A system of integrated agricultural censuses and surveys: Volume 1: World Programme for the Census of Agriculture 2010* (FAO 2005), taking into account the circumstances in Lao PDR.

A list of all data items collected in the census is shown in Appendix 3. The main items were:

- **Village component**: presence of electricity, irrigation facilities, credit facilities, schools, health facilities, agricultural market, public services and community facilities; transport links; sale of agricultural produce; shifting cultivation practices; sources of drinking water; UXO affected agricultural land; resettlement; soil degradation; weather patterns; natural disasters; and changes in living standards.
- **Household component**: identification of farm households; area of agricultural land; area irrigated; area of each temporary crop by season; area of productive and non-productive permanent crops; livestock numbers by type; purpose of agricultural production; sale of agricultural production; ownership of tractor and water pump; aquaculture and capture fisheries; household size; sex, age and ethnic group of household head; presence of forest land; and main source of income.
- **Sample farm household component**: farm size; land tenure; land fragmentation; land use; shifting and rotating cultivation; use of crop inputs; age, sex and purpose of livestock by type; vaccination; use of credit; agricultural marketing; certified agricultural produce; farm population by age and sex; employment of farm population; farm management; forestry activities; and types of fishing activities.

3.4 Sample design and selection

The sample for the sample farm household component was selected using two-stage sampling: a sample of villages was first selected, and then a sample of farm households was selected in each sample village.

In most districts, a sample of between 16 and 22 villages was selected, with 16 farm households selected in each sample village; that is, a sample of between 256 and 352 sample farm households in each district. The more villages or farm households in a district, the bigger the sample that was taken.
smaller sample was taken in urban districts and districts containing few villages or households.

In each district, the sample of villages was selected using stratified systematic probability proportional to size (PPS) sampling. A list of all villages in Lao PDR was prepared. Villages were divided into urban and rural strata, with rural strata being sampled more heavily than urban strata because of their agricultural importance. The estimated number of households in each village was used as the size measure for PPS sampling.

The sample of farm households in each sample village was selected using stratified systematic random sampling based on a list of all farm households in each village prepared following the household component of the census.

Altogether, 2,620 villages and 41,660 sample farm households were selected in the sample. The sample sizes for each province are shown in Table 3.1.

### Table 3.1: Lao Census of Agriculture 2010/11, sample size by province

<table>
<thead>
<tr>
<th>Province</th>
<th>Districts</th>
<th>Villages</th>
<th>Sample villages</th>
<th>Sample farm h'holds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phongsaly</td>
<td>7</td>
<td>541</td>
<td>131</td>
<td>2,094</td>
</tr>
<tr>
<td>Luangnamtha</td>
<td>5</td>
<td>356</td>
<td>93</td>
<td>1,488</td>
</tr>
<tr>
<td>Oudomxay</td>
<td>7</td>
<td>471</td>
<td>135</td>
<td>2,159</td>
</tr>
<tr>
<td>Bokoe</td>
<td>5</td>
<td>283</td>
<td>93</td>
<td>1,488</td>
</tr>
<tr>
<td>Luangprabang</td>
<td>12</td>
<td>783</td>
<td>219</td>
<td>3,491</td>
</tr>
<tr>
<td>Huaphanh</td>
<td>8</td>
<td>721</td>
<td>155</td>
<td>2,479</td>
</tr>
<tr>
<td>Xayabury</td>
<td>11</td>
<td>446</td>
<td>189</td>
<td>3,024</td>
</tr>
<tr>
<td>Vientiane Cap.</td>
<td>9</td>
<td>490</td>
<td>136</td>
<td>2,062</td>
</tr>
<tr>
<td>Xiengkhuan</td>
<td>8</td>
<td>512</td>
<td>148</td>
<td>2,332</td>
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<tr>
<td>Vientiane Prov.</td>
<td>13</td>
<td>506</td>
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<td>3,726</td>
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<tr>
<td>Bolikhamsay</td>
<td>7</td>
<td>323</td>
<td>124</td>
<td>1,984</td>
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<tr>
<td>Khammuanee</td>
<td>9</td>
<td>587</td>
<td>168</td>
<td>2,683</td>
</tr>
<tr>
<td>Savannakhet</td>
<td>15</td>
<td>1,012</td>
<td>289</td>
<td>4,566</td>
</tr>
<tr>
<td>Saravane</td>
<td>8</td>
<td>605</td>
<td>159</td>
<td>2,544</td>
</tr>
<tr>
<td>Sekong</td>
<td>4</td>
<td>233</td>
<td>71</td>
<td>1,133</td>
</tr>
<tr>
<td>Champasack</td>
<td>10</td>
<td>643</td>
<td>191</td>
<td>2,997</td>
</tr>
<tr>
<td>Attapeu</td>
<td>5</td>
<td>150</td>
<td>88</td>
<td>1,408</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>143</strong></td>
<td><strong>8,662</strong></td>
<td><strong>2,620</strong></td>
<td><strong>41,660</strong></td>
</tr>
</tbody>
</table>

### 3.5 Census field organization

There were four levels of census field organization.

Central coordinators, recruited from MAF, DoS and other central agencies in Vientiane, had overall responsibility for the census enumeration in a province. There were one or two central coordinators in each province. ACO provided a two-week training course for central coordinators.

Provincial coordinators, one from each of the provincial MAF and DoS offices, were appointed to assist the central coordinators. Provincial coordinators were trained at the same time as the central coordinators.

District supervisors were appointed to work under the control of the central and provincial coordinators to supervise the enumeration work. There were 312 district supervisors: two in most districts and three or four in larger districts. District supervisors were district-level staff from MAF and DoS. District supervisors were trained in a two-week training course given by the central/provincial coordinators.

Some 2,333 census enumerators were recruited to collect the census data. The enumerators were government staff from districts, as well as teachers, students, police officers and military personnel. Enumerators received five days of training provided by the district supervisors.

### 3.6 Census enumeration

The list of villages was sent to provinces and districts to identify villages for the census enumeration.

The census data collection was undertaken from 28 February to 8 April 2011. The enumerator’s task in each village was to:

- interview the village head to enumerate the village component;
- list all private households currently living in the village;
- interview each private household in the village to enumerate the household component;
- prepare a list of farm households in the village, based on responses to the household component; and
- (sample villages only) select a sample of farm households for enumeration in the sample farm household component, and interview sample households to collect the required data.

### 3.7 Census processing

Completed questionnaires were returned to ACO in Vientiane for processing. Processing involved:
checking that the census enumeration was complete; manually checking that questionnaires had been correctly filled out; coding of descriptive responses (such as crop types); entering data into the computer (using keyboard methods); running computer checks to identify and correct errors; and producing tabulations of census data.

There were nearly 1.2 million questionnaires and therefore it took some for the processing to be completed. Preliminary checking and coding was done from May-September 2011; data entry was done from June-December 2011; and error checking was done from August 2011-February 2012. Tabulations were prepared by April 2012.

3.8 Data presented in this report

This report presents results of all components of the census. Appendix 1 shows tables for the household and sample farm household components. Appendix 2 shows tables for the village component. Some commentary and key findings are presented in Chapter 1 (household and sample farm household components) and Chapter 2 (village component).

Most of the data in the household tables in Appendix 1 are obtained from the sample farm household component. However, some tables include data from the full enumeration household component. Tables are shown classified by province.

The village tables in Appendix 2 present the main village characteristics classified by province, together with national totals for village type (urban, rural with road, rural without road) and land type (lowland, upland, plateau, and mixture of land types). General infrastructure data are shown for all villages. Data related to agriculture are shown for rural villages only.

More detailed tables not shown in this report are also available on request.

3.9 Definitions of terms used in this report

Household and farm household data

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. Only private households were covered in the census; collective households – that is, households living in multiple accommodation units such as in hotels, temples, schools and hospitals – were excluded. A household is not the same as a family, which consists of related persons. Usually, a household consists of a single family or contains more than one family.

A farm household is a household that:

- operated 0.02 ha or more of agricultural land in the 2010 wet season or the 2010/11 dry season; or
- was raising 2 or more cattle or buffaloes, 5 or more pigs or goats, or 20 or more poultry at the time of the census; or
- was raising any other livestock at the time of the census; or
- had aquaculture facilities at the time of the census.

Agricultural land is land used for growing any temporary or permanent agricultural crops in the 2010 wet season or the 2010/11 dry season, land temporarily fallow during that period, or land under pasture.

To operate land means to have management control over growing crops or other activities on that land. Thus, land operated by a farm household includes land owned and operated by the household, as well as land operated by the household but rented from someone else. Land owned by the household but rented out to someone else is excluded.

Most farm households have some land, but a few raise livestock without having any land. A land holding is a farm household with some land. A livestock holding is a farm household that is not a land holding.

Area of holding is the area of all agricultural and non-agricultural land operated by the farm household. Non-agricultural land includes forest land, fish ponds, grazing land and wasteland. A livestock holding has zero area of holding.

A land parcel is any piece of land entirely surrounded by land, water, forest, road, etc. not forming part of that holding. A land holding consists of one or more 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 under certain land use conditions. 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 labour. Under land tenure, other includes squatter land, land not authorized for cultivation, or land borrowed from someone else. A farm household may have land of different tenure types.

Land use refers to the main use of the farm household’s land during the 2010 wet season and the 2010/11 dry season. Where 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 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 on which temporary crops were grown in the 2010 wet season or the 2010/11 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 2010 wet season and the 2010/11 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 during the reference year. 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 refers to land on which temporary crops were grown during the reference year, whereas area of temporary crops planted refers to the total area of all crops planted during the reference year. 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. Temporary crops that are not planted in a systematic manner or sufficiently densely to permit the area to be measured, or are less than 100 square metres in area, are not included in crop area figures but are included in the number of grower figures.

Rice data are shown by season, land type, seed type, rice type and maturity. Land type refers to whether it is lowland or upland. Upland rice is that grown under dry land conditions, including land permanently cultivated as well as shifting cultivation. Seed type refers to whether it is local or improved. Improved varieties are those that MAF 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 the length of the growing period: short maturing rice matures in about three months, medium maturing in about four months and long maturing in about five months.

Permanent crops are crops with a greater than one-year growing cycle, such as fruit and nut trees, bananas, coffee, tea and cardamom. Data on permanent crops refer to the crops present on the day of enumeration. Many permanent crops are not grown in a compact plantation but scattered around the holding. Scattered permanent crops or crops not planted in a systematic manner or sufficiently densely to permit the area to be measured are not included in crop area figures but are included in the number of grower figures.

Grazing land is land used for grazing livestock, including cultivated and naturally grown pastures, and permanent and temporary pasture land.

Forest land includes natural and planted timber tracts that have, or will have, value as wood, timber, other forest products, or for protection. Two types of forestry data were collected in the census: forest land that forms part of the land owned or operated by the household, and public forest land exploited by the household. Forest land owned by the household may be economically exploited or may be present for environmental or other purposes.

Other land includes land under water, land occupied by buildings or roads, wasteland, and other uncultivated land.

Cultivation intensity is the sum of the area 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 a cultivation intensity of 150%.

Livestock refers to animals and poultry raised mainly for agricultural purposes. To raise livestock means to have primary responsibility for looking after the animals on a long-term basis and to make day-to-day decisions about their use. Livestock numbers refer to those present on the day of enumeration. Average animals per holding is the average for those farm households with the particular type of livestock (not the average for all farm households).

Use of vaccination means administering an animal with a substance to control or eliminate disease. The reference period is the 2010/11 agricultural year. Vaccination is shown as being used even if only some animals of the given type had been vaccinated, or if the vaccination was not up-to-date.

Agricultural machinery used refers to use of machinery for agricultural purposes during the reference year, regardless of ownership. Machinery means farm equipment driven by electricity, petrol/diesel engines, batteries, wind or water, as well as 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. Data are also presented on agricultural machinery owned.

Fertilizers are mineral or organic substances, natural or manufactured, which are applied to soil to supply plants with nutrients or to enhance plant growth. Fertilizers contain the three primary nutrients (N, P2O5 and K2O). Data on fertilizers refer to their use during the reference year. Chemical fertilizers are fertilizers prepared from inorganic materials manufactured through an industrial process. Organic fertilizers are fertilizers prepared from processed plant or animal material and/or unprocessed mineral materials (such as lime, rock or phosphate). This includes animal manure and compost.

Pesticides are materials intended to mitigate, control or eliminate pests in plants or animals, including insecticides, herbicides, fungicides and rodenticides. Data on pesticides refer to their use during the reference year.

Agricultural credit refers to any type of loan of money received for purposes related to crop, livestock or aquaculture production activities. This includes credit for purchasing crop and livestock inputs, constructing farm buildings and purchasing farm machinery. For the agricultural census, the term “credit” refers to whether the household had debt existing at the time of the census enumeration; that is, the household still owed money on the loan.

Household size is the number of persons who usually live in the household. Farm population is the number of members of farm households.

A person is usually employed if he or she was usually engaged in an economic activity during the reference year 2010/11. It refers to work done in paid employment, on the family farm, or in another family business or profession. Persons who are students, unemployed, home-makers, retirees or too old or too sick to work are not employed.

An employee is a person working in paid employment; that is, he or she works in a job for which they receive payment either in money or in another form. A farm employee is someone working in paid employment in a farming occupation.

Main job refers to the main occupation of a usually employed person. Farm occupation means the person’s main job was a farm employee or work on the family farm.

In the Lao Census of Agriculture 2010/11, data were collected on usual employment and secondary employment. Thus, household members could have a main job off the family farm but work on the family farm at peak periods as a secondary activity.

Outside labour means the employment of people, other than household members, to do agricultural work on the holding during the reference year. Type of payment refers to how outside workers are paid.

Aquaculture is the raising of fish in captivity. Aquaculture data refer to facilities present on the day of enumeration. Capture fisheries refers to all fishing other than aquaculture undertaken during the reference year.

Village data

The percentages in the village tables are measured relative to the total number of villages in the class as shown in the first column of the table. Thus in Table A2.1, the percent of villages connected to electricity grid is the number of villages connected to the electricity grid as a percent of all villages in the
province, village type or land type class. It is not the number of villages connected to the electricity grid as a percent of households with electricity.

Data on infrastructure and services refer to whether the particular type of infrastructure or service is present, or is available to or used by people in the village.

Village type (urban; rural with road; rural without road) is based on DoS definitions determined according to the availability of services (roads, electricity, water supply and public services).

Land type (lowland; upland; plateau; mixture) is based on the village head’s assessment of land conditions in the village. Only 31 villages reported a mixture of land types and these are included under plateau.

Primary school less than one hour’s walk means that either:
- there is a primary school in the village; or
- there is no primary school in the village, but there is a primary school within one hour’s walk of the village.

Dispensary or hospital less than two hours’ walk means that either:
- there is a dispensary or hospital in the village; or
- there is no dispensary or hospital in the village, but there is a dispensary or hospital within two hour’s walk of the village.

Safe water means that the village has either a piped water supply or a protected well or borehole.

Data on living standards refer to the village head’s overall assessment of conditions in the village.

UXO affected land refers to agricultural land affected in some way by UXO. It includes agricultural land not cultivated because of the presence of UXO, as well as land that is still cultivated despite the presence of UXO.

Soil degradation refers to the decline in soil quality, such as soil erosion and loss of soil fertility. This is based on the village head’s overall assessment of soil conditions in the village.

Rotating cultivation and shifting cultivation refer to the practice of farming a piece of land for one or more years before abandoning it. Under rotating cultivation, the land is cultivated on a rotating basis; that is, the land is left for some years to regain fertility before being cultivated again. Under shifting cultivation, the land is abandoned permanently.

Assessment of weather conditions is based on the village head’s assessment of the change in weather conditions. Three aspects are considered: (i) the rainfall in the last few years compared with normal; (ii) the rainfall in 2010 compared with normal; (iii) the timing of arrival of the wet season in the last few years compared to normal. Normal means the situation about ten years ago.

3.10 Non-response

In the village component, data were collected from all 8,662 villages in the country. However, some villages did not report all data. For most items, responses were received from over 99% of villages. Village data in the report are presented as percentages, based on the number of reporting villages.

In the household component, all 8,662 villages in the country were enumerated, but 6,030 household questionnaires were missing. This represents a non-response rate of only 0.6%.

In the sample farm household component, only 29 selected sample households were not enumerated – a non-response rate of only 0.1%.

In both the household and sample farm household components, some households did not report all data. For most items, the response rate was over 95%. For some items, it was possible to “impute” for missing data. This was done based on responses to other questions taking account of data reported in neighbouring households.

Because non-response is so low, it should have little effect on the reliability of the census results.

3.11 Reliability of data

The census data presented from the sample farm household component are based on a sample and are therefore subject to sampling errors. Because of the sample design used, sampling errors on provincial and national estimates are generally quite small.

Apart from sampling errors, census results may not be consistent with data from other sources because:
• The census covers only the household sector. Crops grown or livestock raised by private companies, government farms, etc. are excluded. Also excluded are crops or livestock of collective households.

• Census data for a province refer to land operated, or animals raised, by households living in the province, not the land or animals located within the province. Other agricultural statistics in Lao PDR are based on land or livestock located in the province. This effect may be significant in large urban areas.

• Rice area data exclude the land of those households who do not have 0.02 ha or more agricultural land. This should have little effect.

• The census livestock data refer to the number of animals on the day the household was enumerated in the census. Livestock data from other sources may have different reference periods.

• The census only covers livestock raised by farm households. Thus, households with just a few animals or a little agricultural land are excluded.

The census estimate of upland rice area is higher than the official statistics. Different data collection methodologies are used: in the census, data were collected directly from households, whereas the official statistics are obtained from reports of local agricultural officials. This makes it difficult to make comparisons. The census confirms the decline in slash-and-burn cultivation, and suggests a shift to permanent upland cultivation. One factor could be the planting of temporary crops in newly planted permanent crop plantations in upland areas. The reasons for the differences will be further studied, including an evaluation of data quality.

The census estimate of dry season rice area is lower than the official statistics. Again, the different methodologies make comparisons difficult, and there could be data quality problems. Also, in the reporting system, the data might be based on expected planting or pumping potential, rather than actual planted areas. Further in-depth studies will be undertaken.

Generally, the quality of data in the village component was good because of the simple factual nature of the data collected and the willingness of the village heads to participate in the census. The data collection for households was more difficult to control because of the large number households enumerated.

Every effort was made to ensure that reported data were of high quality. Provincial and District Steering Committees closely managed the data collection operation; enumerators were well-trained; the enumeration work was closely supervised; and reported data were checked in the field and during processing.

Comparisons between 1998/99 and 2010/11 agricultural census data for provinces are affected by changes in provincial boundaries. Xaysomboon Special Region has been abolished and the districts within it were assigned to Luangprabang, Xiengkhuang and Vientiane Province.

3.12 Notes on the tables

The data presented in the report are often rounded to make it easier to read. Much of the household data are shown in thousands. Percentages are usually shown in whole numbers. There may be minor discrepancies in the tables – such as in totals or percentages – because of this rounding.

The symbol “-” in a table means that the figure is nil or negligible (less than one half of the unit indicated).

The symbol “..” in a table means that the item is not applicable.

The symbol “n.a.” in a table means that the figure is not available.
APPENDIX 1

OUTPUT TABLES: FARM HOUSEHOLDS
APPENDIX 2

OUTPUT TABLES: VILLAGES
APPENDIX 3

LAO CENSUS OF AGRICULTURE 2010/11
DATA ITEMS COLLECTED
DATA ITEMS COLLECTED: VILLAGE COMPONENT

1. GEOGRAPHY
V1 Province code
V2 District code
V3 Village code
V4 Kumban code
V5 Village type (urban; rural with road access; rural without road access)
V6 Main land type (lowland; upland; plateau; mixture of land types)
V7 Land area
V8 Whether village is UXO affected
V9 Area of agricultural land affected by UXO
V10 Area of other land not cultivated that could be suitable for cultivation
V11 Presence of soil degradation (none; light; moderate; severe; don't know)

2. WEATHER
V12 Assessment of rainfall in the last three wet seasons compared with ten years ago (drier; same; wetter)
V13 Assessment of arrival of wet season in the last three years compared with ten years ago (earlier; same time; later)
V14 Rainfall in 2010 wet season compared with ten years ago (drier; same; wetter)
V15 Whether natural disasters occur
V16 Type of natural disasters (floods; droughts; landslides; pests; other)
V17 Whether natural disasters occur frequently (floods; droughts; landslides; pests; other; none)

3. SOCIO-ECONOMIC CONDITIONS
V18 Perceived change in living standards of people over the last 2 years (improved; declined; stayed the same)
V19 Agricultural labour cost for females compared with males (above; same; below; no paid labour)
V20 Presence of shop by type (food; agricultural machinery and tools; veterinary clinic; agricultural inputs; petrol station; other)

4. VILLAGE INFRASTRUCTURE
V21 Whether households use electricity
V22 Whether more than 70% of households have electricity
V23 Sources of electricity (electricity grid; public generator; private generator; hydro-generator; solar cells; other sources)
V24 Sources of drinking water (piped water; well/borehole-protected; well/borehole-unprotected; river/stream/dam; rainwater from tank; other)
V25 Whether more than 70% of households have piped water
V26 Presence of school by type (primary school; pre-primary school only; neither primary school nor pre-primary school)
V27 Walking distance from village headquarters to the nearest primary school (less than one hour; one hour or more)
V28 Presence of pharmacy or drug kit (drug kit; pharmacy; neither pharmacy nor drug kit)
V29 Presence of dispensary or hospital (hospital; dispensary but no hospital; neither hospital nor dispensary)
V30 Walking distance from the village headquarters to the nearest dispensary or hospital (less than two hours; two hours or more)
V31 Whether a year round motorable road exists from the village to the district headquarters (both wet and dry seasons; dry season only; neither wet nor dry season)
V32 Presence of credit facilities
V33 Type of credit facility (public bank; foreign bank; private domestic bank; microfinance; Village Development Fund; other)

5. AGRICULTURAL INFRASTRUCTURE
V34 Presence of irrigation facilities
V35 Type of irrigation scheme (permanent weir; reservoir; pump scheme; gates and dykes; temporary weir; gabion; other)
V36 Presence of irrigation groups
V37 Number of irrigation groups
V38 Season for use of irrigation (wet season only; dry season only; both wet and dry seasons)
V39 Whether any agricultural produce is sold
V40 How produce is sold (contract farming; direct to processing companies; broker/trader in own village; broker/trader in other village; village market; other)

6. VILLAGE ORGANIZATION
V41 Presence of public services (trade group; rice bank; livestock bank; veterinary worker; cooperative; Village Development Fund; other)
V42 Whether the village has been resettled since 2000
V43 When the village was resettled
V44 Whether there is a plan for the village to resettle
V45 When the village will be resettled
V46 Whether a land or forest allocation programme has been implemented
V47 Area of land under land or forest allocation programme by type (construction; conservation forest; protection forest; exploitable forest; other)
V48 Presence of community facilities (District or Provincial Office; Village Office; permanent market; temple/meeting hall; Centre for Technical Agriculture and Forestry; sporting facilities; community management of fisheries; post and telecommunication office)
V49 Presence of development projects by type of project (crops; livestock; fisheries; forestry; reduction of slash-and-burn cultivation; environmental protection; other sectors)
V50 Source of funding of development projects (Government funds; domestic private funds; foreign private funds; Non-Government Organization; other)

7. OTHER
V51 Main constraints/problems faced by farmers (lack of land for cultivation; lack of seed or other agricultural inputs; lack of irrigation facilities; lack of labour; no market; lack of draught animals or farm machinery; lack of vaccination; low commodity prices; other)
V52 Whether rotation cultivation is practised
V53 Whether shifting cultivation is practised

DATA ITEMS COLLECTED: HOUSEHOLD COMPONENT

1. HOUSEHOLD ITEMS
H1 Province code
H2 District code
H3 Village code
H4 Household code
H5 Whether household is a farm household
H6 Whether household has aquaculture
H7 Whether household engages in special agriculture (sericulture; mushroom growing; floriculture; insect raising; beekeeping; crocodile farming; wildlife hunting; other)

2. FARM HOUSEHOLD ITEMS
H8 Area of agricultural land
H9 Area of non-agricultural land
H10 Whether irrigated
H11 Area of irrigated land
H12 Whether grew wet season temporary crops
H13 Whether grew dry season temporary crops
H14 Whether have permanent crops
H15 Number of cattle
H16 Number of buffaloes
H17 Number of pigs
H18 Number of goats
H19 Number of sheep
H20 Number of local chickens
H21 Number of commercial chickens
H22 Number of ducks
H23 Main purpose of agricultural production (sale; other)
H24 Whether any agricultural production sold
H25 Household size
H26 Ethnic origin of household head
H27 Sex of household head
H28 Age of household head
H29 Whether engaged in capture fisheries
H30 Main source of income of household (agriculture-crops; agriculture-livestock; aquaculture; capture fisheries; forestry [timber]; forestry [non-timber]; other)
H31 Whether owns a tractor
H32 Whether owns a water pump
H33 Whether household has forest land

3. ITEMS FOR EACH WET SEASON TEMPORARY CROP
H34 Crop type
H35 Area of crop planted
H36 Whether crop is scattered

4. ITEMS FOR EACH DRY SEASON TEMPORARY CROP
H37 Crop type
H38 Area of crop planted
H39 Whether crop is scattered

5. ITEMS FOR EACH PERMANENT CROP
H40 Crop type
H41 Area of crop
H42 Area of crop: productive
H43 Area of crop: not productive
H44 Whether crop is scattered

6. ITEMS FOR EACH LIVESTOCK TYPE (OTHER THAN THOSE IN H15-H22)
H45 Livestock type
H46 Number of livestock
DATA ITEMS COLLECTED: SAMPLE FARM HOUSEHOLD COMPONENT

1. IDENTIFICATION
Household level
S1 Province code
S2 District code
S3 Village code
S4 Household code

2. LAND
(a) Household level
S5 Number of land parcels
S6 Whether agricultural land is affected by UXO
S7 Whether shifting/rotating cultivation is practised (rotating cultivation; shifting cultivation; neither)
(b) Parcel level
S8 Parcel ID
S9 When land was cleared (last year; 1-4 years ago; 4 or more years ago; not cleared)
S10 Location (in this village; in other village)
S11 Land tenure of parcel (owned; rented; other)
S12 Terms of rental (agreed money; share of produce; exchange of services; other)
S13 Area
S14 Area by main land use (temporary crops; fallow land; permanent crops; grazing land; forest and other wooded land; other)
S15 Whether irrigated with Government irrigation scheme
S16 Whether irrigated in other ways
S17 Area irrigated

3. CROPS
(a) Household level
S18 Whether rice grown
S19 Assessment of crop growing conditions in 2010/11 compared with a “normal” year (better; same; worse; don’t know)
S20 Assessment of crop growing conditions in the last three years compared with “normal” (better; same; worse; don’t know)
(b) Type of rice level
S21 Rice type: season (wet/dry) by land type (lowland/upland) by type (glutinous/non-glutinous) by maturity (short/medium/long)
S22 Rice variety
S23 Area planted
S24 Area irrigated
S25 Production
(c) Crop level (temporary crops)
S26 Temporary crop type
S27 Whether used organic fertilizer
S28 Whether used chemical fertilizer
S29 Whether used pesticides
(d) Crop level (permanent crops)
S30 Permanent crop type
S31 Number of scattered trees: productive
S32 Number of scattered trees: unproductive
S33 Number of compact trees: productive
S34 Number of compact trees: unproductive

4. IRRIGATION
Covered under 2. Land and 3. Crops

5. LIVESTOCK
Household level
S35 Number of local cattle by sex and age (under 1 year; 1 to 2 years; 2 years and over)
S36 Number of cross-breed cattle by sex and age (under 1 year; 1 to 2 years; 2 years and over)
S37 Purposes of raising cattle (milk; meat; draught; breeding; other)
S38 Number of cattle in milk
S39 Number of cattle used for draught purposes
S40 Whether cattle were vaccinated
S41 Number of buffaloes by sex and age (under 1 year; 1 to 2 years; 2-3 years; 3 years and over)
S42 Purposes of raising buffaloes (milk; meat; draught; breeding; other)
S43 Number of buffaloes in milk
S44 Number of buffaloes used for draught purposes
S45 Whether buffaloes were vaccinated
S46 Number of small-breed pigs by sex and age (under 3 months; 3-9 months; 9 months and over)
S47 Number of large breed pigs by sex and age (under 3 months; 3-9 months; 9 months and over)
S48 Whether pigs were vaccinated
S49 Number of goats by sex and age (under 9 months; 9 months and over)
S50 Purposes of raising goats (milk; meat; wool; breeding; other)
S51 Number of sheep by sex and age (under 9 months; 9 months and over)
S52 Purposes of raising sheep (milk; meat; wool; breeding; other)
S53 Number of local chickens by type (chicks; adult layers; adult other)
S54 Number of commercial chickens by type (layers; broilers)
S55 Number of ducks by type (small breed; large breed)
S56 Whether poultry vaccinated
S57 Activities for which draught cattle used (land preparation; transport; other)
S58 Activities for which draught buffaloes used (land preparation; transport; other)
S59 Activities for which draught horses used (land preparation; transport; other)
S60 Activities for which other draught animals used (land preparation; transport; other)
S61 Types of livestock feed (natural pasture; improved pasture grasses; other fodder crops; paddy; rice stalks; purchased processed food; root crops; other)

6. FARM PRACTICES AND SERVICES
(a) Household level
S62 Whether sold any rice production
S63 Whether sold any other crop production
S64 Whether sold any livestock production
S65 Whether have certificate for organic agricultural products
S66 Whether have other certified agricultural produce
S67 Sources of credit (public bank; foreign bank; private domestic bank; microfinance; Village Development Fund; other)
S68 Use of credit (buy crop inputs; buy livestock products; buy farm equipment; buy farm animals; construct farm buildings; buy land; other)
S69 Type of collateral for credit (own land; other assets; other type of collateral; no collateral)
S70 Sources of agricultural information (State organizations; extension services; radio; television; newspapers; input suppliers; other farmers; other)
S71 Whether technical assistance provided
(b) Machinery item level
S72 Machinery type
S73 Whether machinery used
S74 Whether machinery owned

7. FARM POPULATION
Person level
S75 Household member code
S76 Relationship to household head (household head; spouse; child; parents; other relative; other)
S77 Sex
S78 Age

8. FARM LABOUR
(a) Household level
S79 Whether used outside farm employees
S80 How employees were paid (with money; with farm produce; by exchange of labour; other ways)
S81 Months of the year in which employees were used (rice growing)
S82 Months of the year in which employees were used (other crops)
(b) Person level (aged 10 years and over)
S83 Main economic activity (employee; employer; own-account worker; unpaid family worker; other)
S84 Occupation of main job (farmer-grow crops; fisher; farmer-raise livestock; mixed farmer; other)
S85 Secondary activity/occupation (farm employee; other employee; other family business-agriculture; other family business-other; no other work)
S86 Whether did work on crops
S87 Duration of work on crops (less than 3 months; 3-6 months; 6-9 months; more than 9 months)
S88 Type of work done on rice (land preparation; seeding; transplanting; weeding; fertilizing; pest control; irrigation; harvesting; winnowing; transportation)
S89 Duration of work on livestock activities (none; less than 1 hour/day; 1-5 hours/day; 5 or more hours/day)

9. FARM MANAGEMENT
Household level
S90 Identification of first manager
S91 Identification of second manager

10. FISHERIES
Household level
S92 Whether aquaculture activities
S93 Types of aquaculture production facility (rice-cum-fish culture; pond; cage; tank; other)
S94 Area of aquaculture
S95 Whether aquaculture products sold
S96 Whether engaged in capture fisheries
S97 Where capture fishing was done (river; lakes/reservoirs; swamps/seasonal floodplain; rice field; irrigation canal; village pond; other)
S98 Whether capture fisheries products sold

11. FORESTRY
Household level
S99 Whether forest land on holding
S100 Whether own forest land exploited
S101 Own forest products (timber; fuel wood; bamboo; mushrooms; fruit and other food products; other)
S102 Whether own forest products sold
S103 Whether public forest exploited
S104 Public forest products (timber; fuel wood; bamboo; mushrooms; fruit and vegetables; other)
S105 Whether public forest products sold