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Full Length Research Paper

A study of medicinal plants in the provision of health care in Lao PDR

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The Lao People' Democratic Republic is one of the poorest countries in the world, with an income per capita of less than US$2 a day. The provision of health care is severely underfunded, and outside the largest cities often provided by poorly qualified health workers. Under these circumstances, most people – both in the capital and the rural areas – prefer to use traditional medicine rather than synthetic drugs. Medicinal plants form a central tenet of Lao traditional medicine, and are believed to be more efficient than synthetic drugs, since synthetic drugs are thought to address the symptoms of the illness, while medicinal plants its causes. This article presents the result of a survey of the medicinal plants on sale in the capital city – Vientiane – in August 2006. A total number of 61 medicinal plants were on sale, of which 52 were identified and their use, mode of preparation, price, and province of origin recorded.

Key words: Medicinal plants, traditional medicine, Vientiane, Laos.

INTRODUCTION

The Lao People's Democratic Republic (hereafter Lao PDR) is a relatively small, landlocked country in South-east Asia, bordering Vietnam, China, Burma (Myan-mar), Thailand and Cambodia (Figure 1). Lao PDR is one of the poorest countries in the world. With a popu-lation of 5.9 million people, in 2005 it had a Gross National Income (GNI) of only US$2.6 billion, or US$440 per capita (World Bank, 2006). According to the World Health Organization, "71% of the population lives on less than US$2.00 a day and 23% live on less than US$1.00 a day" (WHO, 2006a).

Lao PDR gained independence from France in 1949, but it soon became engulfed in the regional instability and the war in neighboring Vietnam. In 1975, shortly after the end of the Vietnam war, the nationalist Pathet Lao movement swept to power with the help of the Soviet Union and the North Vietnamese Army. During the second half of the 1970s, the Lao government put in place a highly centralized and isolationist economic system, with the aim of developing its own economy independently from that of the rest of the world: fac-tories were nationalized, private trade outlawed, and agriculture collectivized.

The provision of healthcare also followed the national attempt at self-sufficiency and relative independence from the outside world. In 1976, shortly after Pathet Lao swept to power, the Ministry of Health set up the Tradi-tional Medicine Research Center (TMRC), with the pur-pose of studying and incorporating "the use of medi-cinal plants and traditional Lao medicines into current and more modern healthcare systems' (Libman et al., 2006). The TMRC still exists today, and through 12 Tra-ditional Medicine Stations (TMSs) in 13 different provin-ces, it is involved in ethnnobotanical field studies, plant collection and identification, cataloging medicinal plants, and developing drugs from traditional Lao medi-cinal plants (Libman et al., 2006).

In 1986, faced with economic decline, the isolationist, centrally planned economic system was gradually rela-xed, and the economy opened up to the outside world with a number of economic reforms collectively referred to as the New Economic Mechanism (NEM) (Stenson et al., 1997). Private enterprise was gradually libera-lized, and private trade was allowed to develop in many branches of the economy. Since then, the country's economy has grown at about 6% a year on average.

The provision of health care in Lao PDR

The provision of health care in Lao PDR followed the pattern of liberalization and privatization of the econo-my. While before 1986 the health care was controlled entirely

Figure 1. The provinces of Laos. Source: Transformed from Bourdet, 1998.

by the state, the NEM led to the emergence of private health facilities, which slowly complemented those provided by the state. Today, the health care system has a public and a private sector.

The public sector is severely underfunded. In 2003, health expenditure was only 3.2% of GDP, one of the lowest of the region. Per capita government expen-diture on health is the 154th lowest among the 189 countries surveyed by the WHO (WHO, 2006b). In 2005, the total health expenditure was of only US$12.0 per capita, of which only 10% was financed by the Government – the remaining coming from households (60%) and donors (30%) (WHO, 2006a). Given the investment available, the country suffers from lack of trained staff. In 2005, Laos only had about 18,000 public sector health workers, including 1,283 physicians (2.26 per 10,000 population), 5,291 nurses (9.32 per 10,000 population), and 276 pharmacists (0.49 per 10,000 population). In 2005 only 53 new physicians and 30 nurses graduated from the National University of Laos (WHO, 2006a). The World Health Organization concluded that 'low salaries and low levels of basic training inhibit health system efficiency' (WHO, 2006a).

Most public expenditure for health care is for hospitals (there are 2 central, 5 regional, 6 specialized, 13 provincial, and 133 district hospitals, as well as 533 rural health care centers) (Paphassarang et al., 2002). On the other hand, the private sector is primarily involved in operating licensed pharmacies, run by one or two individuals, and smaller private clinics. Private pharmacies experienced a particularly strong boom in the last 20 years: from 32 in 1986, the number of private pharmacies swelled to over 2000 by 2005. Private clinics increased from none in 1986 to 261 in 2000 (MOH, 2000) and 484 in 2005 (WHO, 2006a).

As is the case for most other countries, the geographic distribution of health is not even across the country, with the larger cities being better served by public hospitals, private clinics and pharmacies. All the central, regional, and specialized public hospitals are either in the capital city (Vientiane) or other larger cities (specially Luang Prabang and Pakxe in Champasack province, Figure 1), while the smaller towns only have smaller provincial and district hospitals. Similarly, private clinics provide health care mainly to the growing middle classes and foreign aid workers in the larger cities. About 80% of all the private clinics of the country are located in the capital city and other urban areas (MOH 2000). The same is true for private pharmacies, which now sell most of the synthetic drugs purchased in Laos. In 1995 there were about 2,500 people per registered pharmacy in the country, but the number of people per pharmacy ranged from 1,400 in the Vientiane municipality to 10,700 in Huaphanh province (Stenson et al., 1997).

The private pharmacies in Laos are classified into three different categories, according to "the qualification of the owner or manager of the pharmacy" (Paphassarang et al. 2002): Class I pharmacies, staffed by qualified pharmacist with a university degree; Class II pharmacies, staffed by assistant pharmacist or technician pharmacist, and Class III pharmacies, staffed by 'a nurse or other health worker having received training on drug management' (Stenson et al., 1997). Because of the small number of trained pharmacists in the country, Class III pharmacies account for an estimated 95% of the total (Stenson et al., 2001). These pharmacies drain the trained nurses from public hospital because the low salary provided to public health workers entices many nurses to leave the public sector and set up a private pharmacy.

Most of the better-staffed class I pharmacies are in Vientiane or other larger cities (Paphassarang et al., 2002), and the rural areas are left with Class III private pharmacies, staffed by nurses rather than trained pharmacists. In the more isolated districts there is usually only a class III pharmacy in the district capital, and most villages have neither pharmacy nor health worker.

Medicinal plants in Lao PDR

It is not surprising that most rural dwellers turn to medicinal plants. Hospitals are often at considerable distance from the village and the staff of the local pharmacy (if there is any) are poorly qualified, while advice on the use of medicinal plants is given by traditional healers, relatives, or neighbors who have considerable experience treating ailments, and are often willing to give their advice for free or for little compensation (Sydara et al., 2005). Also, while traditional medicines are usually either free or very cheap when purchased in the local market, synthetic drugs are often too expensive for people with cash incomes of US$1/day. Finaly, as Sydara et al. (2005) points out, to many people, medicinal plants are more appealing. Lao people believe that Traditional Medicines (TM, which includes medical plants, massage, sauna, and acupuncture) are more efficient than the synthetic drugs sold in pharmacies, because TMs are said to address the causes of the ailments, while synthetic drugs only the symptoms (Sydara et al., 2005).

The same factors that explain the popularity of medicinal plants in Laos are also valid for many other countries. About 80% of the world's population uses medicinal plants for primary health care (Cordell, 1995), and traditional medicines are the "only health resource available to about 60% of the world population" (Taylor et al., 2001). Medicinal plants have proven their efficiency for their "safety, efficacy, cultural acceptability and lesser side effects." (Kamboj, 2000), and synthetic drugs are only turned to when medicinal plants prove inefficient.

This article looks at the medicinal plants on sale in Vientiane. All the major towns in Lao PDR have markets where people can purchase medicinal plants, either individually for specific ailments, or as bundles of medicinal plants for general well-being, the latter often imported from China. As mentioned above, the provision of medi-

cal health in Vientiane is better than in the provincial towns, since the capital city has more hospitals, private clinics, and class I pharmacies with trained pharmacists. However, as Sydara et al. (2005) argue, the better quality health facilities in Vientiane have little direct influence on the use of TM by the inhabitants. In their study on the popularity of TM in various areas in Laos, Sydara et al. (2005) found that the use of TM was similar in rural areas and in urban areas, 'in contrast to the common notion that TM is more popular in remote areas because people have less access to trained medical personnel'.

Many people in Vientiane grow some of the medicinal plants they use. Vientiane municipality has a total population of slightly over 200,000, and the population census of 1995 reported a population density of 133.7 people per km² (Bourdet, 1998). During the last 10 years population density has grown by approximately 3% a year (Kethongsa, 2004: 10), but it is still suffi-ciently low for many inhabitants to grow medicinal plants in their gardens. Many people also buy medicinal plants, because the plants are for rare ailments, do not grow in the Vientiane climate, or because the people do not have the expertise or enough space to grow these plants. This article reviews the medicinal plants sold in the largest market in Vientiane, the 'Morning Market' (Talat Sao), and the neighboring streets. Although medicinal plants are also on sale in the other (smaller) markets of the capital, the 'Morning Mar-ket' has the largest number of retailers. The other mar-kets may have only one or two retailers – if any – selling 10 to 15different plants.

METHODOLOGY

A survey was carried out during the second half of August 2006 in the Morning Market and the streets surrounding the market. In the morning market fourteen retailers were selling medicinal plants in relatively permanent structures, while in the streets neighbouring the morning market between 10 and 15 retailers (depending on the time of the day) were selling between 10 and 20 medicinal plants on plastic sheets on the pavement. A survey was also made of two other smaller markets in Vientiane. Only in one of these two markets a retailer was selling medicinal plants.

The fourteen retailers in the morning market were interviewed as to the Lao names of the medicinal plants they sold, the origin of the plant, the part of the plant that is used, the medicinal use, the preparation, and the price. The retailers in the neighbouring streets sold no plant that had not been recorded in the morning market. One sample was selected and weighted with the help of a hand held scale, and its price inquired. The interviews were conducted in the Lao language by the author with the help of a local specially trained research assistant. A total of 61 medicinal plants were recorded. Of these, 53 were identified (Table 1). A sample of each medicinal plant identified was purchased and deposited at the herbarium of the Faculty of Science, National University of Laos. Callaghan (2004) was consulted to help identifying the plants and the meaning of the Lao name.

RESULTS

Table 1 reports the botanic name, the Lao name and its meaning, the area of origin of the plant, the medical use, the part used, the mode of preparation, and the price per kilogram (exchange rate at time of fieldwork: US$1 = Lao Kip10,000). Approximately half the plants (27 out of 52) come from Vientiane or Vientiane province, while the other half come from different provinces in the north and the south. The plants are either purchased in the different provinces by the retailers themselves, who travel to these provinces once or twice a year, or brought to the capital by friends or traders. The seven plants that come from Xiengkhuang, and the two that come from Borikhamxay, are purchased from people who make the trip to Vientiane to sell the plants to local retailers. Xiengkhuang and Borikhamxay provinces are bordering Vientiane province and Vientiane Municipality respectively (Figure 1), so the trip to the capital is not very expensive. On the other hand, the low prices of the medicinal plants seem to discourage traders from bringing medicinal plants from more distant provinces.

In some rural areas the collection of medicinal plants for the Chinese market is a flourishing business that has attracted the attention of a number of wholesalers who transport the goods from the provinces to China (Ducourtieux et al., 2006). However, the local market in Vientiane seems to be too small to generate the same interest, and those who sell the plants in Talat Sao are forced to travel to the provinces themselves, or call upon friends who visit the capital.

Most medicinal plants are for common ailments, such as fever or pain in different parts of the body, for which chemical drugs are also available. However, in some cases the medicinal plants address problems for which synthetic drugs are not available, and might be considered placebo medicines. For example Myriopteron extensum (Wight & Arnott) is given 'if a man is tired of his wife', while Kaempferia galanga L. is taken 'to attract girls'. The most common plant parts sold are roots (13 cases) followed by stems (10 cases), often with the bark (in five cases the bark is sold alone, in one case the bark is sold with the leaves), fruits (eight cases), the whole plant (five cases) and leaves (four cases). Most medicinal plants are boiled and the water drunk. In a few cases it is powdered and applied externally, or chewed.

The last column of the table reports the price of the medicine per kilogram, unless the medicinal plant is sold in fruits or seeds, which is the case for four plants. The price reported for each medicinal plant is only indicative, since it varies both daily and seasonally. Daily because if the retailers have not made any sale by late afternoon, they often drop the prices in the hope to sell at least something by the end of the day. Seasonally because some plant parts (for example fruits) are not available year-round. Prices also drop for habitual customers, or for customers who purchase large quantities, while they rise for foreigners, including Thai tourists who make day-long trips from neighboring Thailand.

What is notably lacking in the market are transformed products, such as concentrates or extracts of plants. This

Table 1. Medicinal plants sold in the morning market in Vientiane, August 2006.

Scientific name	Lao name	Meaning of Lao name	Origin	Medical use or disease treated	Part used	Mode of preparation	Price (Lao kip) per Kg
ACANTHACEAE							
Andrographis paniculata (Bum. f.) Nees	Sarm phan pee	Deer's tail flower	Xiengkhuang	General purpose	Bark	Boil powder in water	100,000
AGAVACEAE							
Sansevieria zeylanica (L.) Willd.	Bai' lai	Varicoloured leaf	Pu Khuai Kwai (Vientiane)	Liver problems	Leaves		500,000 (don't sell, very hard to find)
AMARYLLIDACEAE							
Hymenocallis littoralis (Jacq.) Salisb.	Varn xon	Ground lotus flower	Vientiane	Testicles are too low because of excessive running	Root	Boil in water	25,000
ANNONACEAE							
Polyalthia suberosa (Roxb.) Thwaites	Tao' noy	Small breast	Near Vientiane	Mothers: to have more milk after delivery. Men: to have more sperm	Branches	Boil in water	33,000
APOCYNACEAE							
Alstonia sp.	Teen pet	Duck's foot	Vientiane province (52 kms from Vientiane)	High sugar level in blood	Bark	Boil in water (10 grams/1 litre)	100,000
Aganonerion polymorphum Pierre ex Spire	Bai' som lom, phak	Sour wind leaf vegetable	Vientiane province (52 kms from Vientiane)	Kidney, lung problem, back pain	Stem	Boil in water	75,000
ARACEAE							
Homalomena aromatica Schott	Kheeng khaeng par kang	Kang fish's ginger	Thadideng village near Vientiane	Muscle weakness, rheumatisms	Whole plant		85,000
ARECACEAE							
Calamus tenuis Roxb.	Vai nyae	Lizard rattan	Oudomxai	High sugar level in blood, fever	Stem	Boil in water	150,000

Table 1. Contd.

ASCLEPIADACEAE							
Hoya sp.	Buap lom	Wind loofah	Vientiane (52 kms from Vientiane)	Gastritis (have gas)	Fruit		5,000/1 fruit
Myriopteron extensum Wight & Arnott	Oy sam suan	Three gardens sugar-cane	Pu Khau Khuai	Throat ache; back, arm and leg pain; if a man is tired of his wife			30,000
Streptocaulon tomentosum Wight & Arn.	Pa-song	Horn vine	Xiengkhuang	Hard to urinate, urinate blood		Boil powder in water	22,000
ASTERACEAE							
Vernonia squarrosa (D. Don) Less.	Deua heen	Stone fig	Meung Phuan (outside vientiane)	Back pain, kidney stones	Fruit	Boil powder in water	125,000
BALANOPHORACEAE							
Balanophora fungosa J.R. & G. Forster	Het' din	Ground mushroom	Nong Het, Chen Kuan (north)		Whole plant		200,000
CELASTRACEAE							
Salacia chinensis L.	Tar kai'	Chicken eye	Borikhamxay	Back pain	Stem	Boil in water	28,000
COMMELINACEAE							
Aneilema herbaceum (Roxb.) Wall.	Karp phoo	Jungle orchid	Champasak	Chew to strengthen teeth	Bark and leaves	Chew	50,000
ELAEOCARPACEAE							
Elaeocarpus robustus Roxb.	Bee mee	Bear's bile	Vientiane (52 kms from Vientiane)	Gastritis	Root	Smash and eat powder	95,000
FABACEAE							
Acacia farnesiana (L.) Willd.	Som poy ton	Thorny 'kan thin'	Xiengkhuang	Washing hair	Fruit		
Centrosema pubescens Benth.	Thua lai	Stripped bean	Loung Namtha	Snake and scorpion bites	Seed	Crush and put on the skin	2,000/1 seed

Table 1. Contd.

Dalbergia sp.	Pa-dong leuat	Blood rosewood	Vientiane (52 kms from Vientiane)	Blood too dark	Bark	Boil in water or put in alcohol	90,000
Dalbergia bariensis Pierre	Pa-dong daeng	Red eczema	Nung Hai village near Vientiane	Pain in bones and rheumatism	Bark		55,000
Dalbergia cochinchinensis Pierre	Pa-dong khao	White rosewood	Xiengkhuang	Syphilis, for girls who have kidney problems	Stem	Boil	100,000
Glycine max (L.) Merr.	Thua leuang	Yellow bean	Chen Khuang (north)	Help digestion	Root	Boil with water	50,000
Pachyrhizus erosus (L.) Urban	Man phao'	Axle tuber	Vientiane	Stomach ache	Seeds		5,000/3 seeds
Pterocarpus indicus Willd.	Chan daeng	Red sandalwood	Houaphan	Improves blood circulation	Stem	Boil (10 grams for 1 litre of water)	35,000
Vigna umbellata (Thunb.) Ohwi & H. Ohashi	Thua daeng	Red bean	Vientiane	Kidney problem, liver problem, back pain, gastritis	Seed	Break the beans and boil, (6 seeds/1 litre)	2,000/3 seeds
FLACOURTIACEAE							
Hydnocarpus anthelmintica Pierre	Ka-bao', mark	Urine fruit	Vientiane province	Liver problems, throat ache	Fruit	Boil in water	35,000
FUNGI – AURICULARIACEAE							
Auricularia polytricha (Mont.) Sacc.	Het' hoo noo	Mouse ear mushroom	Xiengkhuang	Vitamin deficiency	Whole plant		33,000
Dictyophora sp.	Het' daeng	Red mushroom	Kie Pi Set (Near Vientiane)	Skin burned by fire	Whole plant	Put powder on skin	120,000
IRIDACEAE							
Eleutherine subaphylla Gagnep.	Bua leuat, phak	Red lotus vegetable	Vientiane	Cover wound, late period, stops bleeding when delivery, heart failure	Root	Boil in water	100,000
LAURACEAE							
Cinnamomum iners Reinw. ex Blume	See khai' ton	Lemon-grass tree	Xiengkhuang	Cough, difficulty breathing, fever	Stem and bark	Boil in water	125,000

Table 1. Contd.

MALVACEAE							
Abelmoschus esculentus (L.) Moench.	Som phor dee		Vientiane	Fever	Fruit		100,000
Sida corylifolia Wall.	Varn kham	Night-time rhizome	Xiengkhuang	Acne	Root	Put powder on skin	150,000
MELASTOMATACEAE							
Osbeckia chinensis Linn.	Ian dorn	Stink of island	Pu Khau Khuai	High blood sugar level	Root	Boil in water	21,000
Limacia triandra Miers	Yar narng, Yar narng daeng	Lady's medicine, red lady's medicine	Vientiane	In case of excessive bleeding after delivery; increases amount of milk after delivery	Root	Boil in water	50,000
Tinospora crispa (L.) Hook. f. & Thoms.	Khao' hor, kheua	Granted horn vine	Vientiane	Malaria (drink), acne (wash body)			7,000
MYRSINACEAE							
Ardisia crenata Sims	Tar karng	Eye in the middle	Borikhamxay	Back pain	Stem	Boil in water	28,000
Knema globularia (Lamk.) Warb.	Thorm leuat, kok	Bloody humble tree	Chen Khuang (north)	Diarrhoea	Root	Boil in water	30,000
OCHNACEAE							
Ochna integerrima (Lour. Merr.)	Xarng nao	Elephant pulling down	Vientiane	Sickness due to bad food after delivery			25,000
PANDANACEAE							
Pandanus sp.	Teuy	Pandanus	Mang Fuam (150 kms from Vientiane)	Kidney problems, sore throat	Fruit		100,000
Pandanus odoratissimus L. f.	Bai' teuy	Assenting leaf	Vientiane	Makes physically stronger	Leaves	Boil in water	Don't sell, everybody grows
PIPERACEAE							
Piper betle L.	Bai' Phoo	Hill leaf	Vientiane	Chewing to strengthen teeth	Leaves	Chew	500,000
Piper nigrum L.	Phik thai', p. noy	Little chilli	Vientiane	Coughing, lose weight	Fruit	Powder and put in raw egg.	77,000

Table 1. Contd.

POACEAE							
Cymbopogon nardus (L.) Rendle	See khai'	Citronella	Vientiane	Cough, high blood pressure, headache	Stem	Boil in water	50,000
ROSACEAE							
Eriobotrya sp.	Kor khee lex	Iron-filing oak	Vientiane province	Pimples	Leaves	Put powder on skin	30,000
RUTACEAE							
Aegle marmelos (L.) Correa	Toom, mark	Swollen fruit	Vientiane (52 kms from Vientiane)	Stomach ache, lack of appetite	Fruit		125,000
Tetradium fraxinifolium (Hook.) Hartley	Hao, kheua	Cobra vine	Champasak	Kidney problems for girls	Root	Boil in water	30,000
SIMAROUBACEAE							
Brucea javanica (L.) Merrill	Bee khon	People's bile	Chen Khuang (north)	High blood sugar level, syphilis	Stem	Boil in water	60,000
SMILACEAE							
Smilax glabra Roxb.	Yar hua	Striped vine	Van Viang (5 hours drive from Vientiane)	Feeling tired after delivery	Root	Boil in water	30,000
TILIACEAE							
Pentace burmanica Kurz	See siet	Rub graze	Champasak	Strengthens teeth	Bark	Use like chewing gum	100,000
USNEACEAE							
Usnea siamensis Wainio	Foy lom	Wind's sawdust	Xiengkhuang	Coughing, difficulty breathing, asthma	Whole plant		500,000
ZINGIBERACEAE							
Curcuma sp.	Varn chai' dam	Black-hearted rhizome	Champasak	Gastritis	Root	Boil in water	60,000
Kaempferia galanga L.	Varn horm	Fragrant rhizome	Vientiane	Headache, to make perfume, to attract girls	Root	Boil in water	42,000
Zingiber zerumbet (L.) Smith	Varn phai' chai' leuang	Forest rhizome	Vientiane	Helps digestion	Root	Boil in water	35,000

might be explained by the small amount of money that the retailers are able to charge for the plants they sell, even for Lao standard. The local sale of medicinal plants is unlikely to be a very lucrative business that may support the emergence of entrepreneurs. Sizeable profits only seem to be obtainable with the export of the medicinal plants to China. The research that the government of Lao PDR is pursuing through the TMRC might be instrumental in developing new medicines with a higher value added.

CONCLUSIONS

As in many other developing countries, the people in Laos rely on medicinal plants for many of their ailments. This is for three reasons in particular. First, many people cannot afford to buy medicines in pharmacies. Second, pharmacies are often staffed by people with little training, while knowledge of medicinal plants is readily available from one's neighbors, family members, traditional healers, and sellers. Third, people believe that Western medicines only cure the symptoms, not the causes of the illness, while Traditional Medicines (of which medicinal plants form an important part) address the causes of the illness. Interestingly, medicinal plants are not only popular in the countryside, where medical services are worse, but also in the capital city.

This survey only records the sale of medicinal plants. Observation, as well as the literature cited, shows that a large number of households grow medicinal plants in their gardens. Indeed, the fact that approximately half of the plants on sale – 25 out of 52 species identified – come from other provinces, suggests that local retailers seem to specialise in the plants that cannot be grown locally. Hence, the relatively small number of medicinal plants on sale (61) and merchants (30, with a total popu-lation of 200,000) selling medicinal plants in and around Talat Sao might be an indication of the widespread cul-tivation of medicinal plants in the capital city, rather than of the limited interest in medicinal plants.

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