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Office on Drugs and Crime

Central Committee for Drug Abuse Control

Lao National Commission for Drug Control and Supervision

Office of the Narcotics Control Board

Opium Poppy Cultivation in South East Asia

Lao PDR, Myanmar, Thailand

October 2007

UNODC's Illicit Crop Monitoring Programme (ICMP) promotes the development and maintenance of a global network of illicit crop monitoring systems in the context of the illicit crop elimination objective set by the United Nations General Assembly Special Session on Drugs. ICMP provides overall coordination as well as direct technical support and supervision to UNODC supported illicit crop surveys at the country level.

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Regional Reports

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Opium Poppy Cultivation in South East Asia 2007

Opium Cultivation in the Golden Triangle 2006

Country Reports

Afghanistan

Opium Survey 2007

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Bolivia

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Colombia

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Opium Survey 2005

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Coca Cultivation Survey 2001

** Country reports from 2006 onwards are included in regional publications.*

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This document has not been formally edited.

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PREFACE

The Golden Triangle is closing a dramatic period of opium production. Thailand has been opium-free for a long time. Vietnam is also opium-free. Laos has cut opium production by 94% in less than a decade (down to 1,500 hectares). Myanmar's share of the world opium market has collapsed from 30% in 1998 to under 6% in 2007. A decades long process of drug control is clearly paying off. Thailand, in particular, stands out as an inspiration to its neighbours and a role model for other countries trying to overcome their drug problems.

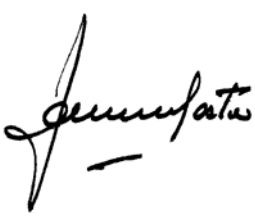
Yet it is too early to declare the drug problem in Southeast Asia as over. In 2007, opium cultivation in Myanmar rose by 29% while production was up 46% thanks to higher yields. These increases are dwarfed by the opium boom in Afghanistan, that produces 20 times more drugs than Myanmar. But they flash a warning sign that reminds us that Myanmar is still, by far, the world's second largest opium producer (at 460 tonnes). Myanmar needs a more effective counter narcotics strategy and more assistance, if it is to reach its target of being opium free by 2014.

The situation is particularly worrisome in the South Shan State. Although access for our ground surveyors was difficult, there are signs of significant opium cultivation in this region. Furthermore, there is evidence that double cropping, irrigation and fertilization are resulting in higher yields than in other parts of the country. As in parts of Afghanistan and Colombia where drugs and insecurity overlap, various groups are taking advantage of the situation in the South Shan State to profit from instability.

More rural development assistance is essential to reduce the vulnerability to cultivate drugs stemming from poverty. Ridding the Golden Triangle of opium, which has taken a generation, could be quickly undone if farmers see no improvement in their living standards. In Laos, for example, as opium production has fallen, prices have gone up – by 500% in the past five years. Returning to opium is a serious temptation in poor communities which have yet to see the benefits of abandoning poppy.

Opium growing regions would also benefit from improved drug treatment in order to cope with disproportionately high rates of addiction.

The signs from South East Asia have been encouraging over a number of years. But there is no guarantee that progress can be sustained over time. To consolidate the gains made until recently, national governments and all stakeholders in an opium-free region need to continue their engagement. The Golden Triangle should not be forgotten now that it is no longer notorious.



Antonio Maria Costa
Executive Director
UNODC

PART 1. REGIONAL OVERVIEW

FACT SHEET - SOUTH EAST ASIA OPIUM SURVEYS 2007

		2006	2007	Variation
Opium poppy cultivation[1]		**24,157 ha**	**29,405 ha**	**+22%**
Of which	Lao PDR	*2,500 ha*	*1,500 ha*	*-40%*
	Thailand[2]	*157 ha*	*205 ha*	*+31%*
	Myanmar	*21,500 ha*	*27,700 ha*	*+29%*
Weighted average dry opium yield				
	Lao PDR	*8 kg/ha*	*6 kg/ha*	*-25%*
	Thailand	*15.6 kg/ha*	*15.6 kg/ha*	*0%*
	Myanmar	*14.6 kg/ ha*	*16.6 kg/ha*	*+14%*
Potential production of dry opium[1]		**337 mt**	**472 mt**	**+40%**
Of which	Lao PDR	*20 mt*	*9.2 mt*	*-54%*
	Thailand	*2.4 mt*	*3.2 mt*	*+25%*
	Myanmar	*315 mt*	*460 mt*	*+46%*
Opium poppy eradication		**5,641 ha**	**4,647 ha**	**-18%**
Of which	Lao PDR	*1,518 ha*	*779 ha*	*-49%*
	Thailand	*153 ha*	*220 ha*	*+44%*
	Myanmar	*3,970 ha*	*3,598 ha*	*-9%*
Average price of dry opium				
	Lao PDR	*US$ 550 /kg*	*US$ 974 /kg*	*+77%*
	Thailand[3]	*US$ 1015 /kg*	*US$ 1,071 /kg*	*+6%*
	Myanmar	*US$ 230 /kg*	*US$ 256 /kg*	*+15%*
Total potential value of opium production		**US$ 85.4 million**	**US$ 132.5 million**	**+55%**
Of which	Lao PDR	*US$ 11 million*	*US$ 8.9 million*	*-19%*
	Thailand	*US$ 2.4 million*	*US$ 3.6 million*	*+50%*
	Myanmar	*US$ 72 million*	*US$ 120 million*	*+67%*
Households involved in opium poppy cultivation		**133,600**		
Of which	Lao PDR	*5,800*	*n/a*	*n/a*
	Thailand	*1,300*	*1,600*	*+23%*
	Myanmar	*126,500*	*163,000*	*+29%*
Yearly income of opium poppy growing				
households	Lao PDR	*n/a*	*n/a*	*n/a*
	Thailand	*US$ 300*	*n/a*	*n/a*
	Myanmar	*US$ 437*	*US$ 501*	*+15%*
Of which from opium sale				
	Lao PDR	*n/a*	*n/a*	*n/a*
	Thailand	*US$ 30*	*n/a*	*n/a*
	Myanmar	*US$ 217*	*US$ 227*	*+5%*
Addiction rate in opium poppy growing regions				
	Lao PDR	*0.58%*	*0.58%*	*0%*
	Thailand	*n/a*	*n/a*	*n/a*
	Myanmar[4]	*0.60%*	*0.75%*	*n/a*

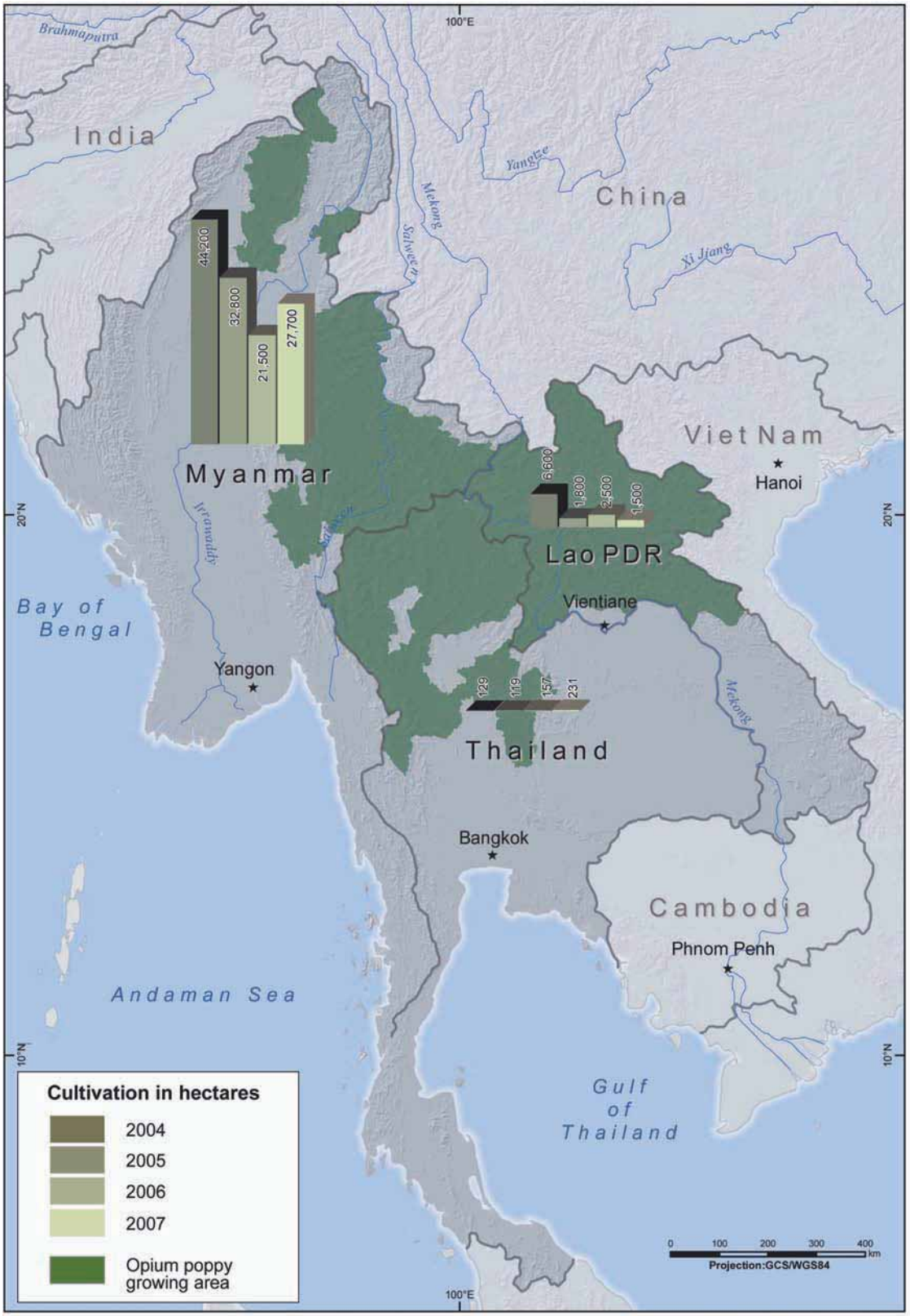
[1] These figures differ slightly from those published in the World Drug Report 2007, which subsumes Thailand under the category of "other countries".

[2] Source: Government of Thailand.

[3] Increase due to change of currency exchange rate. In the local currency Thai Baht, prices did not change significantly.

[4] Surveyed areas of 2006 and 2007 are not comparable.

Map 1: Opium poppy cultivation in South East Asia (hectares), 2004 - 2007



Sources: Governments of Lao PDR, Myanmar and Thailand, national monitoring systems supported by UNODC in Lao PDR and Myanmar
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations

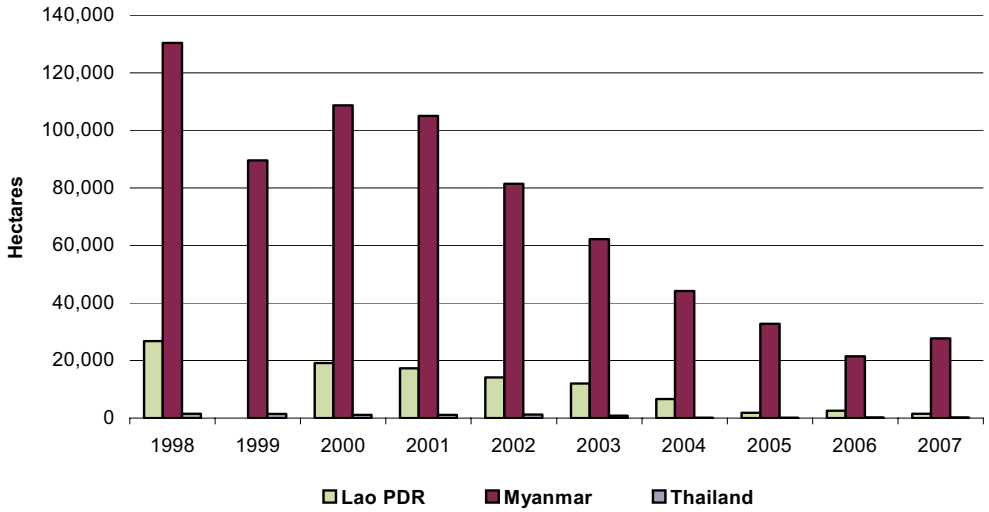
REGIONAL OVERVIEW

In order to assess the scope of opium poppy cultivation and opium production, UNODC has been carrying out opium surveys in cooperation with Governments. These collaborative surveys have been undertaken in Lao PDR since 1992 and in Myanmar since 2002. Thailand has established its own monitoring system. This report contains the results of the UNODC supported opium poppy cultivation surveys in Lao PDR and Myanmar as well as results from the opium poppy surveys implemented by the Thai Office of the Narcotics Control Board (ONCB).

Opium poppy cultivation in South East Asia

Opium cultivation in South East Asia takes place mainly in Lao PDR, Myanmar and Thailand. Eradication figures reported by the Government of Viet Nam indicate that only a negligible amount of opium poppy is cultivated there. Opium poppy cultivation in Lao PDR, Myanmar and Thailand combined has decreased from an estimated 157,900 hectares[5] in 1998, the year of the United Nations General Assembly Special Session on Drugs, to only 29,400 hectares in 2007. Despite a 22% increase in 2007, this corresponds to an 81% overall reduction in only nine years. If this decrease can be sustained in the future, it will be a remarkable, and unprecedented, success and an important step toward the goal of eliminating the cultivation of illicit crops worldwide.

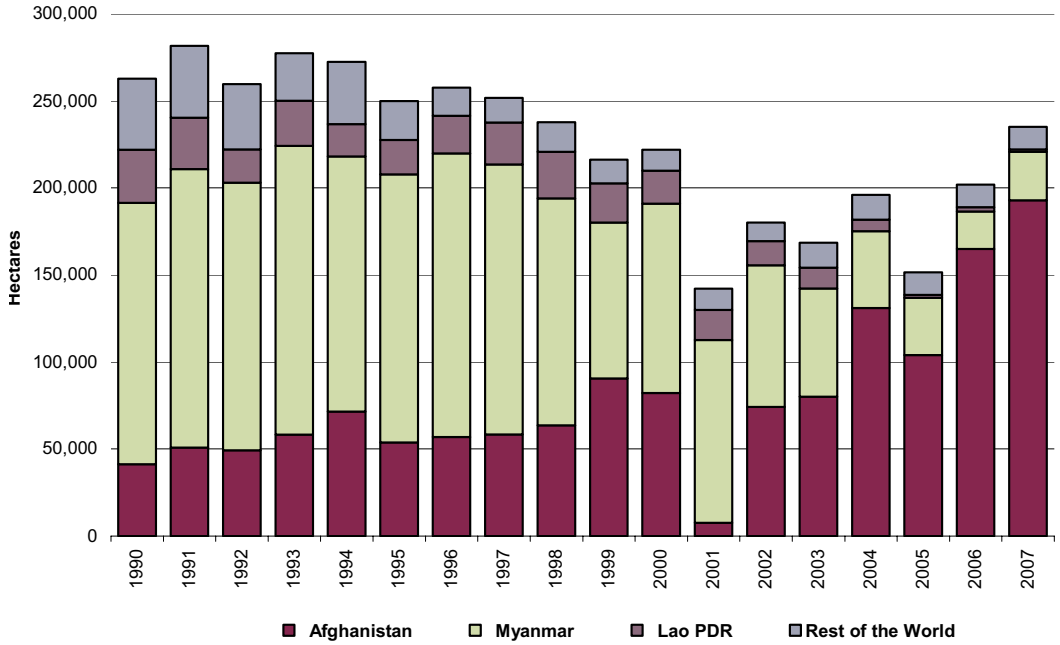
Figure 1: Opium poppy cultivation in South East Asia (hectares), 1998 – 2007



The largest reduction in absolute terms has taken place in Myanmar where opium poppy cultivation decreased by 83% in nine years from 130,300 ha in 1998 to only 21,500 ha in 2006. Following six straight years of decrease, cultivation increased by 29% in 2007 to 27,700 ha. In Lao PDR, the area under opium poppy decreased from 26,800 ha in 1998 to 2,500 ha in 2006 and further in 2007 to only 1,500 ha. This is a reduction by 94% between 1998 and 2007, the largest proportional reduction among the three countries. Thailand reported a reduction of its opium poppy cultivation area from 1,486 ha in 1998 to only 157 ha in 2006 (-89%) but has observed a slight increase to 207 ha in 2007. Lao PDR and Thailand have reduced cultivation to such an extent that opium production is negligible and no longer finds its way to international markets.

[5] Source: UNODC, World Drug Report 2007.

Figure 2: Global opium poppy cultivation (hectares), 1990 - 2007*



** Data for 2007 for Rest of the World are based on preliminary estimates.*

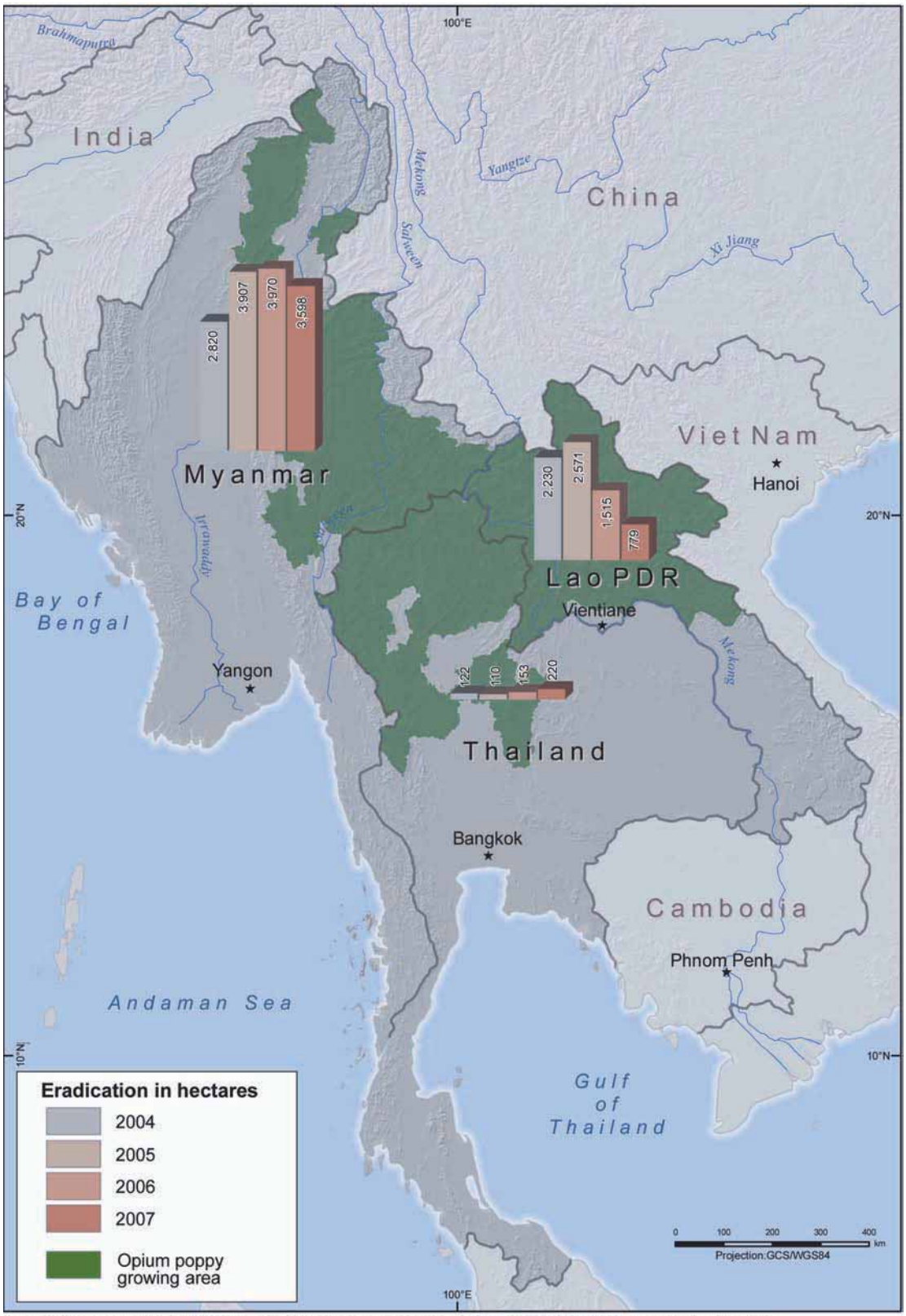
Total area under opium poppy cultivation in Myanmar remains second only to Afghanistan. The country's share of the global opium poppy cultivation fell from 55% in 1998 to only 11% in 2006, before increasing slightly to 12% in 2007. Lao PDR, which in 1998 still had an 11% share of the global opium cultivation, now accounts for less than 1%. In 2003, South East Asia has ceased to be the largest opium poppy cultivating region. Its share of the world opium cultivation fell from 67% in 1998 to under 13% in 2007.

Opium poppy farmers in Laos, Myanmar and Thailand are ethnically diverse and live in remote, mountainous regions. In these upland areas, difficult agricultural and geographic conditions contribute to high levels of poverty. Opium poppy is currently cultivated in Kachin, Kayah and Shan States in Myanmar, in the five northern-most provinces of Lao PDR and in the 10 northern provinces of Thailand. Over the last fifty years or more, those regions have produced most of South East Asia's opium. Motivated by development and poverty alleviation objectives, the Governments of Lao PDR, Myanmar and Thailand each committed to end opium cultivation in these areas (by the year 2000 for Thailand, by 2006 for Lao PDR and by 2014 for Myanmar). So far, Lao PDR and Thailand are on the verge of accomplishing this.

Eradication

Official reports from the Governments of Lao PDR, Myanmar and Thailand indicate that a total of 4,647 hectares of opium poppy were eradicated in 2007. This is significantly lower than in 2006 when 5,641 ha where eradicated. A total of 779 ha (50% of cultivated opium poppy) were eradicated in Lao PDR, 3,598 ha in Myanmar and 220 ha in Thailand.

Map 2: Opium poppy eradication in South East Asia (hectares), 2004 - 2007



Sources: Governments of Lao PDR, Myanmar and Thailand, national monitoring systems supported by UNODC in Lao PDR and Myanmar
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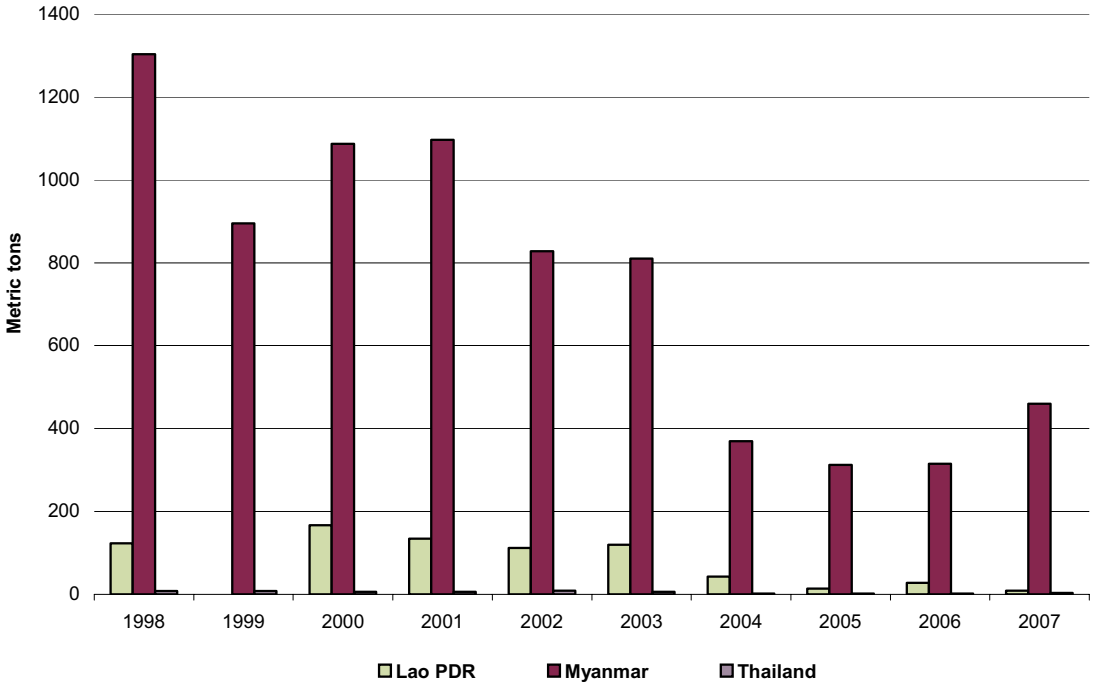
Opium yield and production

Opium poppy cultivation in South East Asia takes place mainly on steep hills with poor soil and no irrigation facilities. Opium yields are much lower than in Afghanistan where the crop is often cultivated on good soil and irrigated land. In 2007, opium yields were estimated at 6 kg/ha in Laos, 16.6 kg/ha in Myanmar and 15.6 kg/ha in Thailand.

Total potential opium production in South East Asia decreased from an estimated 1,435 mt in 1998[6] to only 337 mt in 2006, before increasing to 472 mt in 2007. In spite of this increase, opium production has fallen by 67% compared to 1998. South East Asia's Golden Triangle, which produced 33% of the world opium production in 1998, now produces only about 5%. The once notorious Golden Triangle has ceased to play a major role as an opium production area and this region can no longer be called Golden Triangle on the reason of opium production alone.

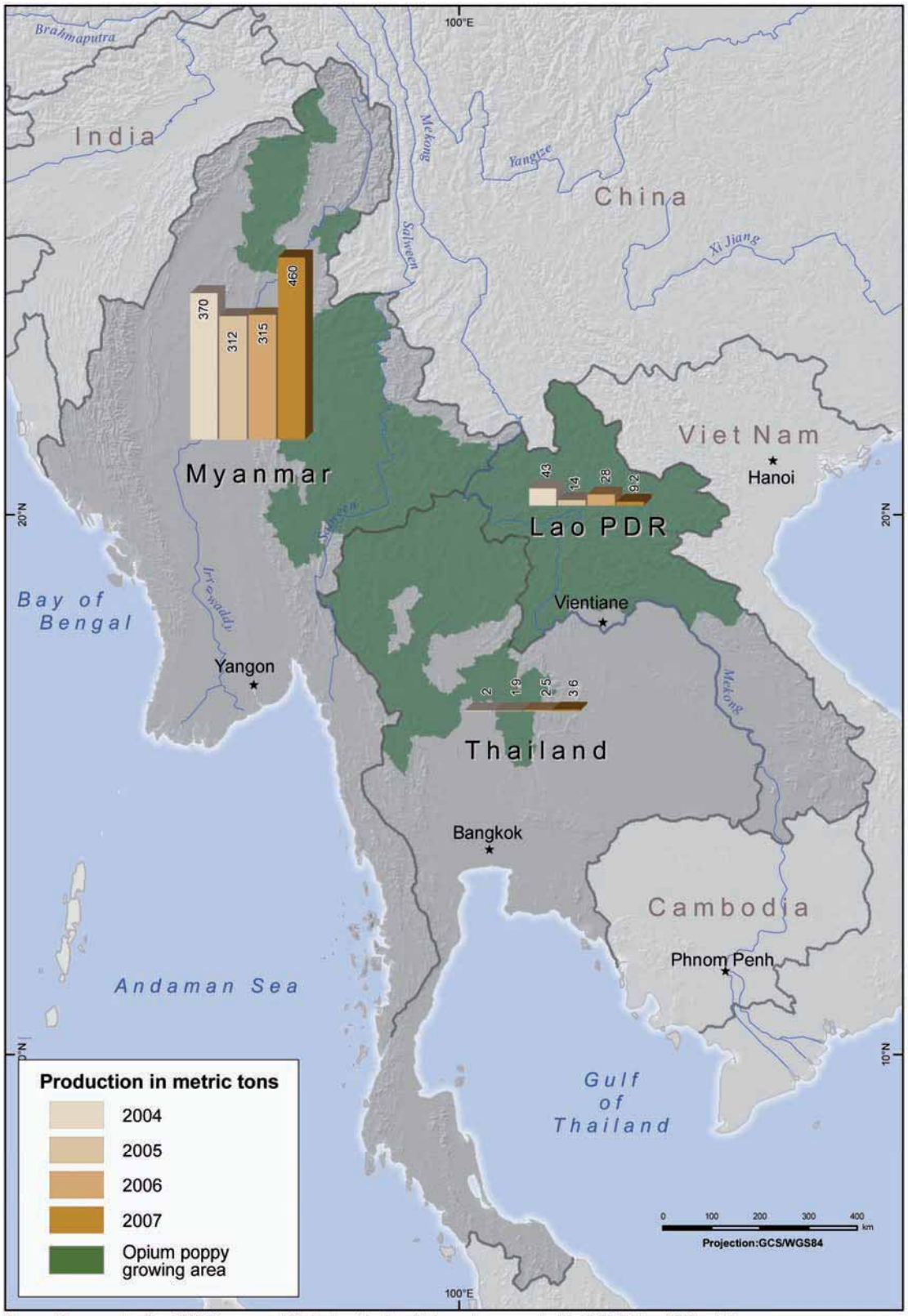
Figure 3: Opium production in South East Asia (metric tons), 1998 - 2007



In 2007, due to increases in opium poppy cultivation area and higher opium yields in Myanmar, total potential opium production in this region increased by 40% over 2006. Although Myanmar remains the second largest opium producer worldwide, its share of the global opium production fell from 30% in 1998 to 5% in 2007.

[6] Source: World Drug Report 2007.

Map 3: Opium production in South East Asia (metric tons), 2004 - 2007



Sources: Governments of Lao PDR, Myanmar and Thailand, national monitoring systems supported by UNODC in Lao PDR and Myanmar
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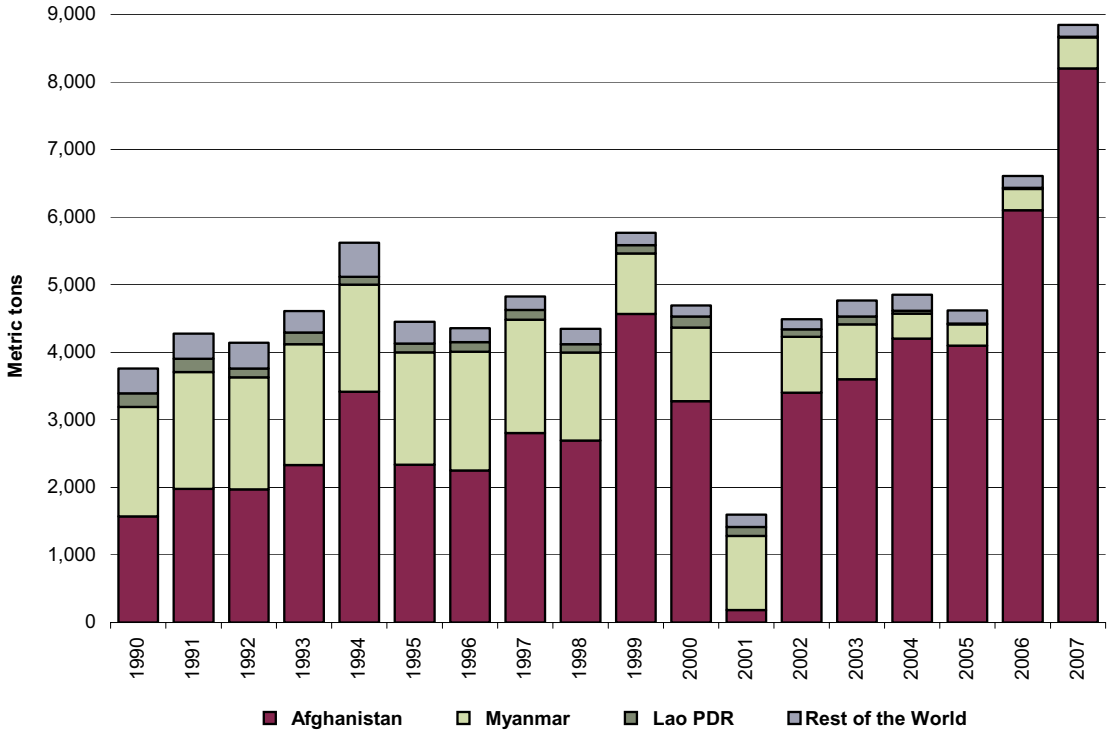
Figure 4: Global opium production (metric tons), 1990 - 2007*



** Data for 2007 for Rest of the World are based on preliminary estimates.*

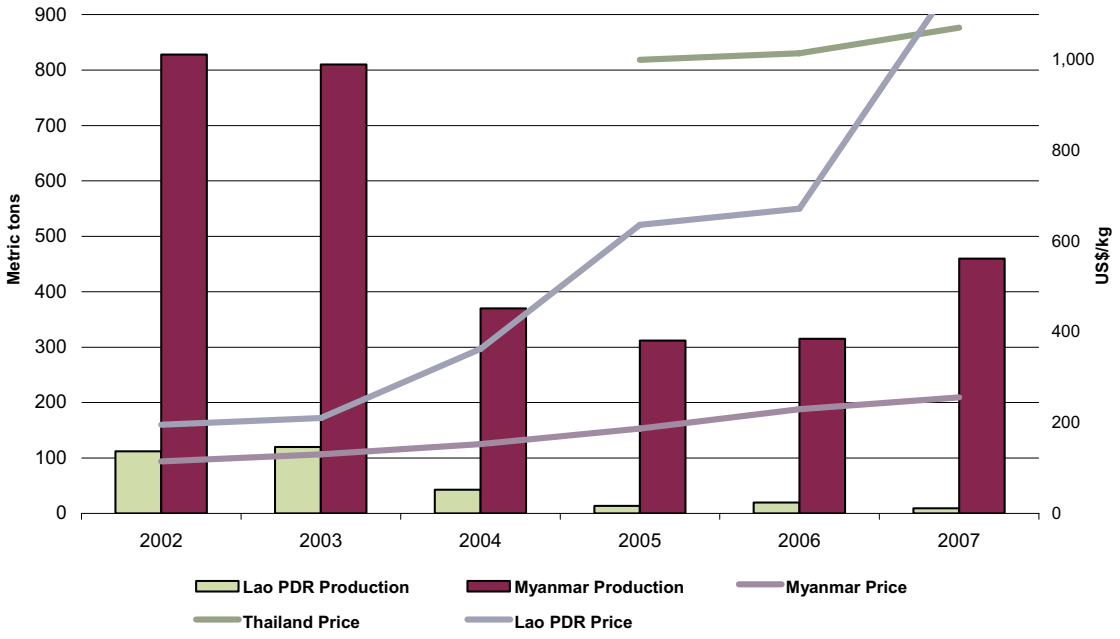
Opium prices

Opium prices in South East Asia have increased over the past years and there are pronounced price differences between countries as well as between regions within these countries.[7] In 2007, the average price for one kilogramme of dry opium was highest in Thailand and Lao PDR with prices of US$ 1,000/kg and US$ 974/kg, respectively, and, similar to previous years, lowest in Myanmar (US$ 265/kg at the farm-gate).

The 500% price increase in Laos between 2002 and 2007 reflects the scarcity of opium in the country, which is now a net importer. In Myanmar, by far the largest producer, prices rose as well but much slower than in the rest of the region. The price for opium in Myanmar at the farm-gate more than doubled from US$ 115/kg to US$ 265/kg from 2002 to 2007. Prices in Thailand remained at a comparatively high level of over US$ 1000/kg for the third year in a row.

[7] The level of transaction for opium prices in Lao PDR, Myanmar and Thailand is not easy to determine, which makes a direct comparison of prices difficult.

Figure 5: Opium production and prices in producing areas in Lao PDR, Myanmar, and Thailand, 2002 – 2007

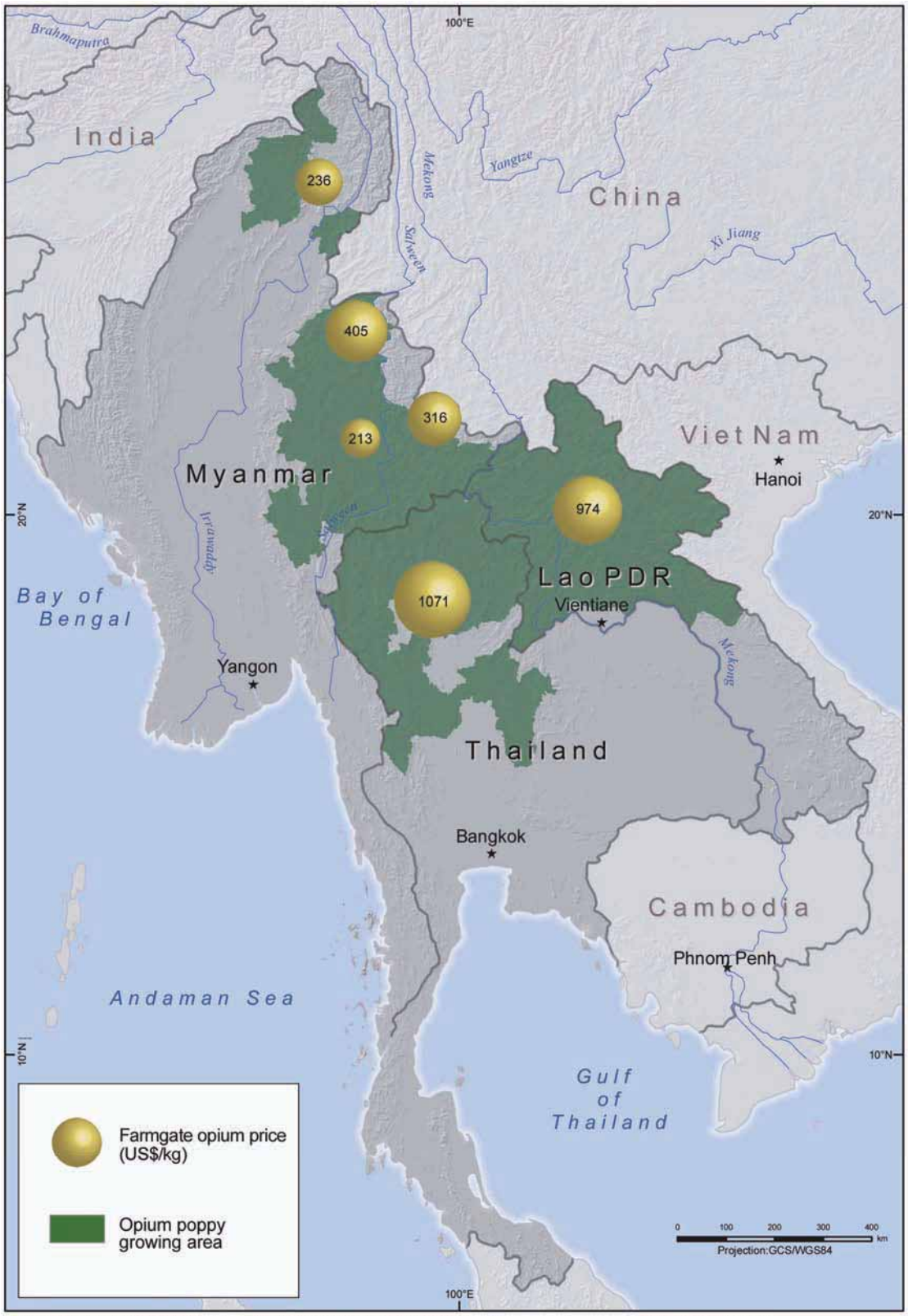


Household income from opium

The contribution of opium sales to the household income of farmers varies considerably throughout the region. In Myanmar, opium sales constitute about half of the annual household cash income and are mainly used to cover food shortages. In Laos and Thailand, income from opium represents only 10% of the household cash income.

Higher opium prices in 2006 pushed incomes of opium poppy farmers up by 50% over the previous year. In Myanmar, 43% of the average annual household income (US$ 437) of opium cultivating households came from opium sales in 2006 in contrast with 10% of US$ 300 annual cash income in Thailand. With such a large proportion of the household cash income generated by opium, farmers in Myanmar are vulnerable to opium price fluctuations and decreases in production caused by drought, disease or law enforcement. These income fluctuations have a serious and immediate impact on household food security. In Special Region 2 (Wa) in Myanmar where local authorities enforced an opium ban in 2005, farmers lost up to 70% of their cash income. In Laos, where opium cultivation was at lower levels and elimination has been more gradual, farmers are better off in terms of food security. In Thailand, opium elimination has taken place over more than 30 years and sufficient alternative livelihood promotion and programmes have accompanied this process, thereby developing and increasing the range of income sources available to farmers.

Map 4: Prices of dry opium in South East Asia (US$/kg), 2007



Sources: Governments of Lao PDR, Myanmar and Thailand, national monitoring systems supported by UNODC in Lao PDR and Myanmar
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Opium abuse

In South East Asia, opium addiction is mainly found in places where opium poppy is cultivated. Since opium cultivation has declined rapidly in the last five years, the cost of opium has increased greatly. This has encouraged, or forced, many users to try to stop smoking opium, either by self-treatment or through treatment programmes. The number of opium addicts in Lao PDR declined from 11,200 in 2006 to only 7,700 addicts in 2007, a reduction of over 30%. The addiction rate decreased similarly from 0.58% to 0.30%. In Myanmar, opium addiction remains high at 0.75%. In Thailand, opium and heroin addiction have largely become urban problems. Very few opiates abusers are reported by the Thai Government.

The impact of opium poppy elimination on rural livelihoods

Rural households that abandoned opium poppy cultivation have reported both positive and negative changes as a result. Positive impacts include the rehabilitation of addicts, lightening of women's workload, and the opportunity to diversify out of an unreliable and illicit cash crop. Negative impacts include shortage of food and cash, increased debt and higher levels of stress.

Predictably, a vulnerability analysis of farmers in Myanmar living in areas where opium has been banned showed a limited impact on living conditions for non-opium poppy farmers, and a more serious impact on ex-opium farmers. Within both groups there were farmers who have coped more or less successfully than others in dealing with the changes caused by the ban.

In terms of coping strategies, some ex-opium poppy farmers have developed alternative means of income by working as casual labourers, selling livestock, collection of non-timber forest products and diversification of agricultural activities, such as rubber tree and tea cultivation. However, not all of these strategies are economically or environmentally sustainable, and as a result farmers in difficulty have been forced to borrow money or reduce their expenditures by limiting their household's access to food, health facilities, education and primary needs. This has contributed to a deterioration of their living conditions, their debt has increased and there is little opportunity for them to generate new income in the absence of external capital.

For non-opium poppy farmers, who were already engaged in non-opium income generation activities and who possessed some material assets, such as livestock, land and a good level of food security, the opium ban has had little, if any affect on their situation. However, there still exists a group of non-opium poppy farmers who are in a very vulnerable situation due to insufficient levels of income, which has worsened after the ban due to the lack of casual employment opportunities in the opium poppy fields.

Today, the needs of vulnerable farmers are so great that the level of assistance provided thus far has been insufficient. Emergency aid and sustainable development programs are urgently needed to support farmers in the development of alternative livelihoods. This will be crucial to preventing out-migration of the people and the resumption of opium poppy cultivation.

PART 2. THE IMPACT OF OPIUM POPPY ELIMINATION ON RURAL LIVELIHOODS

1 INTRODUCTION

The Golden Triangle is known throughout the world as an important centre where opium poppy has been cultivated and marketed for centuries. The town of Sop Ruak, at the Lao-Myanmar-Thai border, along the Mekong River, is thought to be the centre of the region and known informally as the Golden Triangle. Often, the Golden Triangle is perceived as a lawless area where warlord gangs fight with each other over caravan routes and markets.

Almost everything about this image is false. While parts of the Golden Triangle might be beyond the effective control of national Governments, most of the people in the area are not drug traffickers, but poor farmers who cannot grow enough food to support themselves. Sop Ruak has only been called the "Golden Triangle" since the 1980s.

Some thirty years have elapsed since the term "Golden Triangle" was reportedly first used by Marshall Green, United States Assistant Secretary of State. At a press conference in July 1971, Green said that drugs were spreading through a "golden triangle" encompassing Laos, Burma (Myanmar), and Thailand. By referring to this region as a triangle, Green implicitly recognized the absence of opium cultivation and use in China.

At that time, United States and Thai leaders were planning the implementation of an illicit crop replacement project in northern Thailand. When the Crop Replacement and Community Development Project started operations in 1971, it became the first such activity of the then newly created United Nations Fund for Drug Abuse Control (UNFDAC), a predecessor organization to UNODC.

By the 1970s, intensive cash-cropping of opium poppy was little more than a century old. Before that time, opium was not a cash crop and mostly grown in backyard gardens, for use as a medicinal substance in treating pain, dysentery, cough, and the symptoms of malaria.

This changed after British gunboats attacked Chinese coastal towns in the mid-nineteenth century to force China to open the country to the sale of opium that it had banned because opium addiction among the Chinese population had reached problematic levels. Once gaining access to this potentially huge Chinese market, British merchants hoped to sell opium grown in British-controlled Bengal for huge profits. Both because China's Ching Dynasty was weakening at this time and because of superior British gunboat firepower, the Chinese could not resist. The so-called Opium Wars of 1839-1842 and 1856-1860 ended with the legalization of the opium trade in China. However, British hopes of exporting Bengal opium to China did not fully materialize. Chinese entrepreneurs realized that opium was already being grown in the hills of southern provinces of China and promoted opium poppy cultivation by the ethnic minorities as a cash crop for export elsewhere in China.

Eventually, many people living in southern China migrated southwards into British Burma, Thailand, and French Indochina as unrest spread in the late nineteenth, early twentieth century. As they moved, so did the opium trade. Colonial and Thai administrators generally welcomed the income that could be derived from this trade to administer their respective countries. The move of opium cultivation southwards accelerated after 1949. Several campaigns in the early-1950s eliminated opium cultivation in southern China, leading to large-scale crop displacement from southern China to some provinces in Burma as well as Laos, Viet Nam, and Thailand.

Only then did the Golden Triangle take shape as a major centre of opium cash cropping. In this region there were several major cultivation centres. In Myanmar, these were the Wa Region and Kokang, both along the China border in Shan State. In Laos, opium poppy was cultivated in the northernmost province of Phongsaly and the eastern provinces of Xieng Khouang, particularly Nonghet District and Xam Neua, as well as in adjacent areas in Viet Nam. Major growing areas in Thailand were in Chiang Rai Province around two mountains, Doi Tung and Doi Mae Salong. Large poppy fields were also cultivated in some villages just west and northwest of Chiang Mai city.

For decades, there were no systematic estimates on opium poppy cultivation. This began to change after the opium cultivation ban in Thailand which went into effect in 1958. In 1965/1966, the

Public Welfare Department of Thailand carried out a socio-economic survey of hill people in opium poppy growing areas and in 1967, the United Nations Commission on Narcotic Drugs financed a survey on socio-economic needs. The latter survey estimated cultivation of opium poppy in Thailand to cover 18,500 hectares with an opium production of 145 tons. Soon, alternative development projects were implemented by the government as well as by international agencies including UNFDAC. This and the strong political commitment of the Government of Thailand resulted in significant reductions in cultivation levels. By 1984, Thailand had become a net importer of opium.

Civil unrest and warfare in the other opium poppy growing countries of the Golden Triangle prevented opium surveys and development work until the late 1980s. However, from then on, increased political will as well as the implementation of various development projects contributed to the reduction of opium cultivation in Laos and Myanmar. Although opium poppy is still cultivated in the so called Golden Triangle, other trades are overtaking the opium business and its reputation is slowly changing for the better. Two out of three countries of the so called Golden Triangle, Lao PDR and Thailand, are on the verge of becoming virtually free of opium poppy cultivation.

2 COPING WITH CHANGE IN THE WA REGION: A CASE STUDY FROM MYANMAR

Opium poppy cultivation has decreased dramatically in South East Asia over the last decade due to the enforcement of opium elimination policies by the respective governments. However, the strategies employed and the conditions, under which these opium elimination policies were implemented, differed from country to country, as well as from region to region within these countries. This case study looks at the impact of the introduction of an opium ban in the Wa Special Region 2 in eastern Myanmar in 2005. The Wa region, which is part of Shan State, used to be the main opium poppy cultivation region in the country until the enforcement of the ban.

In June 2005, a complete ban on the trade of opium and cultivation of opium poppy entered into force in the Wa region, and in the same year the region was declared opium free. The introduction of the opium ban provides an opportunity to study the impact of opium elimination on the socio-economic situation of households and villages in the Wa region. Furthermore, the lessons learned from this case study may be of assistance when preparing the introduction of similar bans in other regions – especially with regards to designing coping strategies for ex-opium poppy farmers to deal with the impact of the ban.

The following is a summary of the opium ban's impact in Wa Special Region 2, and is based on both quantitative and qualitative analysis.[8]

Collecting base line data

[8] All quantitative and qualitative data used in this chapter are based on the following report: *Northern Wa Region: Socio-economic and vulnerability analysis of Naung Khit, Nam Kham Wu, Man Man Hsain and Kong Ming Sang Townships*. UNODC Wa project, Myanmar 2007.

UNODC conducted a socio-economic survey in four townships of Northern Wa Special Region 2 between 2005 and 2006. This survey was the last opportunity to study household conditions, during the period when opium poppy cultivation was not yet banned by the local administrations. This data was used to investigate the livelihood conditions of farmers who were cultivating opium poppy, and also to gain a clearer understanding of the likely impact of the opium ban on the rural population. An additional field survey to research the impact of the opium ban and the coping strategies adopted by former opium poppy farmers was conducted in early 2007.

Impact on opium addiction

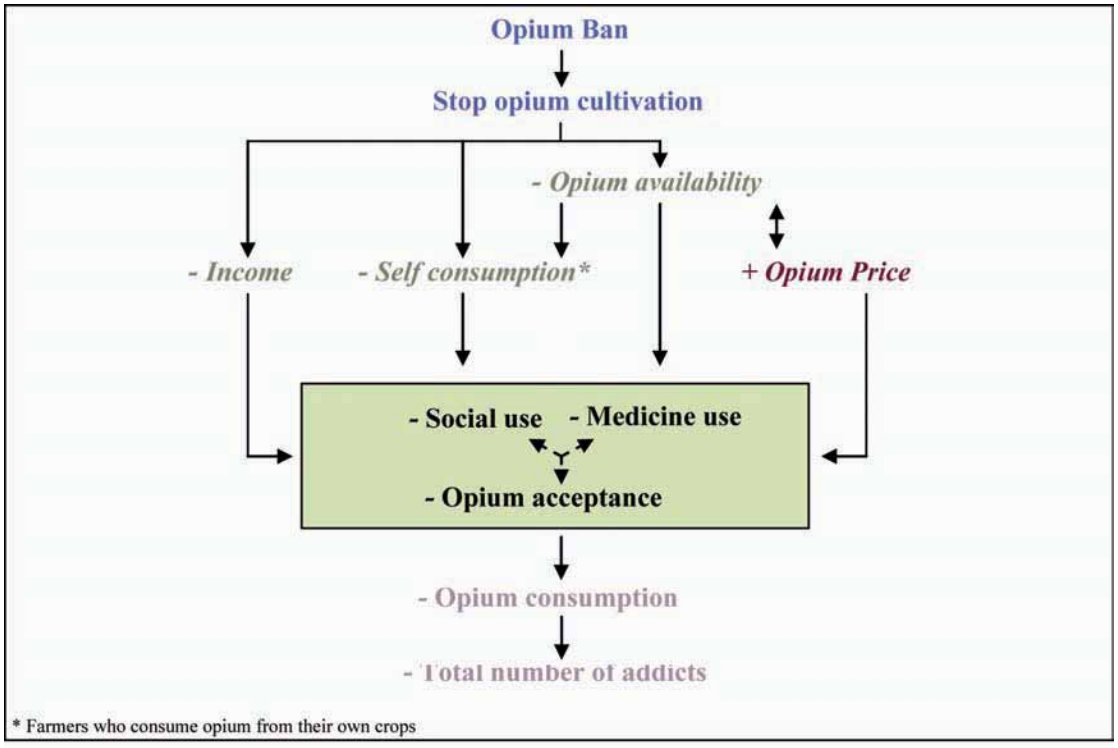
Opium use often leads to lower levels of work productivity. Quite often it is the male head of the household who becomes addicted, which in turn creates an increase in workload for the rest of the family. This leads to a tense social climate, whereby the household suffers from a reduction in productivity and food security is at risk.

The opium ban resulted in the emergence of a clandestine opium market, and as a consequence of the new scarcity of opium, opium prices increased drastically. Due to the reduced availability and the increase in price, opium use as well as the number of addicts in the region began to decrease.

- Opium addiction often resulted from using opium for medicinal purposes, initially. However, as the opium price increased, other forms of medicine became relatively cheaper, thus reducing rates of addiction. Furthermore, this escalation in price and the lack of income has restricted the social use of opium.

- Having lost cash income from opium and wage labour on opium fields, households could less than ever afford to risk their household's survival by an opium addicts habit, and therefore placed pressure on addicts to quit in the time following the opium ban. This also contributed to a decrease of the opium addiction rate.

Figure 6: Main mechanism of opium addiction rate reduction



Remaining opium addiction in Wa region

Impact on ex-opium poppy farmers

In the past, the primary difference between opium poppy growing and non-growing farmers in opium poppy cultivating villages was their level of income, with opium sales accounting for 70% of a opium poppy farmer's total cash income. Opium farmers relied on the yearly opium harvest as a source of cash, and although this source of income was controversial, it helped them to cover their food deficit and purchase other necessary items. Today, these former opium poppy farmers face a lack of cash income, and are therefore forced to reduce their expenditures. With few opportunities to invest in alternative income generation activities, some of these farmers were not successful in coping with the effects of the opium ban. Consequently, their living conditions have worsened, which is reflected in a lack of food and the inability to purchase necessary household items. This increases their vulnerability, which is manifested in an deteriorating health status and by increasing school drop-outs as farmers can no longer afford school fees for their children.

Impact on household vulnerability

The livelihood potential for all households is primarily linked to their farming possibilities, which are also important in providing for their own consumption needs. As the opium ban led to a reduction in cash income from opium for the former opium poppy farmers and because most of them did not develop their capital when the cultivation of opium poppy was still possible, the income differences between opium poppy growing and non-growing farmer strongly decreased after the ban. Already before the opium ban, a large number of non-opium farmers were facing financial difficulties, whereas after the ban, the majority of villagers was in this situation. This is primarily caused by a lack of capital and livelihood assets, such as livestock or land to diversify and improve their income generation activities.

For all farmers in difficulty, their access to food, health services, education and other primary needs is very restricted. This has led to high levels of stress and health problems, especially during times of food shortage. Furthermore, poor nutrition means that parents have less energy to work and improve their family's situation, the children's growth is hampered and they are less likely to attend school regularly. Thus, the family enters into a cycle of poverty, which is very hard to break.

Based on research in four townships of the northern Wa region, a village typology was developed to classify households with regards to their livelihood assets and living conditions. The study compares the living conditions before the ban with the situation after its implementation. Five types of households have been identified, and a summary of their characteristics is presented below:

Table 1: Characteristics of household types (yearly totals 2005 – 2006)

	ECONOMIC SITUATION (US$/capita/yr)		FIELDS (Hectares)		LIVESTOCK (Number)				FOOD SECURITY (kg/capita/yr)
	Former opium income	*Non opium income*	*Lowland paddy*	*Former poppy fields*	*No. of Buffalo*	*No of Cattle*	*No of Pig*	*No of Chicken*	*Rice production (unhusked rice)*
Non-Opium Farmers in Difficulty	1.06	13.55	0.02	0.00	0	0	1 to 2	3	97.66
Better-off Non-Opium Farmers	0.16	19.93	0.15	0.00	1 to 2	1 to 2	1 to 2	10 to 11	209.95
Ex-Opium Farmers in Difficulty	31.54	9.56	0.02	0.34	0	0	0 or 1	2 to 3	80.57
Average Ex-Opium Farmers	41.80	12.59	0.03	0.46	1	0 or 1	1 to 2	4 to 5	115.40
Better-off Ex-Opium Farmers	72.35	19.05	0.21	0.68	2 to 3	2	2 to 3	6 to 7	213.84

Non-opium farmers in difficulty

These farmers do not own buffalos or cattle, and raise only a few small animals, such as 1 to 2 pigs and a few chickens. Within this cluster, 80% of the villagers do not own lowland, and they produce an average of 97 kg of rice per capita per year. This means 77% of them face at least 4 months of food shortage per year. Before the opium ban, these households recorded the lowest yearly average cash income of US$ 14.61 per capita per year, out of which only a small amount came from working in opium poppy fields. This income was insufficient to guarantee a minimum level of food security. Therefore, farmers were forced to rely on external assistance to meet their needs, which resulted in about 80% of households becoming indebted. Thus, the opium ban enforced in 2005 has had limited impact on their situation, which was, however, already quite critical.

Mustard leaves and nothing else

Better-off non-opium farmers

These farmers harvest an average of 210 kg of rice per year per capita. This represents a high amount in comparison to the majority of non-opium farmers. Within this cluster, 80% of the households have lowland and they own an average of 1 to 2 buffalos, in addition to some cattle, pigs and more than 10 chickens. These households benefit from a good quantity of harvested rice, and also possess some capital. As a result, they are better prepared to face unexpected emergencies. Their non-opium income is high in comparison to the average of the other clusters (US$ 19.93 per year per capita), and this can be used to improve their living conditions or invest in other activities. Therefore, the opium ban has not affected these households much.

Ex-opium farmers in difficulty

These farmers raise few animals and 83% of them do not own any lowland. With a lower average of rice harvested (80 kg/year/capita), 92% of them experience at least 4 months of food shortage per year. Before the ban they owned an average of 0.34 ha of opium poppy fields, and purchased rice with their annual average income of US$ 41. To begin opium cultivation, about 80% of households had to incur debts. After the ban, they lost 76% of their total income, and now survive on a much lower average income derived from non-opium income generation activities. Families are forced to reduce expenditures, e.g. by limiting their access to food, health facilities, education and primary needs. As a result, their living conditions have worsened, their debt has increased and there is little chance to improve their situation without any capital.

Ex-opium farmer in Mongpawk District in Wa region

Ex-opium farmer average

In this cluster, 78% of the households do not have any lowland paddy, but they own 1 to 2 pigs and about 5 chickens, in addition to one buffalo or cattle. Before the ban, they cultivated 0.46 ha of opium and earned US$ 54.7 per year per capita. With this income, they were able to purchase the required amount of food, and meet all basic primary needs. After the opium ban, these households lost 73% of their income. They now earn an average of US$ 12.59 of non opium income per capita, and also harvest a better quantity of food than households in difficulty – with an average of 115.40 kg of rice per year. In addition, they own a little capital that can be used to try and cope with the change. However, if they do not find some valid coping strategy, this small amount of capital will decrease rapidly.

Better off ex-opium farmers

Before the ban, these households were in the better economic situation. On average they cultivated 0.68 ha of opium poppy, and their cash income was the highest at around US$ 91 per year per capita. After the ban, they lost 74% of their cash income. However, they still retained an average of US$ 19 of non-opium income per capita per year. In addition, they harvested 213.84 kg of rice, which put them into a better position compared to most households in other groups. Moreover, they have the strongest asset base in terms of livestock with at least 2 buffalos, 2 cattle, 2 pigs and 6 chickens on average.

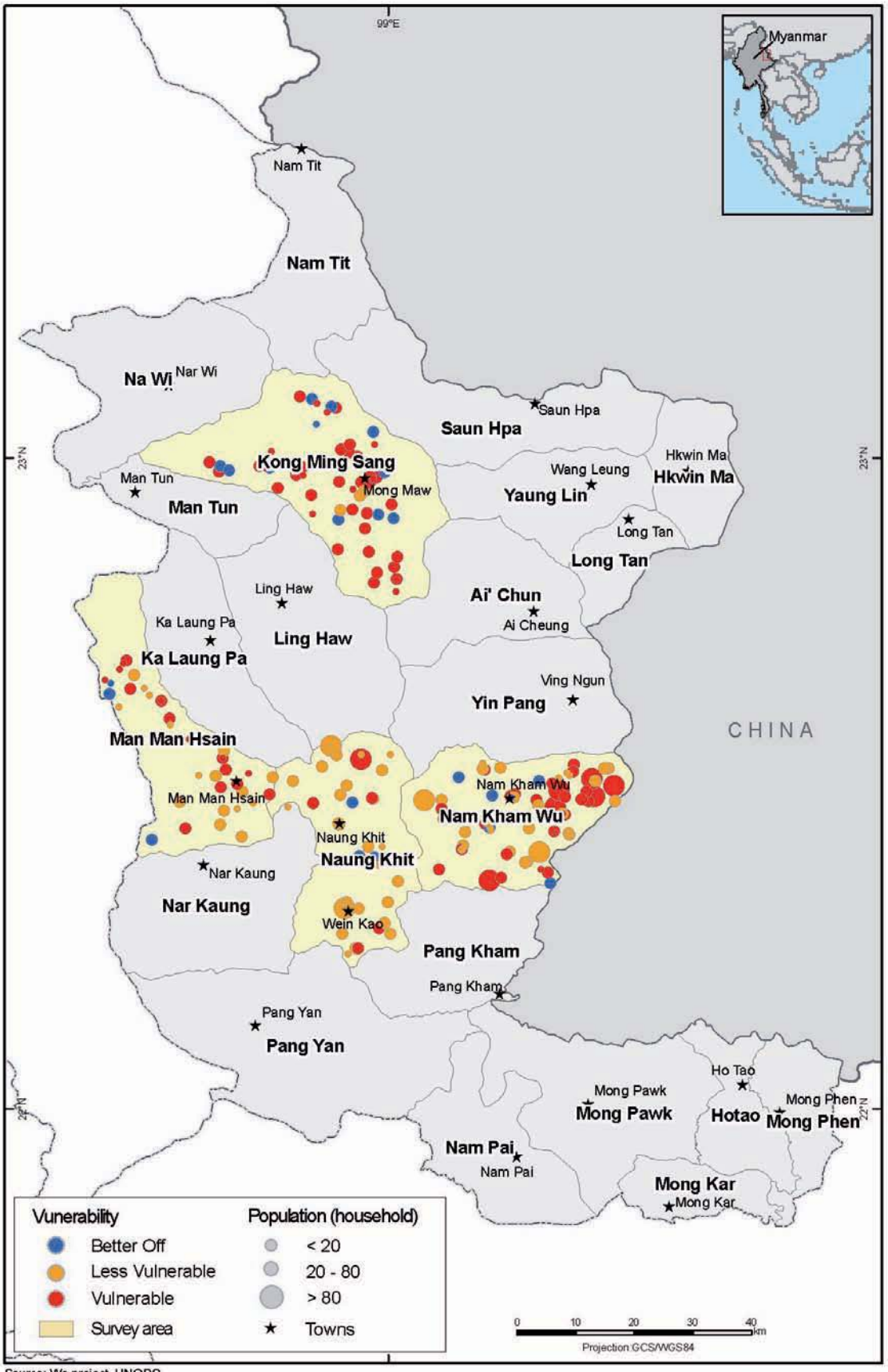
In Wa region farmers increased corn production after the opium ban.

Other criteria of vulnerability

Besides the household's livelihood assets situation, which strongly influences the household's capacity to cope with change, several factors accentuate the household vulnerability and should be taken into consideration.

- Opium addiction: Remaining drug addicts spend their little income to purchase opium at higher prices, thus reducing their chances to cope with change.
- Lack of access to the market (in terms of road access, marketing and availability of transport): Farmers are not able to sell their products to earn an income.
- Lack of casual labour: After the opium ban, wage labour opportunities strongly decreased.
- Quality and quantity of natural resources available: This limits the potential for alternative income generation activities such as collection of non-timber forest products or farming.
- Lack of inputs and techniques: Without inputs such as seeds, fertilizers, vaccines etc., it is difficult to improve the productivity of the households.

Map 5: Village vulnerability in Special Region 2 (Wa)



Source: Wa project, UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The vulnerability map shows the level of vulnerability of villages in four townships of the northern Wa region, namely Kong Ming Sang, Nam Kham Wu, Naung Khit and Man Man Hsain based on the results of a socio-economic survey. Kong Ming Sang township recorded the highest number of vulnerable villages, as previously a lot of opium poppy had been cultivated in this area. Nam Kham Wu recorded the highest number of larger-sized vulnerable villages, which were located near to the Chinese border. This indicates a slowing down of the local economy that has been influenced by the opium ban, as many shop owners were forced to close due to the lack of customers after opium trade ceased on the border. A similar situation occurred in Naung Khit Township, where more than half of the general stores have closed due to lack of business. Kong Ming Sang and Man Man Hsain townships record the highest number of less vulnerable and better off villages. All of these are of a smaller size, with less than 80 households per village.

Coping strategies: how upland farmers make a living in the post opium poppy environment

Local casual labor for other households: Failed

After 2005, half of the people in northern Wa planned to engage themselves in casual labor to increase their income and cope with food security. However, wage labour was no longer as easily available as after the ban, the better-off villagers stopped hiring casual labourers or offered lower wages.

Sale of livestock: not applicable to the poor and limited by the livestock morbidity

Raising livestock can represent an important part of a household's yearly income. However, only the average or better-off households owned enough livestock to be able to sell some. Furthermore, livestock morbidity is a serious constraint to increased livestock raising in these upland areas. Once sold, households have little opportunity to replace livestock, which results in a decrease in this important livelihood asset.

Expansion of cultivated area: already limited by the labour force availability

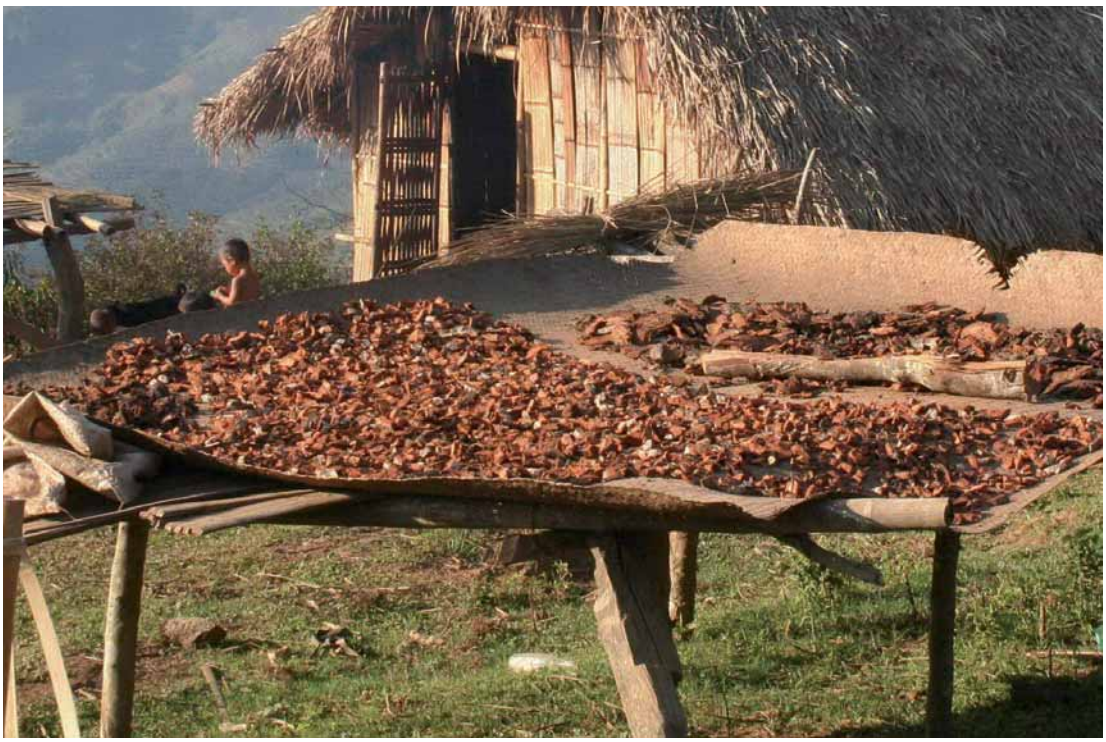
Following the ban, households planned to increase cultivation in their upland areas. However, this potential was limited due to a lack of the household's labour force, and it was not viable to pay workers for cultivation of upland crops other than opium poppy. Furthermore, most households do not have the capacity to intensify their agricultural labor, as they lack access to money to pay workers or use buffalos, and knowledge and skills related to alternative cultivation practices.

Women preparing for highland fields for licit crop

Collection of non-timber forest products: source of income and food but over exploited

Following the ban, 27% of villagers planned to increase their consumption of forest products in response to food insecurity. In addition, many have increased collection of non-timber forest products to earn an income. All marketable non-timber forest products such as medicinal roots, tubers, leaves and bark are collected and sold for small amounts of money.

Non-timber forest products in the Wa region



Agricultural diversification: partly failed due to the lack of investments and the soil constraints

Crop diversification is one of the most important strategies helping farmers to cope with change. However, the lack of inputs caused by the lack of capital to invest, in addition to the lack of agricultural techniques and poor quality of soil, hampered the success of agricultural diversification.

Rubber and tea cultivation: new possibilities with limitations

Rubber and tea plantations are mostly owned by Chinese companies and Wa authorities, and offer casual labour to villagers. However, the low salary paid makes this unattractive. Furthermore, these plantations reduced the amount of land available to villagers, and also increased the competition for labour during the peak agricultural season.

Rubber plantation in the Wa region

Farmers can make good profits from their own tea plantations, despite the tax burden. But the lack of initial capital is often a limiting factor in implementing and sustaining a plantation for the first couple of years, before it becomes productive.

Rubber plantations are not developed at the village level, because local farmers cannot afford the set up costs and then wait 7 to 9 years before it produces any income.

Migration

After the opium ban, some farmers were unable to find alternative sources of income, and therefore decided to relocate to other areas in search of greater financial opportunities and better wages. For farmers, who wanted to continue opium cultivation or be employed as labourers in opium poppy fields, there were still opportunities in the outskirts of the Wa, or, to a larger extent, in the rest of Shan State where opium poppy can still be found. Therefore, out migration, partly to continue opium poppy cultivation in other areas, has been a last resort for farmers, who were unable to find an adequate and sustainable coping mechanism after the ban.

Environmental impact

In the past, the traditional rotating fallow system used in the Wa hills allowed the restoration of soil fertility, in order to implement several cultivation cycles. Today, due to the wide extension of cultivated land, and the implementation of rubber and tea plantations, the land has suffered more pressure, and as a result the fallow periods have strongly decreased. This is gradually reducing crop yields, and is also leading to land erosion and soil degradation. Furthermore, the increase in the collection of non-timber forest products has led to a deterioration of the ecosystem, and the natural forest is quickly depleting. Villagers know that these practices are unsustainable and threaten the continuation of their activities. However, they have little alternatives to avoid this.

Future risks and challenges

After the opium ban and associated loss of income, the number of vulnerable households has doubled and now represents more than 55% of the total. This has seriously increased food and livelihood insecurity in the area.

Since 2003, UNODC Myanmar has implemented programs to assist the needs of the Wa people. This has been done in partnership with the World Food Programme, and several non-governmental organizations through the KOWI initiative. However, the needs of the Wa people are so great, that the assistance provided is insufficient in meeting the needs of all vulnerable farmers. Therefore emergency aid and sustainable development programs are urgently needed to avoid an out-migration of the people, and to avoid their resuming of opium cultivation.

PART 3. LAOS

CONTENTS

ABBREVIATIONS

DCDC	District Committee for Drug Control
GoL	Government of Lao PDR
ICMP	Illicit Crop Monitoring Programme
LCDC	Lao National Commission for Drug Control and Supervision
PCDC	Provincial Committee for Drug Control
PFU	Programme Facilitation Unit
RAS	Research and Analysis Section (UNODC)
UNODC	United Nation Office on Drug and Crime

ACKNOWLEDGEMENTS

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Martin Raithelhuber	Programme Officer, ICMP/RAS
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PREFACE

2007 marked the third straight year of negligible levels of poppy cultivation in Lao PDR, with a further 40% reduction of cultivated opium poppy. While this is a commendable achievement, the plight of former opium farmers remains precarious, and the need to support the creation of sustainable livelihoods has never been more urgent. With the average retail price of opium having increased to nearly US$ 1,000 per kilogram resuming cultivation of opium poppy must appear to be a very tempting source of income for poppy farmers. The current reduction in cultivation is dependant on the existence and creation of appropriate and sustainable livelihood opportunities.

Progress on treating opium addicts in Laos has been equally impressive. Although there remain some 7,700 addicts who have not yet had a chance to participate in community based treatment and rehabilitation programmes, this is down from an estimated 62,000 addicts in the year 2000. There is an urgent need to provide treatment to these opium users and to continue rehabilitation of those that have undergone treatment. Attention must be paid to preventing relapse and addiction to new drugs, such as amphetamine type stimulants. Attention must also be given to the special needs of opium addicts who because of age and severe underlying diseases are not able to participate or benefit from community based programmes.

In Laos, opium production, addiction and poverty are closely interrelated. The production of opium had never made the farmer wealthy. All opium producing areas remain in the poorest regions of the country. Of the 47 poorest districts identified in the national growth and poverty reduction strategy, 32 have cultivated opium poppy.

In an effort to ensure the sustainability of opium poppy elimination, in 2006, the Lao Government, with the support of UNODC, launched a national programme strategy for the post opium development and an alternative livelihoods action plan targeting 1,000 priority former opium growing village. This programme is integrated in the Lao Government's Sixth National Socio-economic Development Plan (2006-2010) as an important poverty focused national programme.

More efforts are needed to enable access of all former opium poppy farming communities to a sustainable human development process that addresses poverty reduction, good governance practices and sound environmental conservation practices. Continued assistance and support from the international community remains crucial to ensure that the success achieved are not reversed.

Leik Boonwaat

Representative

UNODC Lao PDR

FACT SHEET - LAOS OPIUM SURVEY 2007

	2005	2006	2007	Variation between 2006-2007
Opium poppy cultivation	1,800 ha	2,500 ha	1,500 ha	-40%
Average dry opium yield	8 kg/ha	8 kg/ha	6 kg/ha	-25%
Potential production of dry opium	14.4 mt	20 mt	9.2 mt	-54%
No. of villages growing opium poppy	270	n/a	n/a	
No. of households growing opium poppy	6,200	5,800	n/a	
Average price of opium [1]	US$ 521/kg	US$ 550/kg	US$ 974/kg	+77%
Average annual cash income of opium poppy growing households	1,457,000 kip (US$ 139)	n/a	n/a	
Opium poppy growing households with rice deficit	57%	n/a	n/a	
Average annual cash income of households not cultivating opium poppy	2,418,000 kip (US$ 231)	n/a	n/a	
Eradication [2]	2,575 ha	1,518 ha	779 ha	-49%
Number of opium addicts	20,160	11,200	7,700[3]	-31%
Average drug prevalence rate[4]	1%	0.58%	0.30%	

[1] Source LCDC, Provincial authorities survey. Due the limited market for opium, a clear distinction between farm-gate, wholesale and retail price levels could not be established.

[2] Source: LCDC. The 2005 and 2006 eradication campaigns were conducted before and after the survey. In 2007, eradication was conducted after the survey.

[3] The figure does not take into account possible relapse of recently treated addicts (normally > 20%).

[4] Based on 8 northern provinces in 2005, 6 in 2006 and 10 in 2007.

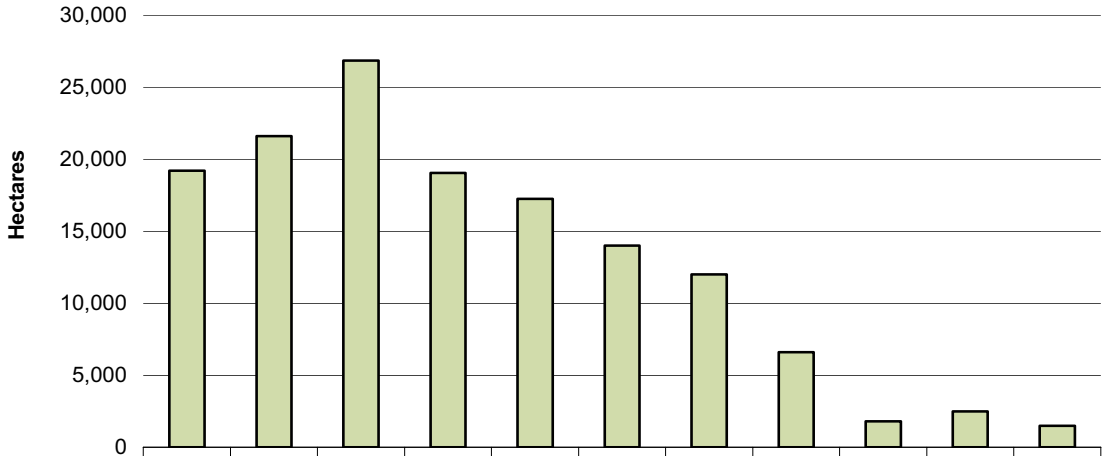
EXECUTIVE SUMMARY

The 2007 Opium Poppy Survey in the Lao PDR was conducted jointly by the Government of Lao PDR and UNODC. As in 2005 and 2006, the methodology consisted of an aerial survey by helicopter over sample sites in 6 provinces in northern Laos. This year, no socio-economic survey among opium farmers was conducted. However, auxiliary information was available for analysis from the last population census and the Government's strategy to support 1,100 villages in Northern Laos with poverty alleviation measures.

Opium poppy cultivation

Opium poppy cultivation was found in five of the six provinces surveyed. The total area under opium poppy cultivation in the Lao PDR in 2007 was estimated at 1,500 hectares. This is a decrease of 40% compared to 2006 (2,500 ha) and the lowest level since 1998 when opium poppy cultivation culminated at 26,600 ha. Although opium cultivation has virtually been eliminated, the geographical pattern of the remaining cultivation is dynamic. Therefore, it is necessary to closely monitor the remaining opium cultivation, not only to sustain the achievements reached so far but also to prevent a possible resumption and/or start of opium poppy cultivation in new areas .

Figure 1: Estimated area under opium poppy cultivation in Lao PDR, 1992-2007

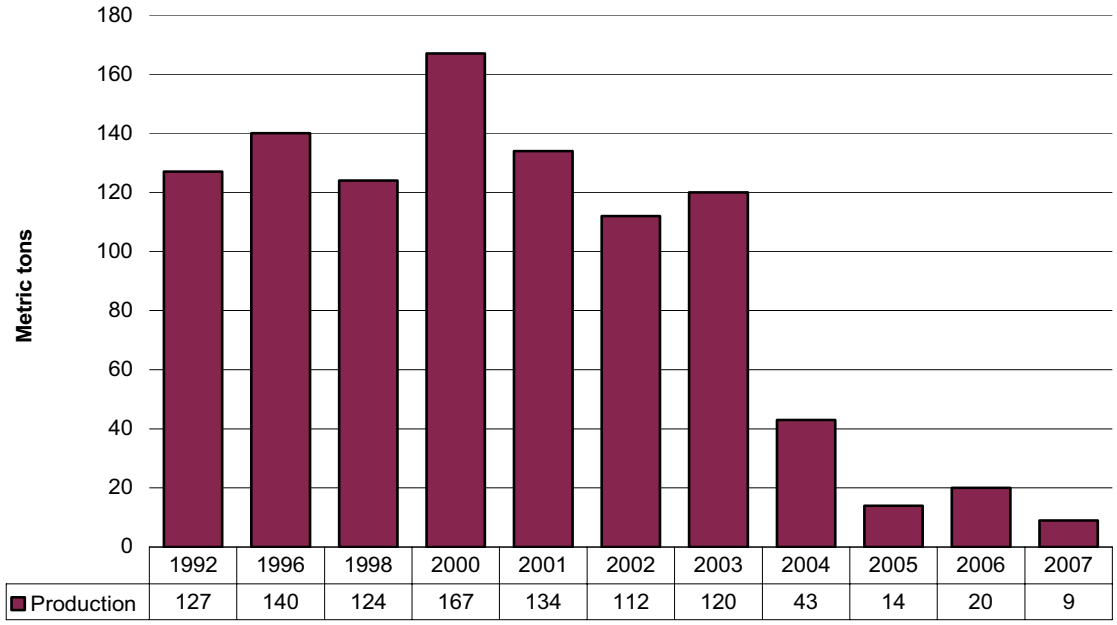


	1992	1996	1998	2000	2001	2002	2003	2004	2005	2006	2007
Cultivation	19,190	21,601	26,837	19,052	17,255	14,000	12,000	6,600	1,800	2,500	1,500

Opium yield and production

The average national opium yield potential for 2007 was estimated at 6 kg/ha. In 2007, weather conditions were average to poor for opium poppy cultivation. The field assessments of standing opium revealed that crop vigour was worse than in previous years, even though some farmers tried to irrigate their opium poppy fields. Based on the estimated area under cultivation, the 2007 potential production of opium was 9.2 mt, which is a 54% decrease with respect to 2006. Opium production in 2007 reached the lowest level since the start of the surveys in 1992 and corresponds to only 5% of the potential opium production of the year 2000 (or 7% of the production in 1998).

Figure 2: Potential opium production (metric tons), 1992-2007



	1992	1996	1998	2000	2001	2002	2003	2004	2005	2006	2007
Production	127	140	124	167	134	112	120	43	14	20	9

Opium prices and trade

Due to the scarcity of opium cultivation and the continued enforcement of the opium ban, it was not possible to collect farm-gate prices of opium during the time of the 2007 survey. However, opium prices have been collected at the provincial level by local authorities during or soon after the 2007 opium harvest. Like in 2006, there was no clear distinction between wholesale and retail prices, since opium was mainly consumed by local addicts who bought the opium directly from the farmers, and only limited amounts were destined for markets outside the province of origin. Opium prices reached a relatively high level of US$ 974/kg, representing an increase of 57% compared to prices during the same time in the previous season. However, opium prices showed strong regional disparities and ranged between US$ 537/kg in Namore district, Oudomxay, and US$ 1,613 in Nan district, Luang Prabang. The high opium prices make it more attractive for farmers to revert to opium production, especially if no alternative sources of income are available. It is therefore of paramount importance to provide relief and development assistance to the most affected population in the region.

Opium poppy eradication

This opium survey was not designed to monitor or validate the results of the eradication campaign carried out by the Government of Lao PDR. According to Government reports, 779 hectares were eradicated after the helicopter survey was completed and, in most cases, at a time when opium harvesting was already underway. Eradication was highest in Phongsaly with 264 ha, followed by Huapanh (209 ha) and Luang Prabang (143 ha).

Sustainable Opium Elimination: the 1,100 Villages Strategy

As of 2007, there are still some 1,100 villages at risk of reverting to opium poppy cultivation for lack of alternatives. 7,700 opium addicts still need to be treated, and around 1,400 ATS addicts are living in these communities. Assistance needs to be provided urgently to these villages. In response to this situation, the Government of Lao PDR together with UNODC developed the "National programme strategy to sustain opium elimination in the post opium scenario". Around 416,000 inhabitants of around 1,100 villages at risk of opium poppy cultivation are expected to benefit from activities carried out in the framework of this programme.

1 INTRODUCTION

This report presents the results of the eighth consecutive opium survey, conducted annually in Laos by the Lao National Commission for Drug Control and Supervision (LCDC), with the support and participation of UNODC. UNODC started to carry out extensive surveys 1992, based on an inventory of all known opium producing villages. Similar surveys were conducted in 1996, 1998 and then annually since 2000.

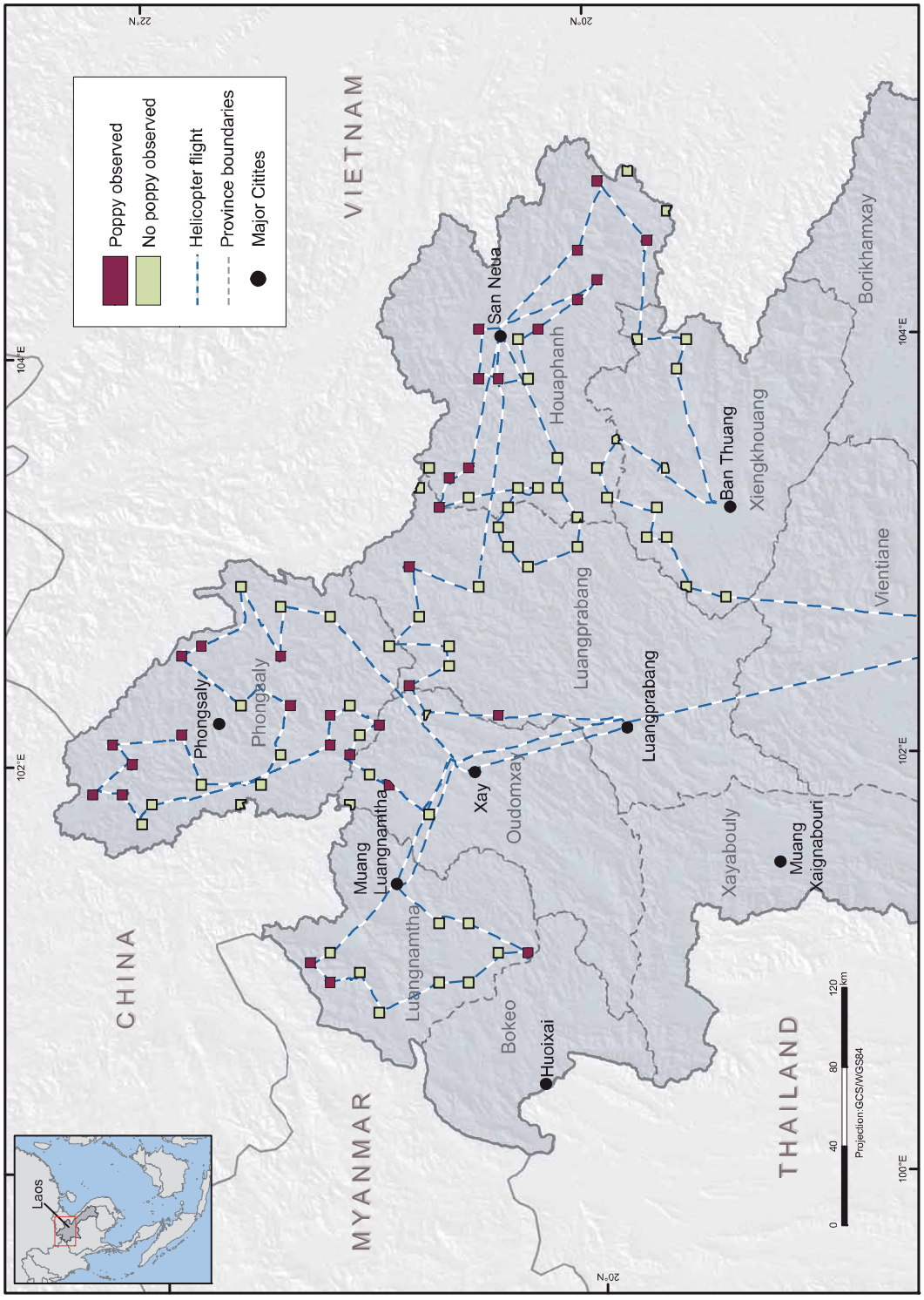
In 1999, the Government of Lao PDR and UNODC developed the programme strategy "Balanced approach to opium elimination in the Lao PDR". This was backed up in November 2000 by the Prime Minister Order fourteen, stipulating measures against opium poppy cultivation and opium abuse. In 2001, the 7th National Party Congress called for opium production and use to be eliminated by 2005, and linked this with poverty reduction. A National Campaign against Drugs was launched in October 2001 to mobilize and convince communities to give up opium production. The Government increased the momentum of this campaign in 2004 and 2005 and declared Lao PDR opium free in February 2006.

The results of the 2006 and 2007 surveys demonstrate that, despite remarkable successes, a total elimination of opium poppy cultivation has not yet been achieved. Therefore, it is necessary to closely monitor the remaining opium cultivation, not only to sustain the achievements reached so far but also to prevent a possible resumption of opium poppy cultivation. A similar situation exists in neighbouring Thailand, where opium poppy monitoring continues and a few hundreds hectares of opium poppy are reported every year, although the country was declared opium free in 2002. Further, it is necessary to assess coping strategies for ex-opium poppy farmers to facilitate the transition towards a licit economy. UNODC aims to continue providing technical support to the Lao PDR, both to monitor the opium poppy elimination process and to analyse the impact of coping strategy on farmers who abandoned illicit cultivation.

Landing in a opium poppy field for yield measurement

In 2007, a helicopter was used to survey 6 provinces of Northern Lao where opium poppy used to be cultivated and where the probability to find opium poppy fields is still relatively high. This methodology has been successfully implemented since 2005 and proved to be cost effective in situations where opium poppy cultivation is limited, dispersed and moving into remote (hilly and forested) areas. In order to plan and monitor the impact of interventions under the “Balanced Approach to Opium Elimination in the Lao PDR", the survey results could be linked to the 2006 population census data on in order to fine tune the Government's strategy of supporting the 1,000 poorest villages in North Laos. This strategy is expected to further reduce opium poppy cultivation and ensure the sustainability of elimination efforts.

Map 1: Sample segments surveyed by helicopter, Northern Laos, 2007



2 FINDINGS

The helicopter survey implemented by UNODC in coordination with the Ministry of Defence of Lao PDR covered the six northern provinces of Lao PDR: Phongsaly, Luang Namtha, Oudomxay, Luang Prabang, Xieng Khouang, and Huaphanh. It aimed at estimating the remaining opium cultivation in the country. The survey covered a distance of approximately 3,800 km over the provinces of during more than 24 flight hours and 84 randomly sampled segments of 5 x 5 km each. In addition, observations were made from helicopter in the corridor between the segments. This information was not used for statistical analysis but serves as a reference for future surveys. The total area covered during the flight was approximately 9,000 km^2, corresponding to 10 % of the total area (88,255 km2) of the six provinces surveyed.

Data on opium yield and cultivation practices were also collected during the helicopter survey when the helicopter team could land close to the opium poppy fields.

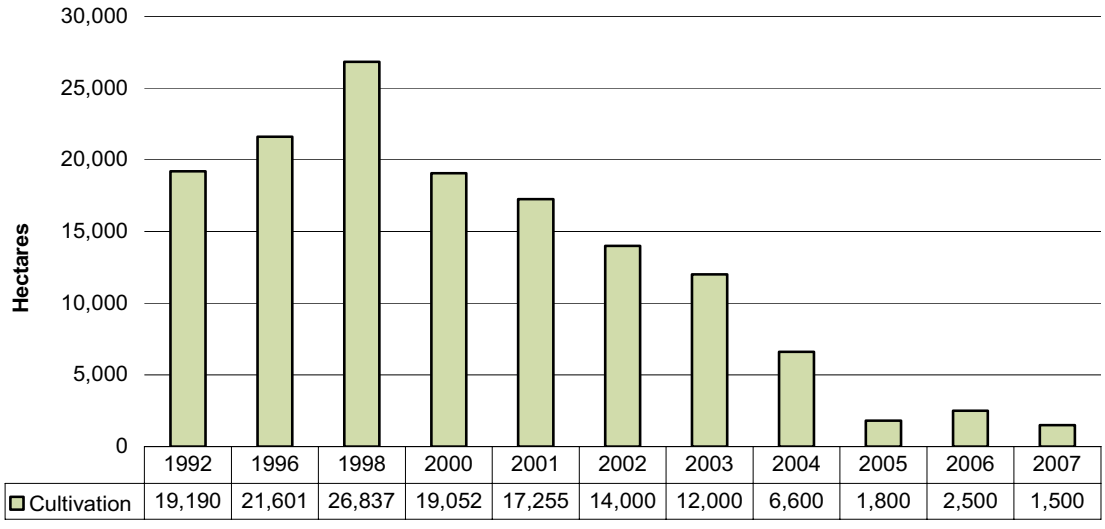
2.1. Area under opium poppy cultivation

The aerial survey revealed the existence of opium poppy cultivation in five provinces in Northern Laos (Phongsaly, Luang Namtha, Oudomxay, Luang Prabang, Huaphanh). No opium poppy cultivation was observed in Xieng Khouang in 2007.

In 2007, the area under opium cultivation was estimated at 1,500 hectares, with an interval of 1,230-1,860 hectares at 95% confidence. This represents a 40% decrease in area compared to 2006 (2,500 ha), and is 94% lower than in 1998 (26,800 ha). It can be assumed that the actual area harvested was smaller due to eradication efforts by the Government. In 2007, eradication took place after the aerial survey when harvesting was already underway. Still, eradication efforts by the Government might have reduced the area in which opium was actually harvested to less than 1,000 hectares.

In 2007, the remaining opium poppy cultivation in Lao PDR corresponded to less than 1% of the global cultivation and is at a similarly low level as in Thailand.

Figure 3: Estimated area under opium poppy cultivation (hectares), 1992 – 2007



	1992	1996	1998	2000	2001	2002	2003	2004	2005	2006	2007
Cultivation	19,190	21,601	26,837	19,052	17,255	14,000	12,000	6,600	1,800	2,500	1,500

The estimated area under opium poppy cultivation was calculated based on a sampling frame, which included the potential area for opium poppy cultivation in Phongsaly, Luang Namtha, Oudomxay, Luang Prabang, Huaphanh, Xieng Khouang. Taking into account the results of previous surveys as well as information from the Government and UNODC projects, it was assumed that opium poppy cultivation outside the sample area was negligible.

Opium poppy fields were found in 24 out of 90 randomly selected grids. Six grids out of 90 were not surveyed due to logistical problems. The average land under opium poppy cultivation was 1 hectare per grid (25 km^2).

In 2007, more opium poppy fields were observed in very remote locations, possibly to reduce the risk of eradication. Temporary camps were identified nearby these fields to allow labourers to stay overnight during harvest time.

A resurgence of opium poppy in Huaphanh can probably be attributed to the fact that less efforts were put into convincing farmers not to cultivate. An increased level of cultivation was also noticed along the borders of 4 out of the 6 northern provinces, which could indicate that opium is trafficked to neighbouring countries.

The number of opium poppy cultivating households in 2007 was not assessed by the Government of Lao PDR due to the remoteness of most of opium fields and the difficulty to relate them to any neighbouring village. However, data collected during helicopter survey indicated that, while in some provinces households might have abandoned opium poppy cultivation, in others they resumed or even increased cultivation. This was particularly the case in Huaphanh and Luang Namtha provinces where more fields were observed this year along the helicopter track. Households, which continued or resumed opium poppy cultivation in spite of the ban, may be the most vulnerable without alternative livelihood options, but could also have been attracted by high opium prices offered along the border with China and Myanmar.

Table 1: Estimated number of opium cultivating villages and households, 2002-2007

Year	No. of opium growing villages	No. of opium growing households
2002	1,610	38,000
2003	1,537	30,000
2004	846	22,800
2005	270	6,200
2006	N/a	5,800
2007	N/a	N/a

Temporary shelter in opium poppy field

2.2. Cultivation practices and crop calendar

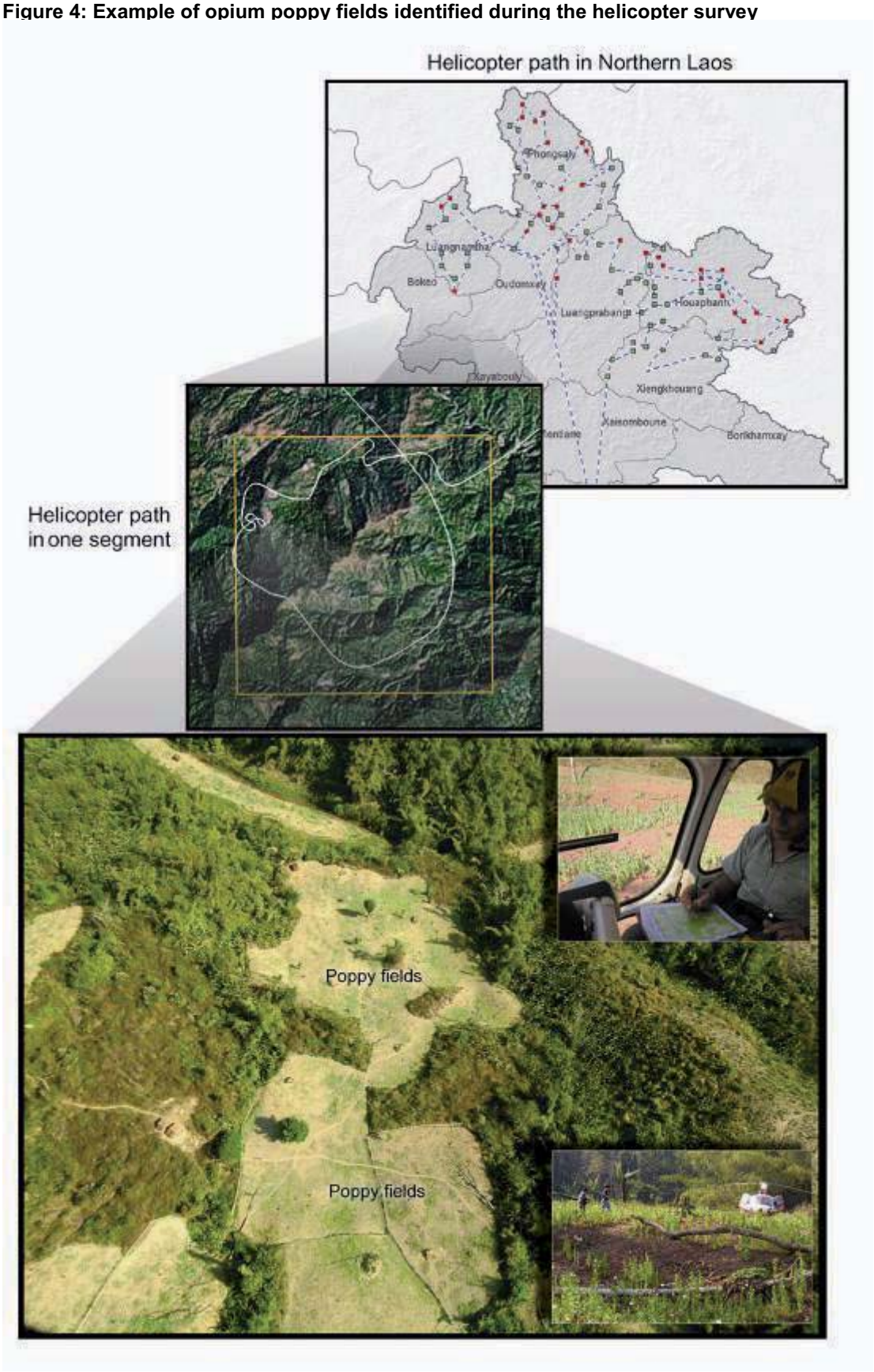
Opium poppy cultivation in Laos has become rare over the last few years. The main area of cultivation and production is now found in Phongsaly province and Huaphanh, while some pockets of cultivation remain in the other four northern provinces, farmers are moving illicit cultivation to more remote locations to avoid eradication; in most cases far away from villages and sometimes well hidden in deep jungle or remote mountains top where there is no access road. Another strategy is to cultivate less, but on better soils with improved cultivation practices. Several opium poppy fields were again this year found near rivers and streams giving easy access to manually watering those fields. The survey team also witnessed multi-stage cropping (different growing stages on the same field). Farmers planted opium poppy at different stages to avoid eradication of the entire harvest, since eradication teams hardly ever return to the same field in the same year.

During the helicopter survey, no major changes in the crop calendar were observed compared to previous years. The ground survey team confirmed that harvesting of opium started at the end of January and was completed by latest mid March. The peak of harvesting fell into mid February.

Table 2: Crop calendar of opium poppy

	Field preparation	Sowing	Harvest
Average	Mid Sept – end October	Early October – mid November	End January – mid March

Figure 4: Example of opium poppy fields identified during the helicopter survey



2.3. Yield and production

In 2007, the average national potential opium yield was estimated at 6 kg/ha. Yield data was collected with the capsule measurement method during the helicopter survey in or near segments where landing was possible. The yield estimate is based on data obtained from those fields. The relatively low yield can be attributed to a lack of rain during the main growing season between September 2006 and January 2007.

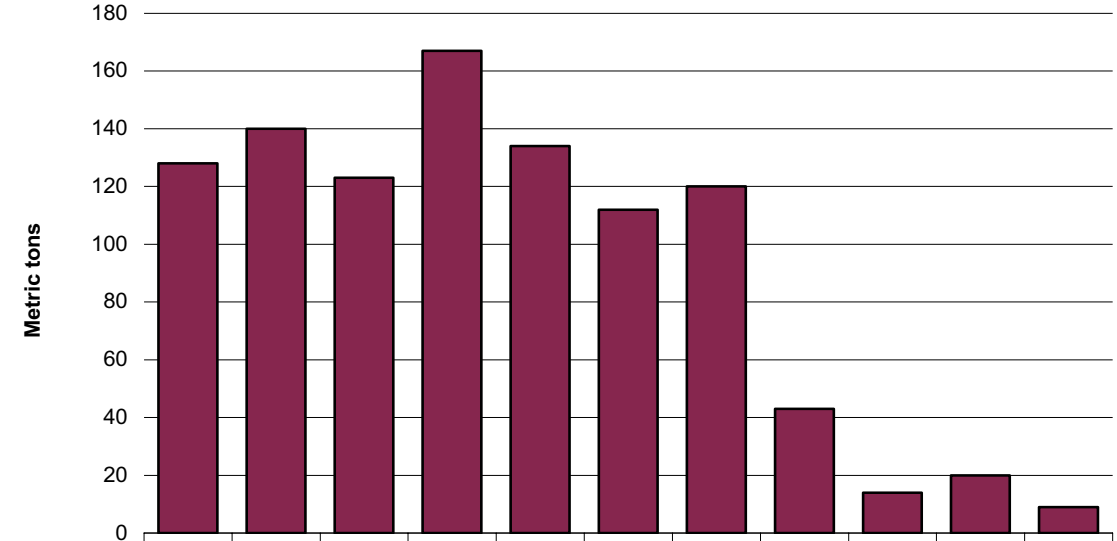
Table 3: Dry opium yield (kg/ha), 1992 - 2007

	1992	1996	1998	2000	2001	2002	2003	2004	2005	2006	2007
Potential Opium yield (kg/ha)	6.6	6.4	4.6	8.7	7.2	8	10	6.5	8	8	6

Based on the estimated area under cultivation, potential production of dry opium for the year 2007 was 9.2 mt, which is a 54% decrease with respect to 2006. Opium production in 2007 was only 5% of its peak in the year 2000 with 167 mt (and 7% of production in 1998). The actual amount of opium harvested in 2007 was probably lower than the estimated potential production due to the impact of eradication.

Large opium poppy field with weak plant vigour in forest clearing

Figure 5: Potential opium production (metric tons), 1992 - 2007



	1992	1996	1998	2000	2001	2002	2003	2004	2005	2006	2007
Production	128	140	123	167	134	112	120	43	14	20	9

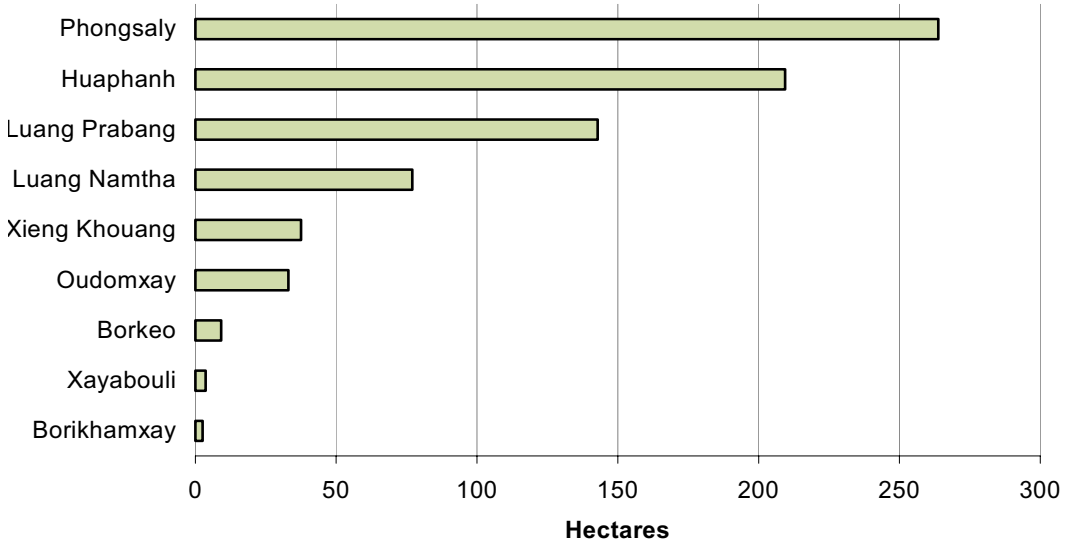
2.4. Opium poppy eradication

This opium survey was not designed to monitor or validate the results of the eradication campaign carried out and reported by the Government of Lao PDR. According to Government reports, eradication took place on 779 hectares soon after the helicopter survey was completed and when opium harvesting was either underway or completed. The highest level of eradication was reported in Phongsaly (264 ha), followed by Huaphanh (209 ha) and Luang Prabang (143 ha).

Table 4: Reported eradication by district (ha), 2007

No	Province	No	District	Eradicated area (ha)	Eradication period
I	Phongsaly	1	Phongsaly	5.8	25/2-19/3/07
		2	May	46	26/2-7/3/07
		3	Khoua	28	28/2-5/3/08
		4	Xamphan	91.3	25/2-10/3/09
		5	BounNeua	16.6	27/2-6/3/10
		6	Gnot Ou	67	24/2-10/3/11
		7	Bountai	9.1	26/2-5/3/12
			Total	263.8	
II	Luang Namtha	1	Luangnamtha	28.2	26/2-7/3/07
		2	Sing	20	25/2-10/3/07
		3	Long	17.6	26/2-7/3/07
		4	Viengphoukha	11.3	3-7/3/07
			Total	77.1	
III	Oudomxay	1	Xay	9.4	25/2-7/3/07
		2	Lar	9.9	24/2-8/3/07
		3	Namore	5.6	26/2-4/3/07
		4	Gna	4.4	25/2-3/3/07
		5	Beng	1.7	26/2/2007
		6	Hoon	1.5	27/2/2007
		7	Pakbeng	0.6	3/3/2007
			Total	33.1	
IV	Bokeo	1	ThonPheung	1.7	25-28/2/07
		2	Meung	3	28/2-2/3/07
		3	PhaOudom	2.3	26-28/3/07
		4	Paktha	1.7	24-25/2/07
		5	NamGnou	0.5	2/25/2007
			Total	9.2	
V	Luang Prabang	1	Luangprabang	1.2	26/2/2007
		2	XiengGnuen	1	28/2/2007
		3	Nan	4.5	26-28/2/07
		4	PakOu	13	3-7/3/07
		5	Nambak	29.2	26/2-3/3/07
		6	Gnoy	28.4	25/2-4/3/07
		7	Pakseng	9	24/2-6/3/07
		8	Phonxay	5	26/2-4/3/07
		9	Chompheth	3	28/2-6/3/07
		10	Viengkham	24	24/2-7/3/07
		11	Phoukhoun	24.53	26/2-5/3/07
			Total	142.83	
VI	Huaphanh	1	Xamtai	30	25/2-5/3/07
		2	Xamnuea	31.6	27/2-6/3/07
		3	Viengthong	22	21/2-3/3/2007
		4	Vienxay	72	28/2-3/3/07
		5	Huameuang	1	26/2/2007
		6	Add	46.7	28/2-3/3/07
		7	Xiengkhor	1.2	26/2-4/3/07
		8	Xobbao	4.9	25-28/2/07
			Total	209.4	
VII	Xayabouli	1	Xienghon	0.25	27-28/2/07
		2	Hongsa	1.6	3-7/3/07
		3	Xayabouli	0.5	26/2/2007
		4	Phieng	1.1	27-28/2/07
		5	Khob	0.25	25/2/2007
			Total	3.7	
VIII	Xieng Khouang	1	Pek	1.6	28/2/2007
		2	Kham	6.3	25-28/2/2007
		3	Nonghed	6.6	25/2-5/3/2007
		4	Khoun	0.25	26-28/2/2007
		5	Mok	2.4	3-6/3/07
		6	Phoukood	20.3	28/2-3/3/07
		7	Phaxay	0.07	
			Total	37.52	
X	Borikhamxay	1	Chuam Focal point	0.7	3/3/2007
		2	Khamkeurt	0.5	28/2/2007
		3	Viengthong	1.4	25-26/2/07
		Total		2.6	
		Grant Total		**779**	

Figure 6: Reported eradication by province (ha), 2007



2.5. Opium addiction

In 2007, opium addiction rates decreased again and the reported number of addicts in the 10 northern provinces was 7,706. However, the figures do not take into account the possible relapse of recently detoxified addicts, which is estimated at 20%. Opium prevalence rates remained higher in the two main opium producing provinces, Phongsaly and Huaphanh.

Table 5: Opium addiction by province, 2007

Provinces	Addicts Number	Population	Prevalence (%)
Huaphanh	1,472	280,938	0.52
Phongsaly	1,711	165,947	1.03
Luang Prabang	1,081	407,039	0.27
Xieng Khouang	844	229,596	0.37
Oudomxay	632	265,179	0.24
Luang Namtha	288	145,310	0.20
Xayabouly	492	338,669	0.15
Vientiane province	542	388,895	0.14
Borkeo	408	145,263	0.28
Bolikhamxay	236	225,301	0.10
Total/average	**7,706**	**2,592,137**	**0.30**

2.6. Sustainability of Opium Elimination: 1,100 Villages Strategy

The socio-economic survey of 2005 indicated that only 50% or around 1,000 of the country's poorest former opium poppy growing villages had received development assistance since giving up opium cultivation. Taking into account that some villages still cultivate opium poppy, it was estimated that altogether about 1,100 villages were at risk of reverting to opium poppy cultivation because of the lack of alternative livelihood options.

These villages are located in the 10 northern provinces of Laos in the most remote and poorest areas of the country. The Government of Lao PDR and UNODC jointly developed the "National Programme Strategy to Sustain Opium Elimination in the Post Opium Scenario" in 2005. In the course of 2006, an action plan to implement this national programme strategy targeting these

1,100 villages was presented on several occasions to the donor community and other stakeholders, and several have shown interest and willingness to cooperate. A total of 1,100 villages with a population of 416,000 inhabitants or 66,500 households are expected to benefit directly from this Action Plan. About 8,550 opium and about 1,400 ATS addicts are living in these communities.

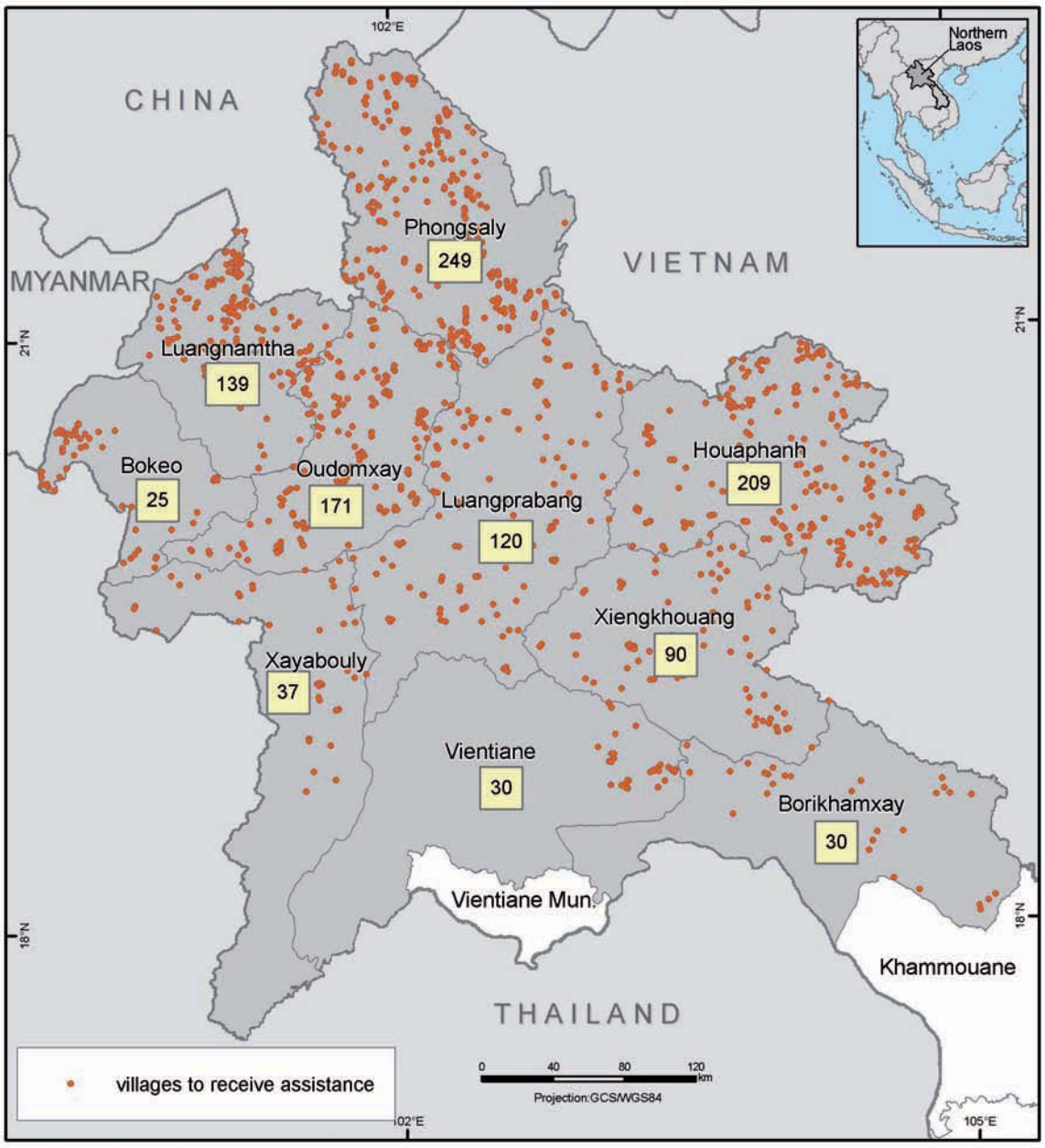
The Programme Strategy's goal is to stabilize the situation by providing relief assistance to former opium poppy cultivating communities in the immediate post opium setting. This support will be provided through the development of new projects or the integration of identified villages into on-going or planned projects run by partners in the field. Priorities in terms of needs of the villages include provision of clean water, access to markets, social services, affordable micro credit schemes and technical services for agriculture. Treatment and rehabilitation will also be provided to the remaining opium addicts. The action plan is designed to provide assistance and facilitate integration of the targeted villages into the national poverty reduction and socio-economic development planning process.

Table 6: Distribution by province of villages targeted by the 1,100 village strategy

Province	Villages
Oudomxay	171
Huaphanh	209
Xayabouly	37
Vientiane Province	30
Borkeo	25
Luang Prabang	120
Bordikhamxay	30
Xieng Khouang	90
Phongsaly	249
Luang Namtha	139
Total	**1,100**

Village in Northern Laos

Map 2: 1,100 Villages Strategy



Source: Government of Lao PDR
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

3 METHODOLOGY

3.1. Helicopter survey 2007

Under its global illicit crop-monitoring programme, The United Nations Office for Drugs and Crime (UNODC) has been establishing methodologies for data collection and analysis, to increase the government's capacity to monitor illicit crops and to assist the international community in monitoring the extent and evolution of illicit crops.

Due to the small size and the limited accessibility of the area under opium poppy cultivation, coupled with the relative scarcity of the target crop, the aerial survey by helicopter was chosen as a feasible way to estimate the extent of opium poppy cultivation in Lao PDR.

3.2. Sampling frame

The quality of the data collected from the aerial survey depends to a large extent on the quality of the sampling frame, from which the sample is to be selected. Building the sampling frame to collect data to verify the existence of opium poppy fields and to estimate the extent of the opium poppy cultivation in this country is a major challenge, particularly given the changing conditions, under which this crop is cultivated.

First, a selection of provinces and districts was made where opium poppy cultivation took place on the base of information from experts on the ground. Within this area, which comprised six provinces in Northern Laos (Phongsaly, Luang Namtha, Oudomxay, Luang Prabang, Huaphanh, and Xieng Khouang) the sampling frame for the area estimation in 2007 was established by defining the potential land available for opium poppy cultivation.

In Northern Laos opium poppy is mainly found in mountainous areas avoiding large, plane, developed areas, which are located at the lower altitudes. Former surveys revealed that 80% of the opium poppy-growing villages are situated above 700 meters altitude and at slopes of more than 10%. These topographic characteristics helped to limit the sampling frame area. The calculation was performed through a Geographic Information System with a digital elevation model (90 meter pixels) and its derived slope map to delineate the areas that were above 700 meters altitude and had slopes of more than 10%.

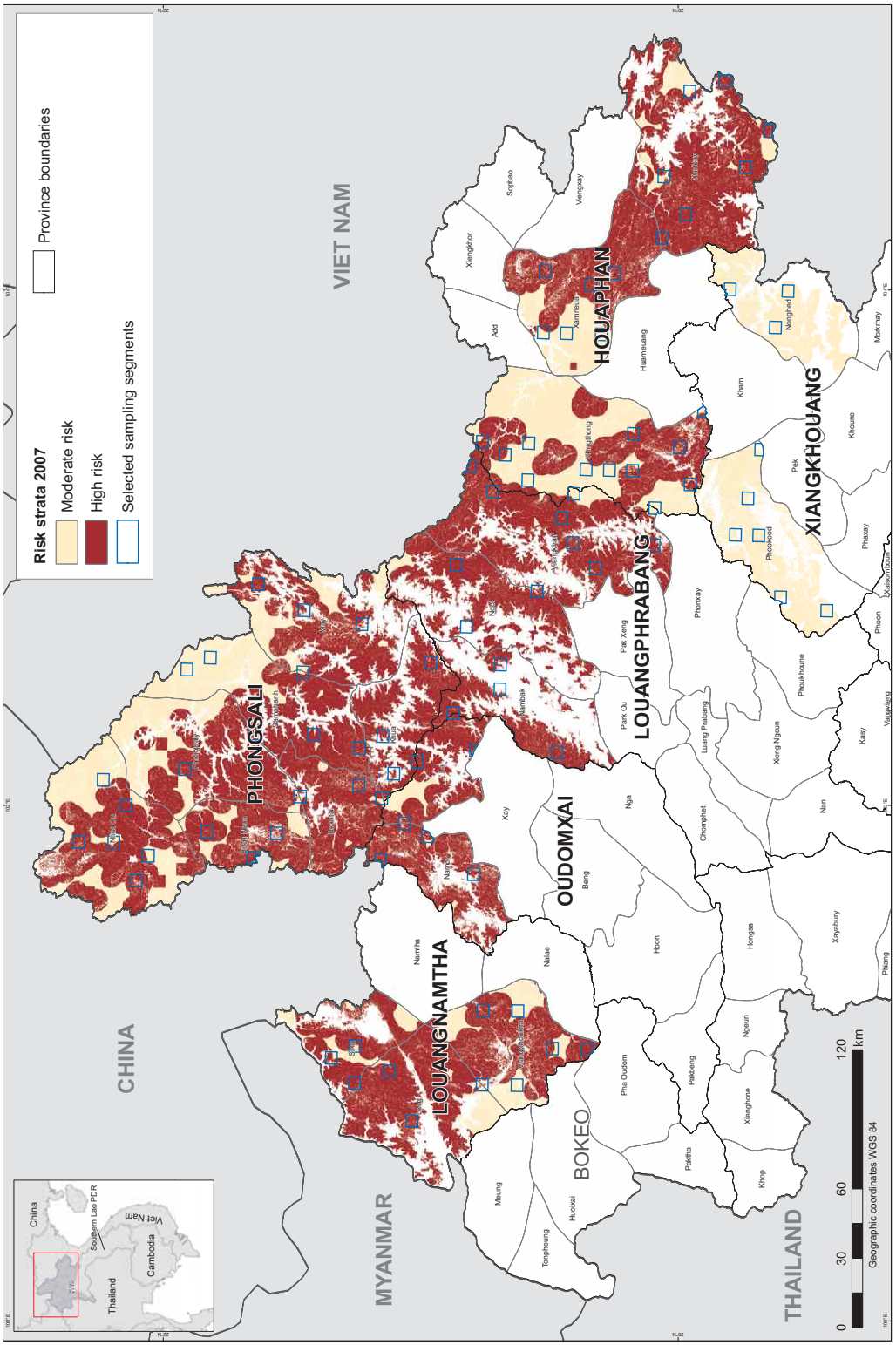
The resulting sampling frame was divided into a set of grids of 5km by 5km (25 $km^{2)}$.

Limiting the sampling frame area carries the risk of missing portions of the crop. Therefore, it should be noted that the resulting estimated area under opium poppy cultivation refers only to the area as defined above.

Table 7: Stratified risk areas used for the segment selection, 2007

Strata	Area (km^2)	Area (%)
High risk	23,006	70
Moderate risk	9,974	30
Total	32,980	100

Map 3: Sampling frame and selected segment cells in Northern Laos, 2007



3.3. Stratification

Previous sample designs and data analysis in the region have shown the existence of sharp differences in the distribution of the opium poppy cultivation across the entire area under research. Therefore, the results of the previous surveys and auxiliary geographic data were used to reinforce the structure of the sampling frame.

An analysis of these geographic data revealed that 88% of the opium poppy fields that were found in the past were located at less than 4 000 meters distance from agricultural areas as defined in a land use map (scale: 1:100 000)[5]. This demonstrates that a land use map was suitable to be used as an indicator of agricultural activities in general and, thus, of the likelihood opium poppy cultivation at certain locations. This fact has been used to design a stratification to be used in the sampling process.

Buffer areas with 4 km width were built around each agricultural area and identified as areas with the highest likelihood to find opium poppy cultivation. The buffer calculation was performed in a Geographic Information System and resulted in two risk strata.

In addition, the sampling segments surveyed in 2005 and 2006 were used to define the stratum. If opium poppy had been found in the segment in previous years, the area was added to the high risk stratum.

The resulting strata were:

- Stratum 1. Areas with high risk of opium poppy cultivation; 4 kilometres or less away from agricultural areas identified by the land use map of 2003; or within a segment area where poppy was found in 2005 or 2006.

- Stratum 2. Areas with moderate risk of opium poppy cultivation; more than 4 kilometres away from agricultural areas.

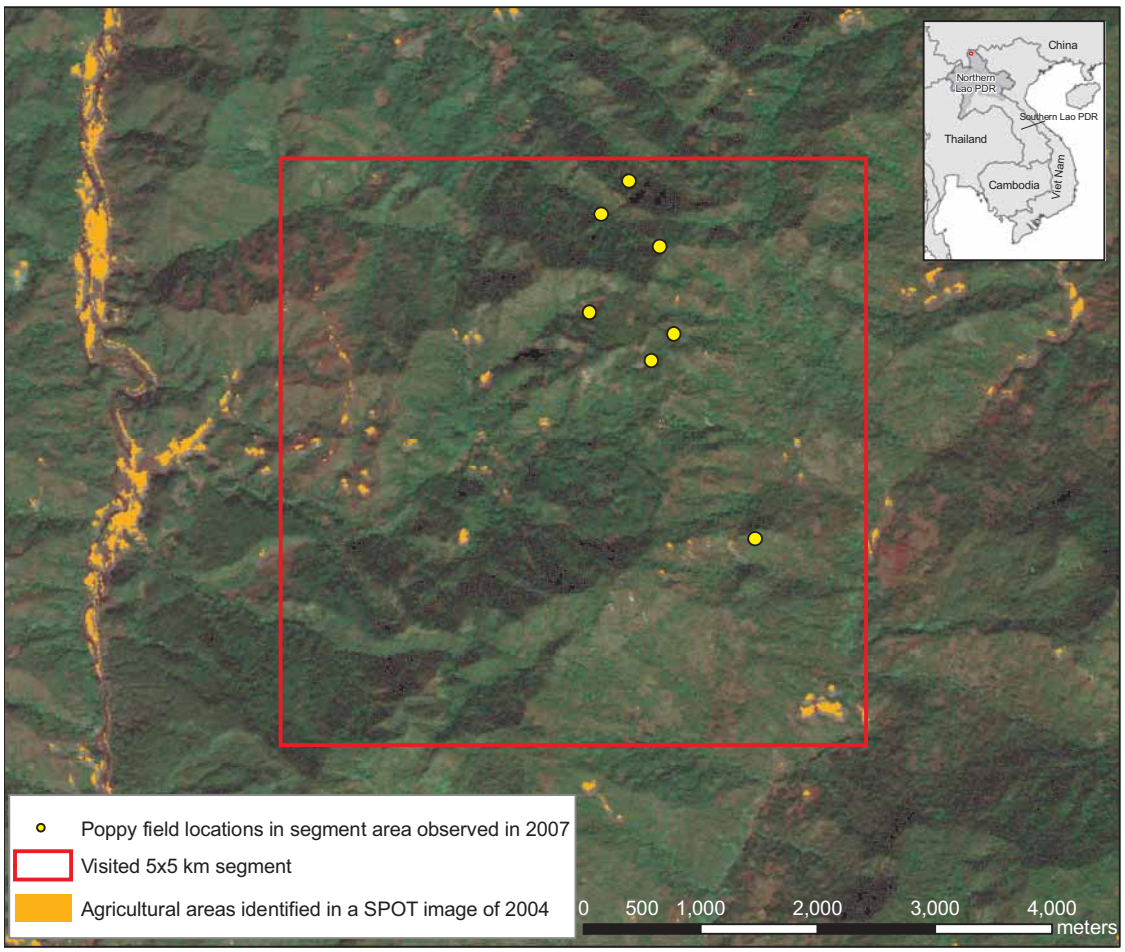
Information from the ground indicated that opium growing in Xieng Khouang Province is significantly lower than in the rest of the area. Therefore, the calculated strata were lowered by one step (the high risk area was lowered to moderate and moderate risk to no risk, i.e. excluded from the sampling frame).

The final sampling frame consisted of 32,980 km^2 distributed in 2,025 grids.

The type of sampling method used to estimate the area under opium poppy cultivation corresponds to a Stratified Area Sampling Frame approach. This technique is often used in agricultural and crops surveys. The methodology starts by dividing the target area into mutually exclusive and collectively exhaustive subgroups or strata. Subsequently, separate samples are then selected from each stratum.

[5] Source of map: Government of the Lao PDR's National Geographic Department, 2003.

Map 4: Example of opium poppy fields observed close to agricultural areas



3.4. Sample size

An imperative consideration in the determination of the sample size for a survey is the quality of the data that will be collected. On the other hand, financial resources are serious constraints limiting the scope of the survey. Compromising both conditions, the resulting sample size was calculated as a function of the costs associated to the helicopter flying time and the precision.

The budget available limited the number of flying hours up to the maximum of 25 hours. Therefore, in order to estimate the number of potential selected segments, it was necessary to investigate the helicopter characteristics.

The helicopter used for the survey was a "Squirrel" helicopter. This type of helicopter is used mostly for rescue, aeromedical, survey and military roles. The Squirrel has a maximum cruise speed of 220 kph powered by a single jet engine and it can accommodate up to four passengers and carry loads of up to 750 kg.

To determine the maximum number of sample segments, a compromise between a sampling ratio of 5.4% of the total potential area and the maximum total of segments has been taken.

The total number of segments is derived from the following formulae:

$$n_\alpha \le MAX\left[\left[\left\{\frac{TEDWs \bullet n}{ESWs}\right\}\right]+\left\{\frac{(MaxDBs - MinDBs)\bullet n}{ESBs}\right\}\right] + BTso \le 33h$$

Where:

TEDWs = Total expected surveillance distance travelled within segments

ESWs= Total expected Helicopter speed within segments

MaxDBS, MinDBs = Maximum and Minimum expected distance between segments

ESBs= Total expected helicopter speed between segments

Btso = Buffer time to stopovers

And,

$$n_{\beta\leq} PotentialLand * 5\%$$

Where:

Potential Land = Total potential land for opium poppy cultivation in Laos

or

40,463X0.05=2,023, or in terms of segments equals to 80 grids.

Finally,

$$n = Min\{n_{\alpha}, n_{\beta}\}$$

or n =Min (65,80)

Table 8: Final Sample Size by stratum

Sample Size	Grids	Area Sq Km
High Risk	38	950
Moderate Risk	27	675
Total	65	1625

The sample allocation used for this survey is optimum allocation. Optimum allocation distributes the sample proportionally using the opium poppy area standard deviation on each grid.

The sample of 25km^2-grids was systematically selected using probability proportional to size (PPS) approach. PPS sampling is a technique that employs auxiliary data to yield dramatic increases in the precision of survey estimates, particularly if the measures of size are accurate and the variables of interest are correlated with the size of the unit.

In this survey, the variable used was the size of the potential land area for opium poppy cultivation. It is the methodology of choice for sampling areas for most crop estimation surveys. PPS sampling yields unequal probabilities of selection for primary sampling areas. Essentially, the measure of size of the primary sampling areas determines its probability of selection.

Table 9: Final Sample Size by province

Area frame sample distribution	
Province	**No. Segments**
XIANG KHOUANG	9
HUAPHANH	25
LUANG PRABANG	14
LOUANG NAMTHA	11
OUDOMXAY	6
PHONGSALY	25

3.5. Estimation procedure

The estimation of the area under opium poppy cultivation was based on the information collected during the helicopter survey. The expansion area for the aerial research was limited to the sampling frame and does not consider opium poppy fields outside this domain.

Accuracy measurements were performed in order to verify the size of fields estimated from helicopter by comparing them with actual measurements on the ground. Ratio estimation formulae were used to estimate the extent of the opium poppy cultivation at the stratum level using the equations described below.

a. Average proportion of opium poppy cultivation per stratum:

$$\underset{k}{\bar{p}} = \sum_{j=1}^{t} \frac{Poppy\_in\_segment\_j}{Potential\_land\_in\_segment\_j}$$

k =1,2 and j=1,…,28, or 37

b. Average proportion of opium cultivation in Northern Laos.

$$\boxed{\underset{st}{\bar{p}} = \frac{1}{N}\sum_{h}^{3} N_h \underset{h}{\bar{p}}}$$

Or

$$\boxed{\underset{st}{\bar{p}} = \sum_{k}^{3} W_k * \bar{p}_k}$$

W_h= relative weight for each stratum

c. Unbiased estimate of the variance of the proportion of opium poppy cultivation in Northern Laos:

$$Var(\underset{st}{\bar{p}}) = \frac{1}{N^2} * \sum_{1}^{3} \frac{N_h^2 (N_h - n_h)}{N_h - 1} * \frac{P_h * Q_h}{n_h}$$

The second term on the right represents the reduction due to the finite population correction[6].

The results for the two strata were refined by the bootstrap method[7]. Bootstrapping is recommended[8] for cases when the sample observations have different sizes. This was the case in the survey area, where the potential land suitable for opium poppy cultivation as defined by the sampling frame within the selected grids was very different from each other. The bootstrap method does not have a significant influence on the mean estimation. The main reason for using bootstrap is to calculate the standard error of the estimates.

Bootstrapping consist of sampling with replacement from the original sample thousands of times. The collection of 84 selected grids constitutes the original sample. After performing each iteration, a mean value is estimated and scored. At the last stage, a distribution of means can be observed, producing a mean estimate and a confidence interval for the mean.

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6 Cochran, W.G.; Sampling techniques, Third edition; Wiley Eds. 1977.

7 Resampling Stats. Stand alone Version 5.0 with 100,000 iterations.

8 Resampling methods, a practical guide to data analysis; Good, P. Birkhauser 2006

Yield survey

Practical field procedures used to collect data (number, height and diameter of opium poppy capsules) to estimate opium yield are based on the "Guidelines for Yield Assessment of Opium Gum and Coca Leaf From Brief Field Visits" published by UNODC. The guidelines provide for practical field procedures and for options to calculate yield from capsule volume using a linear correlation between capsule volume per one square meter (cm^3/m^2) and oven dry gum yield (kg/ha)

During the helicopter survey, the team could land in two separate areas where several opium poppy fields under harvest were monitored and size of fields, plant density and capsules measures were determined. It was not possible to send ground truth team for further yield survey investigation to other area but observations done from helicopter confirmed a poorer crop vigor in 2007 compared to previous years.

PART 4. MYANMAR

CONTENTS

ABBREVIATIONS

CCDAC	Central Committee for Drug Abuse Control
GOUM	Government of the Union of Myanmar
ICMP	UNODC Illicit Crop Monitoring Programme
INGO	International Non-Governmental Organization
RAS	UNODC Research and Analysis Section
SR	Special Region
UNODC	United Nations Office on Drugs and Crime
USG	United States Government
WCS	Wildlife Conservation Society

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Thibault Le Pichon	Chief, RAS
Martin Raithelhuber	Programme Officer, ICMP, RAS
Patrick Seramy	Database management and field work supervision, ICMP, RAS
Javier Teran	Statistician, ICMP, RAS

PREFACE

The sustainable elimination of opium poppy cultivation is a long term and complex process. One of its keys is consistency in government and international commitment. However, even with these there may be some periodic reversals in trend. This year, the cultivation in Myanmar has experienced just such a reversal. Although it is reasonably small, 29%, and contained, mainly in the South and East Shan states, it should serve as a reminder of both the complexities of the challenge and the need to ensure that it continues to be met with vigilance and commitment.

This year's growth in cultivation should be looked upon as a serious warning against complacency. Since the 1998 United Nations General Assembly Special Session on the World Drug Problem the level of opium poppy cultivation in Myanmar has decreased an impressive 79 per cent. The sudden increase this year follows seven straight years of decline, which is extremely alarming.

Special Regions 2 and 4 as well as Kokang, which were declared opium free during the previous years, remain free of opium poppy cultivation. This is an impressive achievement given the complexity of opium poppy cultivation in Myanmar and its role in income generation, impoverished communities, as well as its strong tie to a multitude of significant health, social welfare and environmental issues. Eradication continues to play an important role in the Government's efforts towards opium poppy elimination in regions, where the crop is still cultivated.

Opium poppy cultivation in Myanmar has close linkages with poverty. The farmers engaged in opium poppy cultivation have lower incomes than non-opium producing farmers. When opium producing farmers cease cultivation in the absence of adequate alternative means of livelihood, they get poorer. Drug addiction is high in most high-cultivation areas and this creates significant social and economic pressures. Further hampering efforts toward elimination, the security situation in many opium producing localities is threatened by insurgents and traffickers.

Any sustainable elimination of cultivation and production needs to address all of these problems. This makes the task ahead formidable, and although our present task is not as formidable as it was seven years ago, it should not be tackled with any less resolve or vigor than it was at that time.

Shariq Bin Raza

Representative

UNODC Myanmar

FACT SHEET - MYANMAR OPIUM SURVEY 2007

	Year 2006	Year 2007	Variation on 2006
Opium poppy cultivation in Myanmar	21,500 ha	27,700 ha	+29 %
Opium poppy cultivation in Shan State	20,500 ha	25,300 ha	+23 %
Average opium yield (weighted by area)	14.6 kg/ha	16.6 kg/ha	+14 %
Potential production of dry opium in Myanmar (including the Shan State)	315 mt	460 mt	+46 %
Opium poppy eradication in Myanmar[1]	3,970 ha	3,598 ha	-9 %
Average farm-gate price of opium[2]	US$ 230/kg	US$ 265/kg	+15 %
Total potential value of opium production	US$ 72 million	US$ 120 million	+67 %
Estimated number of households involved in opium poppy cultivation in Myanmar	126,500	163,000	+29 %
Number of persons involved in opium poppy cultivation in Myanmar	632,500	815,000	+29 %
Estimated number of households involved in opium poppy cultivation in the Shan State	120,000	148,900	+24 %
Average yearly household income in opium producing households (Shan State)	US$ 437	US$ 501	+15 %
Of which from opium sales	US$ 217	US$ 227	+5 %
Per capita income in opium producing households (Shan State)	US$ 87	US$ 100	+15 %
Household average yearly income in non-opium poppy producing households (Shan State)	US$ 318	US$ 455	+43 %
Per capita income in non-opium producing households (Shan State)	US$ 64	US$ 91	+43 %
Addiction prevalence rate in Shan State and Kachin (population aged 15 and above)	0.60 %	0.75 %	+25%

[1] *Source: CCDAC.*

[2] *For 2006: yearly average price. For 2007: price at harvest time*

EXECUTIVE SUMMARY

The 2007 Opium Survey in Myanmar was conducted jointly by the Government of the Union of Myanmar (GOUM) and the United Nations Office on Drugs and Crime (UNODC). An extensive survey, combining the use of satellite images and ground verification, was conducted in Shan State where most of the opium poppy cultivation takes place. A rapid ground survey was conducted in Special Region 2 (Wa) to certify its opium free status, as well as in Special Region 1 (Kokang) and Special Region 4 and Chin. Limited ground surveys were also conducted in selected townships of Kachin and Kayah States, where some opium poppy cultivation was reported in 2006.

Opium poppy cultivation

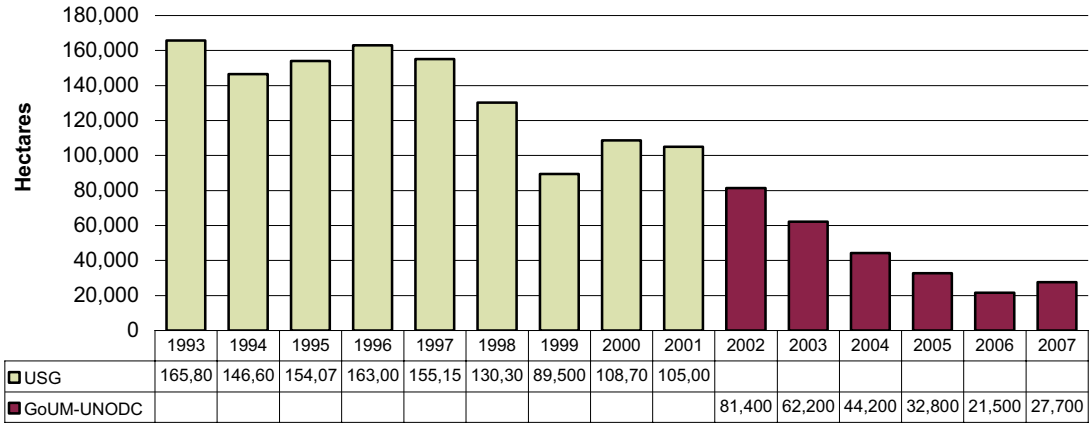
In 2007, the total area under opium poppy cultivation in Myanmar was estimated at 27,700 hectares, representing an increase of 29% from the 21,500 ha under cultivation in 2006. The largest cultivation areas were found in South Shan where 65% of the national cultivation took place, while 25% was cultivated in East Shan State. In North Shan State, opium poppy cultivation remained at a very low level, only 1% of national cultivation. However, the declining trend reversed this year and the area under cultivation in North Shan increased by almost two thirds. In Kayah State, which was surveyed for first time in 2006, opium poppy cultivation was also increasing. The same trend was seen in Kachin State, which accounted for 5% of national cultivation. In spite of a strong decrease in townships located along Chinese border, there was a significant increase in other townships of Kachin. The situation remained unchanged in Special Region 2 (Wa), where opium elimination has been sustained. Further, no opium poppy was found in Chin state. The survey was not allowed to proceed in Sagaing Division and no data is available.

In 2007, opium poppy cultivation in Myanmar increased for first time after 7 years of continuous decline. However, since 1998, the year of the United Nations Special Session on Drugs, the area under opium poppy has decreased by 79% from 130,000 ha to 27,700 ha. Since 2002, the year of the first joint GOUM/UNODC survey – opium poppy cultivation has fallen by 66%.

Table 1: Opium poppy cultivation in Myanmar by state (ha), 2005-2007

Region	2005	2006	2007	% of total area under opium poppy cultivation
East Shan	3,960	4,550	7,000	25%
North Shan	2,570	240	390	1%
South Shan	11,280	15,660	18,000	65%
Special Region 2 Wa	12,960	0	0	0%
Shan State Total	**30,800**	**20,450**	**25,390**	**92%**
Kachin	2,000	1,020	1,440	5%
Kayah	n.a.	15	870	3%
National Total	**32,800**	**21,485**	**27,700**	**100%**
Rounded Total	32,800	21,500	27,700	100%

Figure 1: Opium poppy cultivation (hectares), 1993-2007



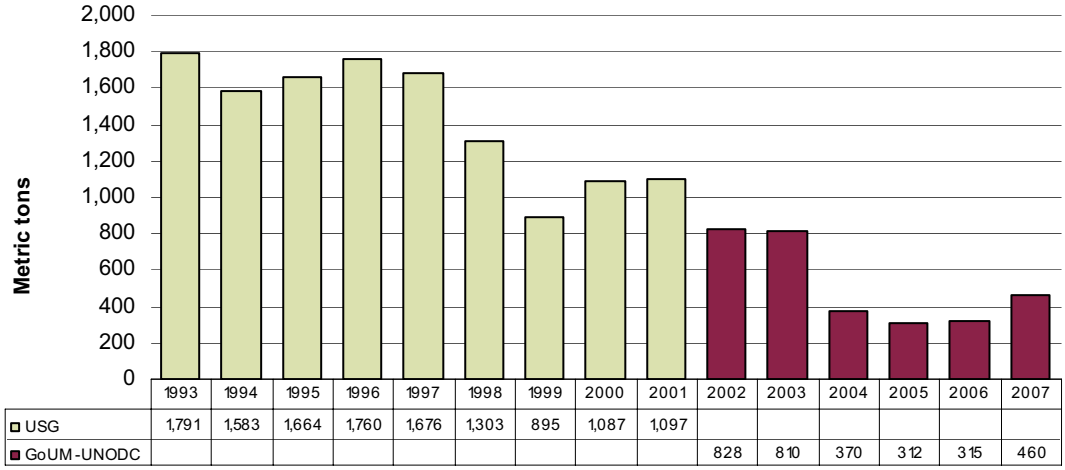
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
USG	165,80	146,60	154,07	163,00	155,15	130,30	89,500	108,70	105,00						
GoUM-UNODC										81,400	62,200	44,200	32,800	21,500	27,700

Opium yield and production

The weighted national average opium yield for 2007 was estimated at 16.6 kg/ha compared to 14.6 kg/ha in 2006. In general, weather conditions were favourable for opium production, with sufficient and timely rainfall. In addition, occasional irrigation of opium poppy fields and multi-stage cropping contributed to yield increases. In 2007, the total estimated production of opium amounted to 460 metric tons, which is a 46% increase in comparison to 2006. The survey results show that opium production in South Shan State was the highest. Overall, opium production in Myanmar has decreased by 65 % since 1998, but the downward trend of recent years came to a halt in 2006, and has since increased due to the production increases in East, North and South Shan State, as well as in Kachin State.

Opium poppy fields in Loilem township in South Shan State

Figure 2: Opium production in Myanmar (metric tons), 1993-2007



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
USG	1,791	1,583	1,664	1,760	1,676	1,303	895	1,087	1,097						
GoUM-UNODC										828	810	370	312	315	460

Opium prices

The average farm-gate price of opium at harvest time was estimated at 265 US$/kg. This represents an increase of 15% compared to the average price reported by farmers for the year 2006. The highest prices were found in North Shan State and the lowest in South Shan State. The highest price increases compared to last year were observed in East Shan State, whereas in Kachin, South Shan and North Shan, price increases were moderate. The price differences reflect well the scarcity or availability of opium in different regions, as well as the fragmentation of the opium market in Myanmar.

Household income from opium

The average annual cash income of an opium poppy cultivating household was estimated at US$ 501, while the average annual income of a non-opium poppy cultivating household was slightly lower, at US$ 455. This year, a larger number of households (+29%) was able to produce an even larger amount of opium (+46%) at a higher price (+15%) compared to 2006. As a consequence, the total value of the national opium production increased by +67% to US$120 million. However, this led to only comparatively moderate income increase for opium poppy growers (+15%), as the income from opium was distributed among a larger number of households.

The 2007, survey results confirmed that the average cash income of households was higher for villages that never grew opium poppy, compared to the ones, which had stopped opium poppy cultivation. The findings also showed that households in former poppy growing villages could not find adequate ways of substituting their lost income from opium. They simply got poorer, and they will need assistance to cope with this difficult situation.

Addiction

The overall proportion of opium users in Shan State, Kachin and Kayah represents 0.75% of the total adult population. Within the surveyed area, the average level of addiction was higher (2.5%) in villages with opium poppy cultivation, compared to non-growing villages (0.3%). As in previous years, opium addiction continued to be a predominantly male phenomenon: 1.3% of the male population was addicted compared to 0.2% of the female population. The level of ATS and heroin addiction was low compared to opium abuse in both growing and non-growing villages. The survey did not cover urban areas where these types of addiction are thought to be much higher.

Eradication

Official reports from the Myanmar Government indicate that 3,598 ha of opium poppy were eradicated in 2007. However, the level of eradication varied greatly between regions. It increased by 33 times in East Shan State, but decreased by 58% in South Shan State where the security was not good. In North Shan State, eradication increased 11 times reflecting the Government's efforts to control opium poppy cultivation at a time of renewed cultivation in this state. Pressure made by local authorities not to cultivate opium poppy along the Chinese border has pushed opium poppy fields to more remote areas and in other townships of Kachin State.

Eradication team around Inle Lake, South Shan State

Food security and coping strategies

The survey showed that villages reporting opium poppy cultivation continue to have significantly lower food security compared to opium poppy-free villages. Villages with access to paddy land tend to cultivate less opium poppy since they can achieve a higher level of food security with rice cultivation. Villages growing opium poppy showed a significantly higher intensity of shifting cultivation, both in terms of acreage of forest cleared and duration of fallow periods compared to non-growing villages. The most common coping strategy for farmers who had stopped opium poppy cultivation, was to grow more rice and maize and to sell livestock. Some limited migration occurred in Wa region were opium poppy cultivation was abandoned in 2005.

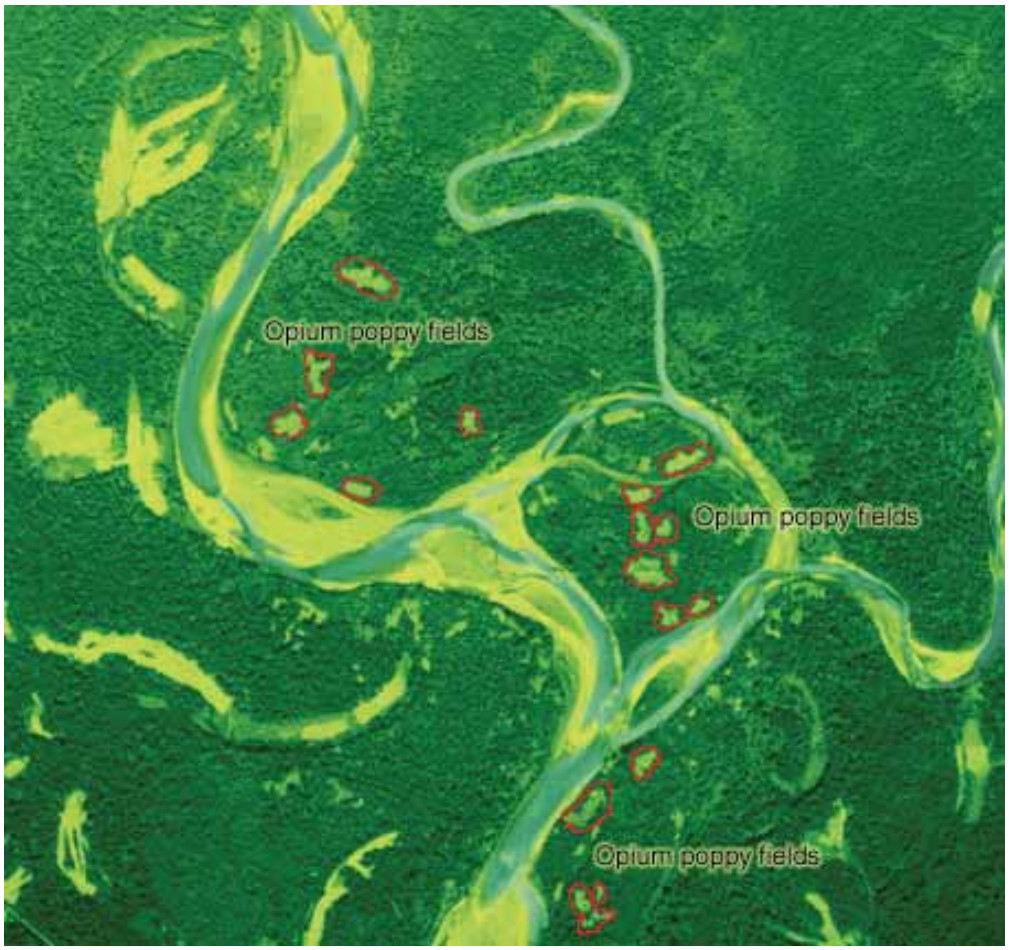
Market day in the Wa region

Deforestation in Kachin State

Deforestation and environmental degradation in Kachin State

Kachin State is located at the northern most part of Myanmar on the border with China and India. This area is considered as the remaining most important area for forest and biodiversity resources, and also includes one of world's last tiger reserves. In recent years, there has been a large scale deforestation and also large dynamic changes in land use. These developments have been identified by rapid assessment teams using aerial photography and satellite imageries analyzed over the years by the Forestry Department. In some cases, deforestation was a direct result of opium poppy cultivation. In addition to farmers clearing closed forest areas for opium poppy cultivation, private companies are engaged in sugar cane plantations and illegal logging. These critical transformations are occurring in important biodiversity conservation areas, such as the Hukaung Tiger reserve and the critical head waters area of the Chindwin River.

Opium poppy fields replacing forest in Kachin State



1 INTRODUCTION

This report presents the results of the annual opium survey in Myanmar, conducted for the sixth consecutive year by the Central Committee for Drug Abuse Control (CCDAC) of Myanmar, with the support and participation of UNODC. Within the framework of its Illicit Crop Monitoring Programme (ICMP), UNODC has collected statistical information on illicit crop cultivation in Myanmar since 2001. ICMP works with Governments to increase their capacity to monitor illicit crops and supports the international community in monitoring the extent and evolution of illicit crops in the context of the elimination strategy adopted by United Nations General Assembly Special Session on Drugs in June 1998. The survey methodology combines satellite imagery with a ground survey to determine the extent of opium poppy cultivation in the country and to collect socio-economic data at the village level.

Opium poppy has been grown in Southeast Asia as a medicinal and cash crop for centuries. Some 150 years ago, cultivation of the crop was commercialized in what was then known as Burma. For the past 50 years, the farm-gate buyers of opium have been Chinese merchants connected with international groups operating from China and Thailand. Through collection of taxes and protection money, various ethnic insurgent groups have used proceeds from onward sales of raw opium and processed heroin to finance their activities.

Opium poppy cultivation has remained village-based, widely dispersed and very "low tech". The agricultural economy of opium–growing regions of Myanmar is based on a traditional opium poppy-maize-rice cropping system. Surplus opium, which is not needed for medicinal purposes or consumed by addicts in their own household, is sold to alleviate food shortages, as most households are not food self-sufficient.

Kid collecting seeds from opium poppy capsule

In the 1980s, Myanmar was the world's largest producer of illicit opium, with an average annual production of about 700 metric tons of opium between 1981 and 1987. Opium production in Myanmar continued to increase until 1996, reaching annual production levels of some 1,600 metric tons. Afghanistan replaced Myanmar as the world's largest producer of opium in 1991,

primarily due to its higher opium yield per hectare. The area under cultivation remained larger in Myanmar than in Afghanistan until 2003.

The surrender of the notorious drug trafficker Khun Sa, leader of the Mong Tai Army, in 1996, resulted in the collapse of armed resistance movements and led to the negotiation of a series of truce agreements with most break-away factions. This paved the way for control of opium poppy-growing regions and allowed the implementation of measures to reduce opium poppy cultivation.

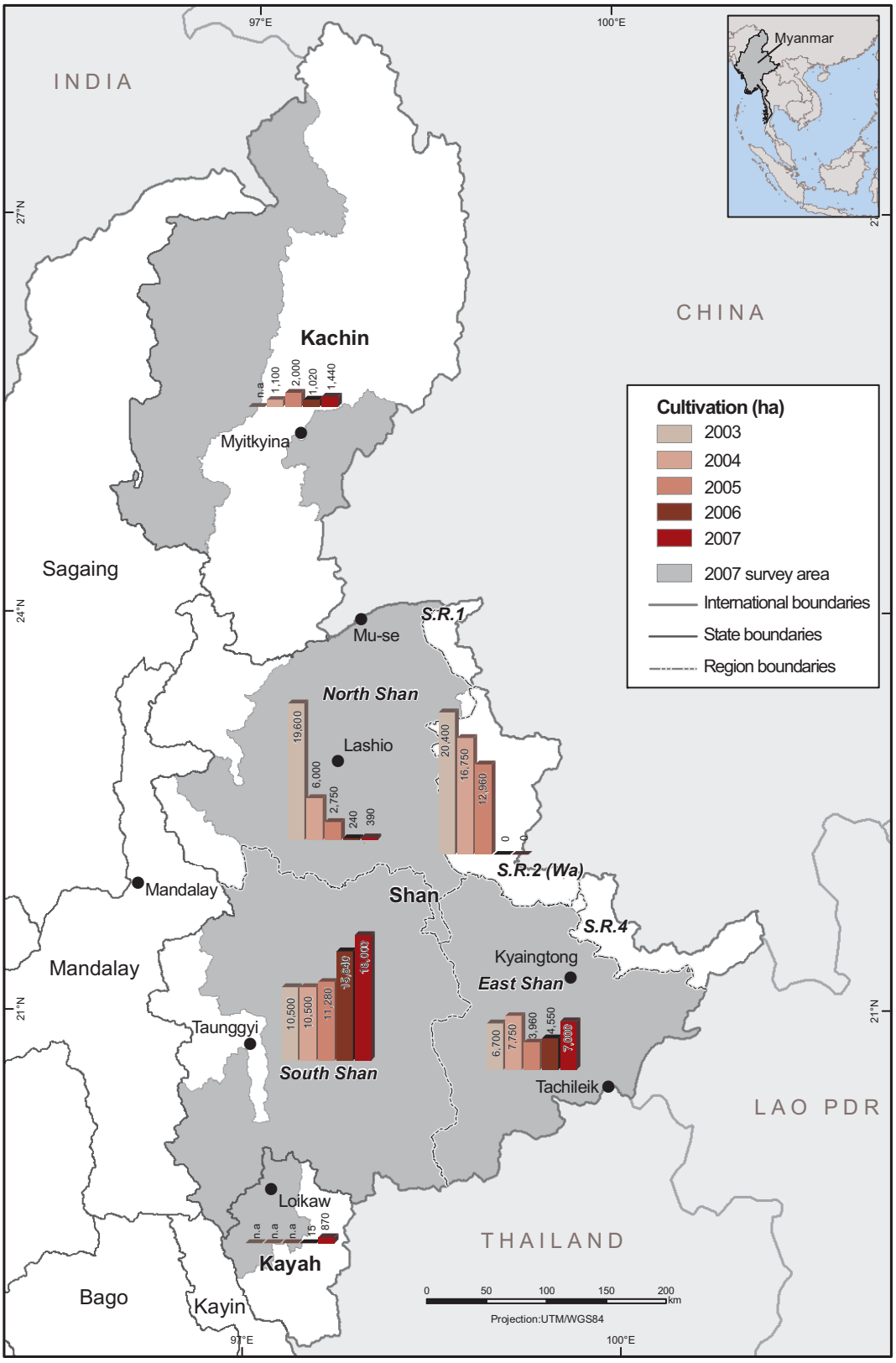
In 1999, the Government of Myanmar and local authorities in areas cultivating opium poppy decided to engage in a 15-year plan to eliminate the illicit crop by the year 2014. Since then, there has been a considerable decrease in the area under cultivation and a strong decline in potential opium production in Myanmar. Opium poppy has been confined almost entirely to the Shan State with a few pockets of cultivation in other states. In the Wa Region, Shan State, which was playing a major role in opium production in the past, a ban on opium cultivation was declared in June 2005, which has been sustained so far. Similarly, no significant opium poppy production has been observed in Kokang and in Special Region 4 since 2003.

However, the achievements in reducing cultivation and production of opium and the efforts made to treat opium abusers, can only be sustained if alternative livelihoods for local communities are available. Farmers are very vulnerable to loss of income derived from opium, especially those who depend on this income source to cope with food shortages. Also, opium cultivation is often linked to a lack of peace and security, which also contributes to impoverishment of the local population.

Annual opium surveys remain essential to assess the extent of opium poppy cultivation within the country and shifts in cultivation, in addition to being useful tools for gauging the effectiveness of opium bans and their implications for the local communities. The present survey examines how farmers are continuing to cope with change in the areas affected by the opium ban. Such information is essential for developing effective strategies to sustain the transition from an illicit economy to a licit economy.

Escort for survey teams in South Shan State

Map 1: Opium poppy cultivation in Kachin, Kayah, and Shan States, Myanmar 2007



Source: Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

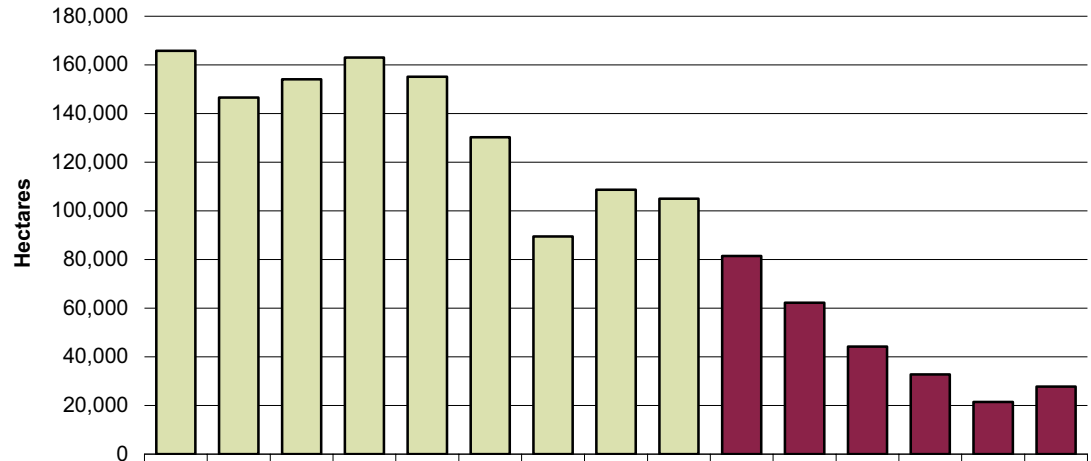
2 FINDINGS

2.1 Opium poppy cultivation

In previous years, the annual opium survey in Myanmar covered Shan State (North, East, and South Shan) and some limited areas in Kachin and Kayah States, where opium poppy cultivation was reported. In 2007, the survey also included Chin State and several Special Regions in Shan (Wa Special Region 2, Kokang Special Region 1 and Special Region 4), where rapid assessments were conducted. The survey confirmed the sustainability of the opium-ban in the 3 Special Regions. Also, in Chin, no opium poppy was observed. A rapid assessment was also planned for Sagaing Division, but the survey was not permitted to proceed in this area.

In 2007, the total area under opium poppy cultivation in Myanmar was estimated at 27,700 ha, a significant increase (29%) compared to 21,500 ha in 2006. This indicates a reversal of the declining trend observed in the past five years.

Figure 3: Opium poppy cultivation in Myanmar (ha), 1993-2007



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
USG	165,800	146,600	154,070	163,000	155,150	130,300	89,500	108,700	105,000						
GoUM-UNODC										81,400	62,200	44,200	32,800	21,500	27,700

The overwhelming majority of opium poppy cultivation in Myanmar continued to take place in South Shan (65%) and East Shan State (25%). In North Shan State, the level of opium poppy cultivation increased significantly in 2007, but still accounted for only 1% of the total area. In Kachin State, opium poppy cultivation, previously located along the Chinese border (Sadon), almost completely disappeared in 2007. However, significant increases were recorded in other areas (Tanai, Hpakant, Putao). In Kayah State, a significant increase of cultivation along the border with Shan State in Demosso and Fruso townships was observed.

Large opium poppy field in Tanai township in Kachin State

Opium poppy field in Pekhon township in South Shan State

The most important increase in opium poppy cultivation was observed in South Shan State, with 15% more opium poppy under cultivation. In North Shan State, opium poppy cultivation, which had almost disappeared in previous years, also increased significantly by 63% in 2007.

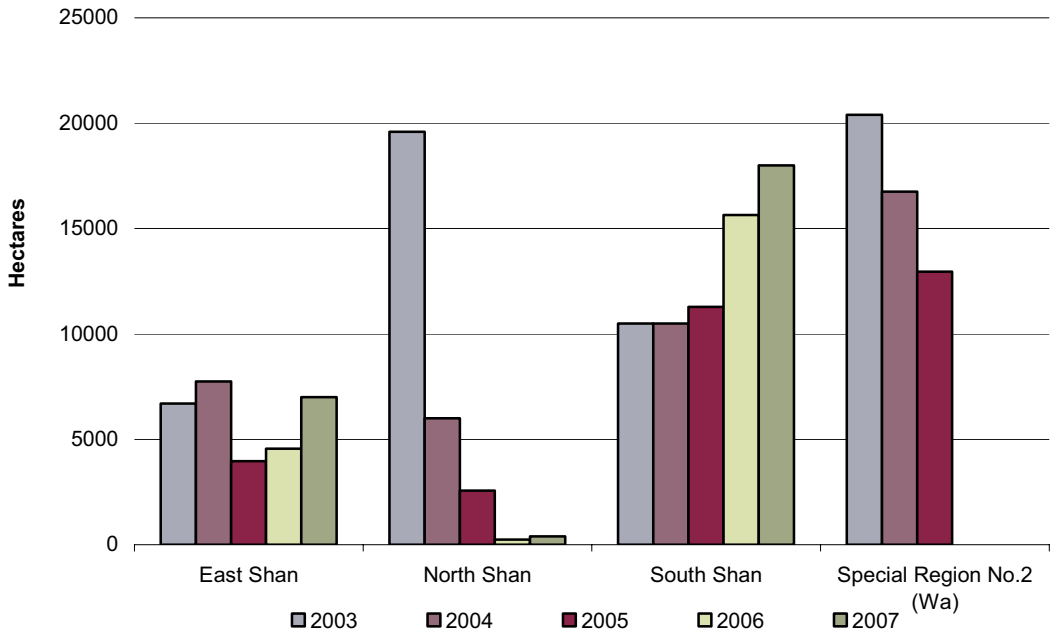
Table 2: Opium poppy cultivation by state (ha), 2006-2007

Administrative unit	2006 Opium poppy cultivation (ha)	2007 Opium poppy cultivation (ha)	2007 % of total area under opium cultivation	Variation (%)
Shan State	20,450	25,390	92%	+24%
Kachin State	1,020	1,440	5%	+41%
Kayah State	15	870	3%	+5700%
National Total	21,485	27,700	100%	
Rounded Total	**21,500**	**27,700**	**100 %**	**+29%**

Figure 4: Opium poppy cultivation in the Shan State (ha), 2006-2007

Administrative unit	2006 Opium poppy cultivation (ha)	2007 Opium poppy cultivation (ha)	Variation (%)
East Shan	4,550	7,000	+54%
North Shan	240	390	+63%
South Shan	15,660	18,000	+15%
Special Region No.2 (Wa)	0	0	0%
Total (rounded)	**20,450**	**25,390**	**+24%**

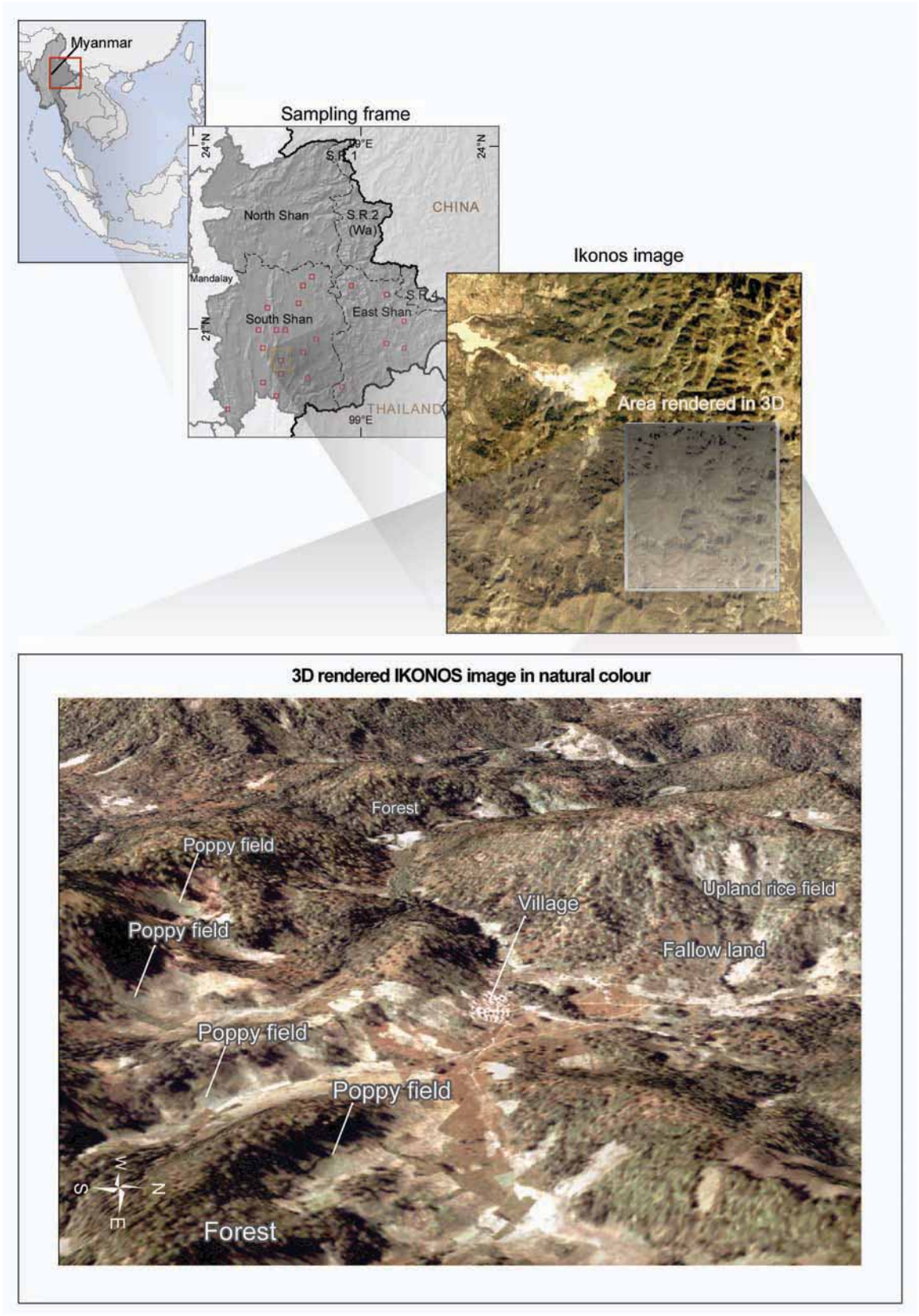
Figure 5: Opium poppy cultivation in the Shan State (ha), 2003-2007



Survey team at work in South Shan State

Early crop in Mongnae township in South Shan State

Three dimensional view of opium poppy fields on a satellite image



Villages and farmers involved in opium poppy cultivation

Based on an estimated average area under cultivation of 0.17[1] ha per household and a total cultivation of 27,700 ha, an estimated 163,000 households were involved in opium poppy cultivation in Myanmar in 2007. The number of households cultivating increased by 29%, with the rise being due to an estimated additional 35,000 households in East and South Shan Shan State, Kayah and Kachin, as well as some 1500 farmers of North Shan State who resumed opium poppy cultivation in 2007. The ground survey revealed that opium cultivation took place in 25% of all villages in the Shan State, but with a higher concentration found in East Shan State (40%) and South Shan State (30%). A high concentration of villages cultivating was found in only two of the five townships surveyed in Kachin State (7% of all villages). Since not all townships were surveyed in Kachin, this figure is only indicative for those 5 townships. In Kayah and North Shan State, the survey findings showed that the percentage of villages cultivating opium poppy had not significantly changed. This is despite higher eradication data indicating to the contrary that there was an increase in the number of villages cultivating. This will need to be addressed in next years survey with a revised sampling approach.

Opium poppy cultivation is related to poverty

Cultivation practices in Shan State

Opium poppy cultivation traditionally takes place between October and February in Shan State but can be extended up to April in higher altitudes. A similar situation exists at higher latitudes in Kachin State where the climate can be cooler. Farmers are trying to counter the effect of eradication activities by changing their cultivation practices. Over the last few years this has been particularly true of South Shan State, and is described in the table below.

Source: UNODC/CCDAC opium poppy surveys 2001 to 2004

Use of chemical fertilizer in Pinlaung township South Shan State

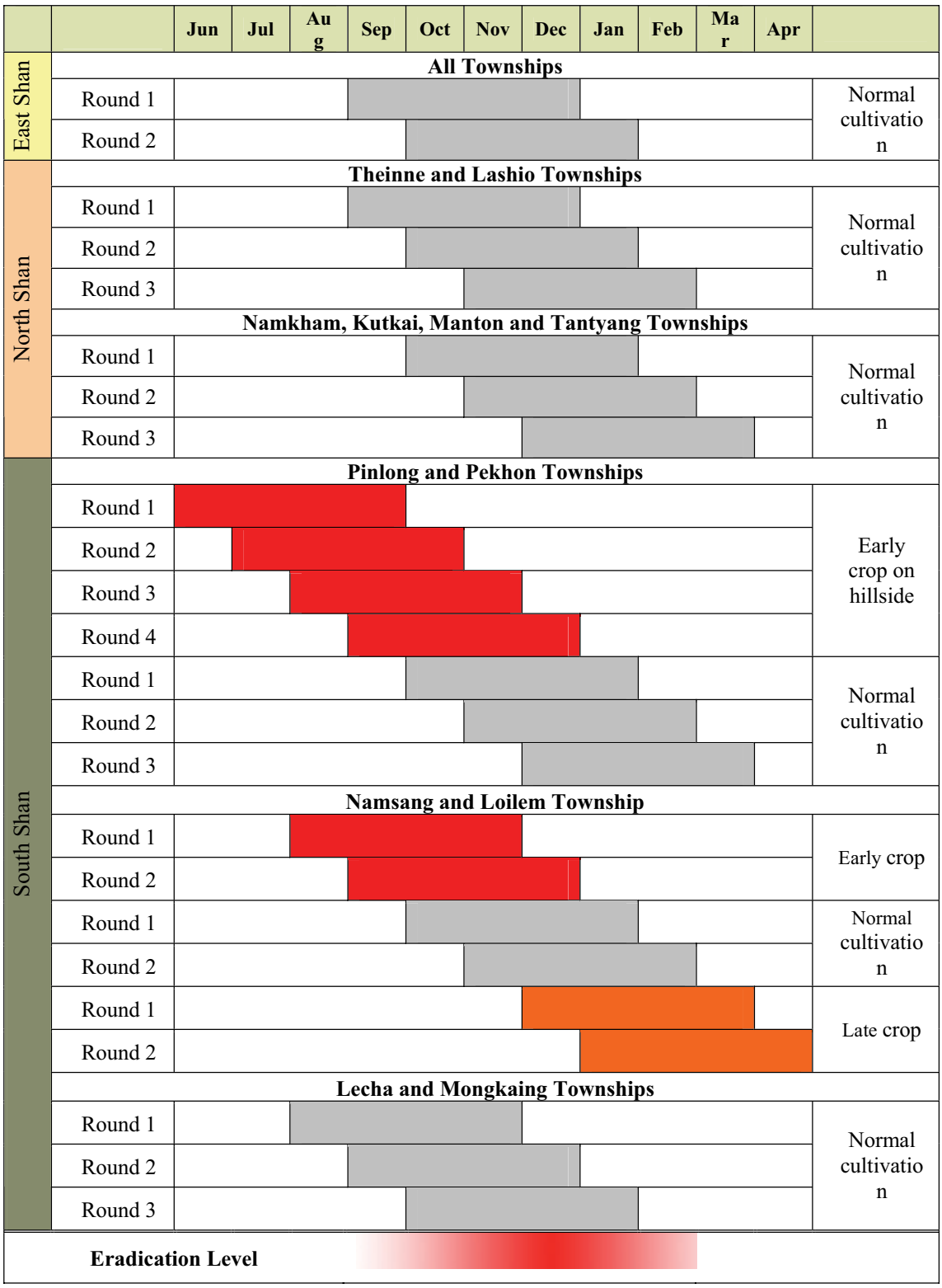
Early cultivation during the monsoon season

So far, off-season cultivation of opium poppy, i.e. early cultivation during the monsoon season, has only been observed in South Shan State. In order to assess the situation, an off-season survey was conducted in September 2006 and additional information was collected through field observations and interviews during the annual opium survey 2007.

According to information gathered in previous surveys, off-season opium poppy cultivation during the rainy season takes place in addition to the normal winter opium poppy cultivation, i.e. it is unlikely to find a village where farmers cultivate opium poppy only during the off-season. Off-season cultivation found so far is almost exclusively limited to well-drained slopes at higher altitudes. Only very few, isolated cases of limited extent of off-season cultivation have been observed in other situations.

Farmers phase opium poppy cultivation to spread workload, to avoid the risk of crop loss due to unfavourable weather conditions during germination or harvest, and to minimize the negative effects of possible eradication activities on their fields. On a large slope with opium poppy fields, only some fields may be used for off-season opium poppy, e.g. those with good drainage close to thicker vegetation in the upper area of the slope, where water run-off can be managed by digging horizontal drainage channels across the field. The fields used for off-season cultivation can be close to fields where opium poppy is grown at other times of the year. For example, a farmer may cultivate off-season opium poppy on field A from July to October, on the adjacent field B from September to December, and on field C from October to January, depending on when and where the conditions at this micro-level are optimal for opium poppy cultivation. In the three townships, where off-season cultivation was observed in 2006, there is no lack of upland fields, which would it make necessary to grow more than one crop per year on the same field. Taking into account the limitations of traditional agricultural techniques used for poppy cultivation, it is therefore reasonable to assume that fields planted with opium poppy during the rainy season are left fallow for the rest of the year.

Table 3: Opium poppy crop calendar in Shan State



Off season opium poppy field in Pinlaung in South Shan State

Harvested opium poppy field in December in Pinlaung township South Shan State

The practice of multistage cropping

Multistage cropping is often employed in opium poppy fields where significant eradication campaigns have taken place or where shortage of labour exists, which is a limiting factor for increasing cultivation. The following photos show examples of multi-cropping. Opium poppy seeds are broadcast twice in the same field with an interval of one to two months. Hence, plants of two different sizes are growing in the same field at the same time.

Even if the plants from the first broadcast were eradicated, the plants from the second sowing have a chance of surviving and may still yield a successful harvest, which would compensate for the loss of the first stage plants. As shown on the photos, the second crop continues to grow even after the first crop was eradicated. The practice of multistage-cropping has been widely applied throughout South Shan State. Past experience has shown that eradication measures are not conducted on the same area of land twice. Therefore, by employing the use of multistage cropping techniques, opium farmers can compensate some of the losses they face due to eradication campaigns.

Moreover, farmers use staggered planting, which means they broadcast opium poppy seeds on different fields at different times to spread the harvest over a longer period. Therefore, the opium poppy plants are growing at different stages, and at the time of gum collection in the first field, the second fields will not yet be at the flowering stage. As a consequence, labour needs are better distributed.

2.2 Yield and production

The average national opium yield was estimated at 16.6 kg/ha (weighted average), based on capsule measurements in 240 fields. This represents a 14% increase compared to 2006, which can mainly be attributed to favourable climatic conditions during the growing season. In South Shan, in addition to timely and good rainfall during the growing of the opium poppy plants, farmers over the last few years have also improved opium cultivation practices by introducing better irrigation, multistage cropping and applying fertilizer when available.

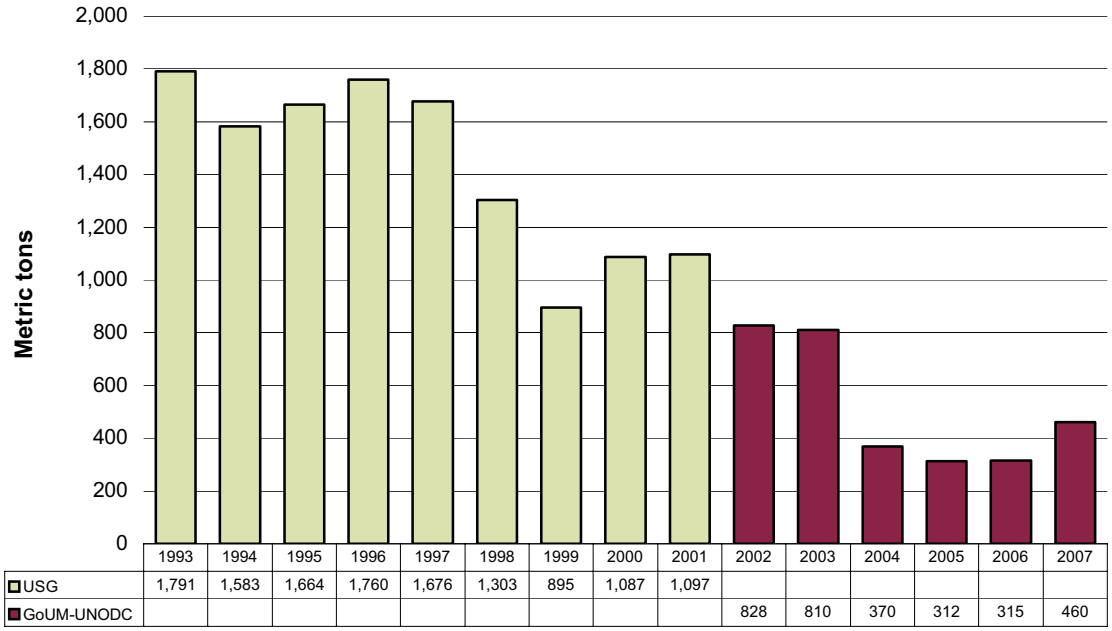
In regions where no formal yield measurements were taken or too few opium poppy fields were found, such as in Kayah and North Shan States, the average national yield was used to calculate the potential opium production.

This year's yield survey was not designed to include off-season opium poppy crops. While in 2006, off-season cultivation of opium poppy was still concentrated in only a few townships of South Shan State, this practice may spread and should be closely monitored future surveys.

In 2007, the potential opium production in Myanmar was 460 metric tons, which is a 46% increase compared to 2006 (315 metric tons). The rise was mainly due to increased cultivation in South and East Shan State, which also have relatively high opium yields. South Shan State, with the largest area under cultivation, also produced by far the largest amount of opium in 2007, representing 65% of Myanmar’s total opium production.

High opium yield in South Shan State

Figure 6: Potential opium production (metric tons), 1993-2007

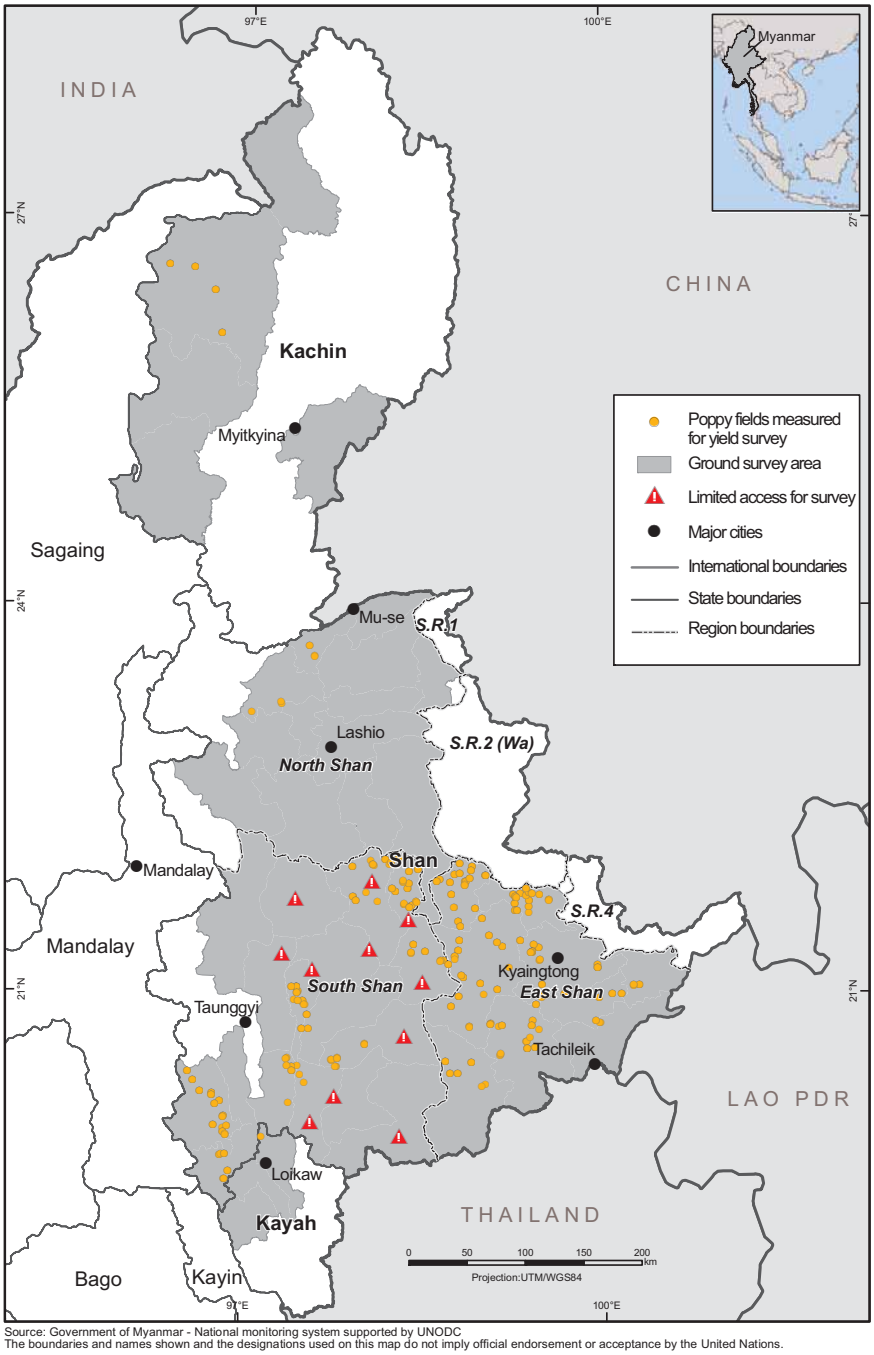


	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
USG	1,791	1,583	1,664	1,760	1,676	1,303	895	1,087	1,097						
GoUM-UNODC										828	810	370	312	315	460

Table 4: Potential opium production by region (mt), 2007

Region	Potential production (mt)
Kachin	55.8
Kayah	14.4
East Shan	106.1
North Shan	6.5
South Shan	274.8
Total (rounded)	460

Map 2: Location of opium yield measurements in Kachin and Shan States, Myanmar 2007



Source: Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

2.3 Opium prices

The price of opium in non-growing villages is usually higher than in growing villages, since opium prices are determined by the ease of marketing, as well as by supply and demand. In 2007, the average farm-gate price of opium weighted by the estimated area under cultivation was US$ 265/kg, which represents a 15 % increase from US$ 230/kg in 2006. The average opium price per region for 2006 was updated with information given by farmers in early 2007. This revised price is more accurate than prices reported in the 2006 survey, which only covered the first months of 2006.

The regional average farm-gate prices were: South Shan US$ 213/kg, East Shan US$ 316/kg, Kachin, US$ 236/kg and North Shan US$ 405/kg. High opium prices in North Shan State were due to low production levels while addiction remains high. In general, opium prices seem to

reflect the local availability of opium rather than a national price level, which is a sign of a fragmented opium market.

Figure 7: Average farm-gate price of dry opium (US$/kg), 2006-2007

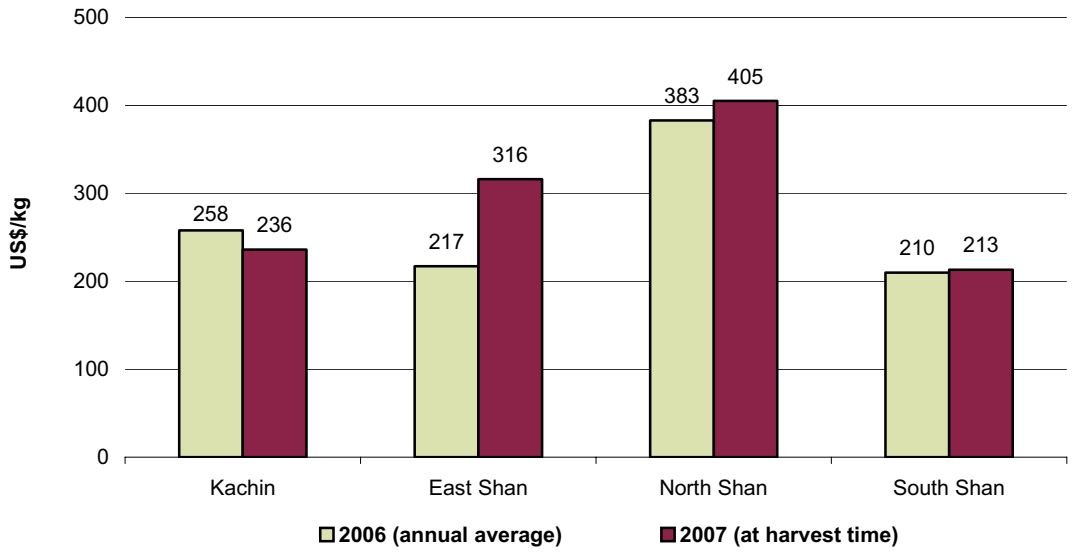
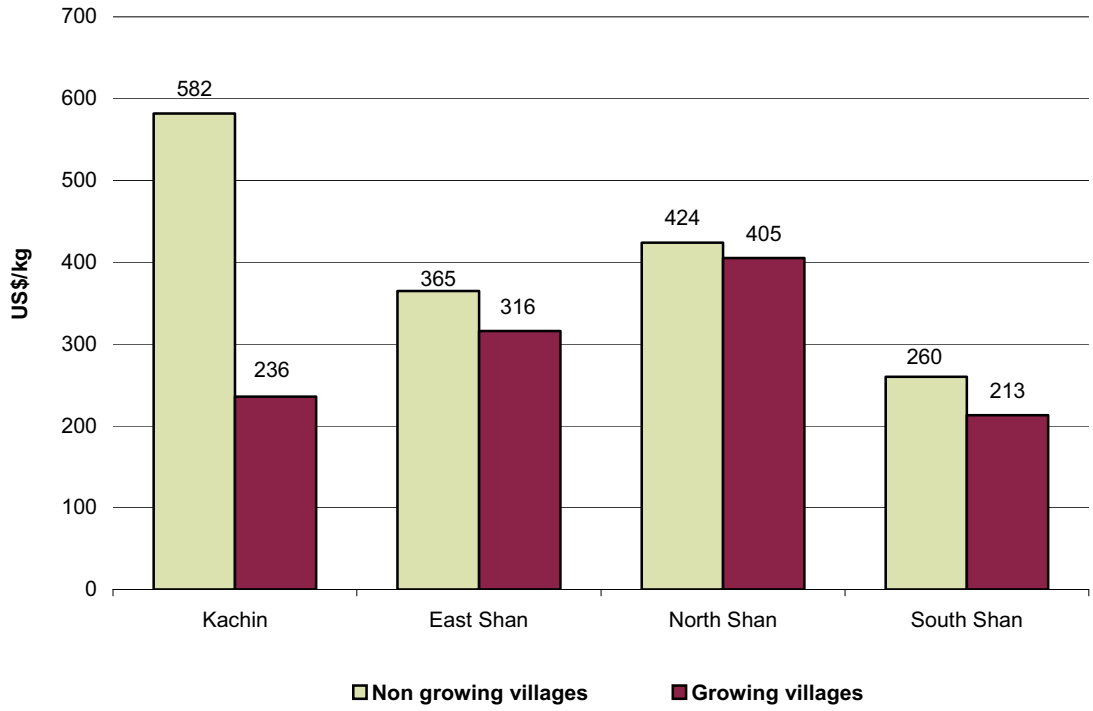


Figure 8: Farm-gate price of dry opium in growing & non growing villages(US$/kg), 2007

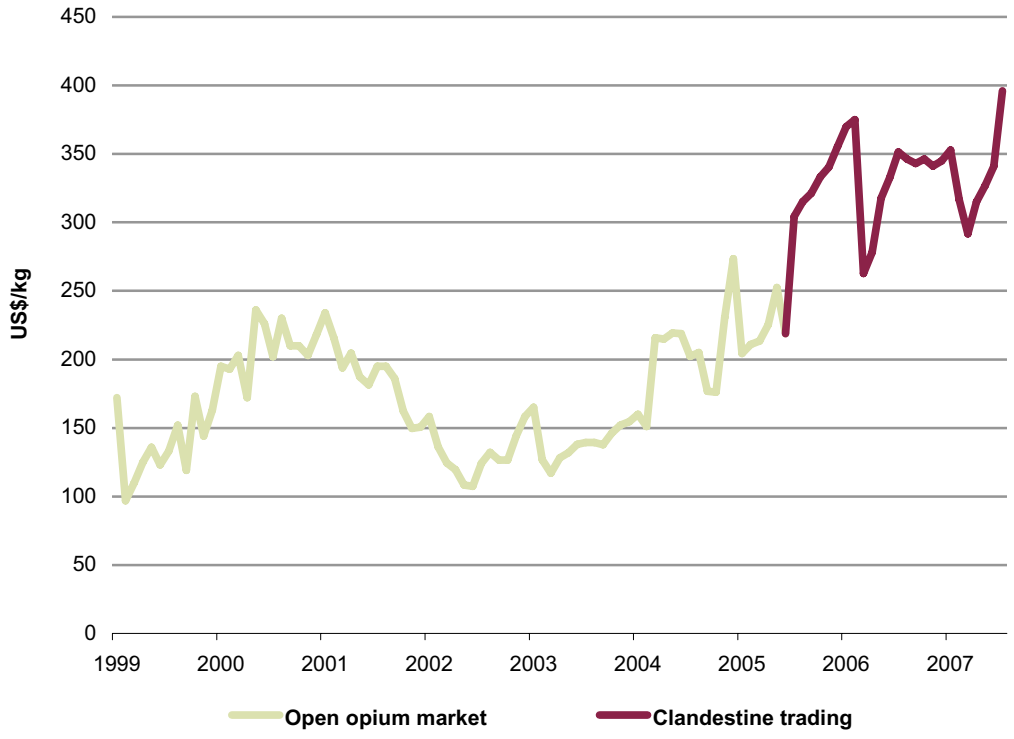


Despite an effective opium ban in Special Region 2 (Wa), opium continues to be sold illegally in the Mong Pawk market to a few local addicts or possibly for further trafficking to other countries. The opium price in the Mong Pawk market was higher than in South Shan State, where opium is produced in large quantities, and similar to opium prices in East Shan State, which has close links with the Wa region.

Table 5: Monthly wholesale prices for dry opium at Mong Pawk market (US$/kg), 1999-2007

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
1999	172	97	110	125	136	123	133	152	119	173	144	163	137
2000	195	193	203	172	236	226	202	230	210	210	203	218	208
2001	234	215	193	204	187	181	194	195	186	162	149	150	188
2002	158	136	124	119	108	107	124	132	126	126	144	158	130
2003	165	126	117	128	132	138	146	139	137	146	152	155	140
2004	155	151	215	214	219	218	202	205	176	176	230	273	203
2005	204	211	213	225	252	300	302	315	321	333	341	355	281
2006	370	375	263	278	318	332	351	346	343	346	341	345	334
2007	353	316	292	315	327	341	396						n/a

Figure 9: Monthly wholesale prices for dry opium at Mong Pawk market (US$/kg), 1999-2007



2.4 Household cash income

In 2007, the average annual cash income of opium producing households was estimated at US$ 501 at the national level, which is an increase of 15% compared to 2006. The average annual cash income of non-opium cultivating households, including households that never grew and households that stopped opium poppy cultivation, was estimated at US$ 455, which is lower than the cash income of opium poppy growing households. However, the average cash income of non opium poppy growing households grew stronger (43%) than the cash income of opium poppy growing households (15%). Thus, the difference in cash income between growing and non-growing households became less pronounced with non-growing households reporting 96% of the income of growing households in 2007 compared to only 73% in 2006. Interestingly, the reported income from opium sales of growing households increased by only 5% while their overall cash

income increased by 15%. This could be due to the fact that respondents felt reluctant to report (illicit) cash income from opium, while they probably gave a more realistic estimate of the total average cash income per household.

The highest income among growing and non-growing villages was found in South Shan State, followed by East Shan State. Some opium poppy income was still reported in villages that had stopped growing opium poppy in 2006 in East Shan State and Kachin.

As was the case in past years in East Shan State, North Shan State and Kachin, the survey results showed that the average income of households in villages that never grew opium poppy was higher than in villages, which grow or used to grow opium poppy. This was not true in South Shan State and Kayah where most of the opium poppy was cultivated in 2007, and where farmers cultivated more hectares per household and obtained high yields. The lack of security, plus a worsening economic situation in both regions seemed to have resulted in farmers strengthening their illegal crops, instead of other legal crops.

New tea plantations replacing opium poppy fields in Hsisaing township South Shan State

Figure 10: Average household cash income (US$/year), 2006

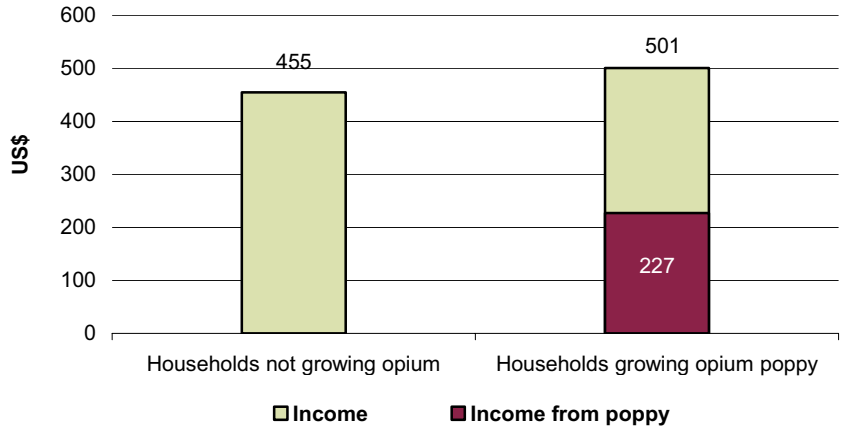


Figure 11: Average household cash income in opium poppy growing villages (US$/year), 2006

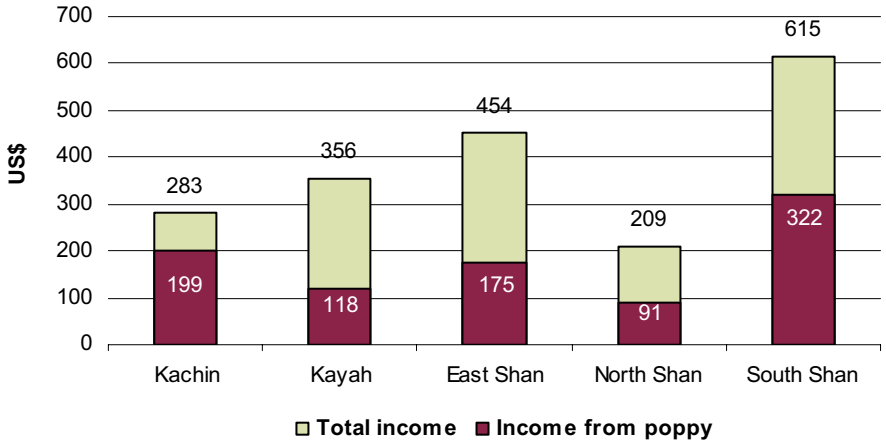
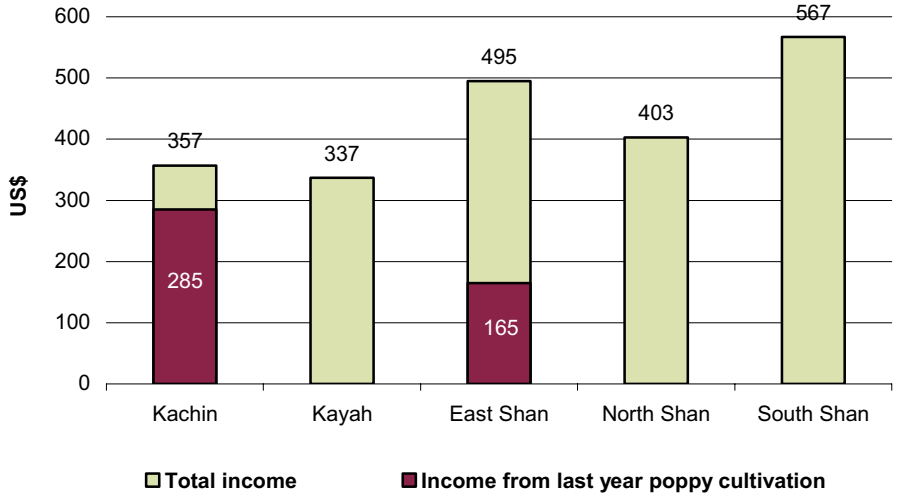


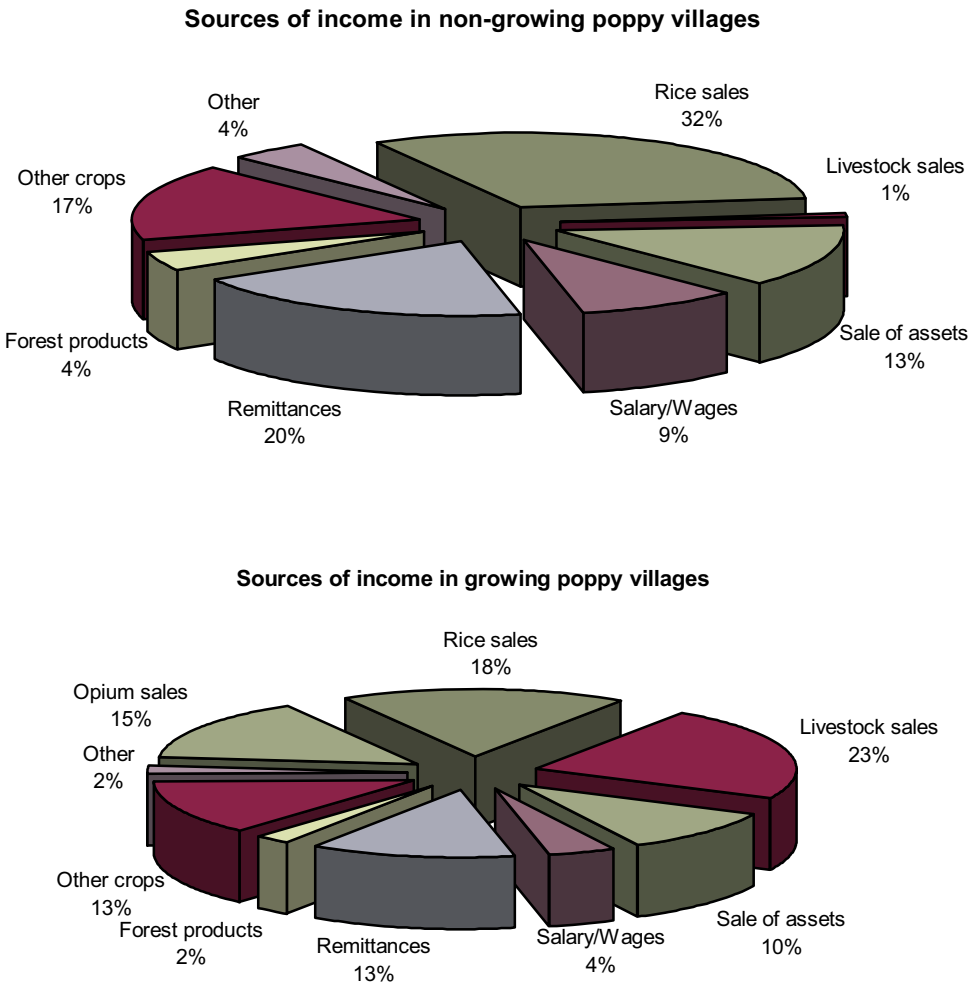
Figure 12: Average household income in non-opium poppy growing villages (US$/year), 2006



Source of income

An analysis of the different sources of household income shows that rice, remittances and agricultural products are the main sources of cash income in non-growing villages in the regions studied; whereas livestock sales, rice sales, remittances, opium sales and agricultural products were the sources most frequently mentioned by opium growing villages during the 2007 survey. Non-growing villages had more rice available for sale, possibly due to the availability of paddy land. In addition to selling opium, growing villages sold much more livestock (15%) as compared to non-growing villages (1%).

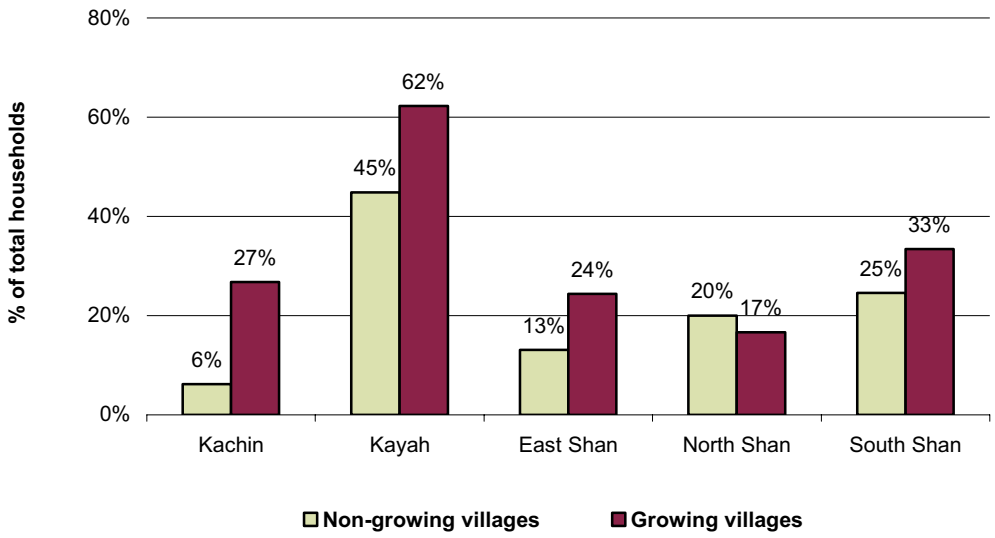
Figure 13: Income sources in villages by opium poppy status



Loans

There are more households in debt in opium poppy growing villages than in non-growing villages in all regions except for North Shan State, where the proportion of household debt is about the same. For other regions, this finding indicates a possible higher level of poverty in opium poppy growing villages.

Figure 14: Households with outstanding loans from 2006



2.5 Addiction

Data on opium addiction with a breakdown by gender (for population aged 15 years and above) was collected during interviews with village headmen. The addicts themselves were not interviewed and no data on their level of consumption was collected.

The prevalence of opium users in Shan State, Kachin and Kayah was 0.75%. This proportion was higher (2.5%) in growing villages compared to non-growing villages (0.3%). The level of opium addiction found in East Shan State was the highest with 1.27%, followed by Kachin with a prevalence rate of 0.97%.

As it was the case in previous years, opium abuse was predominantly a male activity (1.3% in males and 0.2% in females). Based on data collected, it was also possible to estimate that on average for each treated addict there were eight untreated addicts. Furthermore, the relapse rate for treated addicts was 50% in non-growing villages, compared to almost 100% in growing villages. These results demonstrate how difficult it is to successfully treat opium addicts in villages, which still grow opium poppy, and where opium is more easily available and cheaper than in non-growing villages.

Opium addict in a village in East Shan State

Opium addict in the Wa region

The overall prevalence rate of heroin users was 0.08%, 15% higher than in 2006, and the overall prevalence rate of ATS users 0.04% (40% lower than in 2006). Those two types of addiction remain at a low level in rural Myanmar compared to urban areas where other sources indicate much higher rates of abuse.

All these results should be interpreted with caution, as there might be a reluctance of respondents to report opium, heroin and ATS addiction in the context of the Government's effort to curb it.

Table 6: Opium, heroin and ATS addiction rates as reported by headmen, 2007

Description	Non-growing	Growing	Total
Opium addiction (men)	0.6%	4.3%	1.3%
Opium addiction (women)	0.06%	0.7%	0.2%
Heroin addiction	0.09%	0.01%	0.08%
ATS addiction	0.047%	0.04%	0.038%
Ratio of treated to untreated addicts	7.46	8.35	7.88
Rate of relapsed addicts	63%	100%	86%

2.6 Socio-economic characteristics of the survey population

The survey aimed at identifying relevant characteristics of opium growing households, including reasons for growing opium poppy and coping strategies when households abandon opium poppy cultivation. It also looked at issues, which could be linked to continuing or stopping opium cultivation, such as shifting cultivation practices and migration.

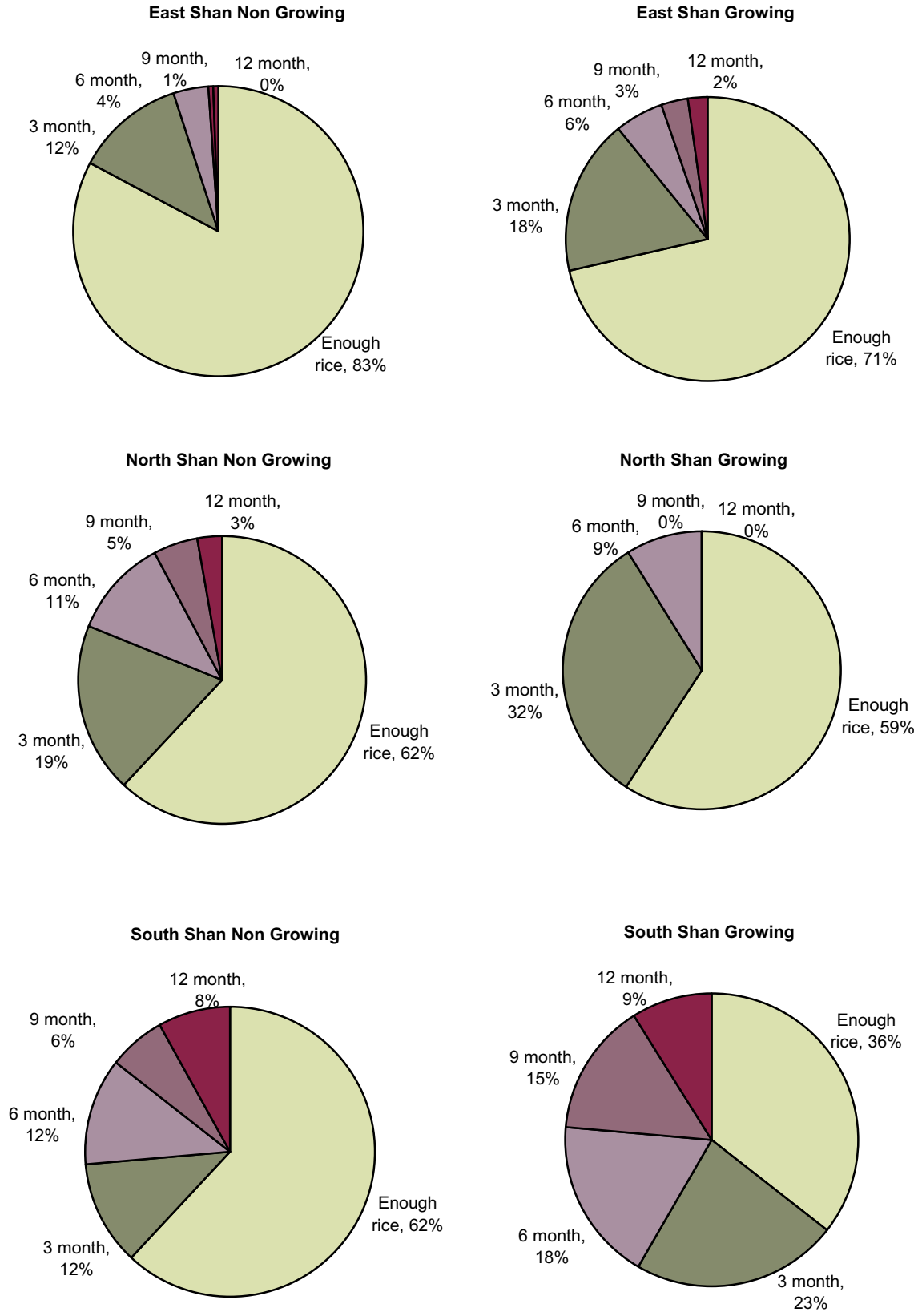
Food security

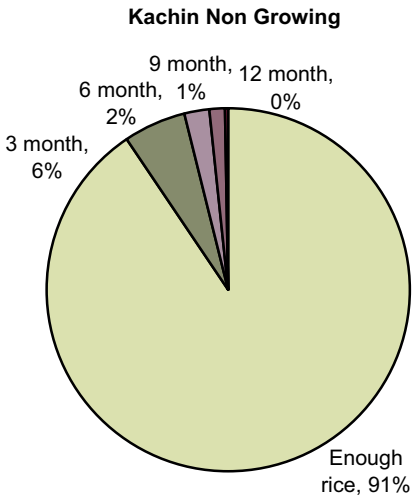
Food security (for this purpose defined as: rice self sufficiency) was consistently better in households that were not involved in opium poppy cultivation, compared to households growing opium poppy. Households in the growing category in North Shan State, South Shan State and Kayah were more likely to suffer from rice deficits.

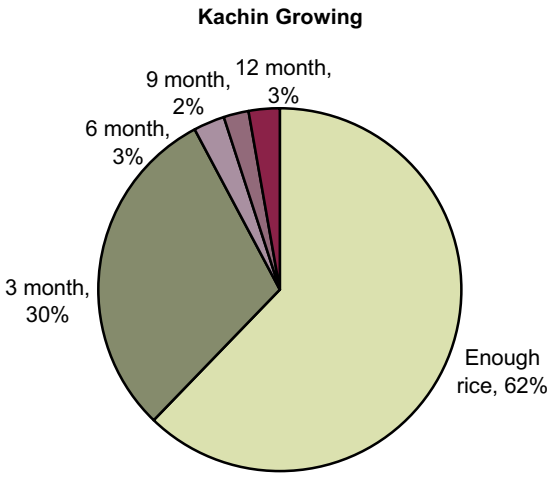
Return from 5 day market in Namsang, South Shan State.

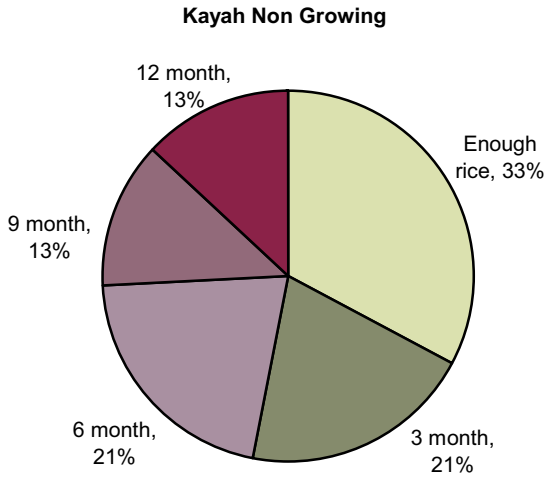
Only 29% of the households in East Shan State experienced a rice deficit for at least 3 months a year, whereas 41% in North Shan State, 64% in South Shan State, 38% in Kachin and 76% in Kayah had to face the same level of food insecurity. This finding stresses the link between opium poppy cultivation and low food security, since one of the main reasons for cultivating opium poppy is to buy rice.

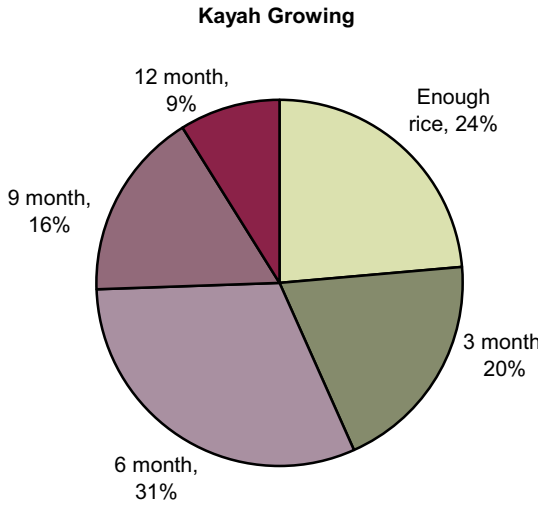
Figure 15: Months of rice deficit











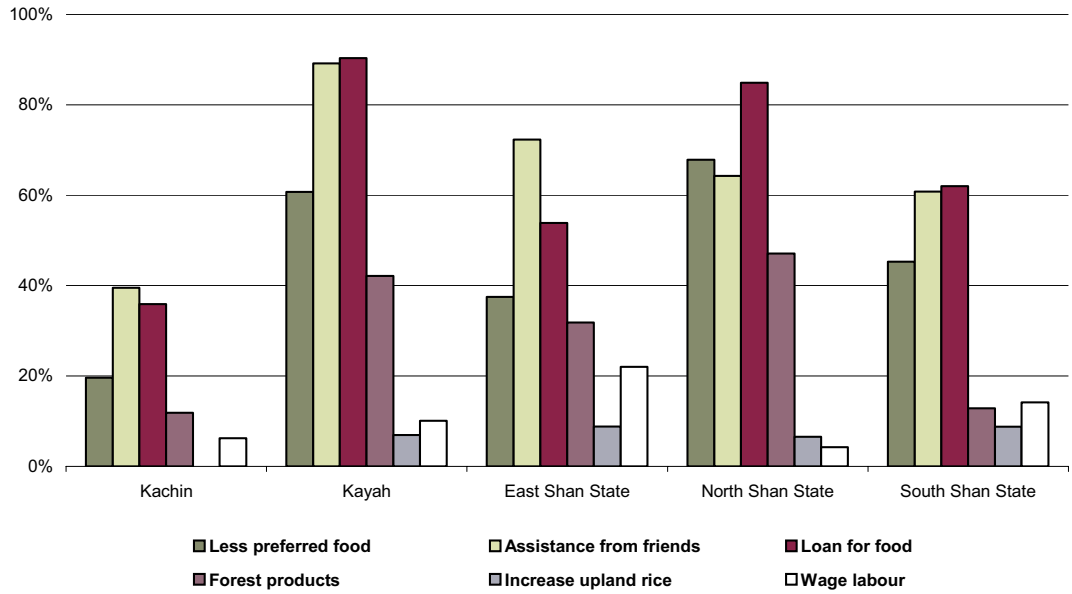
Coping strategies after stopping opium poppy cultivation

In villages that stopped opium poppy cultivation in recent years, households expanded their agricultural activities by growing more maize, more rice and other licit crops to compensate for the lost income from opium. Wage labour and sale of livestock also played an important role. More worrying are strategies such as selling household assets, taking children out of school, or taking loans, which could indicate a deterioration of the situation of individual households and a long-term erosion of its human and economic assets.

Rice sales, sales of assets and remittances were the most often mentioned sources of income in non growing villages in 2007, whereas opium sales, livestock and rice sales were the most frequently mentioned in the growing villages. The most frequently mentioned coping strategies in all regions were: assistance from friends and loans for food. This indicates that, contrary to previous years, farmers might have been more inclined to utilize rice banks to overcome their food deficits. Rice banks are village committees who, on behalf of member farmers, receive paddy or seeds from farmers with surpluses and lend them to needy farmers at an appropriate interest rate. The collected interests are used as village fund.

Relocated village in Naryai region in South Shan State

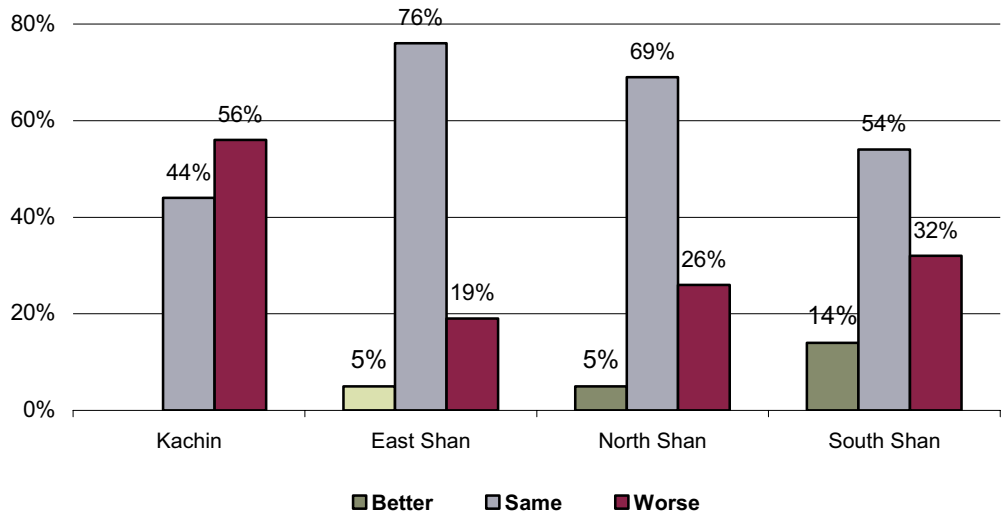
Figure 16: Coping strategies. Proportion of households per village that stopped opium poppy cultivation in Shan State



Food situation after stopping opium poppy cultivation

Taking into account only villages that stopped opium poppy cultivation (mostly in 2006), it was observed that the food situation became worse in 19% of those villages in East Shan State, 56% in Kachin, 26% in North Shan State and 32% in South Shan State. This indicates that elimination of opium poppy without sustainable alternatives could seriously affect the food situation.

Change in food situation in villages which stopped opium poppy cultivation



Paddy land availability

In 2007, like in previous surveys, households in non-opium poppy growing villages had consistently higher percentages of ownership of paddy land than households in opium poppy growing villages. However, some villages abandoning opium poppy were able to increase the area of lowland paddy, which in turn improved their food security.

Table 7: Percentage of households with lowland paddy fields

% of households owning lowland paddy fields	Non-growing villages	Growing villages
Kachin	41%	35%
Kayah	40%	0%*
East Shan	62%	43%
North Shan	23%	22%
South Shan	30%	23%

** Growing villages in Kayah State were all in the highland and did not have any lowland paddy fields.*

Shifting Cultivation

Shifting cultivation often takes place in areas which are unsuitable for permanent cultivation such as steep, hilly areas. The slopes are usually covered by forest and/or scrubs, which farmers clear for opium poppy fields or other crops. Shifting cultivators in the Shan State, who typically have little or no paddy land, grow upland rice and opium poppy, as part of their rotational cultivation system. Unfortunately, most crops produced in these geographical conditions will be low yielding. Shifting cultivation is highly associated with opium poppy growing villages.

Shifting cultivation in Hopong township in South Shan State

Shifting cultivation increased significantly in South Shan State where most of opium poppy was cultivated in 2007. This practice decreased in North Shan State among growing villages, which indicates a possible change in the pattern of cultivation. However, this finding could also be due to under-reporting since opium poppy was under strict control in North Shan, where an intense eradication campaign was conducted by Government authorities. Another possible conclusion is that non growing villages were more involved in developing lowland areas to ensure their food security.

Figure 17: Shifting cultivation in non opium poppy growing villages

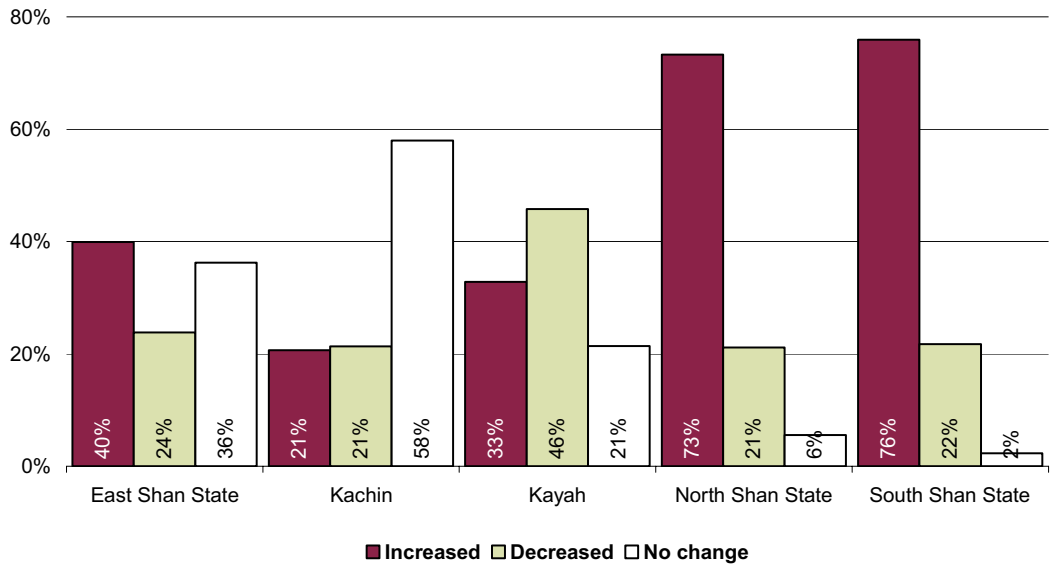
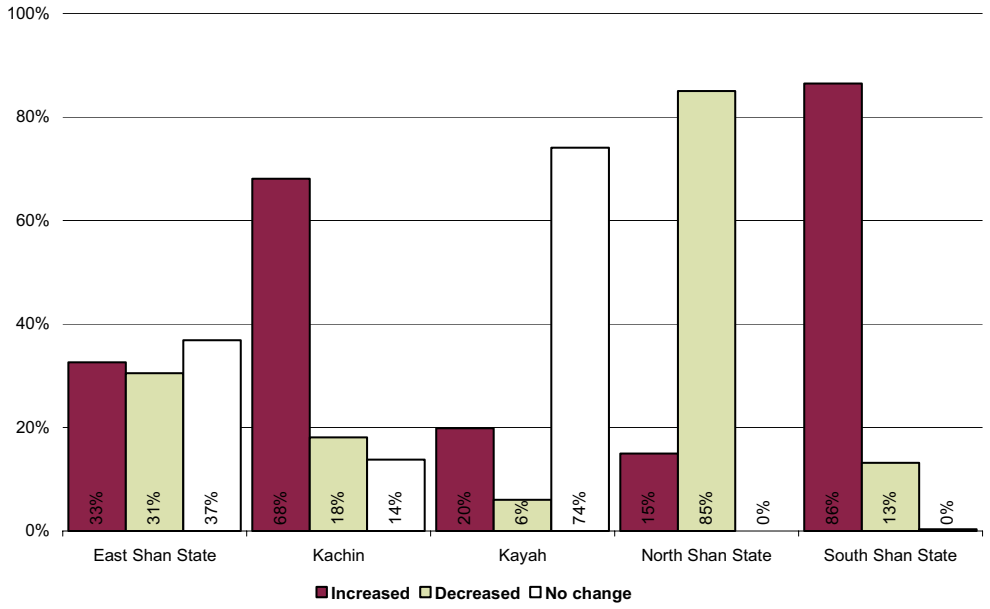


Figure 18: Shifting cultivation in opium poppy growing villages



Migration

In several regions, lower levels of migration were found in 2007 compared to 2006. The highest migration rate with 19 migrants per 1,000 inhabitants was found in Kayah in opium poppy growing villages. This rate was slightly lower in East Shan State with 18 migrants per 1,000 in opium poppy growing villages. In South Shan State, independently of whether villages grew opium poppy or not, up to 16 persons per 1,000 inhabitants migrated. Kachin and North Shan had comparatively lower migration rates. Contrary to previous years, reports of permanent out-migration from the Wa region were received, which could indicate that some villagers were in search of financial opportunities following the opium ban.

Table 8: Out-migration rates in the sample population, 2007

Region	In non-growing villages	In growing villages	Total
Kachin	0.2%	0.0%	0.2%
Kayah	0.3%	1.9%	0.4%
East Shan	0.8%	1.8%	1.1%
North Shan	0.6%	1%	0.6%
South Shan	1.6%	1.2%	1.5%
Total	**0.7%**	**1.2%**	**0.8%**

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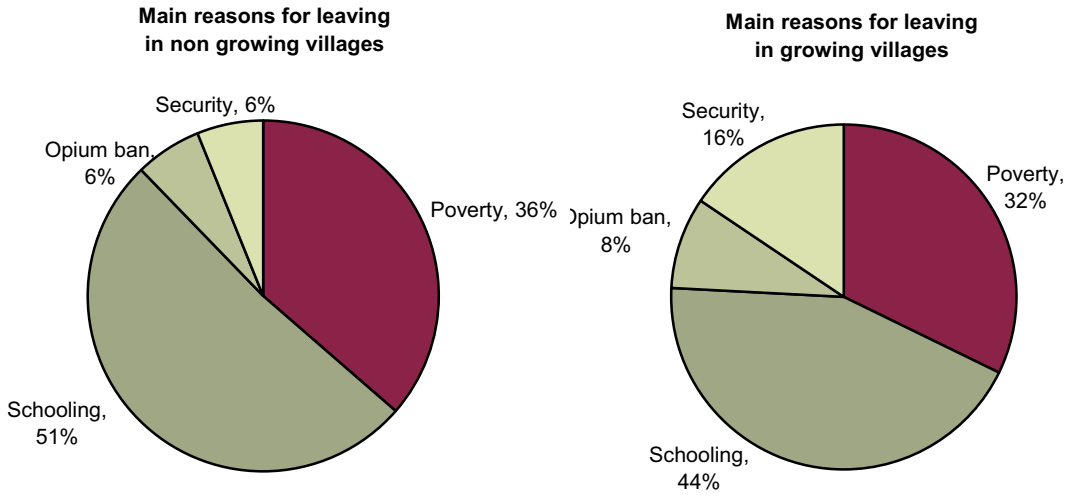
Reasons for emigration

Schooling and poverty were the most significant reasons to leave in both growing and not growing villages. To a lesser extent, opium ban and security were mentioned as reasons for leaving.

Figure 19: Reasons for leaving the village



2.7 Reported Eradication

According to Government reports, eradication took place on 3,598 hectares in the 2006-2007 cropping season, which is a comparable level to the previous year when 3,970 hectares were eradicated.

Eradication in East Shan State increased in 2007, mainly due to a strong eradication campaign conducted in Mongtong. A total of 210 hectares were eradicated, of which 166 hectares were eradicated by GOUM and United Wa State Army (UWSA) joint teams. Eradication by the GOUM took also place in 8 other townships in East Shan State. Increased eradication was also reported in North Shan State where eradication has increased 11 times from 76 hectares in 2006 to 916 hectares in 2007. On the contrary, in Southern Shan State, where security was not good, the level of eradication declined by 58 % compared to 2006.

In Kachin State, the level of eradication declined following some voluntary abandonment of opium poppy cultivation in Kachin Special Region 2, which is located along the Chinese border. Eradication has been negligible or nil in other areas.

Government police eradicating opium poppy fields around Inle lake in South Shan State

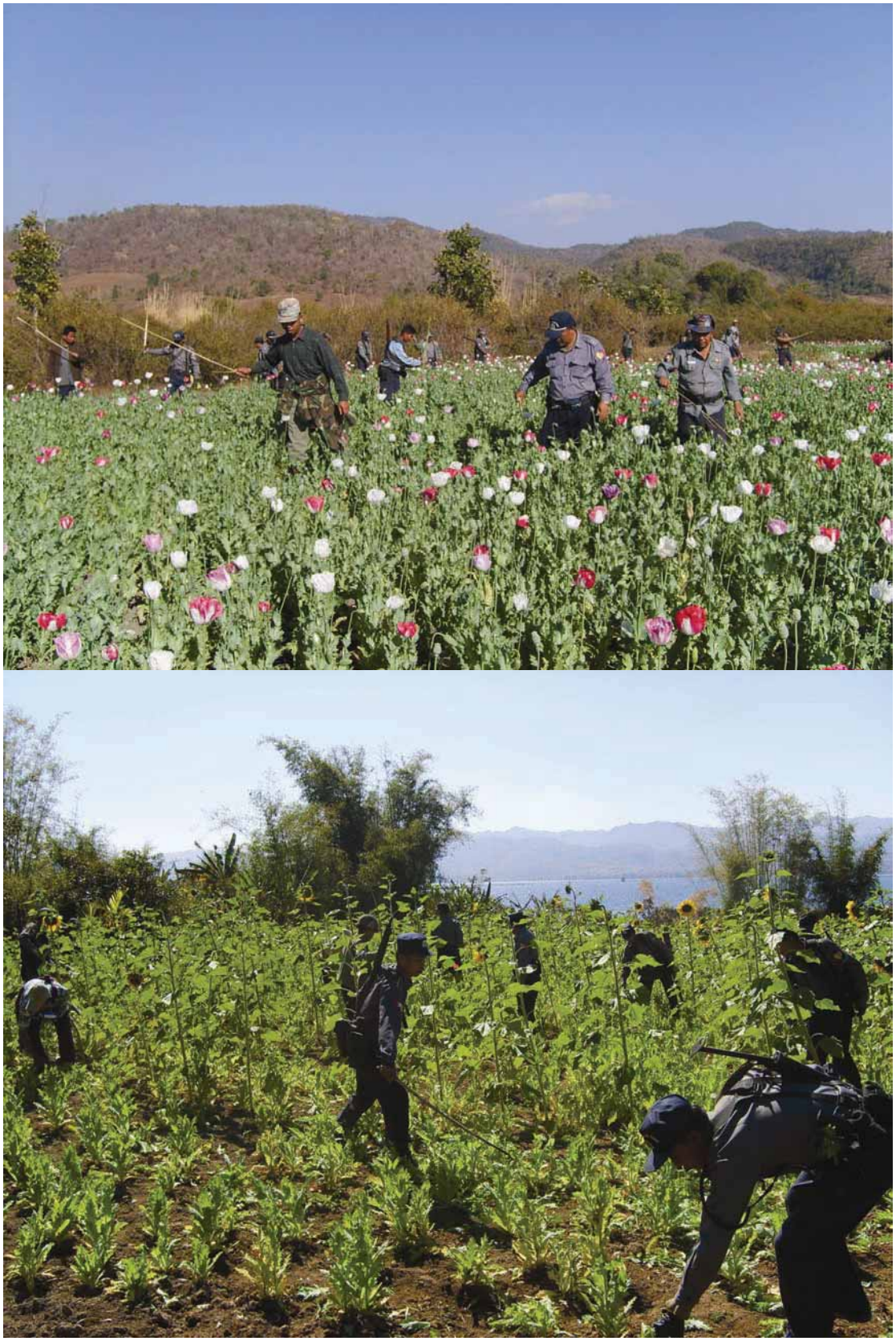


Table 9: Eradication by region (ha), 2004-2007

Region	2004	2005	2006	2007
East Shan	195	124	32	1,101
North Shan	172	1,211	76	916
South Shan	2,170	1,203	3,175	1,316
Total Shan State	**2,537**	**2,538**	**3,283**	**3,333**
Kachin	126	1341	678	189
Kayah	83	8	0	12
Total within surveyed area	**2,746**	**3,887**	**3,961**	**3,534**
Magwe	0	0	0	45
Chin	0	3	0	10
Mandalay	0	0	9	0
Sagaing	74	17	0	9
Other States	74	20	9	64
National Total	**2,820**	**3,907**	**3,970**	**3,598**

This year, the survey teams observed some re-growth of opium poppy plants in previously eradicated fields indicating that farmers might have practiced multistage broadcasting or even replanted their fields after eradication. Those fields were, however, much less productive compared to non-eradicated fields.

Under the cease-fire agreements, ethnic groups have a certain degree of autonomy and self-governance. In the main opium poppy cultivation areas in South Shan State, the Government was able to assert a certain degree of control, and some local authorities agreed to phase out opium poppy cultivation, such as the Paoh National Organisation. However, in most of these areas, no alternative sources of income were available and, therefore, local authorities were reluctant to conduct eradication activities or proceed with opium elimination.

Map 3: The 15-years opium poppy elimination plan in Myanmar

Source: Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

2.8 Impact of the opium ban in Shan State Special Region 2 (Wa)

In 2005, 39.5% of national opium poppy cultivation took place in the Wa Special Region 2. These figures confirmed the area's status as major producer of opium in the country up to June 2005, when the Wa authorities declared a total ban on opium cultivation. No more opium poppy was since cultivated in this region and farmers are now facing major changes in their livelihood.

Situation of farrmers in the Wa Region

A UNODC study on farmers' intention in 2006/2007 revealed that 91% of the villages surveyed had cultivated opium poppy in the past and that all of them had since abandoned it.

Farmers indicated that opium poppy was seven times more profitable than highland rice and two times more profitable than lowland rice. Their household cash income declined by more than 31% compared to 2005, as the revenue from opium, which formerly constituted 72% of the annual total, had been lost. The loss of income from opium had only partially been replaced by income from other sources. Most villages were facing severe food shortages, which were only partially alleviated by external assistance.

In past years, farmers facing food shortages had the possibility of generating extra income by working as casual laborers in the opium fields in the Region. Following the ban, this was no longer an option and such wages were no longer available. As a consequence, with no additional income for investment, the diversification of farms was not possible.

The opium ban has led to an increase of villagers' migration in search of income opportunities and some migration was reported from the Wa region to Mong Khat, Mong Pyin and Metmang townships.

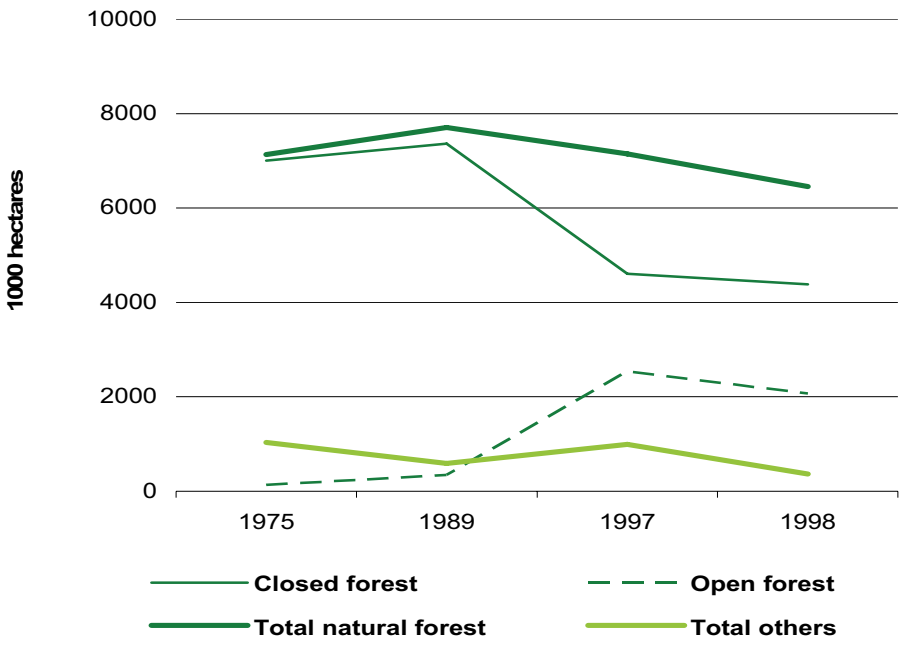
The assistance currently provided by UN agencies and NGOs remained insufficient in the face of the magnitude of vulnerability of the affected population. The World Food Programme estimated the number of food insecure people at 230,000 out of which it had been able to support only 100,000 or 42%. Chinese government was also providing food, however on an irregular basis.

Ex-opium poppy farmers in Wa region selling non-timber forest products

2.9 Environmental impact of opium cultivation in Kachin State

Kachin State is located at the northern most part of Myanmar on the border with China and India. This area is considered as the remaining most important area for forest and biodiversity resources, and also includes one of world's last tiger reserves. In recent years, there has been a large scale deforestation and also large dynamic changes in land use. Forest cover assessments revealed that over the last 20 years total natural forest has declined significantly.

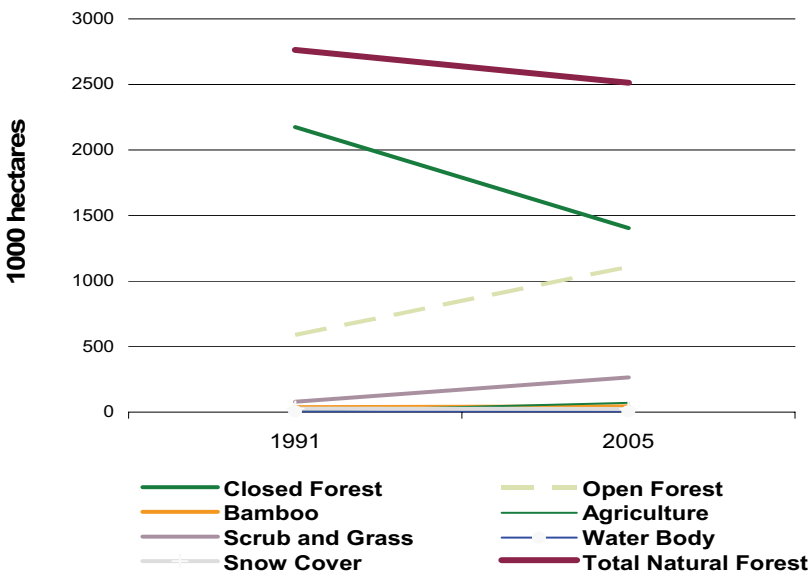
Figure 20: Forest cover assessments of Kachin State (1975-1998)



Source:Forest cover assessments FRA2000 and FRA2005, FAO

A recent study on forest cover status in Kachin-China border areas, using Landsat satellite imageries of 1991 and 2005 reveals an even higher decline in closed forest areas, a sign of severe deforestation.

Figure 21: Forest cover changes of China-Kachin border area (1991-2005)



At the time of the 2007 Opium Survey, the rapid assessment teams observed large changes in land use in Kachin State. Some of these changes were directly linked with opium poppy cultivation, which could be confirmed on aerial photography. Increased clearing of primary forest for opium poppy cultivation and the need to hide cultivation, is possibly due to increased law enforcement.

Opium poppy fields encroaching forest in Kachin State

The large transformations took place in biodiversity hot spots such as the Hukaung Tiger Reserve and proposed reserve areas. Private companies working for alternative development projects had cleared large tracts of closed forests for mechanised sugar cane plantations. These areas were located within important biodiversity conservation areas (tiger habit reserve) and in the critical water catchment area of the Chindwin River.

Sugar cane plantation replacing forest

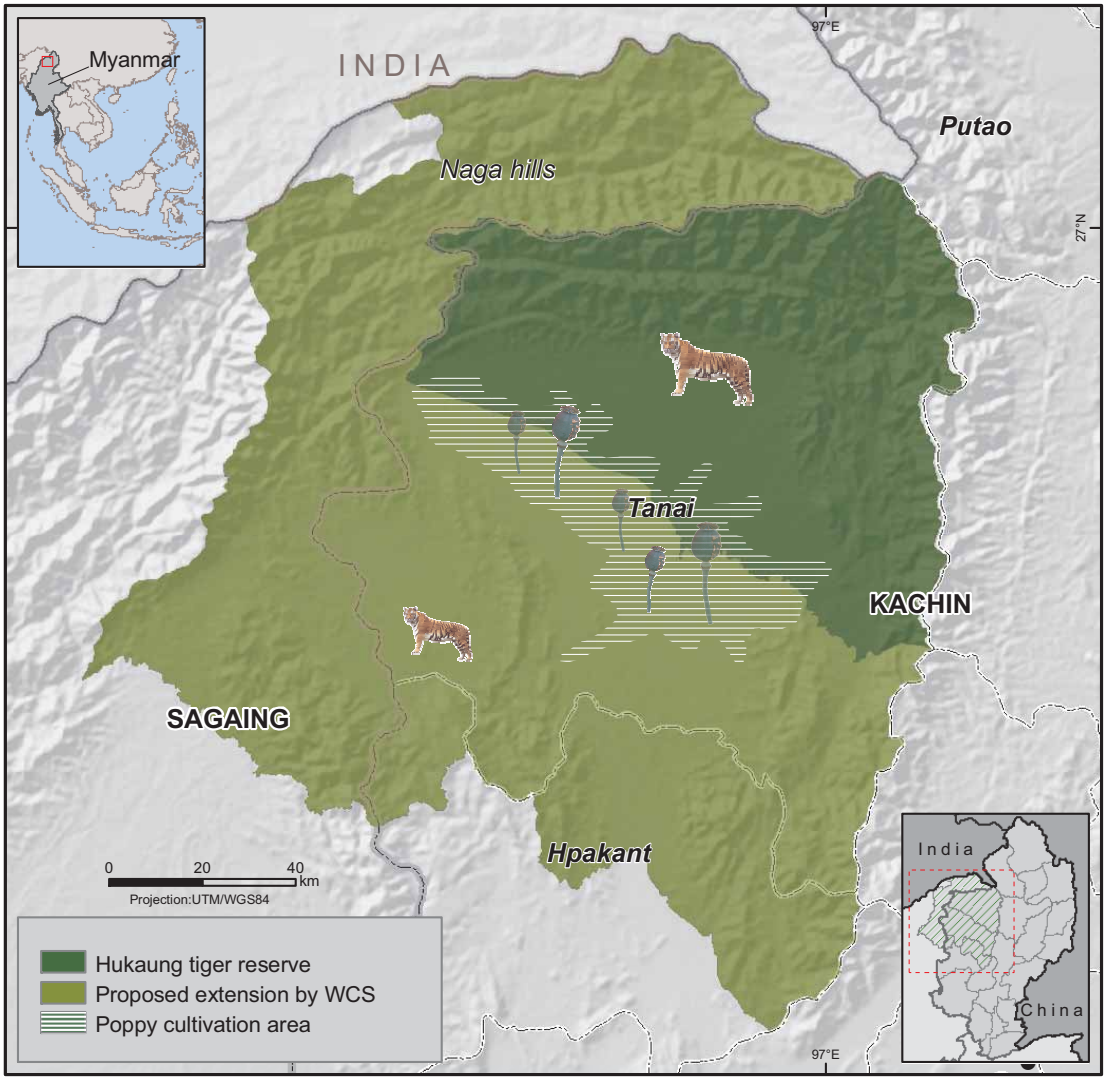
Also, large amounts of illegal timber smugglings was reported to take place in the so-called jubilee area of Kachin State, the triangle area between Mae-Kha and Mae-Li-Kha rivers, the two tributaries of Ayeyarwady. Although both the Chinese and the Myanmar Governments are taking strong actions against smuggling, a lot of timber was still transported out. Lack of roads seemed to be no problem for smugglers, because they had their own bulldozers, road building equipments etc.

Illegal timber truck on the road from Chibwe to Panwar in Kachin State

Other activities with a possible negative impact on the environment were also noted during the survey in Kachin State, such as illegal gold mining. Respondents in Kachin Special Region 1 complained about negative changes of their environment such as unusually prolonged low water periods of the rivers. One of the consequences of this phenomenon is that the Panwar hydropower station is no longer able to produce sufficient electricity throughout the year.

These dynamic changes of the natural environment observed in an ecologically sensitive area such as Kachin highlight the importance of regular monitoring, including of illicit opium poppy cultivation. Action should be taken to review the current status of environmental conditions, the evolving trends throughout the last decades, impacts on bio-physical and socio-economical situations including increasing level of opium poppy cultivation. Options for sound land-use decisions for concerned authorities based on the context of sustainable development should be the primary output of such study. Forest Department Remote Sensing and GIS section plan to undertake such a study before the start of coming opium poppy season 2007-2008.

Map 4: Opium poppy cultivation area in Hukaung Tiger Reserve



Source: Wildlife Conservation Society, Myanmr ; Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

3 METHODOLOGY

This is the sixth year the Central Committee for Drug Abuse Control (CCDAC) of the Union of Myanmar collaborate with the United Nations Office on Drugs and Crime to implement the annual Myanmar Opium Survey.

The pattern of opium poppy cultivation continued to change in Myanmar: Some areas became opium free while some others increased their level of cultivation. In South Shan State, the opium poppy crop calendar changed and new patterns such as multi-cropping were observed. Opium fields generally moved further away from the villages and, in certain regions, were subject to eradication. In addition, cultivation possibly shifted to areas once considered opium poppy free or climatically less favourable. In 2007, all these considerations, combined with reduced accessibility and the expected change in cropping pattern, influenced the survey methodology and the sampling procedures for the estimation of the planted area and other socio-economic indicators.

Considerable efforts have been made over the last years to improve on a number of methodological details and to adapt to the evolving conditions of cultivation. This survey integrated the ground data collection component, and combined the use of satellite remote sensing with field surveys and interviews.

The 2007 opium poppy survey was composed of three parallel components:

1. A cultivation estimation survey throughout three regions of the Shan State (North, South, East) and Kayah State and Kachin State. This survey was based on the use of satellite remote sensing as the primary source of data for East and South Shan state. In these two regions, satellite remote sensing was supplemented by field surveys to provide ground truthing and to support the interpretation of opium poppy fields. In the remaining regions, the estimate of the planted area was derived from the socio economic survey described below.

2. An opium yield estimation survey in the three regions of the Shan State, and Kachin.

3. A socio economic survey in 900 villages randomly selected in Shan State, Kayah State, and Kachin State based on interviews with village headmen of the villages selected.

3.1 Sampling procedure for the village survey

The planning of the surveys started with the definition of the sampling frame. The sampling frame is composed by the complete village listing provided by the Central Committee of Drug Abuse Control in Myanmar. The village listing includes names of villages, regions, township names and codes, village track codes and, in same cases, opium poppy growing history. This listing is regularly updated with information obtained through previous surveys to reflect changes in village location or name, village mergers and relocations, and to delete double entries. For many village entries, GPS positions have been added, which facilitates the unique identification of each village as well as finding it. The more information is available about the population, the easier it is to devise a sample that will lead to more accurate estimates.

The definition of the sample size was influenced by a number of requirements and constraints. The main requirement was the level of accuracy considered acceptable for the estimates, whereas the constraints were either economic or logistical.

It was agreed that the socio-economic survey would be conducted with a sample size of 900 villages. This is approximately 7% sampling of the 13,049 villages listed by the General Administrative Department.

Taking into account the potential source of bias from the village database, as well as considering that the database may not be as accurate as desired despite efforts to update it, a contingency plan had to be developed at the time of sample selection. Therefore, additional names of villages were selected and added onto the list. Although the sample size had to be reduced as in several cases neither the originally sampled village nor the replacement village could be identified on the ground, the stratification structure of the sample was kept intact.

Finally, a total of 700 villages in the Shan State, 100 villages in Kayah State and 100 villages in Kachin State were selected, out of which, 754 villages could be surveyed.

Table 10: Composition of the socio-economic survey sample

Particulars	North Shan	South Shan	East Shan	Kayah	Kachin	Total
Projected no. of villages to be surveyed	100	350	250	100	100	900
Actual no. of villages surveyed	100	230	240	94	90	754

The ethnic composition of the regions of the Shan State is possibly the most diversified in the whole of the Union of Myanmar. The sampling of this year reflects major ethnic groups present in each region surveyed.

3.2 Survey organization

The survey campaigns were coordinated by the UNODC/ICMP office in Yangon and, as in previous years, operationally implemented in close collaboration with Myanmar official institutions:

The ground survey to collect opium yield and socio-economic data was supervised and implemented by CCDAC, while UNODC/ICMP provided technical support, coordination and supervision with national and international staff throughout the survey. The rapid assessment survey, as well as the assessment of the opium ban in Shan Special region 2 (Wa), were implemented directly by UNODC/ICMP in close collaboration with CCDAC and Wa local authorities that participated in field supervision. The other rapid assessment surveys in Shan Special Region 1 (Kokang), Shan Special Region 4 and Chin State were carried out by UNODC/ICMP. A similar rapid survey was programmed for Sagaing but could not be implemented after access was denied.

The area estimation campaign was conducted in collaboration with the Remote Sensing and GIS Section of of the Forest Department, Ministry of Forestry. Three teams, each comprising of two surveyors from the Remote Sensing and GIS Section, visited the field with printouts of the satellite images. Once they reached the area represented in each single scene, they proceeded to annotate the print with the land use classes and relative boundaries, proceeding along specific transect itineraries. Back in the office, the ground truth data were used to classify the satellite images combining digital and visual interpretations. The results were subject to a quality control by an international remote sensing expert at UNODC Headquarters.

3.3 Field operations

Field operations started in the last week of November 2006 and continued until mid February for Shan and Kayah States and up to March 2006 for Kachin State. Due to a worsening of the security situation in East and particularly in South Shan, 22% of the sampled villages in South Shan and some in East Shan could not be visited by ground surveyors.

21 out of 22 satellite image locations ground truth data could be collected, although in some cases only partially.

For the socio-economic and yield estimation campaign, 165 surveyors carried out the fieldwork from 27 November 2006 to mid-February 2007. In Kachin State where opium is harvested later the date was extended up to end of March. The surveyors were organized in 55 teams (23 teams for South Shan State, 13 for North Shan State, 10 for East Shan State, 3 for Kayah State and 6 for Kachin State). In each team, there was one surveyor from the Myanmar Police Force, one from the General Administrative Department and one from the Settlement and Land Records Department or the Myanmar Agriculture Service from each township. Work was coordinated by a head supervisor and three regional national supervisors, in addition two UNODC international officers

monitored the entire field work. The survey teams were all involved in interviews with village headmen and heads of household, as well as field measurements for the collection of yield estimation variables.

Four townships with a heavier workload were assigned two-survey teams each (Nyaung Shwe, Hopong, Waing Maw and Kyaingtong townships). In addition, one survey teams each was assigned to some sub-townships, such as, Pinlon, Naungtayar, and Maing Naung.

The fieldwork survey started on 27 November 2006 in South Shan and Kayah with all 26 teams,. The teams in Kachin State (6 teams) started survey work on February 19, 2007, and continued until March 31. The supervision teams met with all the teams during the field survey to assess the progress of the survey and ensure quality control. The duration of the main ground survey was 8 weeks, and operations were wrapped up by the end of March 2007 with a debriefing.

As the majority of opium gum collection takes place between early September and late December, it is of vital importance that surveyors commence their work as early as possible, in order for them not to miss the opportunity for measuring the opium poppy capsules.

For the first time, a limited survey in five townships in South Shan State was conducted from early September till early October prior to the normal season's ground survey in order to study the extent of off-season opium poppy cultivation,

Table 11: Opium poppy yield estimation and socio-economic survey fact sheet

	North Shan	South Shan	East Shan	Kayah	Kachin
Start date	03-01-2007	27-11-2006	20-12-2006	27-11-2006	19-02-2007
End date	15-02-2007	15-02-2007	15-02-2007	15-02-2007	31-03-2007
Survey Teams	13	23	10	3	6
Targeted Village Tract	86	238	148	43	67
Surveyed Village Tract	86	157	123	41	64
% of Vilage-tracts	100 %	66 %	83 %	95 %	96 %
Targeted Villages	100	350	250	100	100
Villages Surveyed	100	230	240	94	90
% of villages	100 %	66 %	96 %	94 %	90 %
Households covered	5,400	15,515	8,911	7,002	11,636
% of Households	1.6 %	3.8 %	6.5 %	16.0 %	3.01 %
Population covered	29,681	77,901	45,907	35,171	72,901
% of population	1.8 %	3.8 %	6.7 %	16.0 %	3.8 %

3.4 Area estimation procedures

The area estimate for South and East Shan were based on the interpretation of satellite images. The other regions required a different approach, as their level of opium poppy cultivation is much lower. Here, the area estimate was based on the village sample survey.

For the area estimate of opium poppy cultivation in South and East Shan, a remote sensing methodology was applied with very high-resolution satellite images from selected sample locations in the study area.

At 22 selected locations, Ikonos images with 4-meter resolution (4 bands) were acquired. The number of images was limited due to budget restrictions. For every location, images at two different dates were purchased with a 5 weeks interval (December/January and February/March).

Two date images facilitate the identification of the opium poppy, taking into account the different crop calendars for every region obtained from the former surveys.

Sampling frame for the selection of satellite image locations

To select the sample locations of the satellite images, the sampling frame of last year's survey was improved and adjusted with new information. The sampling frame was developed by the combination of the following factors:

- Land cover 2005
- Altitude
- Opium poppy free areas according to ground information

The slope factor was not included anymore, since the areas with low slopes (<5%) were already excluded by the altitude rule.

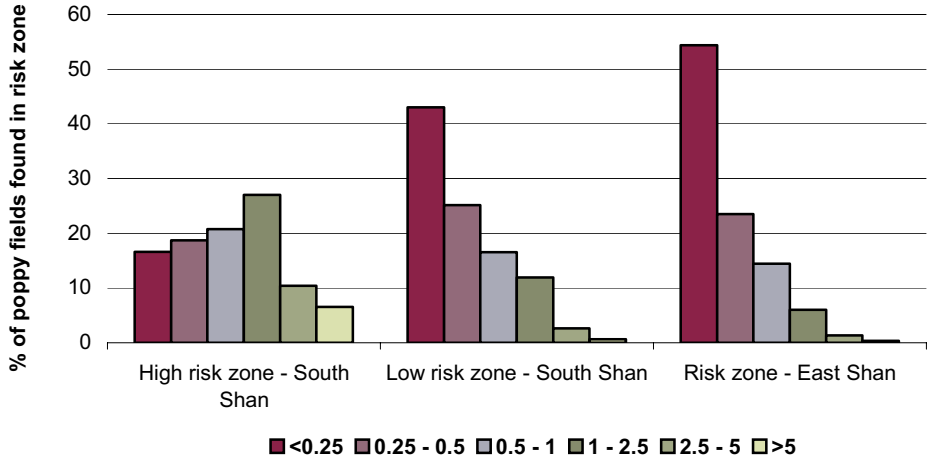
The *land cover map* was developed by classifying 6 Landsat-5 satellite images taken in February/March 2005. From this map, the large agricultural areas were extracted and considered as poppy free, since the cultivation of opium poppy is practised in small agricultural areas, often surrounded by natural vegetation. Wetlands and settlements were also excluded. The other land use classes were considered as potential for opium poppy growing.

Altitude was taken as factor since former surveys had revealed that 95% of the opium poppy was cultivated at altitudes between 800-1800 meter. This year, the maximum altitude was not applied because groundtruth data in 2006 showed an increase of poppy at higher altitudes.

From information on the ground, several *opium poppy free areas* were identified: Special Region 4 and the townships Maingyang, Kalaw, Pindaya, Taunggyi and Ywangan as well as a 10-km buffer zone along the border with Thailand. These areas were excluded from the sampling frame.

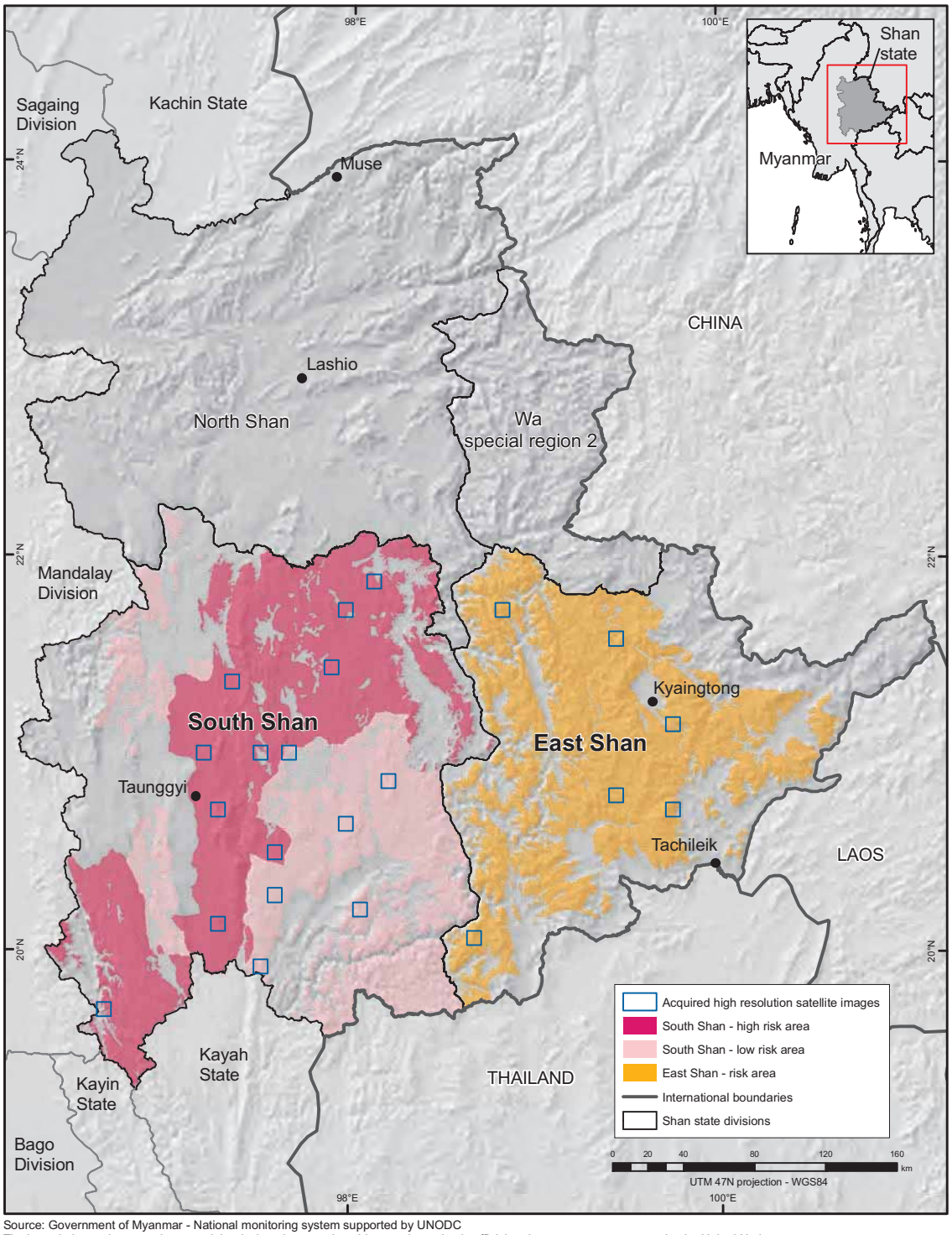
These factors were combined in a Geographic Information System to calculate the sampling frame. East and South Shan were analyzed separately. For East Shan, only one risk class was applied whereas the sampling frame in South Shan was stratified into two risk classes (high/low), based upon ground information about the strong differences in the intensity of opium poppy cultivation. The results of the 2007 satellite image interpretations showed that there is also a difference in the size of the fields in the different risk zones. The size of the opium poppy fields in the high risk zone of South Shan are significantly larger than the fields in the other risk zones in South and East Shan.

Figure 22: Size of the opium poppy fields by risk zone in the interpreted satellite images, 2007



A grid with 8 by 8 kilometer cells was put on top of this sampling frame to select the image locations. Half of the locations that were sampled last year were selected again, if they matched the selection criteria. The rest of the images were selected randomly systematic within the sampling area. In total, 22 locations were selected and all images were successfully acquired for both dates.

Map 5: Sampling frame area and satellite image locations in Myanmar, 2007



Source: Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations

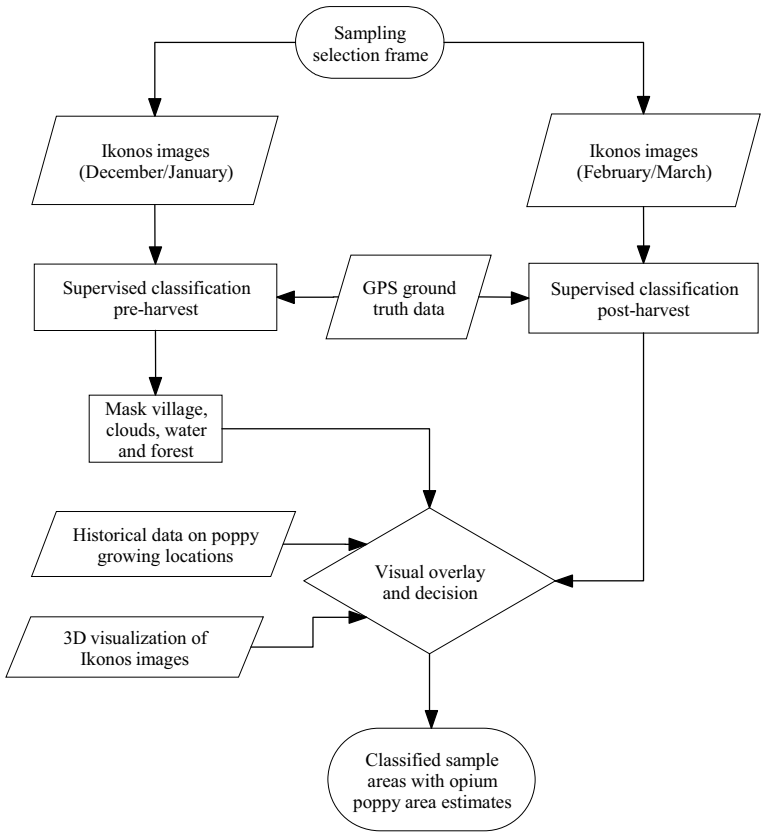
Figure 23: Sampling frame area of the South and East Shan

Region	Strata	Area (km²)	% of total area
South Shan	High risk	21,213	23
	Low risk	15,381	16
East Shan	With risk	20,429	22
South and East Shan	Opium poppy free	37,128	39
Total		94,151	100

Processing of the satellite images

The classification procedure of the Ikonos images is illustrated in the following flow chart.

Flow chart of the satellite images processing steps in South and East Shan



The satellite images were classified with the groundtruth data collected by the ground control teams. For the first collected images, supervised classifications with maximum likelihood rules were applied to obtain maps that identified different land cover classes as forest, scrubs, grass, agricultural land and possible poppy areas. The second collection images were classified in the same way with bare soil as potential area for harvested poppy areas. By applying logical rules, the two resulting maps were combined. This was done in a visual manner, since the images were not geometrically corrected and automation was not possible due to the displacements of the fields. The rules could vary by region and stage of the poppy crop, however the most commonly applied rule was that potential poppy in the first classification, classified as bare soil in the second classification means that it was opium poppy. Historical data on poppy cultivation and 3d visualization was used to facilitate the decision making.

Area estimation formulae for satellite imagery

East Shan State and South Shan State

A ratio estimate approach was used in order to provide the most accurate approximation of the extent of the opium poppy cultivation in East Shan State and South Shan State.

The estimation of opium poppy cultivation for each segment has been calculate as follows:

$$\bar{p} = \sum_{1}^{16} x/G \qquad \textit{(Equation 1)}$$

where P = *Average extent of poppy cultivation in selected area*

x = *Total opium poppy identified in each segment*

G = *Total agricultural area in each segment*

Estimation of the total opium poppy cultivation:

$$X = p^{*} N_A \qquad \textit{(Equation 2)}$$

where X = *Total opium poppy in region*

P = *Average extent of poppy cultivation in selected area*

N_A = *Sampling Frame in region*

The above estimation was later refined by the bootstrap method with 100,000 iterations. Bootstrapping is recommended when the sample observations have different sizes, which was the case during this survey. Since the total agricultural land differs in each selected segment, the standard formula cannot be applied.

Bootstrapping consist of sampling with replacement from the original sample with multiple iterations, composed in this case of the total poppy areas of the selected segments. After each iteration, a mean value is estimated and scored. At the end, a distribution of means can be observed, producing a mean estimate and a confidence interval for the mean. Bootstrap with 100,000 iterations revealed that there was a 95% probability that the extent of the opium poppy cultivation estimated from satellite images for the East Shan State ranged from 4,140 hectares to 9,630 hectares with a mean estimate of 6,920 hectares. The 95% bootstrap confidence interval for South Shan State ranged from 16,390 hectares to 19,620 hectares with a mean estimate of 18,010 hectares.

Area estimation formulae for Village Ground Survey Data

North Shan State, Kachin State, and Kayah State

During the village ground survey, information on the number of households involved in opium cultivation, total number of households and average size of cultivated poppy fields were collected for each selected village during the ground survey campaign. Estimates of areas under opium poppy cultivation were derived and extrapolated to the full extent of the sampling frame in North Shan State, Kachin State and Kayah Satate.

Area estimates were calculated using the following formulae:

T= Total number of households growing poppy in the sample

n= Sample size, number of villages

$\overline{X}_{Hh}$ *= T/n= Average number of households growing poppy per village*

Ns= Total number of villages in the sampling frame

K_h= Average size of opium poppy fields

$A = \sum Ns * X_{Hh} * k_h$ *= Total area under opium poppy cultivation*

As the agricultural land varies from one village to another, the results were refined by the bootstrap method with 100,000 iterations. The bootstrap method also provided the standard error of the estimates.

The 2007 area estimates and confidence intervals for Myanmar are presented in the table below. It has to be noted that upper and lower estimates do not lie symmetrically between the mean estimates because of the different statistical tools used to arrive at the most robust regional estimates.

Table 12: Area estimates with confidence intervals (ha), 2007

	Average	Lowest limit of 95% confidence interval	Highest limit of 95% confidence interval
East Shan State	6,920	4,140	9,630
North Shan State	390	139	538
South Shan State	18,010	16,390	19,620
Kachin	1,460	1,153	1,757
Kayah	870	710	1,035
Total	**27,700**	**22,500**	**32,600**

3.5 Description of opium poppy cultivation intensity by township in Kachin, Kayah and Shan States

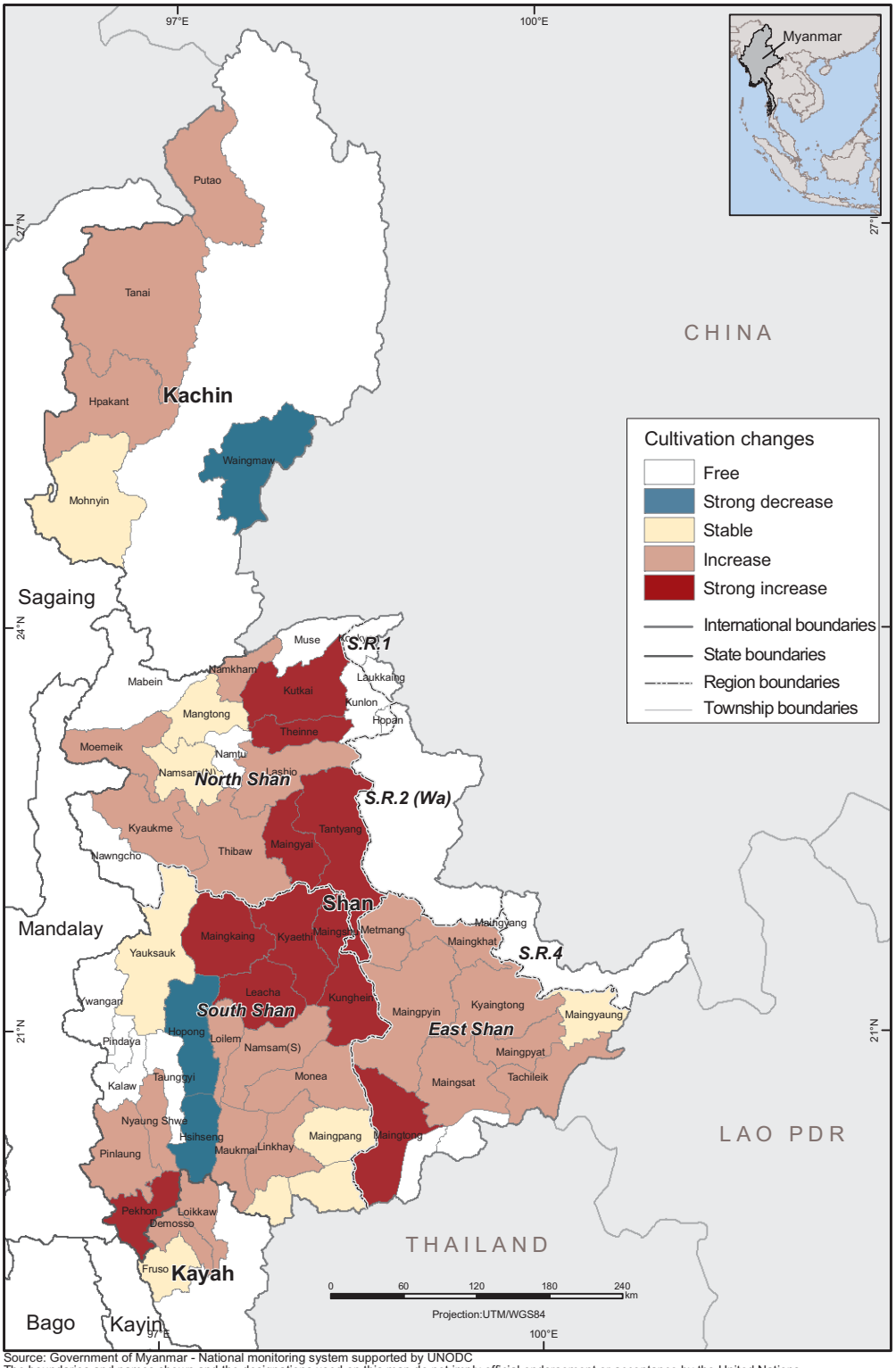
Based on the results from socio-economic and remote sensing surveys of the last years and field observations during several field survey campaigns this year, the townships in Kachin , Kayah and Shan State were divided into opium free, low intensity and high intensity opium poppy cultivation . Those results can be compared with the previous year classification. However, one should be cautious in comparing categories across regions since high density in one region could be interpreted as low in others, depending on local conditions. The 2006 crop calendar also indicated that in some townships, opium cultivation had taken place outside the traditional winter growing seasons. Taking this into consideration, in September 2006, an off-season survey was launched in 5 townships of Shan State, namely; Pinlaung, Pekhon, Hsihseng, Hopong and Loilem. This was followed by the annual survey from November 2006 to March 2007. Hence, this report is based upon the findings of these two surveys.

Opium poppy-free townships: do not have any trace of opium poppy cultivation in 2007, according to the information available.

Low intensity opium poppy townships: there is evidence of opium poppy cultivation. However, the fields are rather small and not easy to detect, are often far away from roads and villages or only a few villages are involved.

High intensity opium poppy townships: a large number of villages is involved in opium poppy cultivation. The crop is grown openly and in locations, which are easy to detect and close to villages. A tendency towards intensification can be observed, which includes multi-cropping and cultivation of opium poppy on lowland, where it can be irrigated.

Map 6: Indicative opium poppy cultivation changes in Myanmar, 2007



Source: Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

** This map is based on field observations, eradication data and reporting by local authorities as the methodology of the annual opium survey does not allow to estimate opium poppy cultivation at the township level.*

Table 13: Township classification in 2006 and 2007

Region	Number of townships surveyed	2006			2007		
		Free	Low intensity	High intensity	Free	Low intensity	High intensity
East Shan	10	2	8	0	1	8	1
North Shan	19	13	6	0	8	5	6
South Shan	21	4	7	10	4	5	12
Kayah*	3	0	3	0	0	2	1
Kachin**	5	0	2	2	0	2	3
Total	**58**	**19**	**26**	**12**	**13**	**22**	**23**

** In Kayah only 3 townships were surveyed in 2006 and 2007*

*** In Kachin only 4 townships were surveyed in 2006 and 5 townships in 2007 out of 18 townships*

The findings indicate the following changes from 2006 to 2007:

Only 13 townships were opium poppy free in 2007 compared to 19 in 2006. the number of low intensity opium poppy townships decreased from 26 in 2006 only to 22 in 2007, whereas the number of high intensity opium poppy townships almost doubled from 12 to 23 in 2007. Among the regions, South Shan State recorded the highest number of high intensity opium poppy townships in both 2006 and 2007.

Opium poppy free townships

13 out of 50 townships in Shan State were opium free in 2007. None of the townships surveyed in Kachin and Kayah State were found to be opium free.

Table 14: Opium poppy free townships

No	Opium poppy free townships by regions				
	East Shan	North Shan	South Shan	Kayah	Kachin
1	Mongyang	Kunlon	Kalaw		
2		Muse	Taunggyi		
3		Namtu	Ywangan		
4		Hopang	Pindaya		
5		Laukkaing			
6		Kongkyan			
7		Naungcho			
8		Mabein			
	1	**8**	**4**	**n.a**	**n.a**

East Shan State

In 2006, there were two opium free townships (Mongyang and Tachileik) in East Shan State. However, in 2007, Tachileik became a low intensity township.

North Shan State

Laukkaing and Kongkyan townships, located in Kokang Special Region 1 became opium free in 2003. A rapid assessment survey in 2007 reconfirmed this status. Kunlon also ceased opium cultivation in 2003. There was no local information nor reports about opium poppy cultivation or eradication in Muse, Naungcho, Mabein, Hopang, and Namtu townships in 2007 confirming their status of opium poppy free.

South Shan State

In 2006, 4 townships of Kalaw, Pindaya, Taunggyi and Ywangan were found to be free of opium poppy cultivation. No evidence of opium poppy cultivation in those townships was discovered over three consecutive years of surveying.

Kayah and Kachin State

Only 3 townships from Kayah State and 5 townships in Kachin were selected for sampling and none of these were found to be opium free.

Low intensity opium poppy townships

In townships under this category, little opium cultivation took place and it is unlikely to be commercialized.

Table 15: Low intensity opium poppy townships

No	Low intensity opium poppy townships by regions				
	East Shan	North Shan	South Shan	Kayah	Kachin
1	Tachileik	Kyaukme	Lawk Sawk	Loikaw	Monyin
2	Mongsat	Manton	Hopong	Fruso	Waing Maw
3	Metmang	Namsan (N)	Hsihseng		
4	Mongkhat	Thibaw	Mongpan		
5	Kyaing Tong	Moemeik	Nyaung Shwe		
6	Mongpyin				
7	Mongpyat				
8	Mong Yaung				
	8	**5**	**5**	**2**	**2**

East Shan State

Kyaing Tong, Mong Pyat, Tachileik and Mong Sat Townships

This low intensity opium cultivation area was located in the centre of East Shan State, which is under control of the Lahu Militia Group. Significant migration of people from North Shan State was reported, most belonging to Lahu ethnic groups, for the purpose of growing opium poppy.

Mong Pyin, Metmang and Mong Khat Townships

These three townships are located in a special area surrounded by South Shan State in the west, North Shan State in the North West and Wa Special Region 2 in the North. Most of the village tracts were controlled by the militia. People from North Shan State and Wa Special Region 2 were moving into this area in order to grow opium poppy, as it is not banned here.

Mong Yaung Township

Mong Yaung Township is well known for exporting rice and bean to neighbouring countries, such as China and Thailand. The North East and East part of this township is under Special Region 4 (opium free area since 1997) and the rest of the area is low land area (paddy fields). Only a few villages located in the west part of Mong Yaung township continued to grow opium poppy.

North Shan State

Five townships under this category were reported to have small opium poppy fields sparsely located in very remote areas, which were usually along the fringe of the township boundaries.

Kyaukme and Moemeik, changed from opium poppy free last year, to low intensity in 2007, as the locals reported few opium poppy fields in the border area between these townships. The remaining townships kept the same status as in 2006.

South Shan State

In 2006, there were 7 townships under this category. This year, Hopong and Hsihseng have reduced their cultivation to become low intensity townships, whilst 4 other townships (Namsang (S), Moenai, Linkhay and Maukmai) reached high intensity status. In total, there were only 5 low intensity opium cultivating townships.

Yauksauk Township

Some of the village-tracts in the northern most part of this township, namely, Naung Lone, Naung Woe and Kyaing Kham have been under control of SSA-S insurgent group for many years. Therefore, no one can access this area and no information about opium cultivation has been reported.

Hopong Township

This township is under control of Paoh National Organization (PNO). In 2006, a vast opium area was observed on top of Maenai Range. But in 2007, this part of the township has become opium free. A few substitute crops, such as tea, coffee, mango and sugarcane could be observed growing on the ex-opium poppy fields. There were no reports of cultivation in the entire Maenai Range.

However, there were numerous reports of opium poppy cultivation in the northern most villages of this township, which are under control of the SSA-S insurgent group, such as Mainglinn, Nartit, Narpone, Hsanin, Namparchi and Maingpyin villages, but they could not be accessed for security reasons.

Hsihseng Township

In previous years, the Shan Nationalities Peoples' Liberation Army (SNPLA) ensured their area was opium free, this included Maukmai, Linkhe, Moenai, and Loilem townships. Survey teams have checked all of these areas and found no evidence of cultivation. However, some pockets of cultivation were observed on top of Loimaw Range in Hsihseng Township.

This year, SNPLA has banned opium cultivation on Loimaw Range, and no evidence of opium poppy cultivation was found except for 11 ha near Htanyan Village in Narkhite village tract. It was all eradicated by SNPLA. As a balloon effect, opium cultivation increased considerably (in both off-season and normal season) in Naryine region in Namsang (S) township, and Kadugyi village tract in Maukmai township.

Mongpan Township

This township remained low intensity. Its southern area was controlled by insurgents and inaccessible to the survey.

Nyaung Shwe Township

Nyaung Shwe, which was reported as low intensity in 2006 remained the same tin 2007, although some 66 ha of opium poppy fields under PNO control were eradicated in Linlan village tract, which is 8 times more than what was eradicated in 2006.

Kayah State

In Kayah State, the survey was conducted in only three townships, namely, Loikaw, Demoso and Fruso. Opium poppy was found in Loikaw and Fruso under low intensity .

Loikaw Township

The north-western part of the township, which is under control of the Kareni National People Liberation Front (KNPLF) cease-fire group, had pockets of opium cultivation around the Kone-sut mines area, which is located on the border between Kayah and Shan States.

Fruso Township

In Fruso township, Moso, Hoyar and Kaykaw village-tracts are under the control of KNPLF cease-fire group, with some low intensity opium poppy cultivation.

Kachin State

The survey was conducted in 4 of the 18 townships in 2006 and in 5 townships in 2007. These can be categorized into low and high intensity opium poppy cultivation townships.

Monyin Township

There are no villages on the mountain ranges in Monyin Township. All the villages are located in the vast plain of low land paddy fields. However, local police reported eradication of 1 ha of opium poppy fields in the mountain range east of Hopin town at the end of 2006.

Waingmaw Township

Last year, opium poppy fields were observed on the mountain ranges in an area controlled by two Kachin armed groups. However, due to the armed groups' strict prohibition on opium poppy growing before the 2006/2007 season, many large patches previously observed in Sadone sub-township had disappeared in 2007. Locals and armed groups members reported an increase in small opium poppy fields hidden in the steep valleys far away from villages. Many villages in this township received rice bags from a Chinese government sponsored food aid program, which may also contribute to the dramatic change witnessed in opium cultivation in 2007.

High Intensity Opium Poppy Townships

There were 23 high intensity townships in Shan, Kayah and Kachin States. Out of those, 12 townships were in South Shan State, 6 townships in North Shan State, three in Kachin, one in East Shan State and one in Kayah State.

Table 16: High Intensity Opium Poppy Townships

No.	High Intensity Opium Poppy Townships by Region				
	East Shan	North Shan	South Shan	Kayah	Kachin
1	Mongtong	Kutkai	Pinlaung	Demosso	Hpakant
2		Lashio	Pekhon		Tanai
3		Maiyai	Loilem		Putao
4		Namkham	Namsang (S)		
5		Tant Yang	Mongnea		
6		Theinne	Linkhay		
7			Maukmai		
8			Kunhein		
9			Mongshu		
10			Kyaethi		
11			Mongkaing		
12			Leacha		
	1	**6**	**12**	**1**	**3**

East Shan State

Mongtong Township

Mongtong changed from being a low to a high intensity township in 2006. UWSA controlled the opium free area along the border of Thailand but in 2007, most of the opium poppy was grown in the central and northern parts of this township under militia control.

North Shan State

Maingyai Township

Maingyai, which had no reported information about opium poppy cultivation during 2006, was put into this category after eradication of a large pocket of fields in 2007.

Likewise, the rest of the 5 townships, categorized as low intensity last year, were changed to high intensity this year after receiving information about increased opium poppy cultivation. However, opium poppy fields were confined to certain geographic areas, which are mostly controlled by armed groups – i.e. both militia and cease fire groups.

Namkham Township

Pansae Range is notorious for growing opium poppy each year, despite the eradication and prevention efforts of the Northern Shan Command. Furthermore, this year eradication took place in the militia area at the early stage of opium growing. In doing this, the Northern Command gave a strong ultimatum to the militia group – either ensure no opium poppy cultivation in their control area, or be forced to disarm.

About 32 ha of opium poppy fields (including seedlings) were destroyed by local authorities in November 2006 and additional fields 86 ha were eradicated in later months.

Theinne Township

Lwetauk Range is under the control of Kachin Defense Army (KDA) and was opium poppy free last year, but it recorded a significant cultivation this year. The eradication teams began their task in December 2006 and could not finish until the end of January. Local anecdotal information said there was a total of 200-300 ha of fields located on this range alone.

One possible reason given by a KDA officer for this year's cultivation in that area was that people re-grew opium poppy because of news that other villagers in Namkham and Kutkai townships were not facing eradication and may be getting large profits.

South Shan State

In 2006, the following 10 townships were classified as high intensity growers: Pinlaung, Pekhon, Hsihseng, Hopong, Loilem, Leacha, Mongkaing, Kyaethi, Kunhein, and Mongshu. However, this year, Hopong and Hsihseng changed to the low intensity category. But at the same time, another 4 townships (Namsang(S), Mongnea, Linkhay and Maukmai) have intensified opium poppy cultivation. Therefore, there are a total of 12 high intensity townships in 2007.

Pinlaung and Pekhon Townships

In South Shan State, there has been a belt of opium poppy cultivation which stretches from the northern part of Pinlaung Township to southern part of Demosso township in Kayah State. This area comprises many villages notorious for opium poppy cultivation, such as:

- Hti Ta Maung, Loi Maung, Nan Naint, Kaung Mae Thin villages in Pinlaung Township,

- La Tain, La Ei, Be Kin, Lweyin and Pharline villages in Pekhon Township

Pinlaung and its sub-township, Naungtayar, are under the control of PNO. Opium poppy is cultivated in the western-most areas of Naungtayar sub-township where no proper road access exists.

Large scale opium poppy cultivation can be found along the access road from Lone Pyin to some remote villages in Pekhon Township. During an off-season survey, many opium fields were observed in this township, too.

The eastern part of Pekhon township is flat, plain and warmer than the mountainous western region where opium cultivation takes place. This western region is accessed by a road that leads off the main road at Lone Pyin village, and which continues to villages notorious for opium cultivation, such as Kaung Mae Thin, La Tain, La Ei, Be Kin, Lweyin and Pharline. All these villages are under the control of KNLP cease-fire group. This area shares a border with Demosso in Kayah State where opium poppy cultivation can also be found.During an off-season survey, many opium fields were observed in Pekhon township. Garlic, potato and cabbage are major products of these townships.

Opium poppy field in mid December in Pekhon township in South Shan State

Loilem, Namsang (S), Mongnea, Maukmai and Linkhay Area

Loilem Township

Loilem Township is controlled by three separate groups. Village-tracts in the northern part are under the control of SSA-S insurgent group, the central part by SNPLA and the southern most part by PNO.

Access is restricted beyond Pinlong town in the north. Extensive opium poppy cultivation was reported in the areas under SSA-S and SNPLA control.

Approximately 20 ha of opium poppy fields were observed near the micro-wave station. Another 12 ha were observed along the valley near Hwe-ywet village, located west of Loilem-Warchar road, 3 miles away from Loilem town.

During an off-season survey, many opium poppy fields were observed in this township. Cheroot-leaves and beans are the major products of this township.

Opium poppy field in mid December in Loilem in South Shan State

Namsang (S) Township

SSA-S insurgent group is active in the northern part of Namsang (S) Township. Only the roadside area on the way to Kholan is secure. No opium poppy cultivation was observed there since the topography of the area is flat, and the weather is much warmer than other areas and not so suitable for opium poppy cultivation. Corn and pigeon-peas are the major products of this township.

However, some village-tracts on Loi-la mountain range, namely, Wan Naung, Loi-la, Kho-Auk villages tracks were reported to cultivate opium, yet the surveyors could not access this area for security reasons.

This year, numerous opium poppy fields have been observed in the Naryine region. This area is primarily controlled by the Naryine group, an ex-MTA group.

During an off-season survey, many opium fields were observed in this region. Police reported eradication of 55 ha in the off-season alone.

Ex-insurgent groups, such as the Matkyan group and a faction of SNPLA are also located in this area. Currently, there are 10 villages in four village tracts, with a population of over 1000. This area needs alternative development as the entire land is fertile, flat and virgin, and inhabited by newcomers who have no fixed occupation yet, which may lead to expansion of opium poppy cultivation.

Opium poppy field in mid December in Naryai region in Namsang Township, South Shan State

Mongnea Township

Previously, both SNPLA and SSA-S groups have strongly prohibited opium cultivation in this township. In the last two years, there was no opium cultivation except in one or two remote villages. Paddy and beans are major products of this township.

This has changed as follows:

The eastern side of the Mongnea-Namsang (S) road is controlled by SSA-A insurgent group, and is known as insecure area, whilst the western part is controlled by SNPLA cease-fire group. Survey team monitored Naung Yar Sine and Naung Laing villages in SSA-S area and Narkon, Tatpin, and Loi Khut villages in SNPLA area in Mongnea townships and opium poppy was found in all of them.

In Naung Yar Sine and Naung Laing villages, a lot of opium poppy fields were observed, even in the household compounds – similar to what could be found in Wa villages before the opium ban. According to villagers, the SSA-S group is encouraging them to cultivate opium poppy in their area, so they can gain tax. Some 10 ha of opium poppy fields were observed on a mountain range

on the west side of the road between Naung Yar Sine and Naung Laing villages. Some local reports suggested that people cultivating opium poppy in this area were coming from Lashio.

Poor opium poppy fields due to the drought were found in Narkon village adjacent to Nar Yine area. Some Kokang and Chinese families who raised pigs, and cultivated sugarcane and groundnut also cultivated opium poppy in Loikut area and some 20 ha of opium poppy fields were observed during the survey. The eastern part of Monae township (Kyaing Taung sub-township) is also notorious for opium cultivation but was not accessible due to insecurity.

Maukmai Township

Maukmai Township is under SNPLA control. Last year, no opium poppy cultivation was observed in these areas as SNPLA authorities had prohibited cultivation. However this year, the SNPLA group had divided into two factions, and intense opium cultivation has resumed in the Kadugyi village tract area.

Linkhay Township

This township is comprised of Linkhay and Homein sub-townships. Mae-aw, Naung-aw, Homein and Kholon village tracts in Homein sub-township and Loilon and Wan Salaung village-tracts in Linkhay township are under SSS control and are reported to be cultivating opium poppy.

Corn, pigeon-peas and beans are major products of this township.

Leacha, Mong Kaing, Kyaethi, Kunhein and Mongshu area

Leacha, Mong Kaing and Kyaethi areas are controlled by various armed groups, with the predominant group being SSA-S.

Leacha Township

Opium poppy cultivation was reported last year but the area was not accessible this year due to insecurity. Pangsanang range, and especially Wan Yein, Wan Hie, Pang Sang, and Pang Tang village-tracts are well known areas for opium cultivation.

Mong Kaing Township

Opium poppy cultivation was reported in Phar Khaung, Son Law, Naung San Phu, Mai Yon, and Wan Wai Hwan village-tracts.

Kyaethi Township

Three village tracts in the western part near Kyaethi town and 6 village-tracts along the border line with Kunhein and Namsang (S) are controlled by SSA-S non-ceasefire group whilst the rest of the township is controlled by SSA-S cease-fire group led by U Pan Pha.

Opium poppy cultivation reportedly increased this year in Kyaing Linn, Naung Swan, Pang Sae, and Saing Linn village tracts. However, the area was not accessible due to insecurity.

In Mong Naung sub-township, opium cultivation was reported in Nar Kham, Lwe Yin, Tuya, Maing Nin, Hopin, Wan Sein, and Lon Yan village-tracts.

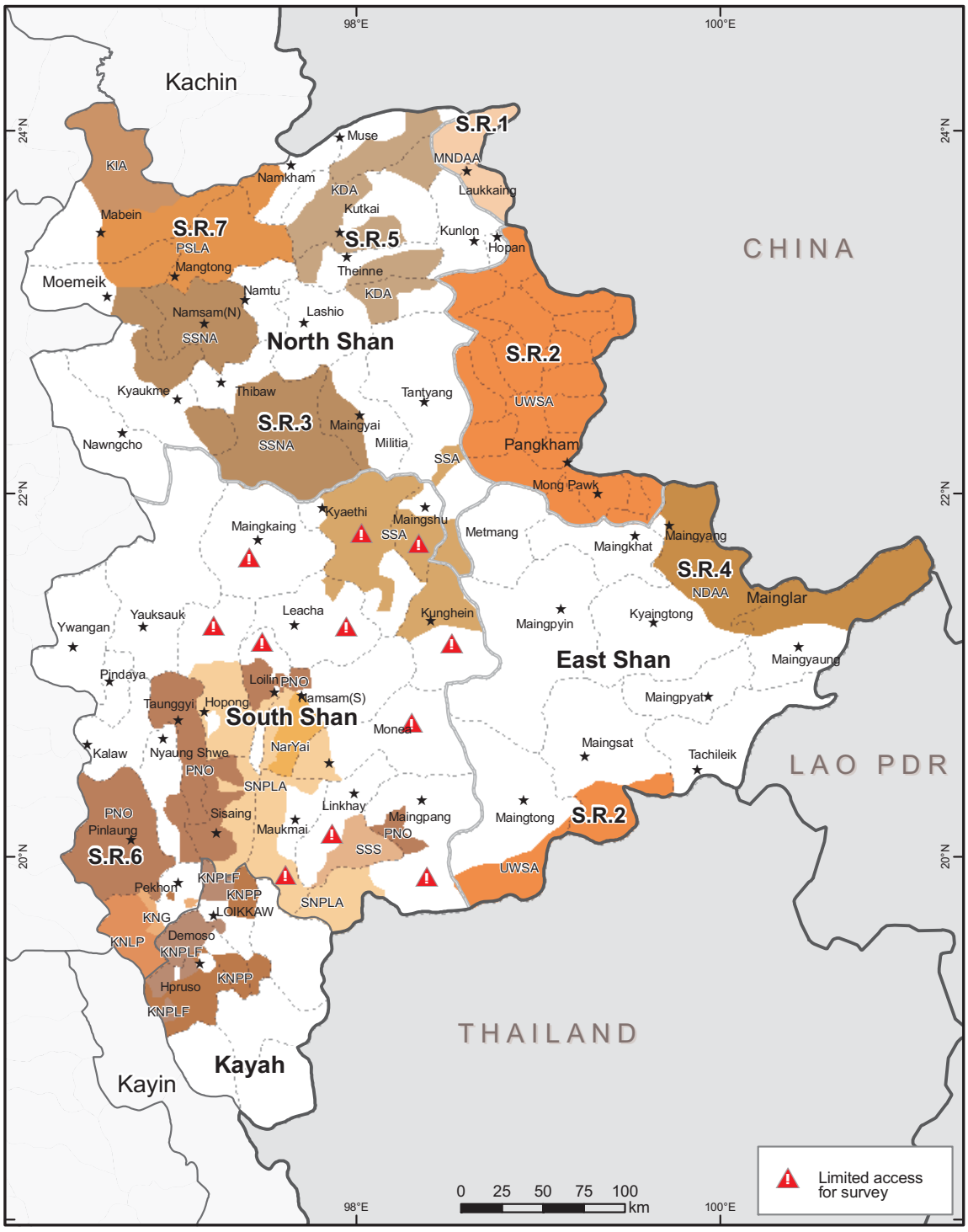
Kunhein Township

The northern area is controlled by an SSA-S ceasefire group covering 4 village-tracts, whilst the southern area, covering 10 village tracts is controlled by an SSA-S non-ceasefire group. From both areas, opium poppy cultivation was reported but could only be observed in the north since accessibility was limited in the south due to insecurity.

Mongshu Township

Some villages, such as Wan Lwe are controlled by Lahu ethnic. Others, such as Wansot, Haepar, Maingsan, Hwehey, and Hopong village-tracts are under the control of U Pan Pha's cease-fire SSA-S group. Pein Kan, Nar San, Maw Meit, Wan Sot, Hae Par, Namt Taung, Maing San, Hopang, Hwehey, Kun Kyaung, and Naung Et village-tracts are well known for opium poppy cultivation. Due to insecurity reasons most of the area was not accessible.

Map 7: Special regions and armed ethnic groups who have returned to the legal fold in Shan and Kayah States



Source: Government of Myanmar - National monitoring system supported by UNODC
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The survey found that opium poppy cultivation took place in areas both of insurgency and ceasefire groups. Peace and security is essential to reduce opium poppy cultivation in those areas prior to be able to provide some alternative livelihood to poor farmers .

Kayah State

Demosso Township

Geographically this township is a continuation of Pinlaung-Pekhon region of South Shan State. Opium poppy cultivation was found only in the western part of the township, which is under control of KNPLF ceasefire group. Lopu, Howan, Loarkho, Khubarto, Warsisaung, and Khupara villages are notorious for opium poppy cultivation. Eleven hectares of opium poppy were eradicated in Lopu Village alone.

Kachin State

Hpakant Township

Opium poppy fields were observed mainly in Karmine sub-township of Hpakant. Although there were reports of eradication in this township, many opium fields were still being harvested during the last week of February 2007. It seems that eradication took place at the very early stage of the growing season, and farmers then had time to replant a second crop.

Tanai Township

Most of villages are located along the main road leading to India except for the numerous gold mining villages. Mountain ranges are located along the township border, whilst the rest of the township consists of flat land covered by thick forest.

Opium poppy field in March in Tanai township in Kachin

In Kachin opium gum is soaked into cloth

People grow opium poppy after clearing trees in the forest area, or by clearing away thatch and wild banana over the alluvial plains along the rivers. Nearly 5.5 ha were found in the thick forest, which was part of a patch comprising 10-12 small fields shared by 10 farmers. Gold miners are the primary consumers of opium from these fields. Many opium poppy fields can be found on both sides of the main rivers of Tanai and its tributaries.

Putao Township

Some 40 ha of opium poppy fields were eradicated in the south of the Putao township where the three townships of Putao, Sumprabum and Machanbaw meet. There are no villages in this area. The closest permanent village (Sumpiyan) to this area is two days walk away. The fields are grown by migrants from the eastern area, which is controlled by a Kachin armed group, which prohibits cultivation inside their territory.

Rapid Assessment in Chin State

There are 8 townships in Chin State. The Government has put Falam and Tunzan townships in the third phase plan – opium poppy elimination in 2009-2014.

Therefore, a rapid assessment survey to determine opium cultivation was conducted in northern Chin State in early February 2007. No opium poppy fields were found during this trip. Furthermore, locals and police reported that opium poppy fields were last observed in 1997 in the northern townships, namely Falam, Tidim and Tunzan. However, at the end of 2006, one hectare of eradication was reported in Kyikhar sub-township, which is located north of Tunzan and borders with India.

Although the armed group CNA exists in Chin State, it is not as active as those in Shan State, and therefore the majority of the State is under effective control of the government. As observations and interviews have indicated, this region may be at risk of cultivating opium, but the level is ranged from nil to very marginal.

Rapid Assessment in Shan Special Region 1 (Kokang), Special region 2 (Wa),and Special Region 4

There was no evidence of opium poppy cultivation in these three regions this year. Special Region 4 has been opium poppy free since 1997, Kokang since 2003 and Special Region 2 Wa since 2005.

ANNEX

Abbreviations used for armed groups in Shan and Kayah States

KDA	Kachin Defense Army
KIA	Kachin Independent Army
KNG	Kayan National Guard
KNLP	Kayan New Land Party
KNPLF	Karenni State Nationalities Peoples' Liberation Front
KNPP	Karenni National Progressive Party
MNDAA	Myanmar National Democrat Alliance Army
NDAA	National Democratic Alliance Army
NarYai	Naryai Group
PNO	Pa-O National Organization
PSLA	Palaung State Liberation Army
SNPLA	Shan State Nationalities People's Liberation Army
SSA	Shan State Army
SSNA	Shan State National Army
SSS	Shan State South company (Homong Region Development and Welfare Group)
UWSA	United Wa State Army

PART 5. THAILAND

CONTENTS

ABBREVIATIONS

ONCB	Office of the Narcotics Control Board
NCSMI	Narcotic Crops Survey and Monitoring Institute
BPP	Border Patrol Police

ACKNOWLEDGEMENTS

Kitti Limchaikit	Secretary General, Narcotics Control Board
Pipop Chamnivikaipong	Director Narcotic Crops Survey & Monitoring Institute

PREFACE

This is the second year that the close cooperation between UNODC and ONCB has led to the publication of this report. The annual opium cultivation survey and the monitoring of cultivation trend have been one of ONCB's top priorities since 1979. With its combination of remote sensing and Geographic Information System (GIS) technologies, the ONCB opium survey reports are one of the most accurate and reliable references on opium poppy cultivation in this sub-region. All reports published so far are crucial information sources, assisting drug control authorities in identifying and addressing the target areas for illicit crop elimination in the most accountable and effective way.

In the 2006/2007 poppy season, the survey found a total of 231.13 hectares of opium poppy fields. Mostly located in the remote mountain areas of Chiang Mai, Chiang Rai, and Tak, opium poppy cultivation increased by 46.8% compared to the last year. In spite of this comparatively high opium cultivation figure, the opium poppy field eradication operation reached and destroyed almost all opium poppy fields.

On this occasion, I would like to convey my sincere appreciation and thanks to all agencies, and partners, namely, the U.S. Narcotics Affairs Section (NAS), the French Government, the Third Army Area – RTA, the Border Patrol Police Region 3, the Royal Thai Police Aviation Division, the Provincial / District Operation Centres for Combating Drugs, the Thailand International Development Cooperation Agency (TICA), and the Geo-Informatics and Space Technology Development Agency (GISTDA) for all their courtesies and cooperation.

Finally, we would like to express our hopes that this document will serve as a reference and be beneficial to all interested parties in controlling illicit opium cultivation in this sub-region and beyond.

Kitti Limchaikit

Secretary-General

Narcotics Control Board

FACT SHEET - THAILAND OPIUM SURVEY 2007

	Year 2006	Year 2007	Variation on 2006
Opium poppy cultivation	157 ha	231 ha	+47%
Average opium yield	15.6 kg/ha	15.6 kg/ha	0%
Potential production of opium	2.4 mt	3.6 mt	+50%
Opium poppy eradication	153 ha	220 ha	+44 %
Average farm gate price of opium	US$ 1015/kg	US$1071/kg*	+6%
Total potential value of opium production	US$ 2.4 million	US$ 3.6 million	+50%
Estimated households involved in opium poppy cultivation	1,300	1,600	+23%
Number of persons involved in opium poppy cultivation	6,500	8,000	+23%
Household average yearly income in opium poppy producing household	US$ 300	N/a	N/a
Percentage of opium income in total income	10%	N/a	N/a
Estimated number of opiates abusers*	2,000	1,359	N/a

* In 2007, the exchange rate of Thai Baht to US$ was US$ 1 for 35 Bahts compared to 40 Bahts in 2006.

* The number of opium abusers in 2006 was based on 2003 estimates for the entire country whereas the 2007 figure refers only to the Northern provinces. The two figures are therefore not comparable.

1 INTRODUCTION

When in 1967 a United Nations team conducted the first opium survey in Thailand that included field checks, it estimated the total opium production in the country at 145 tons. Although this may have been too high because it relied on spot checks and estimates, concerned Thai leaders began then to consider drug control a priority.

In 1969, the Thai efforts were pioneered by King Bhumibol Adulyadej who introduced a crop replacement project after the establishment of his new Phubing Palace in Chiang Mai adjacent to an opium poppy-growing village on the mountain Doi Pui. He promoted a long-term and cooperative approach to opium control that encouraged finding income generation alternatives rather than law enforcement.

When the United Nations Fund for Drug Abuse Control was established in 1971, it established a supply reduction project in northern Thailand that adopted the crop replacement approach. In this and several subsequent projects for the next decade, the approach was to become familiar with the northern Thai highlands, the ethnic minorities growing opium poppy there, and to devise agricultural techniques that could be introduced in an effort to find alternatives to opium production that eventually could reduce opium poppy cultivation.

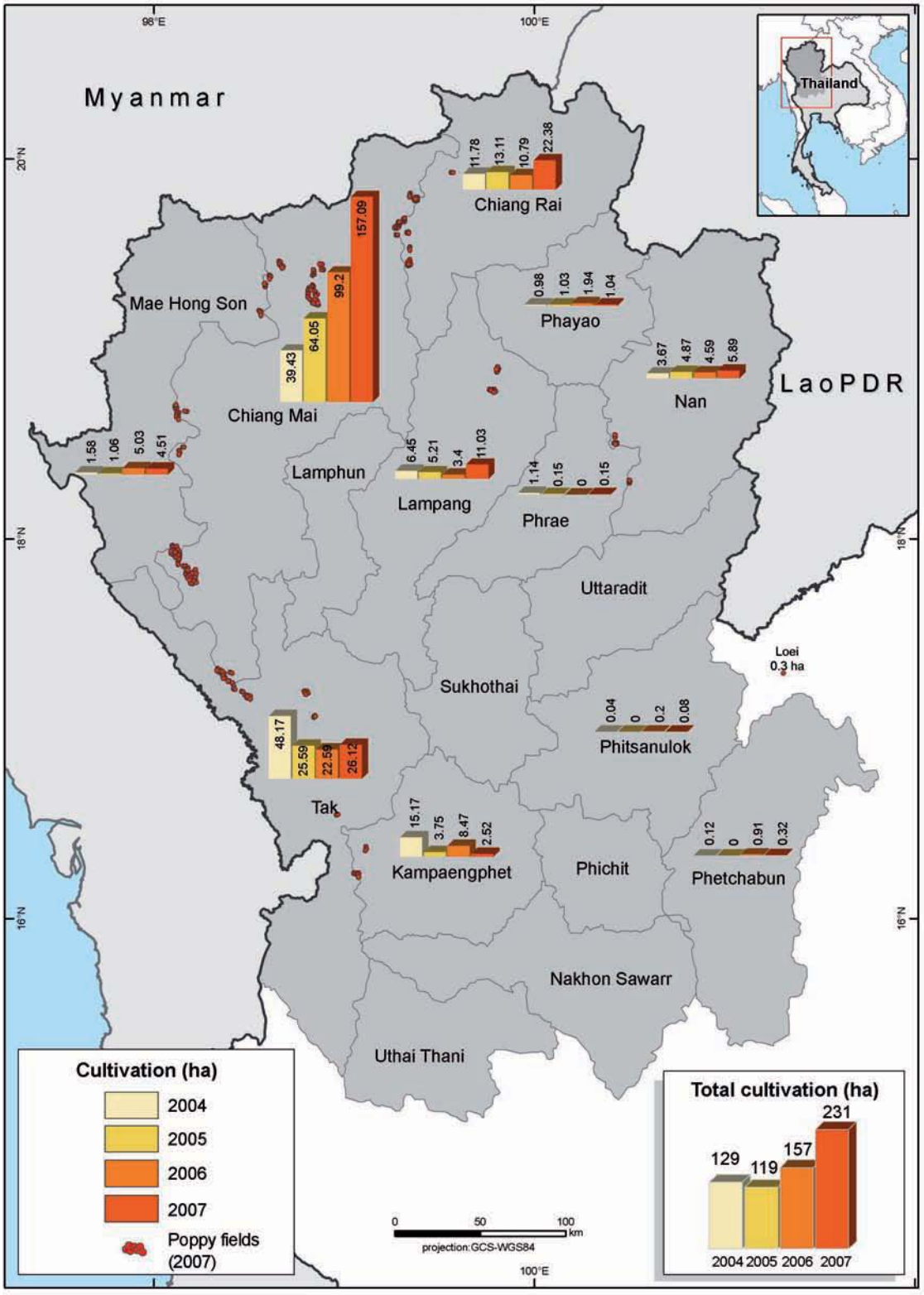
The Thai Government consolidated drug control agencies in the Office of Narcotics Control Board that was established in 1976. In 1978, and with help over the years from the United Nations and the United States, it began conducting surveys of opium poppy cultivation. The increasingly sophisticated tools that ONCB used were challenged by ingenious farmers. Using techniques that sometimes were learned from development projects, such as intercropping opium poppy with other crops to conceal the opium poppy, growing during the off-season, and irrigating their fields, ONCB faced increasing difficulties in finding the fields.

By 1984, Thai and UN officials had become convinced that sufficient alternatives to opium poppy cultivation existed in villages where projects had started over a decade earlier. Also, although Thai Government agencies were not eradicating opium poppy fields, various indirect methods to convince growers to reduce production were making an impact.

When opium poppy eradication began in 1985, ONCB estimated that opium production in the country had declined to 33 tons. After the Border Patrol Police and other enforcement agencies destroyed opium poppy fields in villages close to Chiang Mai, opium production fell by approximately 50% to about 17 tons in 1986. This resulted in Thailand becoming a net importer of opium, a situation that has continued until the present.

Since then, opium poppy cultivation has declined significantly despite the best efforts of growers. In some places, such as in Tak Province on the Myanmar border, farmers triple crop opium poppy to evade law enforcement officials. According to ONCB estimates, from a cultivated area of about 1,100 hectares in 2000-2001, this fell to about 157 hectares in 2005-2006, following eradication efforts. ONCB estimated that the actual production following eradication was about 177 kilograms.

Map 1: Opium poppy cultivation in Thailand, 2004-2007



2 FINDINGS

The opium surveys in Thailand are implemented by the Narcotic Crops Survey and Monitoring Institute (NCSMI) of the Office of the Narcotics Control Board (ONCB). This report presents their findings.

2.1 Opium poppy cultivation

To estimate the area under opium poppy cultivation in Thailand, ONCB conducts annual surveys combining the use of satellite imagery with helicopter surveys and ground surveys when accessibility and security permit. The aerial survey is supported by helicopter units from the Royal Thai Police Aviation Division and the Royal Thai Army. The aerial survey covered all 76 potential highland target areas. GPS, satellite image maps, digital cameras and video cameras are important tools and equipment in the operation. All data were analysed in a geographic information system.

In 2007, the opium survey estimated that 231 hectares of opium poppy were cultivated in the North of Thailand compared to 157 ha in 2006. Opium poppy cultivation was found in three regions and 11 provinces. A total of 1,859 fields were registered with an average of 0.12 ha per field.

Opium poppy cultivation has been decreasing almost every year since 1984 when an estimated 8,777 ha were cultivated in Northern Thailand, and remains at a negligible level.

Table 1: Opium poppy cultivation by Province in Thailand 2006-2007

Province	2006	2007	2007 % of total area under opium poppy cultivation
Chiang Mai	99	157	67.8
Tak	23	26	11.2
Chiang rai	11	22	9.5
Kampaengphet	8	3	1.3
Mae Hon son	5	5	2.2
Nan	5	6	2.6
Lampang	3	11	4.8
Phayao	2	1	0.4
Phrae	0	0.1	0.04
Phetchabun	1	0.3	0.1
Phitsanulok	.2	0.1	0.04
Total	**157**	**231**	**100%**

Young opium poppy field

Figure 1: Opium poppy cultivation in Thailand (ha), 1985-2007

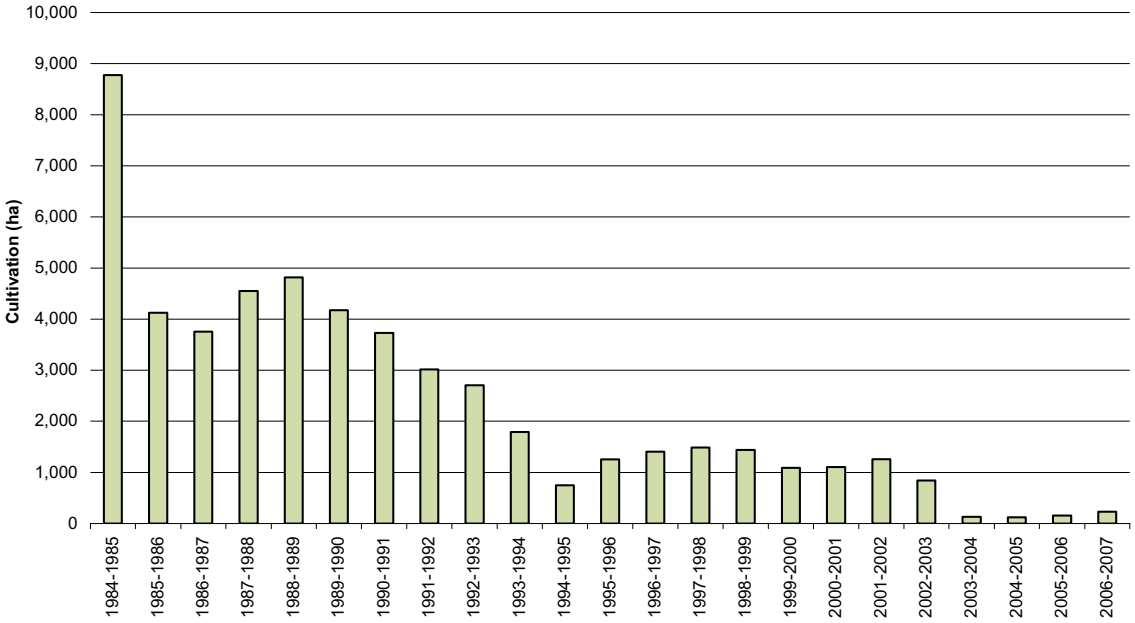
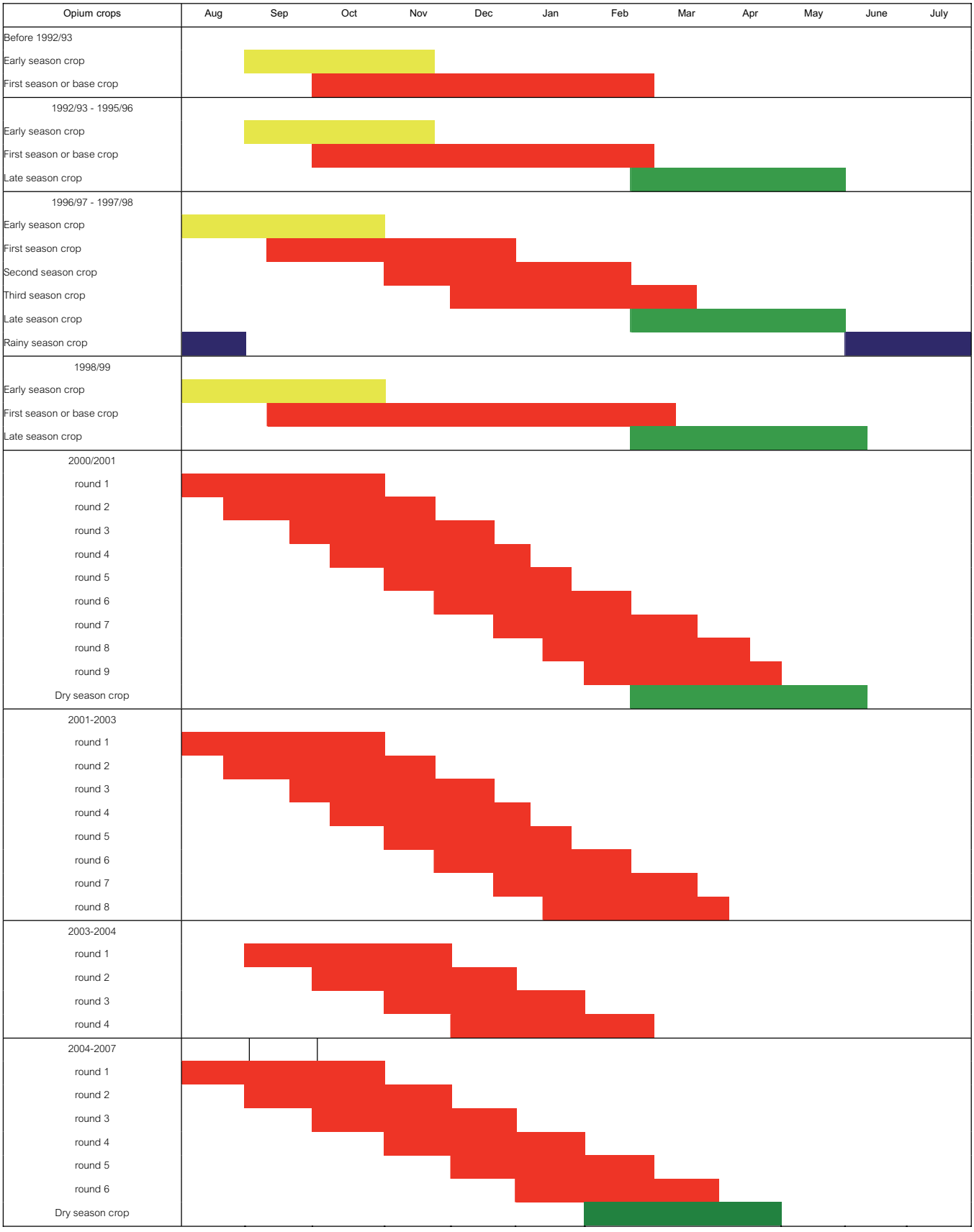


Figure 2: Opium cultivation calendar in Thailand



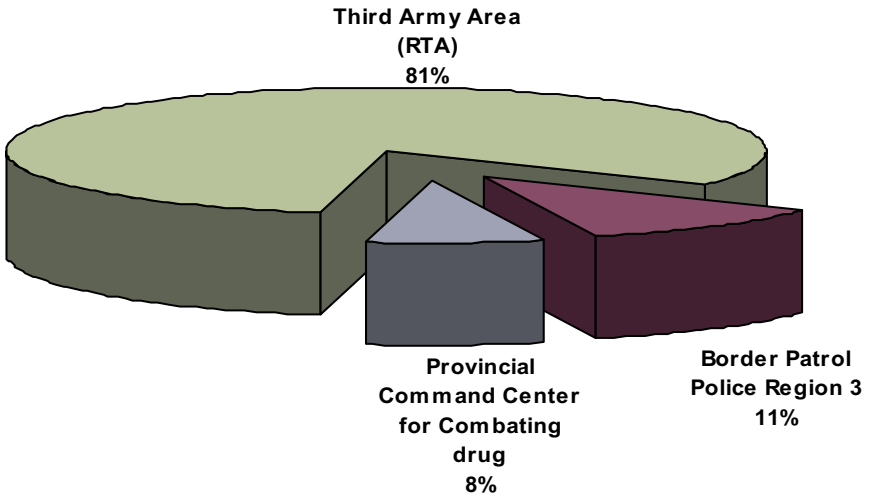
2.2 Opium poppy eradication

Opium poppy eradication is part of the narcotics crop control measures of the Royal Thai Government. Areas of responsibility are shared by various Royal Thai Government entities as follows:

Table 2: Eradication by government entities (hectares), 2007

Eradication Units	Cultivated area (ha)	Eradicated area (ha)
Third Army Area (RTA)	187.35	178.61
Border Patrol Police Region 3	26.16	24.59
Provincial/District Operation Centres for Combating Drugs	17.62	16.52
Total	**231.13**	**219.72**

Figure 3: Eradication by government entities (hectares), 2007

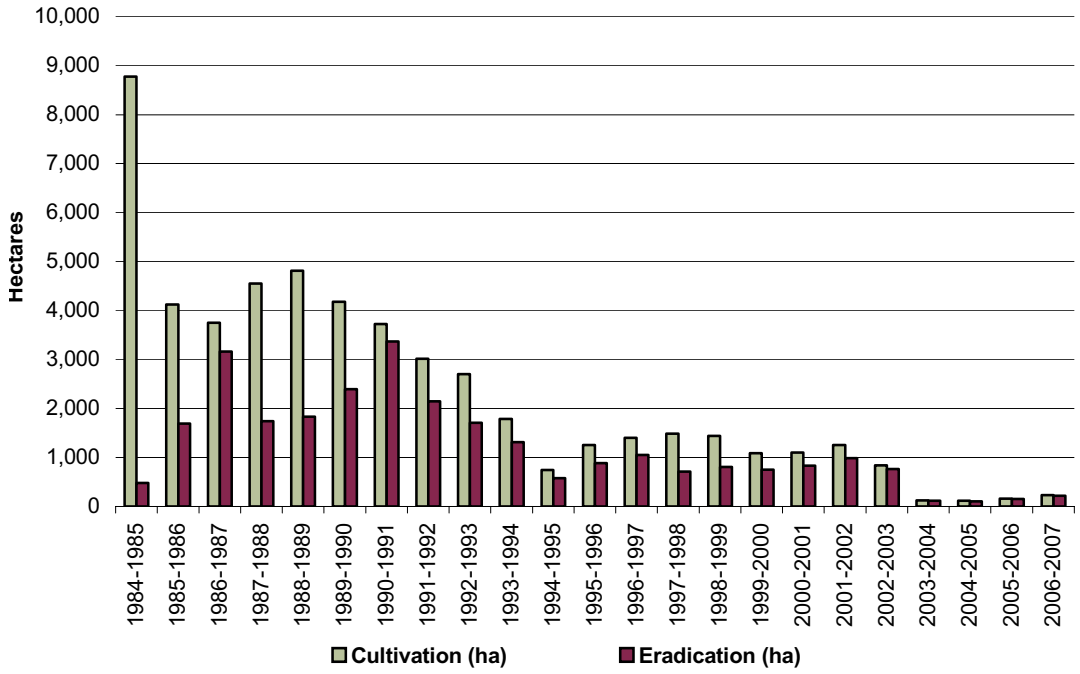


A total of 1,859 fields were registered and eradicated this year. The average size of opium fields was 0.12 ha. Chiang Mai provinces had 1,323 fields recorded and the largest number of fields followed by Tak with 149 fields and Chiang Rai with 193. Other provinces had a much lower number of fields with only 77 fields in Lampang, 50 in Nan, 25 in Mae Hong Son, 29 in Kampaengphet, 9 in Phayao, 2 in Phetchabun and only one in each Phrae and Phitsanulok.

Eradication increased by 44% in 2007 compared to 2006. Net opium poppy cultivation after eradication was estimated at only 11.41 hectares. Since 2002, more than 90% of the opium poppy crop surveyed was reported eradicated in Thailand and 95 % was eradicated in 2007.

Opium poppy eradication

Figure 4: Opium poppy eradication Thailand, 1985-2007

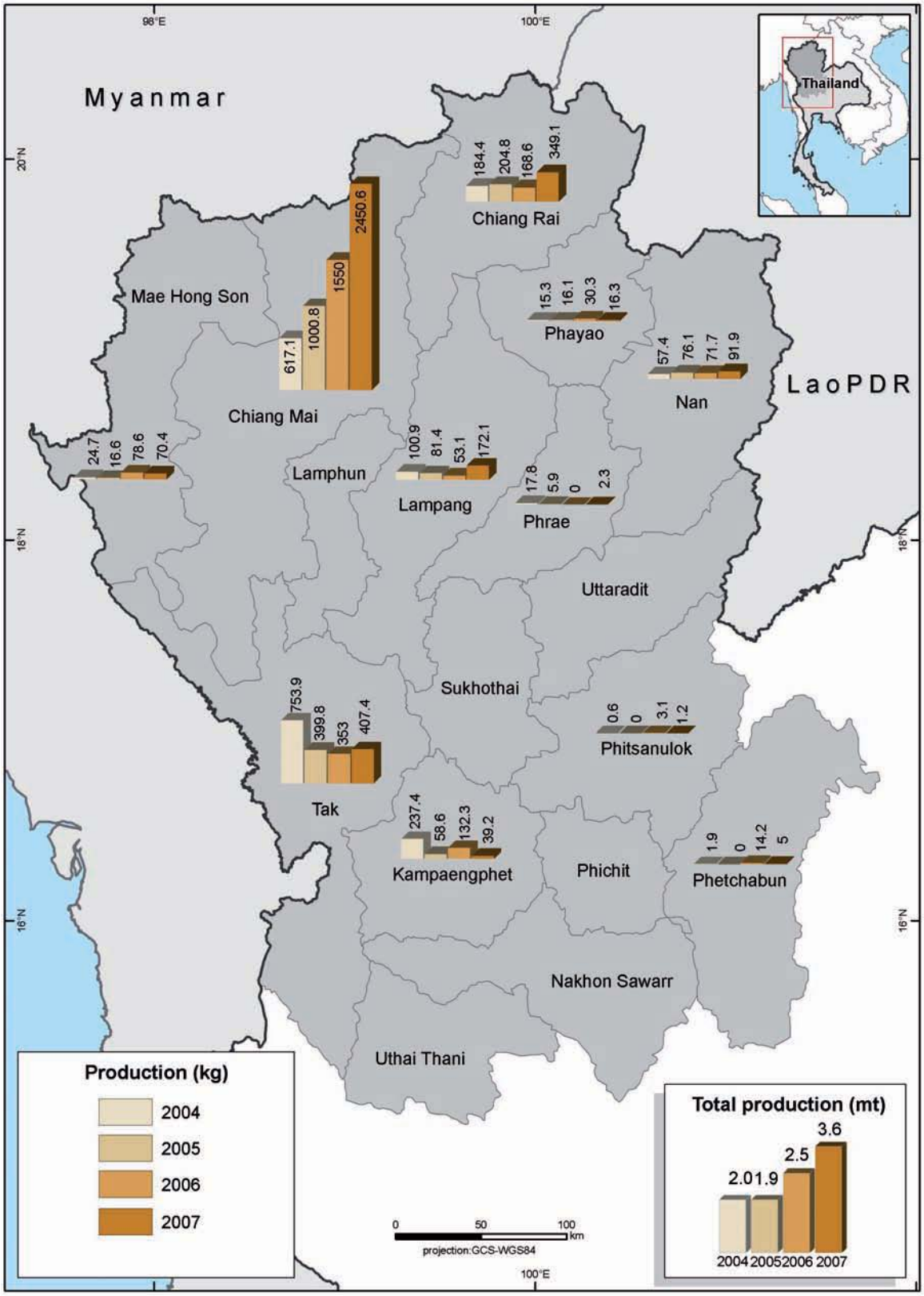


2.3 Opium yield and production

Similar to 2006, the average opium yield at the national level was estimated at 15.65 kg/ha, based on capsule measurement in the field. Good rainfall, use of irrigation and fertilizer contributed to obtain a comparatively high yield. Multiple cropping of opium poppy is practiced in Thailand and has increased from three crops a year in 1995 to six crops a year in more recent years. Multiple cropping is often practiced by farmers to avoid eradication. Based on the extent of opium poppy cultivation surveyed before eradication and average opium yield an estimated 3.6 metric tons of opium could potentially be produced in 2007. The net opium production after accounting for eradication was estimated at 177 kg.

Irrigated opium poppy field, northern Thailand

Map 2: Potential opium production in Thailand, 2004-2007



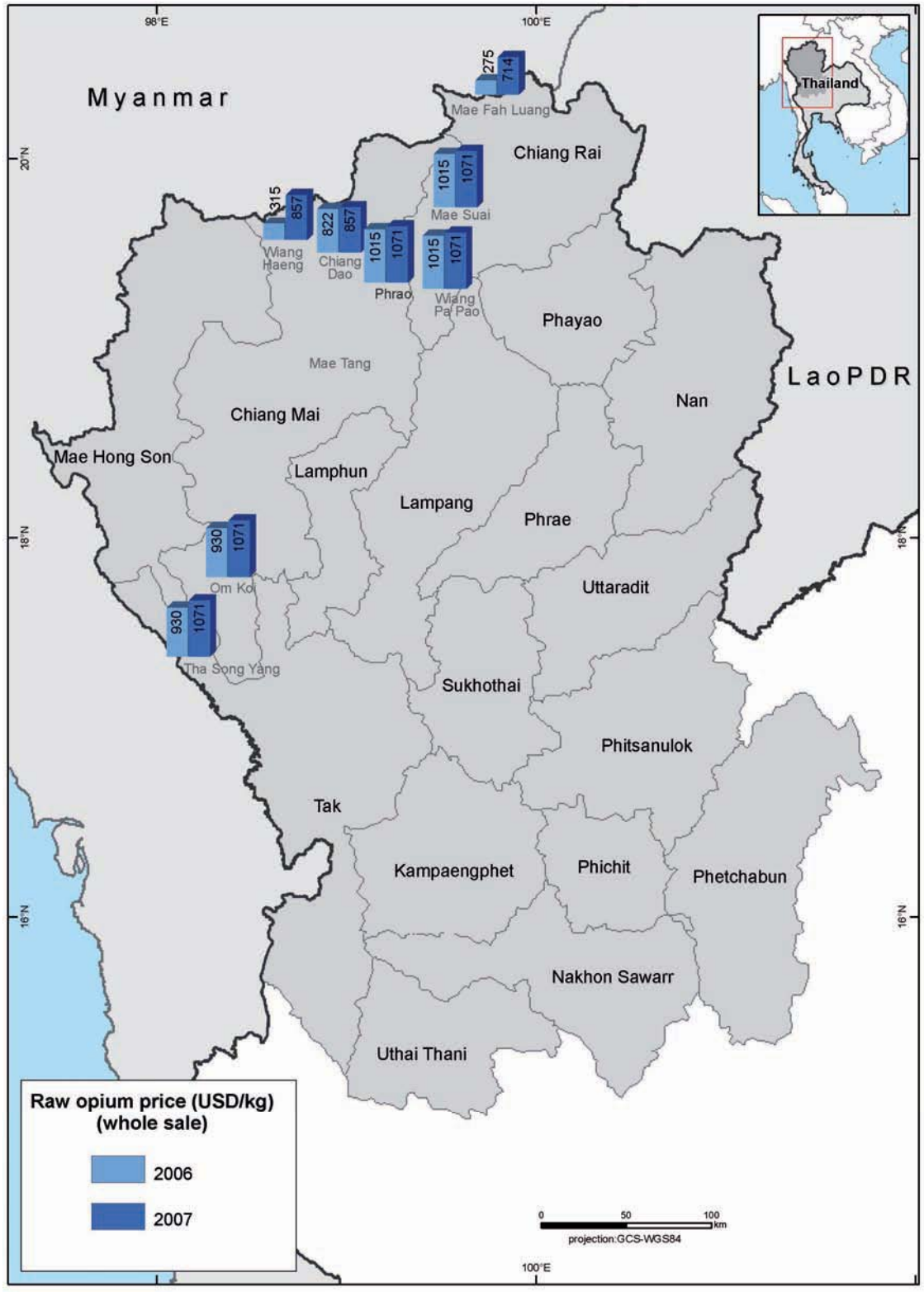
2.4 Opium farm-gate and retail prices

The average farm-gate prices for opium were the highest in the region at US$ 1071/kg and indicated no major change in local currency value (Thai Baht) compared with the previous year. The price of opium in Thailand is not related to supply and demand but rather controlled by middleman and "drug financiers". It appears that opium poppy farmers are more and more often identified as young people or even teenagers who engage in cultivation as a quick way to acquire modern equipment such as telephones and other electronics, or motorbikes. Since 2003, opium prices remained the same in spite of a high demand for opium. "Traditional" opium poppy farmers rely little on opium income for their livelihood as they seldom get wholesale price from middle man or drug financiers who sponsor the cultivation and provide them with other incentive like rice, clothes, fertilizer and sometimes cash. Retail prices of opium can fetch up to US$ 2,100 per kg. The opium is mainly purchased by local addicts.

2.5 Opiates abuse

Opium consumption is closely linked to opium production, which is very limited in North Thailand. Opiates addiction is more a urban problem than a rural problem in Northern Thailand. In 2006, there were 1,351 opiates abusers reported, mostly of them in Chiang Mai with 670 opiates abusers and 389 in Chiang Rai. The data provided on registered number of opium addicts should be interpreted with caution as there might be reluctance of addicts to register into national programs.

Map 3: Opium prices in Thailand, 2006-2007



3 METHODOLOGY

The 2007 opium cultivation survey took place from August 2006 to May 2007. A total of 76 potential opium growing areas were targeted using both ground and aerial survey .

Ground survey

Only high density areas were surveyed through this method due to the difficult terrain. Ground survey team also collected information on opium poppy cultivation techniques, opium prices and opium yields through interviews with farmers and other key informants. After reaching the opium fields, the survey teams collected information on the location by comparing GPS data with topographic maps. The information was later transferred to the survey database system for verification by aerial survey.

Aerial survey

The aerial survey was supported by helicopter units from the Royal Thai Police Aviation Division and the Royal Thai Army with a total of 119 hours in 59 flights. The aerial survey covered all 76 potential highland target areas with an emphasis on areas with high density opium poppy cultivation. For each aerial survey flight, the database from the image processing system (combining Spot and Landsat imagery) were compared with still and video photo images taken from helicopter. Upon return to the ONCB computer centre in Chiang Mai, the image processing system processed the data, which was used to plot the locations and size of the opium poppy fields. Calculations were then loaded into a geographic information system for analysis.

Figure 5: Figure Opium poppy survey process