

Socio-economic survey in Lao PDR

prepared by

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1 Energy related socio-economic factors in rural areas in Lao PDR

General information on Lao PDR

Lao PDR is a landlocked small country in the middle of Indochina peninsula, surrounding by Vietnam from the East, China from the North, Myanmar and Thailand from the west and Cambodia from the South. Lao PDR is classified among the World least developed countries. Although during nearly the two past decade significant efforts have been made in order to improve living conditions of people, especially those, who live in rural areas, but Lao PDR remains poor, with per capita GDP 375 US\$ in 2003. About 31% of population is still living under poverty lines, who get less 1,5 US\$ a day cash income (SPREII, [1])

The rural area comprises of the main part of the territory and is inhabited by the majority (about 73%) of the population (**table 1**. Source: National census 2005). About 51,50% and 21,31% of population live in rural with and without road access, respectively. Lao PDR is the one of the lowest inhabited country in the South-earth Asia region, with average density of 24 persons per square kilometers. This figure is much lower in rural areas, especially remote ones.

Table 1: General data on Lao PDR (National census 2005, [2])

| Description | Data | Remarks |
|---|-----------|------------------|
| Total land area, km² | 236,800 | |
| Provinces | 18 | |
| Districts | 141 | |
| Villages | 10,552 | |
| Population | | |
| Lao PDR | 5,621,982 | |
| Female | 50,19% | |
| Male | 49,81% | |
| Male/Female | 99,87% | |
| Urban population | 27,1% | (not sure ~0,1%) |
| Rural with road access | 51,50% | |
| Rural without road access | 21,31% | |
| Population density, persons/sq.km | 23,7 | |
| Literacy rate, population aged 15+ | | |
| Lao PDR | 72,7% | |
| Female | 63,2% | |
| Male | 82,5% | |
| Urban | 89,3% | |
| Rural with road access | 69,7% | |
| Rural without road access | 53,9% | |
| Life expectancy (average, years) | | |
| Female | 63 | |
| Male | 59 | |

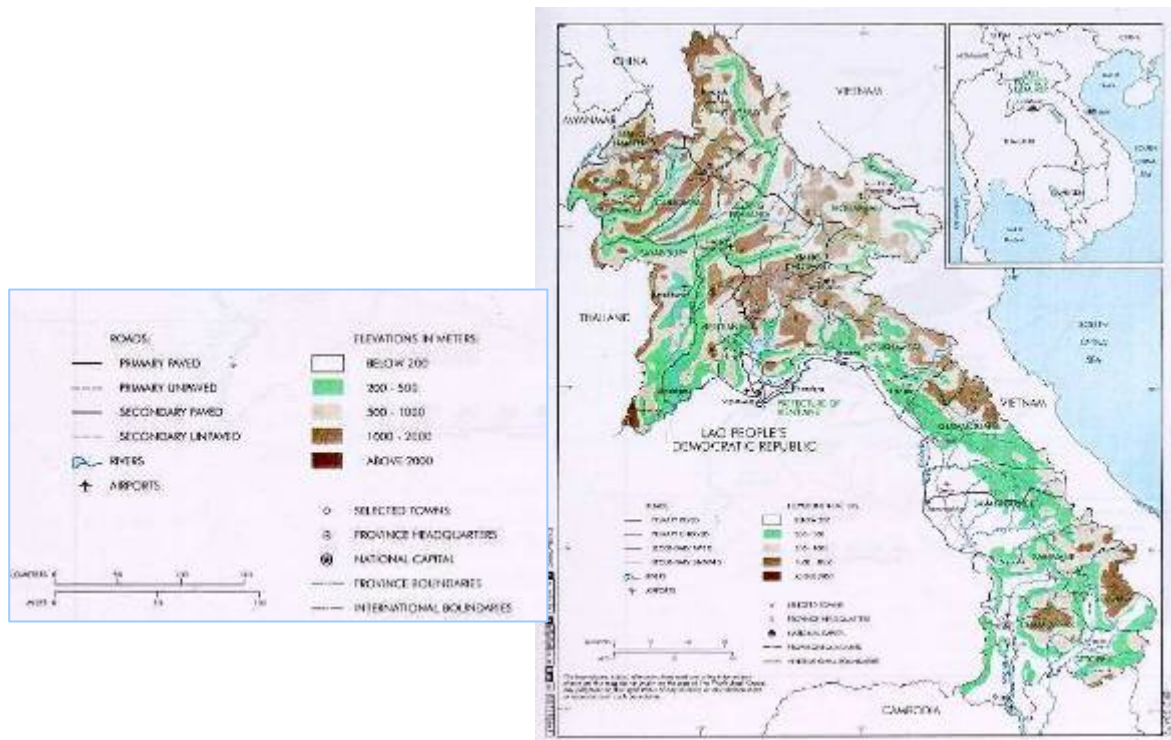


Figure 1: Elevation map of Lao PDR (Source: Department of Cartography, Prime Ministry office)

Administratively Lao PDR is divided into 16 provinces, one special region Xaysomboun¹ and a capital city. Smaller administrative units are district (totally 141) and village (10552) (Source: **NSC, 2006**). Average size of village is 91 households for whole country, while highest (253) is in Vientiane capital and lowest (49) in Phongsaly - most northern province.

Lao rural areas are characterized by underdeveloped infrastructure. According National census 2005 results, only 12% (1291 villages) of the total villages fulfilled the urban conditions, 54% (5721) were rural villages with road access and 34% (3541) without road access. About 7021 of total 10553 villages (66,53%) have been electrified. Only 675 villages (6,40%) have clean pipe water supply and 3757 (7,48%) with their Own Public Health Centers.

A Village is classified as urban if it has at least 3 of 5 of the following conditions fulfilled:

- Village is situated in district or provincial municipality
- More than 70% of total households in the village have been electrified
- More than 70% of total households in the village are access to pipe water network
- Village has two-season road access
- Village has permanent market that operates daily and whole day

Off-grid areas are defined as those, which will not be connected to national power grid by year 2020. Obviously, Off-grid areas are lack of road access and other basic needs, like telecommunication, clean water supply, energy service. According to estimation of Ministry of Energy and Mine (successor of Ministry of Industry and Handicraft), by the year 2020,

¹ Xaysomboun special region has recently reorganized and merged to Vientiane province

75% of rural households will be electrified by grid connection and 15%, or about 150.000 households - by off-grid option (solar home systems, pico hydros, diesel gen-set, battery charging station).

1.1 Target groups

The targets groups are classified by the following factors:

1.1.1 Gender issues

Percentage of female in Lao PDR is 50.19%, which are slightly different in cases of urban, rural with and without road access, 49.9, 50.2 and 50.7 %, respectively (**Table 2**). About 71% of rural women, aged 10+ are occupied in economic sphere (men- 69.52%), while only 28% - in non-economic sphere, comparing to 29.38% for rural men (**Table 3**). Lesser unemployment rate (about 0.3%) for aged 10+ rural women in economic sphere, comparing to urban figure (2.2%) (NSC 2006)

Thus, Lao women play critical roles in agriculture and other economic activities, and are primarily responsible for maintaining their families' food security and health. Female farmers are counted for 85.4% of total economically active women-employees (versus 78.3% for men-farmers) (NSC 2006). The Government recognizes that it will not be able to realise the goals of reducing poverty and improving national education, health and population indicators without the active participation of all women, particularly poor and ethnic minority women (NPGES [4]).

Therefore, the Government is taking concrete steps in all key economic sectors and through national programmes to: support poor women's economic activities; improve their access to basic services such as education and health and productive resources; involve them in local decision-making, and; generally take their needs into account in developing national policy.

Promoting gender equality is an important national goal, as reflected in Articles 22 and 24 of the 1991 Constitution, in numerous international commitments (e.g., the Convention on the Elimination of All Forms of Discrimination Against Women) and in the recently established National Commission for the Advancement of Women – Lao PDR (NCAW-Lao). Ensuring equal access to basic services and productive resources is a matter of equity (fundamental fairness), efficiency (poor women are a valuable resource) and effectiveness (women's support is needed to implement national policies on shifting cultivation, opium production, education, health and population). Under the guidance of the new NCAW-Lao, it is expected that all ministries will develop strategies and action plans to promote gender equality at national, provincial, district and village levels².

²Guidelines have been developed for a National Gender Action Plan to integrate the gender strategies and action plans of ministries, agencies and mass organisations. The development of such a national plan will be guided and co-ordinated by the NCAW-Lao.

Women in Lao PDR, as the same as in the other least developed countries, play an important role in family comfort and prosperity. Often women are the main cash earners for household use, by performing various income generating activities. In this concern, better energy service would help creating more opportunities for women to earn more money for family. Such micro (family-sized) enterprises, as rural food processing, handicrafts making, restaurants, etc would be created if better energy services were available and accessible for them.

Usually, lack of education and economic opportunities pushes women into the informal sector and small-scale enterprises (GRID, 2004 [3]). As seen from table 2, high percentage of women (71%) occupies unpaid jobs (usually daily family chores), comparing to 29% for men. Women entrepreneurs have limited education and experiences. They usually lack access to education or training due to, in one hand, traditional customs do not allow women to leave home for work far away from their village; on the other hand, traditional gender roles of women are to take responsibilities and care within the households, and thus, lack opportunities for improving them selves.

Gender issues:

“Over 85% of Lao Women are farmers- Women generally rise daily between 3-4 AM to grind rice, prepare the meal and do other chores before they go to the field. During rainy seasons they spend everyday from dawn to dusk. On their return they collect firewood. In the evening, woman will prepare food, tend and bathe the children, and socialize. If they have extra time, they engage on handicraft making” (Source: ADB, Northern Master Plan Study, 2002)

1.1.2 Household sources of income (main source of income)

Target groups in rural off-grid areas in Lao PDR probably can be classified by the source of income, as followed:

- Agriculture and Forestry (farmers, animal breeder, gardener, fishermen, and combination of these jobs)
- Non-agriculture jobs (small shop keeper, craftsmen, service provider, rural restaurant)
- Non economic sphere jobs (governmental employees)
- Other: no-income people: unemployed, elderly, children, disabled people

Occupation

Professional occupations in Lao PDR are shown in the table 2. It is seen that a large proportion of working population belongs to self-employed (42%) and unpaid jobs (46%). Working women comprises of only 38% or working people in lao PDR. As already has mentioned above, lacking of education forces female to informal or unpaid jobs. Female predominant in unpaid job (71%), mainly household chores

Table 2: Occupation (National census 2005)

| | Type of jobs | Working | Coverage | Female % | Male% |
|---|---------------------------------|---------|----------|----------|-------|
| 1 | Governmental employees | 168,388 | 6.1 | 31 | 69 |
| 2 | State owned enterprise (public) | 11,446 | 0.4 | 33 | 67 |
| 3 | Public-Private enterprises | 121,786 | 4.4 | 40 | 60 |

| | Type of jobs | Working | Coverage | Female % | Male% |
|---|---------------------------------|-----------|----------|----------|-------|
| 4 | Private enterprises | 19,486 | 0.7 | 27 | 73 |
| 5 | Employers | 7,210 | 0.3 | 31 | 69 |
| 6 | Self-employment | 1,149,906 | 42.0 | 32 | 68 |
| 7 | not-paid jobs (own family jobs) | 1,260,671 | 46.0 | 71 | 29 |
| | Total working population | 2,738,893 | 100.00 | 38 | 62 |

Rural women comprise of larger percentage of economically active population aged 10+. According to the results of National population and housing census 2005, around 71% of rural economically active population aged 10+ are women (comparing to 55% for rural men) (table 3). Contrary, urban women cover just 55% comparing to 61% for urban men.

More urban women (44% vs. 38%) occupy non-economic sphere jobs. This proportion in rural areas is 28% vs. 29%.

Table 3: Population aged 10 and above (National census 2005)

| | Description | Total | Female(%) | male(%) | Remarks |
|----------|--|-----------|-----------|---------|---------|
| 1 | Population | | | | |
| | Lao PDR | 5,621,982 | 50.18% | 49.82% | |
| | Urban | 1,522,137 | 49.87% | 50.13% | |
| | Rural | 4,099,845 | 50.29% | 49.71% | |
| 2 | Population 10+ | | | | |
| | Lao PDR | 4,171,199 | 50.38% | 49.62% | |
| | Urban | 1,230,698 | 49.97% | 50.03% | |
| | Rural | 2,940,501 | 50.48% | 49.52% | |
| 3 | Population 10+, employed in economic sphere | | | | |
| | Lao PDR | 2,778,019 | 66.30% | 66.80% | |
| | Urban | 710,113 | 54.80% | 60.70% | |
| | Rural | 2,067,906 | 71.16% | 69.52% | |
| 4 | Population 10+, employed in non-economic sphere | | | | |
| | Lao PDR | 1,351,468 | 32.70% | 32.10% | |
| | Urban | 508,278 | 44.20% | 38.30% | |
| | Rural | 872,595 | 27.81% | 29.38% | |
| 5 | Population 10+, not sure or not indicated | | | | |
| | Lao PDR | 41,712 | 1.00% | 1.10% | |
| | Urban | 12,307 | 1.00% | 1.00% | |
| | Rural | 29,405 | 1.03% | 1.10% | |

1.1.3 Different areas of living

Geographically Lap PDR is divided into three parts: Northern (included Phongsaly, Luangnamtha, Bokeo, Oudomxay, Huaphanh, Luanprabang and Xayaboury provinces), Central (Xiengkhouang, Vientiane province, Vientiane capital, Bolikhamxay, Khammuane and Savannakhet), and Southern (Saravanh, Champsak, Xekong, Attapeu) regions. Northern and Eastern parts are mostly comprised of high rugged mountains. Flat and low plains are mainly located in Central and Southern areas (see figure 1).

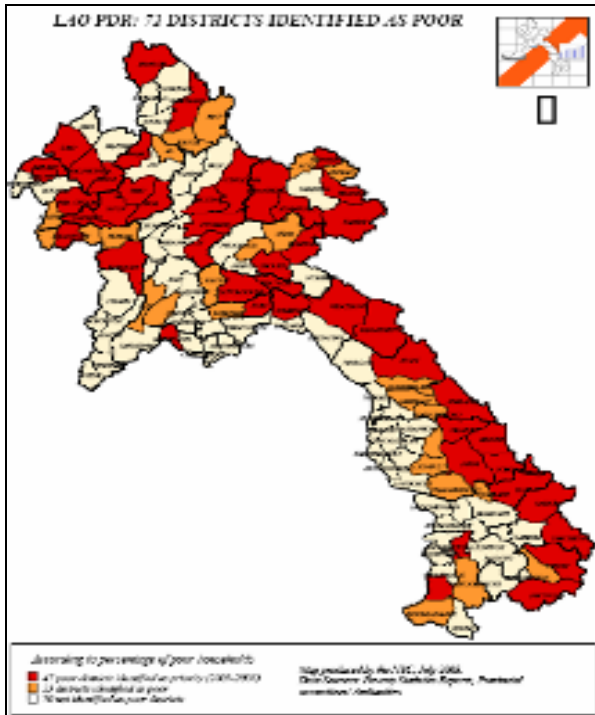


Figure 2: Poor districts of Lao PDR (NGPES [4])

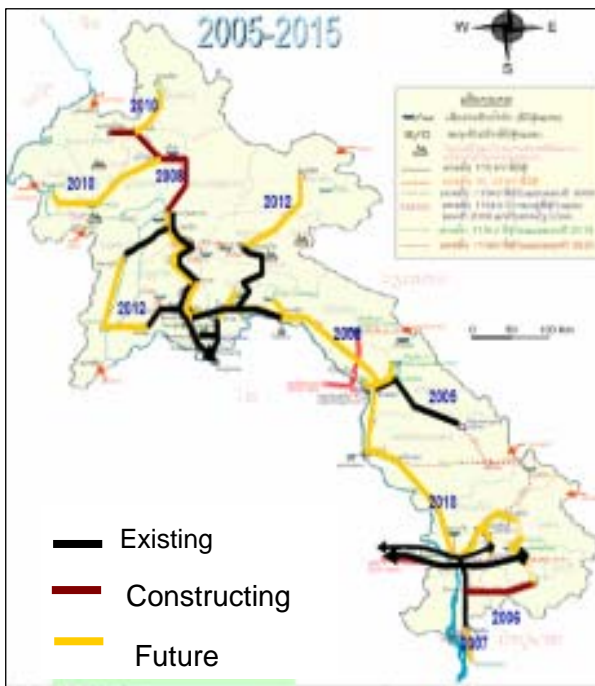


Figure 3: Power Transmission development plan for domestic consumption (EDL, 2005)

As seen from figure 1 and 2, poor (red colour) and less poor (orange) districts of Lao PDR are mostly situated in high mountainous or isolated difficultly accessible areas. Figure 3 show that power transmission lines mostly bypass these areas (Northern, North-East and South-East). The existing, being constructed or future power transmissions lines are

stretched mainly by the low land along the Mekong River and some its largest tributaries, while poor districts are located in mountainous areas (figure 2-3).

The Off-grid areas are defined as those, which will not be connected to national power grid by the year 2020. Obviously, Off-grid areas are lack of road access and other basic needs, like telecommunication, clean water supply, energy service, etc. According to estimation of Ministry of Energy and Mine (successor of Ministry of Industry and Handicraft), by the year 2020, 75% of rural households will be electrified by grid connection and 15%, or about 150,000 households - by off-grid option, such as solar home systems, pico hydros, improved small diesel gen-set, battery charging station, etc.

1.2 Socio-economic data

1.2.1 Household incomes in different target groups

Figures 4-7 show the questionnaires action results, which was done for the TERI-NUOL Joint Research project (NUOL-TERI, 2006, [5])³. The questionnaires action was performed randomly with 100 households in Vientiane capital city and 42 households of village Nam-madao (Phoukhoun district, Luangprabang province). Figure 4 shows number of household members, who make contribution into household income from different professions. Mostly interviewed households have one or two family members employed in government service and own business, followed by private services and casual-daily wages.

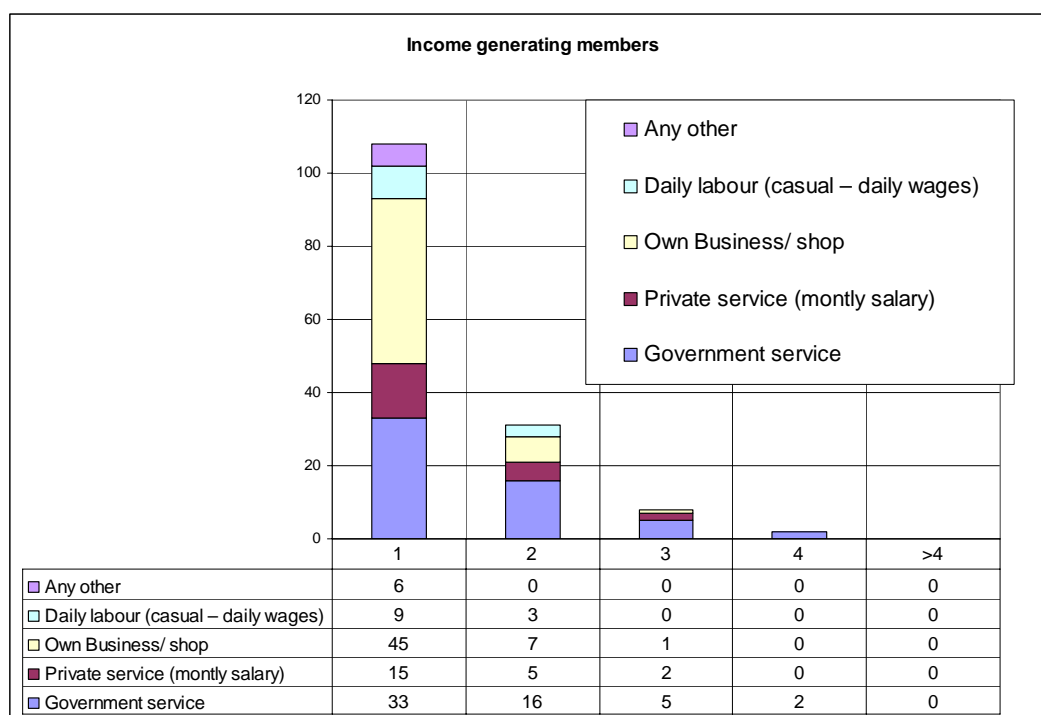


Figure 4: Income generating members (NUOL-TERI, 2006)

³ TERI: **The Energy and Resources Institute (India)**

Majority of households with state-employee members or own small business/shop have income less than 100\$ per month. Higher income (>100US\$) of the family with state employee-members are occurred probably due to numerous of working family members, rather than high personal salary.

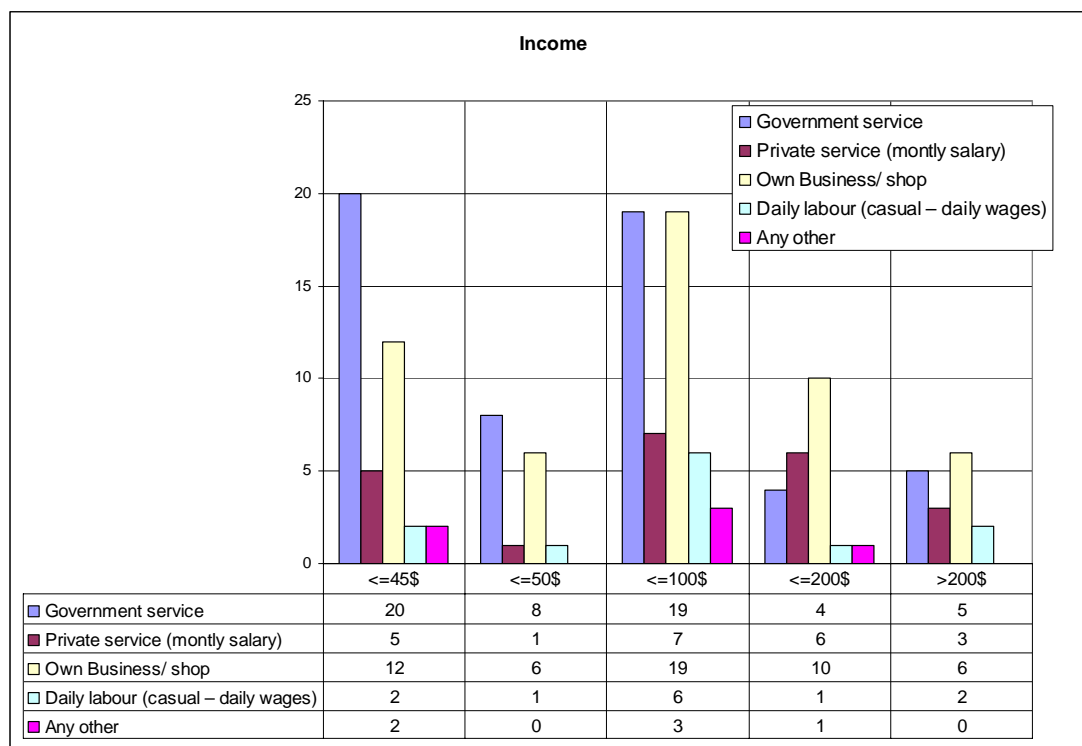


Figure 5: Income range of interviewed urban people (NUOL-TERI, 2006)

The situation is quite different for rural people. Main income sources of rural villagers in Lao PDR are from farming and selling livestock. Generally, rural households depend on subsistence level of agriculture, mainly low productive rice farming, using backward technology. Depending on each local condition, there are possible other sources of income, such as gardening, weaving, fisheries, service, commerce, etc.

Figures 6-7 show results of NUOL study at Ban Nammadao, a village of H'Mong ethnic group inhabitants in Phoukhoun district, Luang Prabang province. Main occupations of the villagers are farming plantation rice, animal breeding (local species of cows, goats, pigs, poultry, ...), gardening (vegetable and starchy roots).

From figure 6, almost all rural households have two people – farmers, one person practices animal breeding, one-gardening. As typical picture in rural areas of Lao PDR, usually there are several families manage own business (transport service, food-stuff, rice huller), or small shop, which provide all kind of goods, necessary for rural people, from candy to simple electronic.

As mentioned above, figure 7 shows that main sources of income are from farming, livestock and gardening products selling.

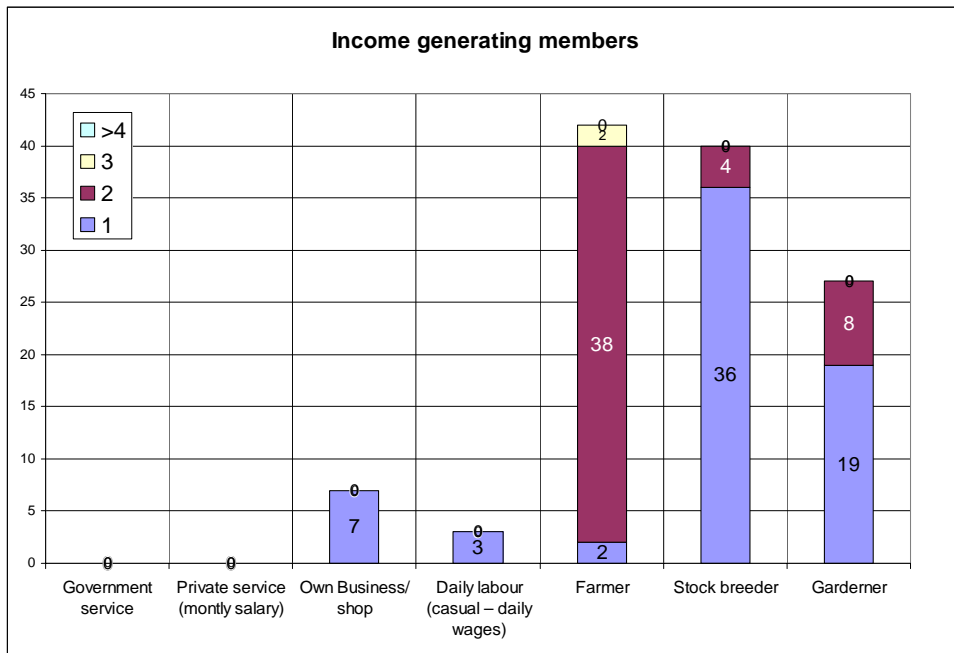


Figure 6: Income generating members in rural households (NUOL-TERI report, 2006)

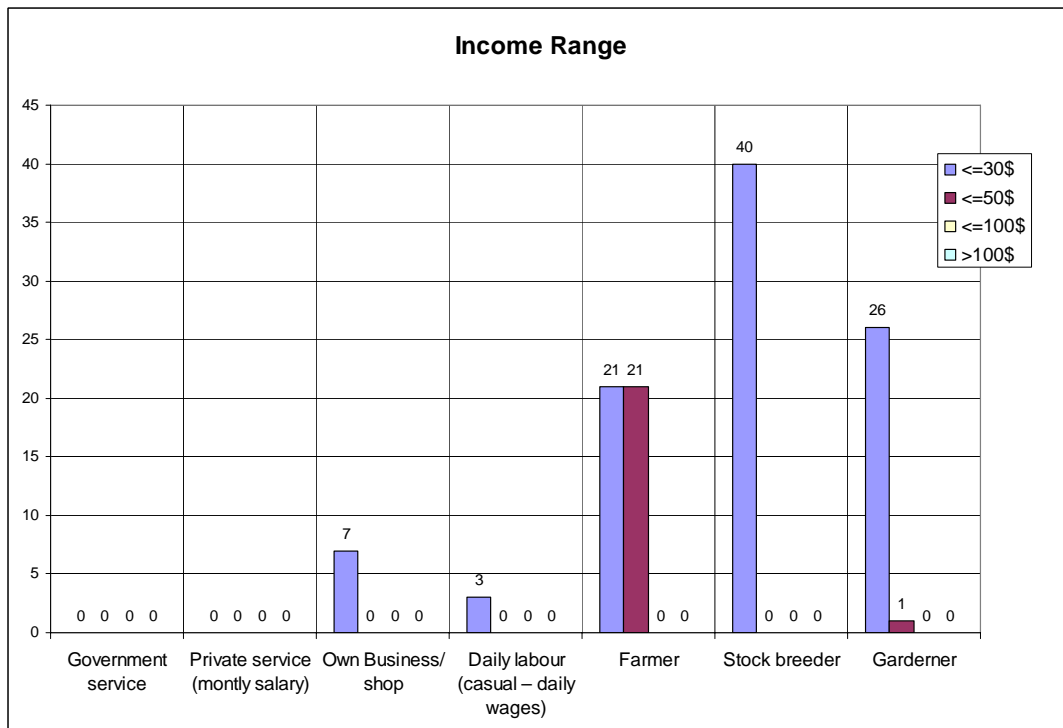


Figure 7: Income range for rural households (NUOL-TERI report, 2006)

The survey results also reflected in the report of National statistic Centre study's LECS2003/03 [6]. Income from grain stands for about 50% of the agricultural production, 48% in urban households and 51% in rural households (LECS 2002/03). The out put consists of production for own final use and for market sale

Table 4: Annual household income from agriculture production, x1000 LAK⁴ (LECS 02/03 [6])

| No. | Province | Grain | Vegetable & fruit | Livestock | Fish | Forestry | Other | Total |
|-----|--|--------------|-------------------|----------------|--------------|-------------|--------------|--------------|
| 1 | Vientiane capital | 2,224 | 231 | 511 | 435 | 50 | 557 | 4,008 |
| 2 | Phongsaly | 3,127 | 888 | 950 | 529 | - | 277 | 5,771 |
| 3 | Luangnamtha | 3,749 | 968 | 1,282 | 461 | 70 | 448 | 6,978 |
| 4 | Oudomxay | 2,971 | 872 | 1,154 | 534 | 19 | 313 | 5,863 |
| 5 | Bokeo | 2,626 | 1,034 | 2,162 | 829 | - | 539 | 7,190 |
| 6 | Luangprabang | 2,376 | 678 | 1,615 | 425 | 87 | 142 | 5,323 |
| 7 | Huaphanh | 3,934 | 776 | 1,194 | 715 | 73 | 217 | 6,909 |
| 8 | Xayabouly | 8,112 | 990 | 1,833 | 657 | 19 | 302 | 1,913 |
| 9 | Xiengkhouang | 3,957 | 976 | 1,867 | 602 | 21 | 291 | 7,714 |
| 10 | Vientiane | 2,673 | 553 | 1,767 | 811 | 152 | 752 | 6,708 |
| 11 | Bolikhambxay | 2,471 | 934 | 917 | 1,593 | 33 | 98 | 6,046 |
| 12 | Khammuane | 2,804 | 740 | 1,277 | 1,254 | 35 | 327 | 6,437 |
| 13 | Savannakhet | 2,948 | 609 | 1,374 | 807 | 10 | 338 | 6,086 |
| 14 | Saravanh | 2,719 | 761 | 836 | 469 | 5 | 169 | 4,959 |
| 15 | Xekong | 2,217 | 1,079 | 2,003 | 466 | 1 | 141 | 5,907 |
| 16 | Champasak | 2,441 | 573 | 664 | 786 | 29 | 91 | 4,584 |
| 17 | Attapeu | 2,355 | 510 | 1,139 | 1,221 | 8 | 97 | 5,330 |
| 18 | Xaysomboun S,R, | 2,259 | 881 | 1,710 | 761 | 61 | 233 | 5,905 |
| | Lao PDR total | 3,109 | 781 | 1,348 | 742 | 37 | 296 | 6,313 |
| | % coverage | 49% | 12% | 21% | 12% | 1% | 5% | 100% |
| | Urban average | 1,691 | 379 | 543 | 508 | 37 | 375 | 3,533 |
| | % coverage | 48% | 11% | 15% | 14% | 1% | 11% | 100% |
| | Rural average | 3,598 | 797,0 | 1,460.0 | 805.0 | 41.0 | 292.0 | 6,993 |
| | % coverage | 51% | 11% | 21% | 12% | 1% | 4% | 100% |
| | Northern average | 3,842 | 887 | 1,456 | 593 | 38 | 320 | 7,135 |
| | % coverage | 54% | 12% | 20% | 8% | 1% | 4% | 100% |
| | Central average | 2,846 | 674 | 1,286 | 917 | 50 | 394 | 6,167 |
| | % coverage | 46% | 11% | 21% | 15% | 1% | 6% | 100% |
| | Southern average | 2,433 | 731 | 1,161 | 736 | 11 | 125 | 5,195 |
| | % coverage | 47% | 14% | 22% | 14% | 0% | 2% | 100% |
| | Source: Lao Expenditure & Consumption survey 02/03. NSC. 2004) | | | | | | | |

⁴ Average Exchange rate in 2003 period was 10500 LAK / 1 US\$

As seen from table 5, Urban agriculture production income is lower than rural (3,533,000 LAK and 6,993,000 LAK respectively). Northern region has highest average agriculture income, while lowest is in Southern (7,135,000 LAK and 5,195,000 LAK respectively).

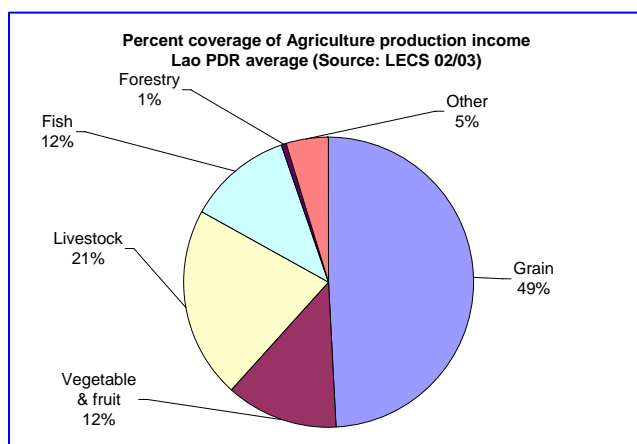


Figure 8: Coverage percents in agriculture production income (Lao PDR average)
Source: LECS 02/03

Income generating activities for population aged 10+ are shown in table 6. Lao population spends nearly half of their working times on agriculture production, followed by own business. This is pointed to the facts that majority of Lao population is engaging in agriculture-based and self employed jobs.

Table 5: Income generating activities (population 10+ of ages) (NSC 2006)

| Activity | Average number of hours per day | Percentage |
|--|---------------------------------|------------|
| Work as employed | 0.5 | 11 |
| Own business work | 0.7 | 14 |
| Agriculture work | 2.4 | 49 |
| Collecting firewood/fetching water | 0.3 | 7 |
| Hunting/fishing | 0.5 | 11 |
| Construction | 0.1 | 1 |
| Handicraft | 0.3 | 7 |
| Total income generating activities hours | 4.8 | 100 |

1.2.2 Household size

Household size in rural areas is larger than urban one. The average household size in Lao PDR has slightly decreased from 6.0 (in 1995) to 5.9 (2005). The biggest family size is observed in rural without road access (6.1), while 5.7 for urban family (table 7).

Table 6: Household size (NSC, 2006)

| Description | Census 2005 |
|-----------------------------|-------------|
| Households size, persons/HH | |
| Lao PDR | 5.9 |
| Urban | 5.7 |
| Rural with road access | 5.9 |
| Rural without road access | 6.1 |

Source: National Population census 2005.

Figure 9 shows household sizes in different provinces of Lao PDR. Larger household sizes (more than 6 persons per household) are observed in rural areas in provinces, which are mainly inhabited by minority ethnic groups (Phongsaly, Oudomxay, Bokeo, Huaphanh, Xayaboury, Xiengkhouang, Bolikhamxay, Savannakhet and Xekong provinces, and Xaysomboun special region).

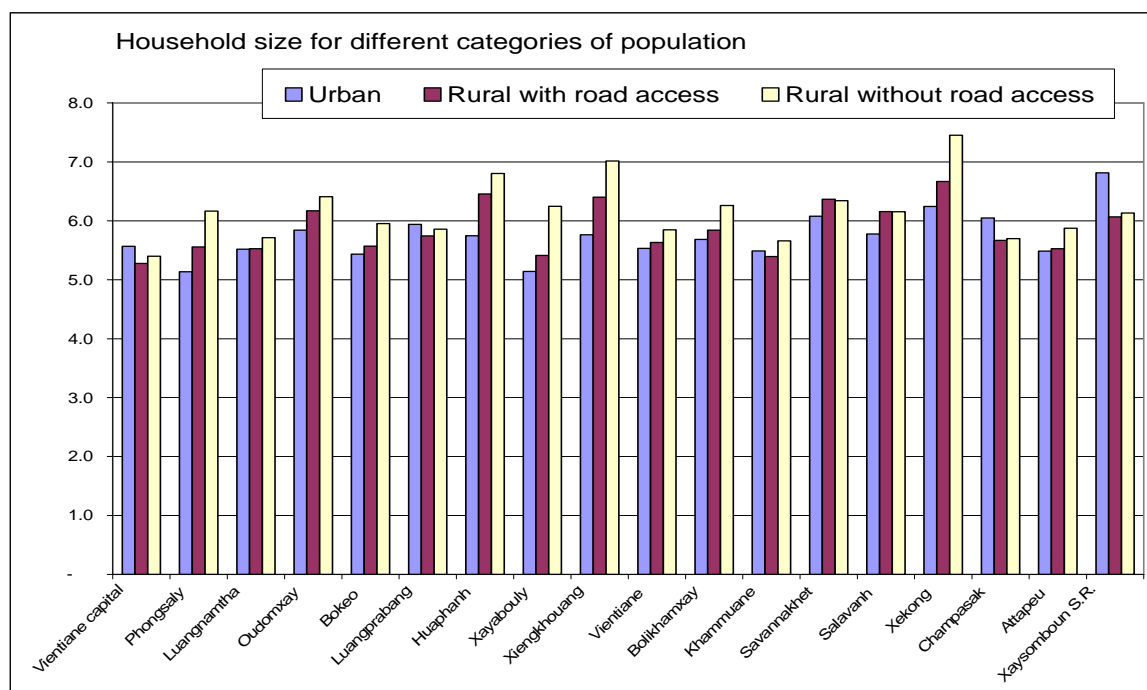


Figure 9: Household size by provinces and areas of living (NSC 2006)

1.2.3 Level of education of the target group

Education levels in Lao PDR are shown in table 7.

Although during the past 10 years, national literacy rate has been significantly improved, from 60% in 1995⁵ to 73% in 2005, but education level of Lao population remains low, especially in higher professional education. Usually, provinces with large remote rural areas have lowest education levels.

Table 7: Education levels (National census 2005)

| No. | Province | Population 6+ | no education | Primary (Grade 1-5) % | | Lower secondary (Grade 6-8), % | | Higher Secondary (Grade 9-11), % | | Vocational % | Medium diploma % | higher diploma/Bachelore % | Post graduation % | other/not sure % |
|-----|-------------------|---------------|--------------|-----------------------|------|--------------------------------|------|----------------------------------|-----|--------------|------------------|----------------------------|-------------------|------------------|
| | | | | C | UC | C | UC | C | UC | | | | | |
| 1 | Vientiane capital | 626,952 | 8.9 | 15.4 | 20.1 | 10.3 | 10.2 | 15.1 | 5.3 | 3.3 | 5.9 | 4.1 | 0.7 | 0.7 |
| 2 | Phongsaly | 139,245 | 52.1 | 8 | 26.6 | 2.9 | 4.4 | 1.3 | 1.5 | 1.6 | 1.2 | 0.3 | 0 | 0.1 |

⁵ National Population and household census 1995. NSC. 1996

| No. | Province | Population 6+ | no education | Primary (Grade 1-5) % | | Lower secondary (Grade 6-8), % | | Higher Secondary (Grade 9-11), % | | Vocational | Medium diploma | higher diploma/Bachelore | Post graduation | other/not sure |
|-----|---------------------------|---------------|--------------|-----------------------|------|--------------------------------|------|----------------------------------|-----|------------|----------------|--------------------------|-----------------|----------------|
| | | | | C | UC | C | UC | C | UC | % | % | % | % | % |
| 3 | Luangnamtha | 123,061 | 44.5 | 10.6 | 25.5 | 4.2 | 5.3 | 2.5 | 2.7 | 2 | 2 | 0.5 | 0 | 0.1 |
| 4 | Oudomxay | 218,922 | 41.5 | 11 | 31.7 | 3.7 | 5.2 | 1.8 | 1.9 | 1.6 | 1.2 | 0.4 | 0 | 0.1 |
| 5 | Bokeo | 121,699 | 38.6 | 12.4 | 29.9 | 4.6 | 5.5 | 2.6 | 2.5 | 1.5 | 1.4 | 0.5 | 0 | 0.3 |
| 6 | Luangprabang | 339,260 | 30.3 | 13.8 | 34.4 | 4.6 | 6.1 | 4.1 | 2.5 | 1.7 | 1.7 | 0.5 | 0.1 | 0.1 |
| 7 | Huaphanh | 231,778 | 32.1 | 13.2 | 36.5 | 3.9 | 7.5 | 1.2 | 2.1 | 1.9 | 1.1 | 0.3 | 0 | 0.2 |
| 8 | Xayabouly | 293,120 | 18.1 | 30.5 | 26.9 | 7.2 | 7.2 | 2.9 | 2.8 | 1.7 | 1.7 | 0.5 | 0.1 | 0.4 |
| 9 | Xiengkhouang | 191,340 | 25.1 | 14.8 | 31.2 | 7.4 | 10.2 | 2.6 | 3.6 | 2.5 | 1.8 | 0.6 | 0.1 | 0.1 |
| 10 | Vientiane | 333,471 | 19.2 | 18.6 | 27.2 | 8.7 | 9.8 | 6.6 | 4.4 | 1.9 | 2.5 | 0.9 | 0.1 | 0.2 |
| 11 | Bolikhamxay | 188,787 | 20.9 | 19.5 | 33.6 | 6.2 | 8.2 | 3.8 | 3.1 | 1.8 | 2 | 0.6 | 0.1 | 0.2 |
| 12 | Khammuane | 281,529 | 28.2 | 14.5 | 33.2 | 5.5 | 7.8 | 3.7 | 2.9 | 1.7 | 1.6 | 0.6 | 0.1 | 0.2 |
| 13 | Savannakhet | 700,687 | 30.6 | 13.8 | 33 | 5.5 | 7.1 | 4.5 | 2.5 | 1.1 | 1.3 | 0.5 | 0 | 0 |
| 14 | Salavanh | 266,778 | 37 | 11.7 | 36.2 | 3.5 | 5.5 | 1.9 | 1.6 | 1.2 | 1.1 | 0.3 | 0 | 0 |
| 15 | Xekong | 67,541 | 39.6 | 8 | 36.9 | 2.7 | 4.3 | 1.5 | 1.7 | 2.1 | 2.3 | 0.8 | 0.1 | 0 |
| 16 | Champasak | 512,659 | 18.3 | 18.6 | 35.1 | 6.7 | 8.6 | 5.5 | 3.3 | 1.4 | 1.8 | 0.6 | 0.1 | 0.1 |
| 17 | Attapeu | 91,548 | 35.1 | 9.4 | 37 | 3.7 | 5.9 | 2.2 | 2.2 | 1.7 | 2 | 0.6 | 0.1 | 0.1 |
| 18 | Xaysomboun S.R, | 32,116 | 24.1 | 14.2 | 33.7 | 6.1 | 8.3 | 2.6 | 3.2 | 3.5 | 2.9 | 1 | 0.1 | 0.3 |
| | Total (Lao PDR) | 4,760,493 | 26.4 | 15.5 | 30.8 | 6.1 | 7.6 | 5.1 | 3.1 | 1.8 | 2.2 | 1 | 0.1 | 0.2 |
| | Urban | 1,354,691 | 17.7 | 16.2 | 28.5 | 7.8 | 8.8 | 8.6 | 3.9 | 2.3 | 3.5 | 2.1 | 0.4 | 0.4 |
| | Rural with road | 2,429,345 | 31.1 | 14.7 | 30.9 | 5.4 | 7.1 | 3.9 | 2.7 | 1.6 | 1.7 | 0.6 | 0.1 | 0.1 |
| | Rural without road | 970,053 | 26.8 | 16.4 | 33.4 | 5.6 | 7.5 | 3.5 | 2.8 | 1.7 | 1.6 | 0.5 | 0.1 | 0.2 |
| | not sure or not indicated | 6,404 | 0 | 18.7 | 54.5 | 6.1 | 7.4 | 3.5 | 3.4 | 2.7 | 3 | 0.9 | 0 | 0 |

C-completed; UC-uncompleted

Source: National Population census 2005.

1.2.4 Literacy rate in household

Literacy rate by gender groups aged 15+ for provinces are shown in table 8. Female average literacy rate (63%) is lower than male's (82%) and Lao PDR average (73%). These figures are also different by urban, rural with and without road access areas, or by provinces. The provinces Phongsaly, Luangnamtha, Oudomxay, Bokeo in the North, Xekong and Attapeu in the South especially have high illiteracy rate (35% and higher). These provinces are mainly inhabited by minority ethnic groups and also among prioritized targets for off-grid electrification programs.

Table 8: Literacy rate for population aged 15+ (National census 2005)

| No. | Province | Population 15+ | Female % | Male % | Totally % |
|-----|----------------------------------|------------------|-------------|-------------|-------------|
| 1 | Vientiane capital | 626,952 | 88.1 | 95.3 | 91.7 |
| 2 | Phongsaly | 139,245 | 33.6 | 52.9 | 43.1 |
| 3 | Luangnamtha | 123,061 | 38.8 | 63.1 | 50.6 |
| 4 | Oudomxay | 218,922 | 39.5 | 72.8 | 55.9 |
| 5 | Bokeo | 121,699 | 44.5 | 72.3 | 58.1 |
| 6 | Luangprabang | 339,260 | 55.1 | 79.5 | 67.2 |
| 7 | Huaphanh | 231,778 | 51.1 | 78.3 | 64.7 |
| 8 | Xayabouly | 293,120 | 73.9 | 86.9 | 80.4 |
| 9 | Xiengkhouang | 191,340 | 61.8 | 83.7 | 72.7 |
| 10 | Vientiane | 333,471 | 70.8 | 88.3 | 79.7 |
| 11 | Bolikhamxay | 188,787 | 68.1 | 86.2 | 77.2 |
| 12 | Khammuane | 281,529 | 59.6 | 81.1 | 69.9 |
| 13 | Savannakhet | 700,687 | 59.2 | 78.5 | 68.5 |
| 14 | Salavanh | 266,778 | 49.4 | 74.9 | 61.6 |
| 15 | Xekong | 67,541 | 48.1 | 76.0 | 61.7 |
| 16 | Champasak | 512,659 | 74.0 | 89.9 | 81.8 |
| 17 | Attapeu | 91,548 | 51.8 | 77.4 | 63.9 |
| 18 | Xaysomboun S.R. | 32,116 | 58.5 | 84.8 | 72.6 |
| | Total (Lao PDR) | 4,760,493 | 63.2 | 82.0 | 72.7 |
| | Urban | 1,354,691 | 84.5 | 94.2 | 89.3 |
| | Rural with road access | 2,429,345 | 59.0 | 80.8 | 69.7 |
| | Rural without road access | 970,053 | 41.1 | 67.6 | 53.9 |

Source: National census 2005.

1.2.5 Sources of energy

Wood fuels (firewood + charcoal) still play dominant role not only in rural areas (96%), but also for large portion of urban population (89%) (table 9). It is seen from this, even in Vientiane capital, large proportion of people still relies on wood (42%) and charcoal (42.3%) as energy sources for cooking. Although there is not yet shortage in wood fuel supply in rural areas of Lao PDR, but some degree of scarcity and difficulties in wood gathering have already been observed somewhere.

Table 9: Primary energy consumption for period of 1996-2005 (MOC 2006)

| Years | consumption | | | | | | |
|-------|-------------|-----------|--------|----------|-----------|---------|-----------|
| | electricity | fuel oil | NP gas | Charcoal | fuel wood | Sawdust | Total |
| | GWH | GWH | GWH | GWH | GWH | GWH | GWH |
| 1996 | 467.10 | 7,230.74 | 25.39 | 2,258.92 | 8,139.67 | 57.59 | 18,179.41 |
| 1997 | 553.51 | 10,970.82 | 38.67 | 2,313.06 | 8,343.20 | 53.53 | 22,272.79 |
| 1998 | 665.56 | 6,879.44 | 23.09 | 2,365.94 | 8,551.72 | 49.76 | 18,535.51 |
| 1999 | 737.74 | 4,159.36 | 15.43 | 2,244.81 | 8,765.33 | 46.27 | 15,968.94 |
| 2000 | 799.78 | 3,689.48 | 19.77 | 2,481.78 | 8,939.41 | 63.60 | 15,993.82 |
| 2001 | 892.83 | 3,989.59 | 19.77 | 2,538.44 | 9,119.75 | 78.55 | 16,638.93 |
| 2002 | 967.54 | 3,689.48 | 19.77 | 2,661.84 | 9,907.34 | 86.80 | 17,332.77 |
| 2003 | 1,113.04 | 3,187.07 | 33.32 | 2,386.86 | 9,586.10 | 108.90 | 16,415.29 |
| 2004 | 1,138.24 | 3,028.86 | 34.22 | 2,537.09 | 9,564.07 | 111.12 | 16,413.61 |
| 2005 | 1,286.85 | 3,036.09 | 33.61 | 2,589.54 | 9,672.77 | 117.79 | 16,736.66 |

Source: Dept of Domestic Trade, Ministry of Commerce, 2006 annual report

Figure 10 a, b) shown changes of Primary energy consumption per capita in Lao PDR for 2000 and 2005 years. It is seen that fuel wood and charcoal comprise about 73% of total primary energy consumption. Comparing 2000, in 2005 electricity, fuel wood, sawdust and NPG consumptions are increased, while Fuel oil - decreased and charcoal - not changed.

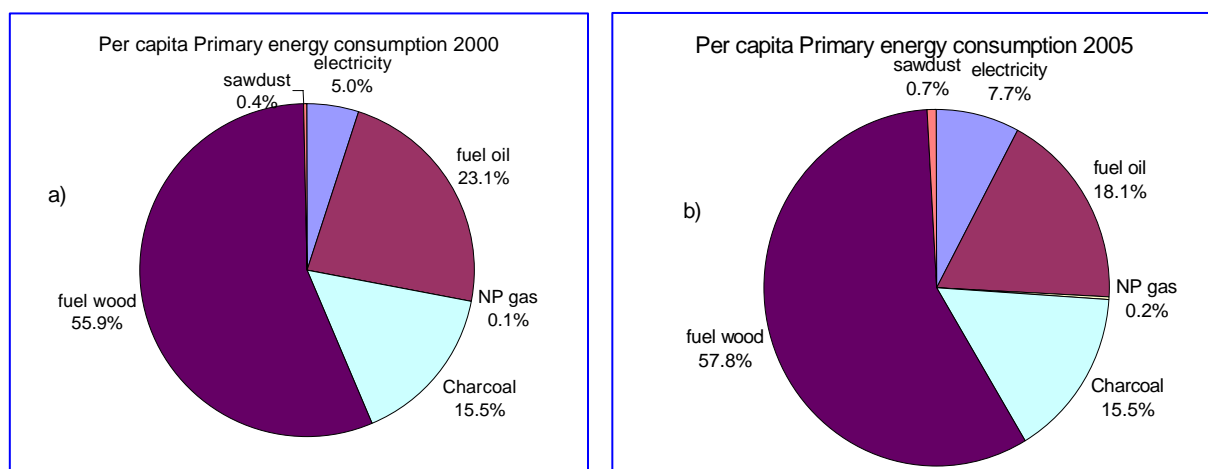


Figure 10: Per capita Primary energy consumption structure (Based on Data of Dept of Domestic Trade, MOC, 2006)

Table 10: Percent coverage in annual primary energy consumption for a period 1996-2005 (MOC 2006)

| year | Electricity | Fuel oil | NPG | Charcoal | Fuel wood | sawdust |
|------|-------------|----------|------|----------|-----------|---------|
| 1996 | 2.6% | 39.8% | 0.1% | 12.4% | 44.8% | 0.3% |
| 1997 | 2.5% | 49.3% | 0.2% | 10.4% | 37.5% | 0.2% |
| 1998 | 3.6% | 37.1% | 0.1% | 12.8% | 46.1% | 0.3% |
| 1999 | 4.6% | 26.0% | 0.1% | 14.1% | 54.9% | 0.3% |
| 2000 | 5.0% | 23.1% | 0.1% | 15.5% | 55.9% | 0.4% |
| 2001 | 5.4% | 24.0% | 0.1% | 15.3% | 54.8% | 0.5% |
| 2002 | 5.6% | 21.3% | 0.1% | 15.4% | 57.2% | 0.5% |
| 2003 | 6.8% | 19.4% | 0.2% | 14.5% | 58.4% | 0.7% |
| 2004 | 6.9% | 18.5% | 0.2% | 15.5% | 58.3% | 0.7% |
| 2005 | 7.7% | 18.1% | 0.2% | 15.5% | 57.8% | 0.7% |

Based on source: Department of domestic trade. Ministry of Commerce. 2005

In 2005, about 57% of Lao households have access to electricity in various forms. The figures for urban, rural with and without road access are 92.2%, 51.8% and 23.8%, respectively (Table 9). The electrification options in Lao rural areas include such options, as grid connection, off-grid (small diesel gen set, micro and Pico hydro, Battery, solar home PV systems) (Source: National census 2005).

Table 11: Energy sources for cooking (Census 2005)

| No. | Province | electricity | Oil | fuel wood | Coal | charcoal | sawdust | LPG | other | not sure |
|-----|-------------------|-------------|------|-----------|------|----------|---------|-----|-------|----------|
| 1 | Vientiane capital | 6.60 | - | 42.40 | 0.90 | 42.30 | 0.4 | 4.0 | 0.2 | 3.2 |
| 2 | Phongsaly | 0.20 | 0.10 | 97.10 | - | 0.30 | 0 | - | - | 2.2 |
| 3 | Luangnamtha | 0.10 | - | 97.30 | - | - | 0 | 0.1 | - | 2.4 |

| No. | Province | electricity | Oil | fuel wood | Coal | charcoal | sawdust | LPG | other | not sure |
|-----|----------------------------------|-------------|-------------|--------------|-------------|--------------|------------|------------|------------|------------|
| 4 | Oudomxay | 0.20 | 0.10 | 96.60 | - | - | 0 | 0.1 | - | 2.9 |
| 5 | Bokeo | 0.30 | 0.30 | 90.90 | 0.10 | 0.80 | 0 | 0.4 | 0.1 | 7.1 |
| 6 | Luangprabang | 0.60 | - | 87.50 | 0.10 | 1.00 | 0.1 | 0.3 | - | 10.4 |
| 7 | Huaphanh | 0.20 | - | 94.00 | - | 0.10 | 0 | 0.1 | - | 5.5 |
| 8 | Xayabouly | 0.20 | - | 92.80 | 0.10 | 4.10 | 0.1 | 0.1 | - | 2.5 |
| 9 | Xiengkhouang | 0.50 | 0.30 | 98.10 | - | 0.10 | 0 | 0.1 | 0.1 | 0.8 |
| 10 | Vientiane | 0.60 | 0.10 | 92.50 | 0.40 | 4.50 | 0.1 | 0.4 | - | 1.3 |
| 11 | Bolikhamxay | 0.70 | 0.40 | 87.30 | 0.40 | 7.30 | 0 | 2.9 | - | 1.0 |
| 12 | Khammuane | 0.30 | 0.10 | 83.50 | 0.50 | 12.40 | 0 | 0.1 | 0.1 | 3.0 |
| 13 | Savannakhet | 0.10 | 0.10 | 72.40 | 0.30 | 23.60 | 0 | 0.8 | 0.1 | 2.6 |
| 14 | Salavanh | 0.10 | - | 82.00 | 0.30 | 15.00 | 0 | 0.1 | - | 2.4 |
| 15 | Xekong | 0.10 | 0.10 | 87.20 | 0.20 | 8.90 | 0 | - | 0.4 | 3.2 |
| 16 | Champasak | 0.30 | - | 65.10 | 0.60 | 30.50 | 0 | 0.3 | 0.1 | 3.2 |
| 17 | Attapeu | 0.40 | - | 93.20 | 0.20 | 3.00 | 0 | 0.1 | 0.1 | 3.0 |
| 18 | Xaysomboun S.R. | 0.50 | - | 95.40 | 0.10 | 1.60 | 0 | - | - | 2.3 |
| | Lao PDR total | 1.1 | 0.1 | 79.1 | 0.3 | 15.0 | 0.1 | 0.9 | 0.1 | 3.4 |
| | Urban | 3.80 | 0.10 | 55.10 | 0.70 | 34.60 | 0.3 | 2.7 | 0.1 | 2.6 |
| | Rural | 0.1 | 18.4 | 88.5 | 0.2 | 7.4 | - | 0.2 | 0.1 | 3.5 |
| | Rural with road access | 0.1 | 10.2 | 87.5 | 0.2 | 8.8 | - | 0.2 | 0.1 | 3.2 |
| | Rural without road access | - | 2.3 | 91.5 | 0.1 | 3.8 | - | 1.5 | 0.1 | 4.2 |

Table 12: Access to Electricity statistics in 2005 (National census 2005)

| No. | Province | Access to Electricity | | | | | Not access to electricity | Not sure |
|-----|----------------------------------|-----------------------|--------------|------------|-------------|--------------|---------------------------|-------------|
| | | own meter | joined other | Gen-set | Other | Total | | |
| 1 | Vientiane capital | 74.2 | 20.6 | 0.3 | 0.7 | 95.8 | 2.1 | 2.1 |
| 2 | Phongsaly | 9.5 | 2.3 | 1 | 18.5 | 31.3 | 67.5 | 1.2 |
| 3 | Luangnamtha | 25.4 | 3.1 | 1.6 | 6.1 | 36.2 | 62.5 | 1.3 |
| 4 | Oudomxay | 11.5 | 5.9 | 2.6 | 4.9 | 24.9 | 73.4 | 1.6 |
| 5 | Bokeo | 20.8 | 5.8 | 1.7 | 6.6 | 34.9 | 61.3 | 3.8 |
| 6 | Luangprabang | 22.6 | 10.3 | 1.8 | 6.6 | 41.3 | 55.8 | 3 |
| 7 | Huaphanh | 20.9 | 6.1 | 0.8 | 15.1 | 42.9 | 54.4 | 2.6 |
| 8 | Xayabouly | 26.5 | 6.5 | 1.4 | 7 | 41.4 | 57.4 | 1.2 |
| 9 | Xiengkhouang | 17 | 5.4 | 5.6 | 8.4 | 36.4 | 62.8 | 0.7 |
| 10 | Vientiane | 57.3 | 18.7 | 0.5 | 5.2 | 81.7 | 17.7 | 0.7 |
| 11 | Bolikhamxay | 44.6 | 11.3 | 0.3 | 7.8 | 64 | 34.7 | 1.3 |
| 12 | Khammuane | 48.2 | 15.5 | 0.3 | 4.6 | 68.6 | 30.1 | 1.4 |
| 13 | Savannakhet | 42.9 | 10.4 | 0.5 | 6.6 | 60.4 | 38.5 | 1.1 |
| 14 | Salavanh | 35.1 | 7.3 | 0.8 | 5.2 | 48.4 | 50.4 | 1.2 |
| 15 | Xekong | 20.8 | 11.3 | 0.8 | 8.5 | 41.4 | 57.4 | 1.3 |
| 16 | Champasak | 41.5 | 8.2 | 0.8 | 8 | 58.5 | 39.8 | 1.7 |
| 17 | Attapeu | 12.9 | 6.3 | 0.2 | 3.9 | 23.3 | 75.3 | 1.4 |
| 18 | Xaysomboun S.R. | 23.7 | 16.1 | 2.5 | 12.6 | 54.9 | 44.2 | 0.8 |
| | Total (Lao PDR) | 38.9 | 9.51 | 1 | 6.5 | 55.91 | 41.2 | 2.89 |
| | Urban | 71.7 | 18.4 | 0.5 | 1.6 | 92.2 | 6.3 | 1.5 |
| | Rural with road access | 33.3 | 10.2 | 1.2 | 7.1 | 51.8 | 46.8 | 1.4 |
| | Rural without road access | 8.6 | 2.3 | 1.3 | 11.5 | 23.7 | 74.7 | 1.5 |

Source: National population census 2005

Urban areas of Lao PDR are mostly access to electricity: Lao average (92.2%); highest rate – Vientiane capital (92.2%); lowest-rural without road access (23.7%).

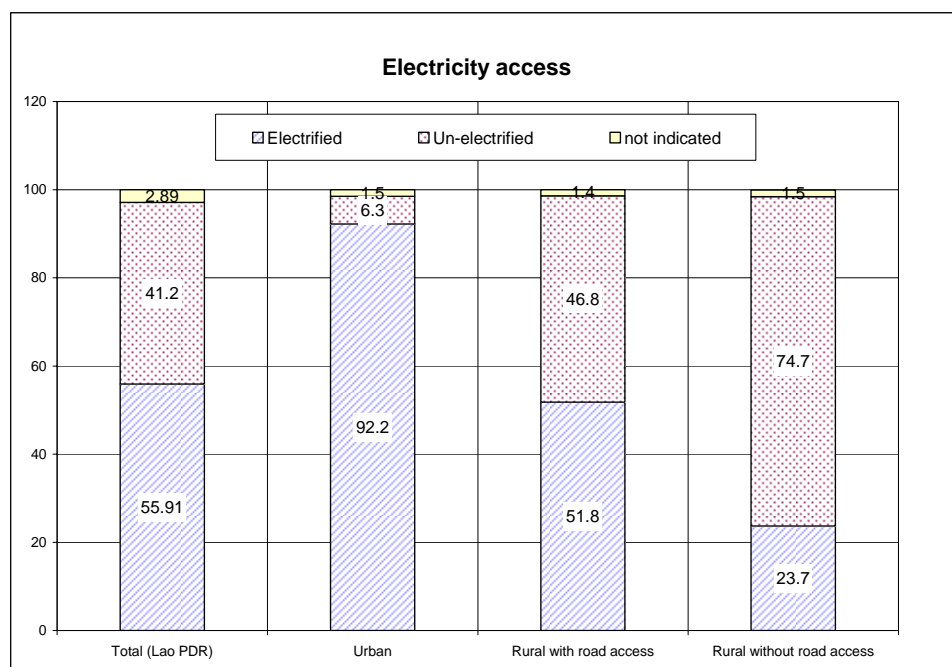


Figure 11: Access to electricity in various forms (NSC 2006)

From Table 13, Vientiane capital has highest electrification rate (100%, 97.8% and 88.8% for districts, villages and households, respectively), lowest by district - Bokeo (33%), village- Phongsaly (5.8%), households- Phongsaly (10.4%). The figures for whole country are 90.1%, 39.2%, and 46.9% (MEM, 2004).

Table 13: Electrification rate (MEM, 2004)

| Pos. | Provinces | Total | | | Electrified | | | % in 2004 | | |
|------|-------------------|----------|----------|-----------|-------------|----------|-----------|-----------|----------|------|
| | | District | Villages | HH | District | Villages | HH | District | Villages | HH |
| 1 | Vientiane capital | 9.0 | 499.0 | 128,185.0 | 9.0 | 488.0 | 113,865.0 | 100.0 | 97.8 | 88.8 |
| 2 | Phongsaly | 7.0 | 606.0 | 27,528.0 | 4.0 | 35.0 | 2,854.0 | 57.1 | 5.8 | 10.4 |
| 3 | Luangnamtha | 5.0 | 410.0 | 24,965.0 | 5.0 | 134.0 | 8,295.0 | 100.0 | 32.7 | 33.2 |
| 4 | Oudomxay | 7.0 | 634.0 | 47,709.0 | 5.0 | 65.0 | 7,477.0 | 71.4 | 10.3 | 15.7 |
| 5 | Bokeo | 6.0 | 369.0 | 23,631.0 | 2.0 | 96.0 | 6,533.0 | 33.3 | 26.0 | 27.6 |
| 6 | Luangprabang | 11.0 | 936.0 | 66,622.0 | 11.0 | 386.0 | 29,681.0 | 100.0 | 41.2 | 44.6 |
| 7 | Huaphanh | 8.0 | 785.0 | 43,175.0 | 8.0 | 130.0 | 12,630.0 | 100.0 | 16.6 | 29.3 |
| 8 | Xayabouly | 10.0 | 494.0 | 59,552.0 | 10.0 | 242.0 | 18,967.0 | 100.0 | 49.0 | 31.8 |
| 9 | Xiengkhouang | 7.0 | 579.0 | 31,232.0 | 7.0 | 77.0 | 7,229.0 | 100.0 | 13.3 | 23.1 |
| 10 | Vientiane | 11.0 | 587.0 | 62,886.0 | 11.0 | 479.0 | 44,236.0 | 100.0 | 81.6 | 70.3 |
| 11 | Bolikhamxay | 6.0 | 328.0 | 36,489.0 | 6.0 | 174.0 | 18,396.0 | 100.0 | 53.0 | 50.4 |

| Pos. | Provinces | Total | | | Electrified | | | % in 2004 | | |
|------|------------------------|--------------|-----------------|------------------|--------------|----------------|------------------|-------------|-------------|-------------|
| | | District | Villages | HH | District | Villages | HH | District | Villages | HH |
| 12 | Khammuane | 9.0 | 804.0 | 60,929.0 | 9.0 | 474.0 | 34,467.0 | 100.0 | 59.0 | 56.6 |
| 13 | Savannakhet | 15.0 | 1,545.0 | 132,560.0 | 14.0 | 631.0 | 67,796.0 | 93.3 | 40.8 | 51.1 |
| 14 | Salavanh | 8.0 | 724.0 | 51,810.0 | 7.0 | 264.0 | 19,622.0 | 87.5 | 36.5 | 37.9 |
| 15 | Xekong | 4.0 | 262.0 | 11,267.0 | 3.0 | 34.0 | 3,543.0 | 75.0 | 13.0 | 31.4 |
| 16 | Champasak | 10.0 | 924.0 | 100,346.0 | 10.0 | 453.0 | 37,680.0 | 100.0 | 49.0 | 37.6 |
| 17 | Attapeu | 5.0 | 210.0 | 18,432.0 | 3.0 | 36.0 | 2,717.0 | 60.0 | 17.1 | 14.7 |
| 18 | Xaysomboun S.R. | 3.0 | 85.0 | 5,664.0 | 3.0 | 31.0 | 1,661.0 | 100.0 | 36.5% | 29.3 |
| | Total (Lao PDR) | 141.0 | 10,781.0 | 932,982.0 | 127.0 | 4,229.0 | 437,649.0 | 90.1 | 39.2 | 46.9 |

1.2.6 Share of different sources of energy

Wood fuel and charcoal are the main energy sources for cooking in Lao households (79.14%+14.97% = 94.11%). From the table 12. showing share of different energy sources, used for cooking in Lao households (NSC 2006), it is seen that fuel wood and charcoal comprise of largest proportion in energy sources for cooking in almost all of provinces, including economically more prosperous provinces with higher urbanization, like Vientiane capital, Vientiane, Savannakhet, Champasak and Luang Prabang provinces. Largest share of electricity for cooking is observed in Vientiane capital, but counted for 6.6% only (country average 1.1%).

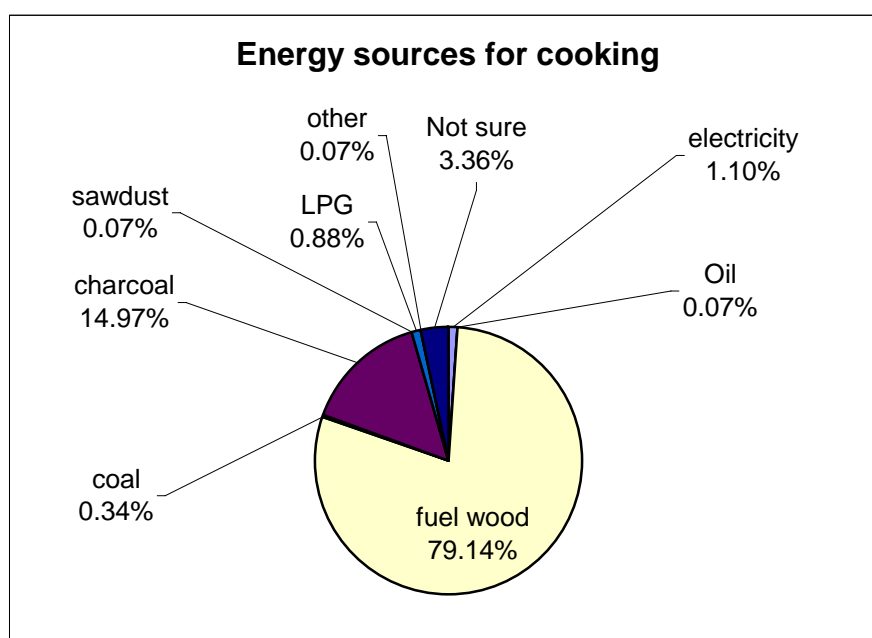


Figure 12: Share of energy sources for cooking (Lao averaged) (NSC 2006)

1.2.7 Expenditure on different energy sources

From NUOL-TERI survey results (figure 13), majority of interviewed households spend less than 10US\$ per month for electricity use (65%). Such consumption often incurred by basic household electric appliances, such as Lighting, refrigerator, TV/Radio/VCD/DVD player, ironing, rice cooker, electric pan, small water boiler and some fans.

About 23% of Vientiane people pay from 11 to 50 US\$ per month for electricity bill. Usually there is air conditioner and water heating systems installed in these households. If several air conditioning systems are used, electricity bill will excess 50\$ per month (only 2% of interviewed households belong to this category).

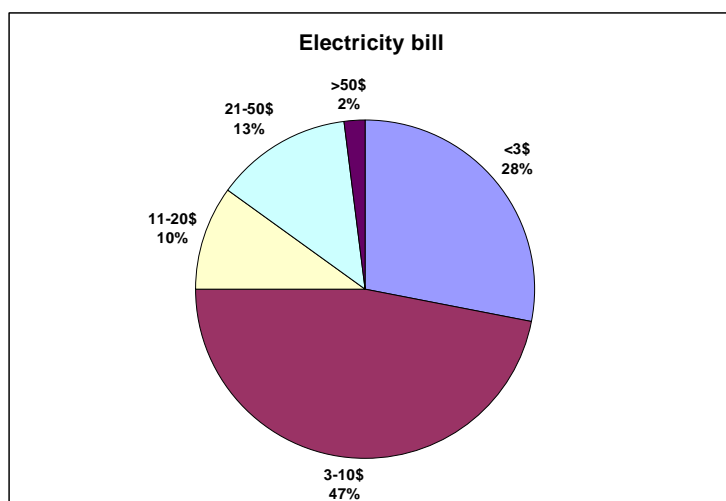


Figure 13: Monthly electricity bill for Vientiane people (NUOL-TERI study 2006)

1.2.8 Prices of different energy sources

EDL's Grid electricity tariffs are listed in table 15. Lao tariff is lowest among ASEAN countries.

Table 14: C Grid Electricity tariff in Lao PDR (Source: EDL 2004 [7])

| | Categories of consumers | 2004-05 | 2006 | 2007 |
|----------|---|-----------------|-----------------|-----------------|
| 1 | Low voltage, Residential | US\$/kWh | US\$/kWh | US\$/kWh |
| | from 0-25 kWh/month | 0.0115 | 0.0135 | 0.0152 |
| | 26-150 kWh | 0.0265 | 0.0273 | 0.0281 |
| | >150 kWh | 0.0765 | 0.0765 | 0.0765 |
| | residential average | 0.038 | 0.039 | 0.040 |
| 2 | Low voltage. none residential | | | |
| | irrigation | 0.0295 | 0.0310 | 0.0325 |
| | governmental offices | 0.0706 | 0.0696 | 0.0686 |
| | industry | 0.0636 | 0.0627 | 0.0618 |
| | Service | 0.0826 | 0.0826 | 0.0826 |
| | Embassies and international organizations | 0.1066 | 0.1066 | 0.1066 |
| | Entertainment | 0.1095 | 0.1095 | 0.1095 |
| | average | 0.0771 | 0.0770 | 0.0769 |

| | Categories of consumers | 2004-05 | 2006 | 2007 |
|----------|---|---------------|---------------|---------------|
| 3 | Medium Voltage, none-residential | | | |
| | Irrigation | 0.0251 | 0.0263 | 0.0276 |
| | Industry | 0.0541 | 0.0533 | 0.0526 |
| | Governmental Office | 0.0600 | 0.0592 | 0.0583 |
| | General business | 0.0702 | 0.0702 | 0.0702 |
| | Average | 0.0524 | 0.0523 | 0.0522 |

Source: EDL annual report 2005.

As a tradition, wood fuel in rural areas are for free. People collect the wood from the surrounding community production forests or from plantation clearance. Some times, rural people collect fuel wood and then sell to urban people in district or provincial centres, of course, by negligible low prices.

Table 14 shows household expenditure for some energy sources in rural areas of Lao PDR.

Table 15: C Household expenditure for energy sources (Ghimire et al, 2003)

| Type of fuel | Consumption per household per month | Price per unit | Expenditure per year |
|--------------|-------------------------------------|-------------------|----------------------|
| Wood | 25 to 35 | Free available | Free or up to 6 US\$ |
| Charcoal | 25 to 40 kg | 0.02-0.04 US\$/kg | 6.00-19.2 US\$ |
| Kerosene | 2 to 4 L | 0.40-0.50 US\$/L | 9.6-19.2 US\$ |

As seen from table 17, showing results of two national censuses 1995 and 2005, use of biomass for cooking has decreased (-15%), while coal and LPG significantly increased (275% and 400% respectively). Use electricity also decreased (-50%). The reasons of decreasing use of electricity would be: (1) people turned to use more efficient electric appliances for cooking (such as microwave, saving and accumulating water boiler and rice cooker, (2) raised awareness on energy saving; (3) electric appliances are more accessible and available, (4) better living conditions

1.2.9 Time allocated for fuelwood collection (by women, men, children)

In general, as settled traditions, especially in rural areas, collecting wood is women and also children tasks. In average Lao people spend 0.2 hours (3.2%) of their daily times in economic activities for wood collection (Figure 14, Table 16, LECS 02/03). This figure is especially typical for rural without road access (0.3 hours or 4.5% of total economic activities time). It is also observed that rural people spend more times for agricultural productions, followed by care of family, food cooking and hunting/fishing. Results of LECS 2002/03 also show that women spend more times (0.5 hours) in firewood collecting, while men – only 0.2 hours, household work (2.5<>0.6). At the same times, women have lesser times for leisure, sleeping and eating (14.8 hrs versus 15.4 hrs), lesser times for schooling (0.9<>1.3), travel (1.2<>1.6), etc.

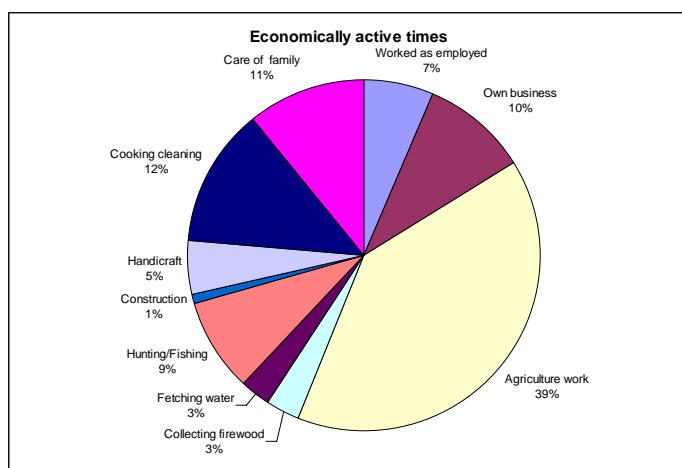


Figure 14: Time use for various economic activities (Lao PDR average, LECS 2002/03)

Table 16: C Time use for various economic activities (LECS 2002/03)

| No. | Province | Worked as employed | Own business | Agriculture work | Collecting firewood | Fetching water | Hunting/Fishing | Construction | Handicraft | Cooking cleaning | Care of family | total |
|-----|----------------------------------|--------------------|--------------|------------------|---------------------|----------------|-----------------|--------------|-------------|------------------|----------------|-------------|
| 1 | Vientiane capital | 1.7 | 1.6 | 1.2 | - | - | 0.1 | - | 0.4 | 0.9 | 0.4 | 6.3 |
| 2 | Phongsaly | 0.1 | 0.3 | 3.5 | 0.3 | 0.3 | 0.4 | 0.1 | 0.2 | 0.9 | 0.9 | 7.0 |
| 3 | Luangnamtha | 0.4 | 0.5 | 2.9 | 0.3 | 0.2 | 0.6 | - | 0.2 | 0.6 | 0.9 | 6.6 |
| 4 | Oudomxay | 0.3 | 0.2 | 3.1 | 0.3 | 0.2 | 0.7 | - | 0.2 | 0.6 | 0.9 | 6.5 |
| 5 | Bokeo | 0.1 | 0.2 | 1.8 | 0.1 | 0.1 | 0.3 | 0.1 | 0.1 | 0.6 | 0.8 | 4.2 |
| 6 | Luangprabang | 0.5 | 0.7 | 2.3 | 0.2 | 0.2 | 0.4 | 0.1 | 0.5 | 0.8 | 0.7 | 6.4 |
| 7 | Huaphanh | 0.2 | 0.3 | 3.0 | 0.1 | 0.3 | 0.6 | - | 0.7 | 0.9 | 0.7 | 6.8 |
| 8 | Xayabouly | 0.3 | 0.7 | 2.8 | 0.2 | - | 0.3 | 0.1 | 0.4 | 0.7 | 0.4 | 5.9 |
| 9 | Xiengkhouang | 0.2 | 0.4 | 2.7 | 0.2 | 0.3 | 0.3 | - | 0.4 | 0.8 | 0.7 | 6.0 |
| 10 | Vientiane | 0.6 | 0.9 | 2.3 | 0.1 | 0.1 | 0.4 | 0.1 | 0.4 | 0.9 | 0.6 | 6.4 |
| 11 | Bolikhamxay | 0.3 | 1.8 | 2.6 | 0.2 | 0.1 | 1.0 | - | 0.3 | 0.7 | 0.8 | 7.8 |
| 12 | Khammuane | 0.4 | 0.4 | 2.0 | 0.2 | 0.2 | 1.0 | 0.1 | 0.3 | 0.8 | 0.8 | 6.2 |
| 13 | Savannakhet | 0.6 | 0.5 | 2.2 | 0.3 | 0.1 | 0.6 | - | 0.4 | 0.9 | 0.6 | 6.2 |
| 14 | Salavanh | 0.1 | 0.3 | 3.1 | 0.3 | 0.2 | 0.8 | 0.1 | 0.2 | 0.8 | 0.7 | 6.6 |
| 15 | Xekong | 0.4 | 0.4 | 3.0 | 0.2 | 0.1 | 0.3 | 0.1 | 0.3 | 0.6 | 0.7 | 6.1 |
| 16 | Champasak | 0.6 | 0.8 | 2.0 | 0.2 | 0.1 | 0.4 | 0.1 | 0.2 | 1.1 | 0.6 | 6.1 |
| 17 | Attapeu | 0.3 | 0.6 | 1.5 | 0.2 | 0.3 | 0.9 | - | 0.2 | 0.6 | 0.3 | 4.9 |
| 18 | Xaysomboun S.R. | 0.3 | 0.3 | 3.1 | 0.2 | 0.2 | 0.6 | - | 0.2 | 1.3 | 0.7 | 6.9 |
| | Total (Lao PDR) | 0.41 | 0.61 | 2.51 | 0.20 | 0.17 | 0.54 | 0.05 | 0.31 | 0.81 | 0.68 | 6.27 |
| | % | 6.6% | 9.7% | 39.9% | 3.2% | 2.7% | 8.6% | 0.8% | 5.0% | 12.8% | 10.8% | 100.0% |
| | Urban | 1.4 | 1.7 | 1.0 | 0.1 | 0.3 | - | 0.10 | 0.3 | 0.9 | 0.5 | 6.3 |
| | % | 22.2% | 27.0% | 15.9% | 1.6% | 4.8% | 0.0% | 1.6% | 4.8% | 14.3% | 7.9% | 100.0% |
| | Rural with road access | 0.3 | 0.4 | 2.8 | 0.2 | 0.1 | 0.5 | - | 0.4 | 0.8 | 0.7 | 6.2 |
| | % | 4.8% | 6.5% | 45.2% | 3.2% | 1.6% | 8.1% | 0.0% | 6.5% | 12.9% | 11.3% | 100.0% |
| | Rural without road access | 0.1 | 0.3 | 3.0 | 0.3 | 0.3 | 0.7 | - | 0.3 | 0.8 | 0.9 | 6.7 |
| | % | 1.5% | 4.5% | 44.8% | 4.5% | 4.5% | 10.4% | 0.0% | 4.5% | 11.9% | 13.4% | 100.0% |

Source: LECS 2002/03. NSC. 2004

1.2.10 Energy end use

- Cooking: mainly fire wood, charcoal, electricity (urban area), coal (briquette coal), LPG (see table 15)
- Lighting: In rural areas, energy sources for lighting are comprised mainly of kerosene, battery (e.g., car battery, dry cell), candle, firewood,
- Motive power: mini - tractor, mini truck, small diesel engine, motorbike, water wheel (pumping, rice hulling, etc)
- Water heating: fire wood, electricity (for electrified areas), solar water heating (popular in Northern provinces, equipment is imported from China)
- Space heating: firewood, charcoal, natural solar heating,
- TV, radio, phone, other entertainment: grid electricity (central grid or community mini grid), solar home system, small diesel gen-set, Pico hydros, car batteries (usually get charged in nearby electrified villages or from gen-set, or Pico hydros),
- Refrigeration: use if electrified areas only. Solar refrigerator are available in Lao market, but quite expensive and usually used for vaccine storage and purchased by donated / grant money only.
- Air conditioning, fans. In some electrified areas, fans are used. But Air conditioning usually is not applied due to power available, house stile, etc.
- Productive activities. Typical productive activities in rural areas of Lao PDR: 1) rice huller (mostly driven by small diesel gen-set, some where also water wheel); 2) small carpentry tools (diesel gen-set, pico hydros); 3) Irrigation pump (usually run by diesel engine of mini tractor); 4) fodder grinder/mixer (small diesel),

2 Appendixes

2.1 Demography

Table 17: Changes of Demographical data of Lao PDR (1995-2005 censuses)

| Description | 1995 | 2005 | % changes |
|---|--------|--------|-----------|
| Total population, x1000 | 4,575 | 5,621 | 23% |
| Female, x1000 | 2,314 | 2,821 | 22% |
| Male, x1000 | 2,261 | 2,800 | 24% |
| % of Urban population | 17.0% | 27.1% | 59% |
| % of rural population | 83.0% | 72.9% | -12% |
| Male/Female ratio | 97.70% | 99.30% | 2% |
| Population density, persons/sq.km | 19.3 | 23.7 | 23% |
| Ages structure | | | |
| 0-14 | 44% | 39% | -11% |
| 15-64 | 52% | 57% | 10% |
| 65+ | 4% | 4% | 0% |
| Literacy rate | 60% | 73% | 22% |
| Life expectancy (average, years) | | | |
| Female | 52 | 63 | 21% |
| Male | 50 | 59 | 18% |
| Households size, persons | 6.0 | 5.8 | -3% |
| Energy use for cooking | | | |
| Fuel wood + included charcoal, sawdust, rice husk | 93% | 79% | -15% |
| Coal | 4% | 15% | 275% |
| Electricity | 2% | 1% | -50% |
| Other (LPG, kerosene, etc) | 1% | 5% | 400% |

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