UNITED NATIONS
Office on Drugs and Crime

Government of Afghanistan
Ministry of Counter Narcotics

Afghanistan

Opium Survey 2005

November 2005

ABBREVIATIONS

ANP	Afghan National Police
CPEF	Central Poppy Eradication Force
GPS	Global Positioning System
ICMP	UNODC Illicit Crop Monitoring Programme
MCN	Ministry of Counter Narcotics
MoI	Ministry of Interior
RAS	UNODC Research and Analysis Section
UNODC	United Nations Office on Drugs and Crime

ACKNOWLEDGEMENTS

The following institutions and individuals contributed to the implementation of the 2005 opium survey in Afghanistan, and to the preparation of the present report:

Afghan Government

Ministry of Counter Narcotics

United Nations Office on Drugs and Crime (Kabul)

Doris Buddenberg (Representative), Alexandre Schmidt (Deputy Representative), Hakan Demirbüken (Regional Illicit Crop Monitoring Expert for South West Asia and Survey Project Manager, RAS/ICMP), Nazir Ahmad Ahmad Shah (National Project Coordinator), Ziauddin Zaki (Database Management), Fazal Mohammad Fazli (Provincial Coordinator Kandahar), Mohammad Alam Ghalib (Provincial Coordinator Nangarhar), Altaf Hussain Joya (Provincial Coordinator Hirat), Mohammed Alem Yaqubi (Provincial Coordinator Badakhshan), Lutfi Rahman Lutfi (Provincial Coordinator Balkh), Mohammed Ishaq Anderabi (Survey Coordinator Badakhshan), Abdul Basir Basiret (Survey Coordinator Nangarhar), Abdul Latif Ehsan (Survey Coordinator Hirat), Abdul Jalil Hussain Khel (Survey Coordinator Balkh), Abdul Qadir Palwal (Survey Coordinator Kandahar) and Bert Tatham (Remote Sensing Consultant).

United Nations Office on Drugs and Crime (Vienna)

Coen Bussink (GIS/Remote Sensing Expert, RAS/ICMP), Ayako Kagawa (Cartographer, RAS), Anja Korenblik (Manager, RAS/ICMP), Suzanne Kunnen (Desktop Publishing, RAS), Thibault le Pichon (Chief, RAS), Thomas Pietschmann (Research Officer, RAS), Shirish Ravan (Remote Sensing Expert, RAS/ICMP), Barbara Remberg (Scientific Affairs Officer, LSS), Patrick Seramy (Database Management, RAS/ICMP) and Javier Teran, (Statistician, RAS/ICMP).

The implementation of the survey would not have been possible without the dedicated work of the field surveyors, who often faced difficult security conditions.

UNODC is grateful to Professor John Taylor and his colleagues for their contribution to the design of the survey methodology and other aspects related to the use of remote sensing in the 2005 Annual Opium Survey, as part of the collaboration agreement with Cranfield University's Centre for Geographical Information Management (UK).

The implementation of UNODC Illicit Crop Monitoring Programme and the opium survey in Afghanistan in 2005 was made possible thanks to financial contributions from the Governments of the United Kingdom, Finland and Italy.

This report, and other ICMP survey reports can be downloaded from:

www.unodc.org/unodc/en/crop_monitoring.html

CONTENTS

PREFACE

The pace of democratic change in Afghanistan has been remarkable by any measure. The country's successful realization of democracy's milestones: the historic election of its President, the entry into force of its first ever Constitution and, most recently, fully democratic parliamentary elections – are all testimony to the conviction and courage of the country's citizens and its leaders.

This year, progress on the illicit opium market is catching up with political change. For the first time since 2001, Afghanistan has succeeded in achieving a decrease in opium poppy cultivation with the area devoted to drug crops declining an impressive 21% to 104,000ha.

The decline in cultivation is important and encouraging. In concrete terms almost 50,000 heads of households made a decision not to plant their fields with opium poppy. One field out of five which was planted with an illicit opium crop in 2004, was planted with a licit crop in 2005. This is real progress, and we need to build on it quickly.

This year's Survey spotlights elements that either contribute to or counter Afghanistan's opium economy, i.e., the kinds of decisions that farmers tend to make, and their reasons for making these choices; the efficacy of anti-cultivation laws and eradication programmes—it is this kind of detailed knowledge that we need to construct sound counter-drug and development strategies in Afghanistan.

Afghanistan's first comprehensive eradication programme was initiated during the 2004-2005 growing season. In October 2004, the Government of Afghanistan ordered provincial governors to eradicate opium fields; the central government also undertook separate eradication campaigns, run by a special-purpose Central Poppy Eradication Force (CPEF) and the Afghan National Police (ANP). In total, about 5,100 hectares may have been eradicated, roughly 5% of the 2005 opium cultivation. Almost three-fourths of the eradication (72%) took place in Nangarhar and Hilmand provinces, where, in 2004, poppy cultivation was ranked highest in the nation.

Unfortunately, although many Afghan growers cooperated with the Administration in 2005, nature did not. Favourable weather conditions and low rates of plant disease resulted in a much higher yield (kg per ha) than in the previous year. As a result, the total potential opium production decreased only some 2½%, to 4,100 tons. In 2005, Afghanistan's share of opium production remains roughly 87% of the world total. Even so, reason for optimism remains. For example, in terms of value, net income from opium exports remained US$2.7 bn, but as a percentage of Afghanistan's GDP, this figure has declined by 10 percent since last year. The licit sectors of the economy are expanding, slowly bringing a greater number of alternative opportunities for farmers currently engaged in illicit cultivation. These new opportunities, whether triggered by economic expansion or concentrated development assistance, remain critical to Afghanistan's economic, social, and cultural recovery.

It may seem that in a country where reality is so stark, opportunities for the poor so limited, and consequences so dire, that there is not a great deal we can do to stop people from engaging in such a lucrative, albeit illegal, activity. That, however, is not what this year's survey results reveal. This year, it was Afghanistan's farmers who bravely complied with the government's anti-cultivation messages or eradication policy. The lack of significant change in production, described above, must be attributed to yield, which is itself determined by forces beyond our control. What we can influence, however, is the decision by a farmer not to cultivate opium, and we do this through the rule of law, effective law enforcement, and through sustainable economic development. This is what we learned in 2005:

- The law is a deterrent. Eradication of opium fields has been, and remains necessary: the law of the land, sanctioned by international conventions, must be respected. This year's Survey found the civil and religious *fatwa* launched against drugs, the opium eradication programme, and the efficacy of law enforcement, were strong enough to create a deterrent to opium cultivation among farmers.
- Viable, sustainable income generation programmes need to be in place to support both eradication and the decision not to cultivate. Again, we have learned a valuable lesson in 2005. To a considerable extent, in 2005, eradication was accompanied, and at times preceded, by alternative livelihood programmes and material support. Noteworthy is the fact that the 3 provinces where declines in cultivation were most striking (Nangarhar –96%, Badakshan –53%,) or where cultivation remained stable (Hilmand –10%), are the same 3 provinces that received the largest contributions for

alternative development (Nangarhar $70.1 million, Badakshan US $47.3 million and Hilmand US $55.7 million).

- When farmers engage in illicit activities they put themselves beyond the protection of the State, leave themselves open to corrupt and exploitative individuals, and absent themselves from Afghanistan's bright potential. History demonstrates that, anywhere in the world, farmers who are given the option to choose between legality and illegality choose legality, even when the money earned is less. When the choice is between hunger and illegality, again, history tells us that farmers choose illicit pursuits, even when they may face serious retribution.

I call upon the Government and people of Afghanistan and the international community to respond quickly, and to build on the progress made this year: these achievements are fragile and could be easily reversed in the course of a season. Crop decline has been uneven, as some provinces actually increased cultivation in 2005 (Kandarhar, +162%, Nimroz, 1370%, Balkh, 334% and Farah, 348%). Whether this year's decline will continue, or even accelerate over the years, will depend on the ability to stay the policy course, and to continue building an environment where the rule of law thrives, human security is strong, and opportunities for livelihood are ever present. To do this, we need to sustain our commitment to Afghanistan.

The key to counter-narcotics success will be the development of countryside replete with infrastructure, with irrigation facilities, market outlets and protection under law. For the period ahead, the Government has identified six key areas of intervention in rural areas: products and markets; infrastructure; rural micro-finance; post-war reconstruction; honest local administration; and the elaboration of a social safety net. This needs to be supported wholeheartedly and across the board.

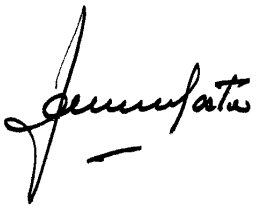
The international community must have the wisdom to fight drugs and poverty simultaneously, to eliminate both the causes and the effects of these twin afflictions. This will be vital to sustaining 2005's gains. If there is one concrete measure that the Government and its development assistance partners can take now to ensure Afghanistan's future, it is this: food security and income generation programmes must remain in place, to support both the farmers' decisions not to plant opium, and enforcement measures designed to eradicate drug crops.

Most importantly, the burden of drug control should not rest only on the shoulders of the poor; measures must also be taken to target illicit wealth belonging to corrupt officials. To this end, the international community must be prepared to fight drugs, corruption and terrorism simultaneously and with equal determination.

It will take time and commitment to deal with the Afghanistan opium problem. Measurable initiatives can and should be pursued in the course of the next 12-24 months to sustain the declining reliance of farming communities on opium. These initiatives should include:

- The removal of corrupt governors;
- The removal of all government administration officials found to be involved in or benefiting from the drug industry;
- A commitment by all newly elected members of the Afghan Parliament to abstain from direct or indirect involvement in the drug industry;
- The disarmament and reintegration of militias, and a zero-tolerance policy towards their commanders' (warlords) involvement in drug refining (labs) and trafficking;
- The facilitation of mutual legal assistance and extradition of major drug traffickers, including making Afghan domestic legislation compatible with the need to provide evidence for, and serve international arrest warrants;
- A commitment by farming communities to refrain from drug cultivation as a condition for the receipt of future development assistance.

Dismantling the opium economy in Afghanistan with the instruments of democracy, the rule of law and rural development continues to be a very complex process. UNODC is, and will remain a loyal partner, committed to helping Afghanistan and other Member States realize every aspect of this historic task. We owe this not only to the Afghans, who are struggling to free themselves from the scourge of drug production, but also to the more than 100,000 people who die annually, directly or indirectly, as a result of their addiction to Afghan opium.



Antonio Maria Costa
Executive Director
UNODC

FACT SHEET - AFGHANISTAN OPIUM SURVEY 2005

	2004	Variation on 2004	2005
Net opium poppy cultivation	131,000 ha	**- 21%**	**104,000 ha**
in percent of actual agricultural land	2.9%		**2.3%**
number of provinces affected[1]	32 (all)		**25**
Average opium yield	32 kg/ha	**22%**	**39 kg/ha**
Production of opium	4200 mt	**-2.4%**	**4,100 mt**
in percent of world illicit opium production	87%		**87%[2]**
Number of households involved in opium cultivation	356,000	**- 13%**	**309,000**
Number of persons involved in opium cultivation	2.3 million		**2.0 million**
in percent of total population (23 million)	10%		**8.7%**
Average farm-gate price of fresh opium at harvest time	US$ 92	**+ 11%**	**US$ 102/kg**
Average farm-gate price of dry opium at harvest time	US$ 142	**- 3%**	**US$ 138/kg**
Afghanistan GDP[3]	US $ 4.7 billion	**+10.4%**	**US $ 5.2 billion**
Total export value of opium to neighbouring countries	US$ 2.8 billion	**- 3.6%**	**US$ 2.7 billion**
in percent of GDP	61%		**52%**
gross trafficking profits of Afghan traffickers	US$ 2.2 billion	**- 2.7%**	**US$ 2.14 billion**
total farm-gate value of opium production:	US$ 600 million	**- 6.6%**	**US$ 560 million**
Household average yearly gross income from opium of opium growing families	US$ 1,700	**+ 6%**	**US$ 1,800**
Per capita gross income from opium of opium growing families	US$ 260		**US$ 280**
Afghanistan's GDP per capita	US$ 206		**US$ 226**
Indicative gross income from opium per ha	US$ 4,600	**+17%**	**US$ 5,400**
Indicative gross income from wheat per ha	US$ 390	**+41%**	**US$ 550**

[1] In 2005, the Afghan Government reorganized the country's administrative division into 34 provinces. However, the 2005 opium survey was designed, and its results are presented, according to the previous administrative division into 32 provinces.

[2] Preliminary estimate

[3] Source: Afghan Government, Central Statistics Office: GDP figures for the year 1382 (2003/2004): Afs 223,629 millions and for the year 1383 (2004/2005): Afs : 254,487 millions.

EXECUTIVE SUMMARY

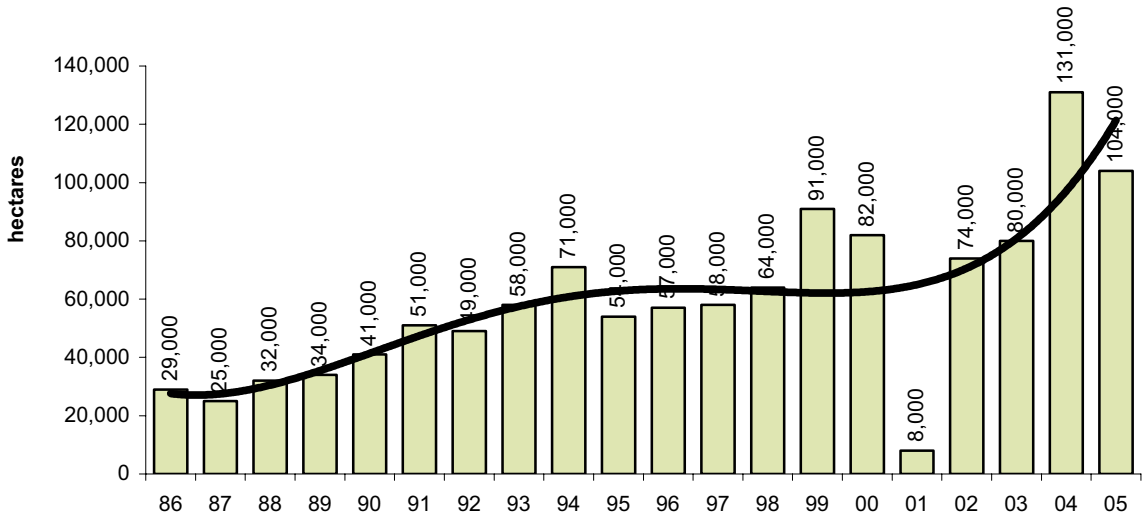
Opium poppy cultivation decreased by 21% to 104,000 hectares in Afghanistan in 2005

The area under opium poppy cultivation in Afghanistan decreased by 21% from about 131,000 hectares (ha) in 2004 to a level of 104,000 ha in 2005.

Afghanistan opium poppy cultivation, 1994-2005 (hectares)

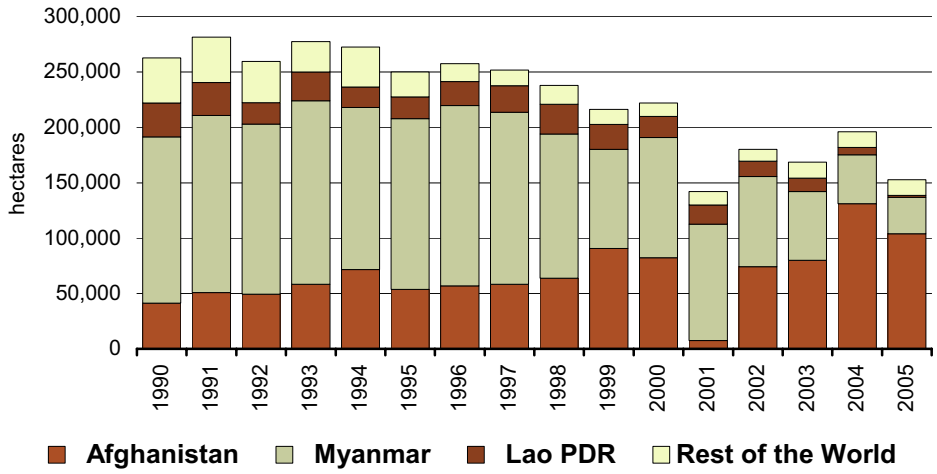
1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
71,000	54,000	57,000	58,000	64,000	91,000	82,000	8,000	74,000	80,000	131,000	104,000

Afghanistan: Opium poppy cultivation from 1986 to 2005 (hectares)



As a result of the decline in opium cultivation in Afghanistan in 2005, global opium poppy cultivation will fall by some 16% in 2005. The share of Afghanistan would remain almost stable at 67%.

Global opium poppy cultivation 1990-2005* (hectares)



* For 2005, estimates for the "rest of the world" and Myanmar are still tentative

Opium poppy cultivation decreased in 19 provinces in 2005. The largest declines -in absolute terms- were found in Nangarhar (27,120 ha), Badakshan (8,237 ha) and in Uruzgan (6,475 ha). A very sharp decrease of 96% was observed in Nangarhar, the number two opium poppy producing province in 2004 (28,213 ha). Badakshan and Uruzgan, with the third and fourth largest areas under opium poppy cultivation in 2004, dropped to the fifth and sixth place in 2005. Opium cultivation in Central Afghanistan (Parwan, Paktya, Wardak, Khost, Kabul and Logar) almost disappeared in 2005: declining from 4,600 ha in 2004 to 106 hectares in 2005. Hilmand remained the province with the largest area under cultivation, although it declined by 10%.

Increases of more than 10% were seen in 10 provinces. Major increases –in absolute terms- were found in Balkh (8,342 ha), Kandahar (8,030 ha) and Farah (7,952 ha). Poppy cultivation in Kandahar increased 162% to 12,989 ha making it the province with the second largest area under cultivation. Surprisingly, Balkh, with a 334% increase, became the number three opium poppy producing province followed by Farah at 10,240 hectares. Neither province was an important producer last year or in previous years. In 2005, opium poppy cultivation moved from traditional growing areas (Hilmand, Laghman, Nangarhar, Uruzgan) to new provinces (Badghis, Balkh, Farah, Samangan).

The main opium poppy cultivation provinces in 2005 were (in order of magnitude): Hilmand, Kandahar, Balkh, Farah and Badakshan. Together, these 5 provinces represented 65% of the total area under opium poppy cultivation in 2005.

Main opium poppy cultivation provinces in Afghanistan in 2005 (hectares)

Province	2003	2004	2005	Change 2004-2005	% Total in 2005	Cumulative %
Hilmand	15,371	29,353	26,500	-10%	25%	25%
Kandahar	3,055	4,959	12,989	162%	12%	38%
Balkh	1,108	2,495	10,837	334%	10%	48%
Farah	1,700	2,288	10,240	348%	10%	58%
Badakhshan	12,756	15,607	7,370	-53%	7%	65%
Rest of the Country	46,010	76,298	36,064	-53%	35%	100%
Rounded Total	**80,000**	**131,000**	**104,000**	**-21%**		

35% of farmers reported they decreased cultivation due to fear of eradication

As part of the survey 2,073 farmers in 1,243 villages across Afghanistan were asked why they were increasing or decreasing opium poppy cultivation. A total of 1,922 farmers (93%) reported reasons for the decline or the non-cultivation of opium poppy while only 151 farmers (7%) reported reasons for an increase of opium poppy cultivation in 2005. The main reasons quoted by farmers for not cultivating or reducing opium poppy cultivation in 2005 were:

- Fear of eradication (35%)
- Fear of imprisonment (20%)
- Forbidden by Islam (16%)
- Poppy ban (15%)
- Lower prices and less demand (10%)

The same question was asked as part of the UNODC's Farmers Intention Survey 2003/04, though at an earlier stage of the crop cycle, before the farmers had actually planted the opium poppy. At that time, in October 2003, the number of farmers reporting that they would reduce opium poppy cultivation was significantly lower and the main reasons for reducing opium poppy cultivation were: 'forbidden by Islam' and 'poppy ban'. In 2004/05, 'fear of eradication' gained strongly in importance as a deterrent to cultivating opium poppy.

The main reasons quoted by farmers for having increased opium poppy cultivation in 2005 were:

- Higher opium prices and higher demand for opium (40%)
- Personal consumption requirements (21%)
- High cost of wedding (16%)

As in the UNODC's Farmers Intention Survey 2003/04 findings, the high price of opium was one of the main reasons for increasing opium poppy cultivation. The need to engage in opium production to satisfy personal consumption requirements, which was not mentioned in 2003/04, showed a surprisingly high affirmative response. However, the sample of farmers admitting to increasing opium poppy cultivation in 2005 was small, so these results must be treated with some caution.

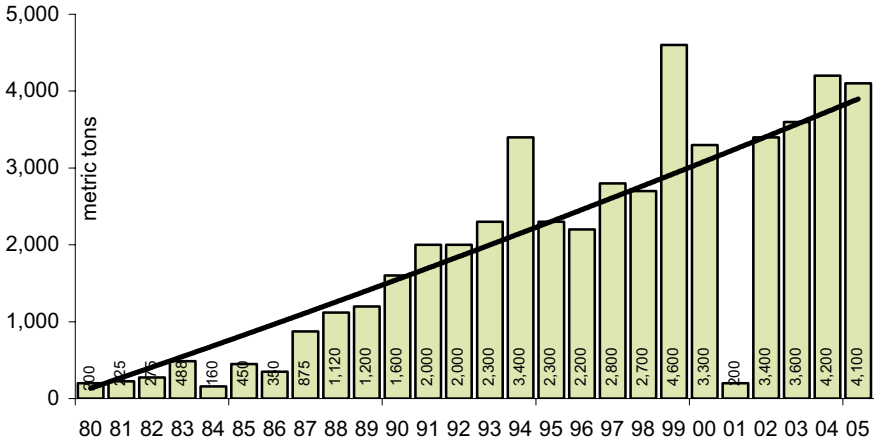
Potential opium production estimated at 4,100 metric tons (- 2.4%)

Potential opium production was estimated at around 4,100 metric tons (mt), representing a decrease of about 2.4% compared to 2004. The apparent discrepancy between the decrease in opium production and the decrease in cultivation was due to improved weather conditions. The opium yield in 2005 was estimated at 39 kg/ha, an increase of 22% compared to the 2004 yield (32 kg/ha).

Afghanistan potential opium production, 1994-2005 (metric tons)

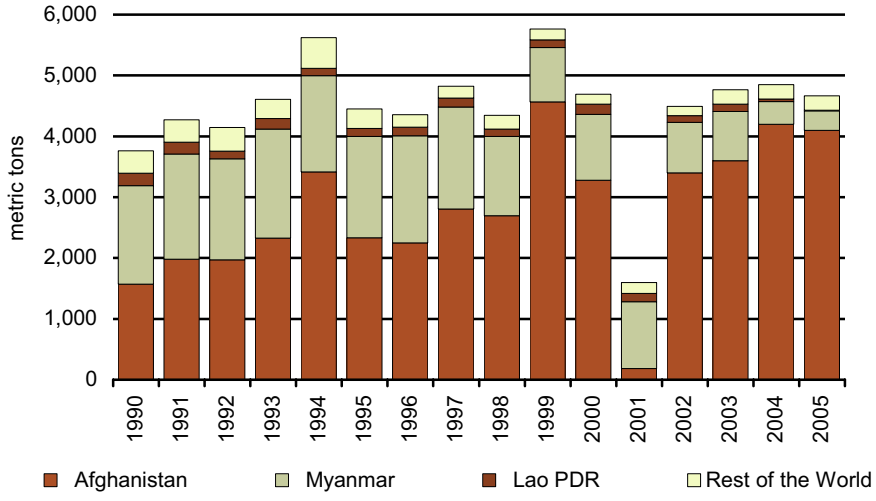
1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
3,400	2,300	2,200	2,800	2,700	4,600	3,300	185	3,400	3,600	4,200	4,100

Afghanistan: Opium production from 1980 to 2005 (metric tons)



Global opium poppy cultivation is estimated to have fallen by some 16% in 2005 and opium production by some 3% as a result of the decline in opium cultivation and production in Afghanistan. The proportion of Afghanistan in global opium production is likely to remain close to 87%.

Global opium production 1990-2005* (metric tons)

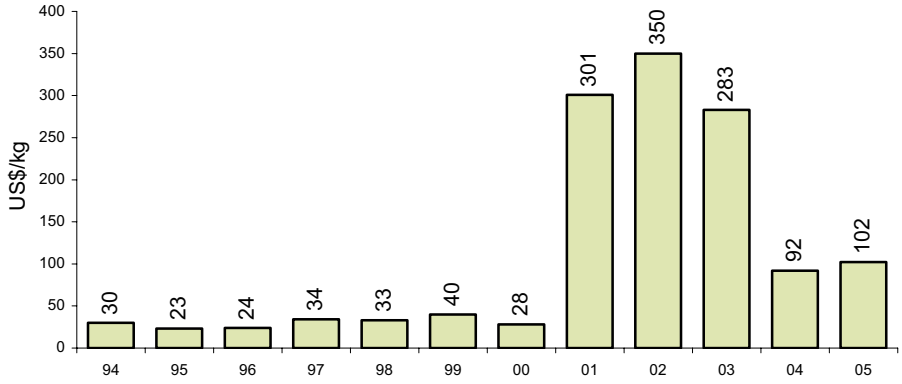


* For 2005, estimates for the "rest of the world" and Myanmar are still tentative

Opium prices remain high

The average price for fresh opium at the time of harvest, weighted by regional opium production, amounted to US$ 102 per kilogram, an 11% increase compared to last year. Fresh opium prices at the farm-gate level remain three to four times higher than in the second half of the 1990s. They are, however, significantly lower than over the 2001-2003 period when they had risen to around US$300.

Fresh opium farm-gate prices at harvest time (weighted by regional production) in Afghanistan, 1994 – 2005 (US$/kg)



The prices of dry opium remained relatively stable, decreasing 3% from US$ 142 in 2004 to US$ 138 per kilogram in 2005. The fragmentation of the Afghan opium market continues to give rise to important regional price differences. The lowest prices were found in Northern Afghanistan (US$112), reflecting the following factors: lower prices in neighbouring Tajikistan; a limited number of traders; and, an increase in opium production. Prices were highest in Central Afghanistan (US$235) where production basically ceased in 2005. Prices were above average in Eastern Afghanistan, possibly due to law enforcement activities, and in Western Afghanistan (US$164), reflecting high opium prices in neighbouring Iran.

309,000 families are involved in opium poppy cultivation (compared with 356,000 in 2004)

The number of families involved in opium poppy cultivation decreased by 13% to 309,000 in 2005 (356,000 in 2004). This number represents about 2 million persons, 8.7% of the total population in Afghanistan (down from 10% in 2004) and 11.2% of the rural population in 2005. (The number of itinerant workers who work on poppy cultivation is not included).

Total number of opium poppy growing farmers

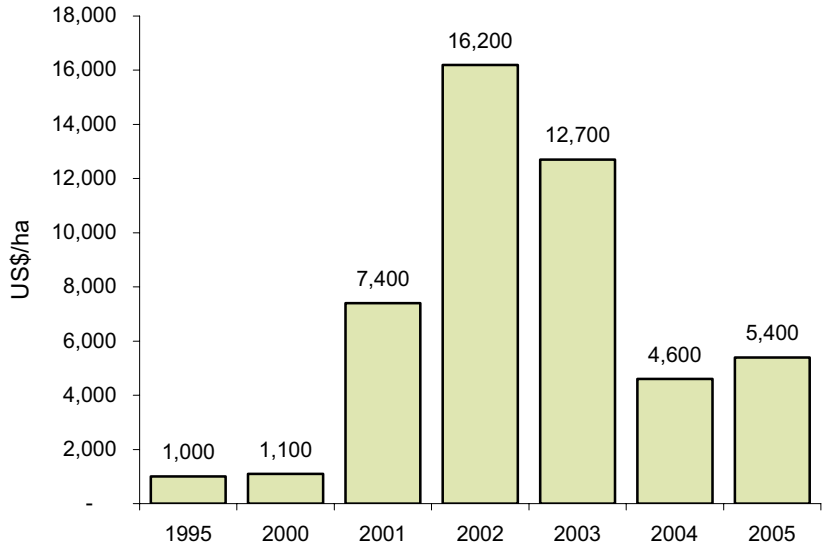
Region	Total Poppy Farmers	Average opium poppy cultivation area per farmer (ha)
Central	Negligible	
East	22,169	0.17
North-Easter	37,241	0.25
Northern	101,266	0.27
Southern	89,468	0.33
Western	58,869	0.32
Rounded total	**309,000**	**0.25**

The farmers who ceased cultivation in 2005 had received an average 13% of their total income from opium in 2004. In contrast, farmers who continued growing in 2005 had obtained 28% of their total income from opium in 2004.

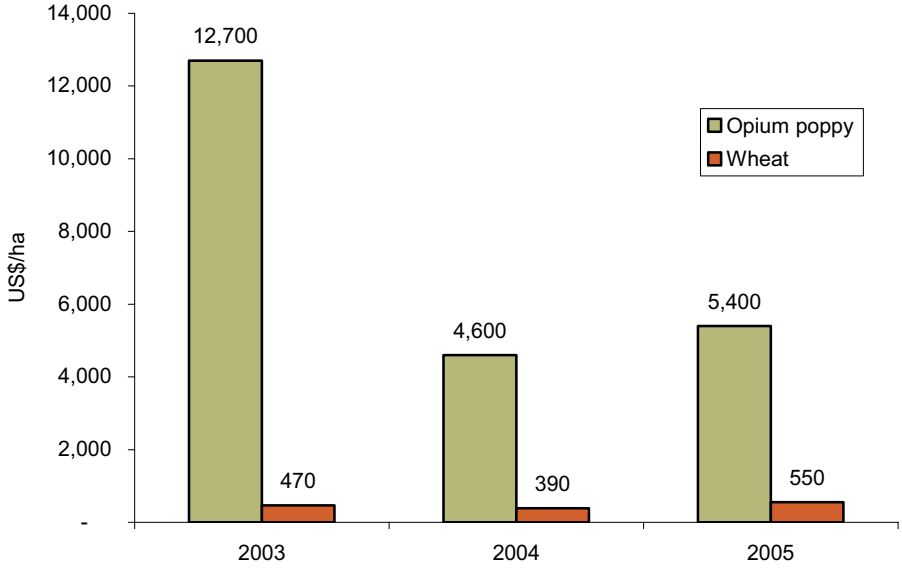
Estimated farmers' per capita gross income from opium rose 6%, but poppy to wheat income ratio in 2005 (10:1) smaller than in 2004 (12:1)

The yearly gross income per opium growing family increased by 6% to US$1,800 in 2005. The increase was entirely due to higher yields, which rose by 22% in 2005. The gross income from poppy cultivation per hectare increased to US$5,400. This is almost 10 times higher than the gross income a farmer could expect from one hectare of wheat (US$550 per hectare on irrigated land). This poppy to wheat income ratio (10:1) is now smaller than in 2004 (12:1) or 2003 (27:1). The net income from opium could not be estimated, but costs for opium poppy cultivation are thought to be relatively high. Inputs to cultivation including labour, fertilizer, seed, fuel, depreciation of agricultural equipment, as well as taxes paid to local commanders and various bribes keep these costs high.

Gross income of poppy cultivation in US$ per hectare



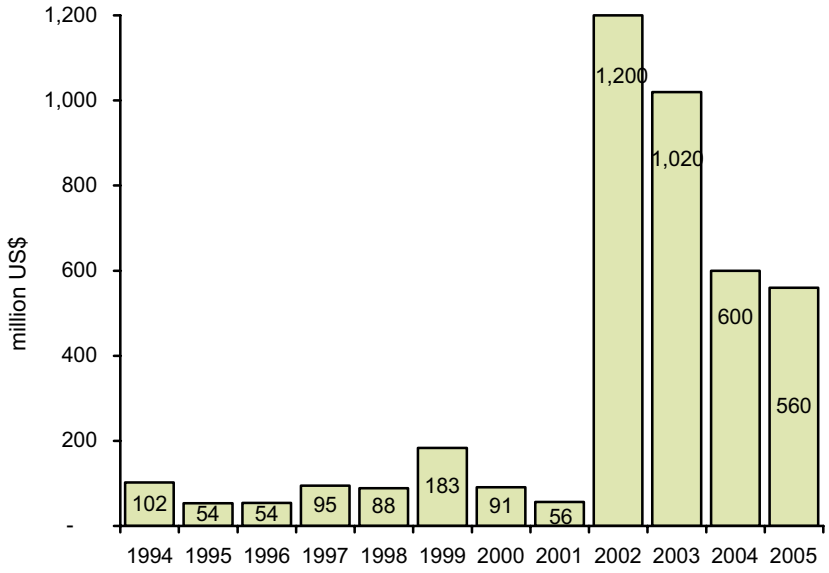
Gross income of opium poppy and wheat in US$ per hectare



Total farm-gate value of opium decreased 5% to US$ 560 million

Based on opium production and reported opium prices, the farm-gate value of the opium harvest amounted to US$ 560 million in 2005. Slightly lower production (-2.4%) and lower prices (-3%) reduced the overall farm-gate value of opium production. It was 6.6% lower than in 2004 and 45% lower than in 2003. The farm-gate value was equivalent to 11% of GDP (2004/05), down from 13% a year earlier.

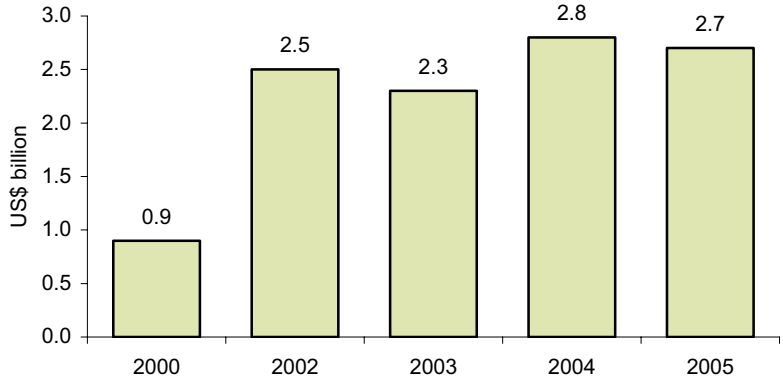
Estimated value of opium production at farm-gate level, 1994-2005



Value of opiate exports to neighbouring countries

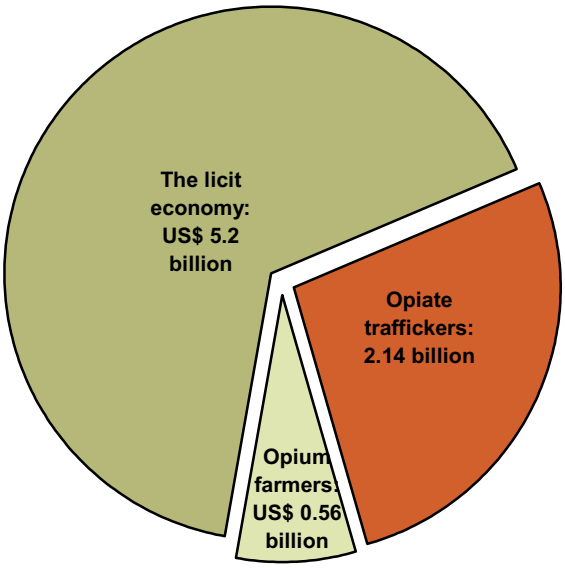
The value of 2005 opium production, exported by Afghan traffickers to neighbouring countries in the form of opium, morphine and heroin, was estimated at US$2.7 billion, slightly less than in 2004 (US$2.8 billion). Gross profits of Afghan traffickers would thus decrease from around US$2.2 billion in 2004 to US$2.14 billion in 2005. The value of opiates exports to neighbouring countries in 2005 is equivalent to around 52% of the 2004/05 GDP of Afghanistan[4], down from 61% a year earlier.

Value of opiate exports to neighbouring countries, in billion US$, 2000-2005



[4] The GDP figure for the year 1383 (2004/2005): Afs : 254,487 millions does not include the value of opium production.

Size of the licit economy and the opiate industry in Afghanistan in 2005



Eradication

The annual opium survey neither monitors the activities, nor assesses the results, of eradication campaigns launched by the Afghan authorities during the opium growing season. As in previous years, the 2005 survey relied on a methodology designed to estimate the actual harvest (cultivation net of eradication). However this year, at the request of the Afghan authorities, UNODC implemented jointly with the Ministry of Counter Narcotics (MCN) a separate eradication verification survey (Support to the Verification Process of Opium Poppy Eradication). In this survey, UNODC verified the eradication of some 4,000 hectares of opium poppy by provincial governors. The majority of the governor-led eradication activities took place in the provinces of Nangarhar (46%) and Hilmand (26%), the two main opium producing provinces in 2004. In addition, the central Government undertook eradication, run by a special-purpose Central Poppy Eradication Force (CPEF) and by the Afghan National Police (ANP). These campaigns reported the eradication of 200 ha by CPEF and of 900 ha by ANP, however this was not verified by UNODC. Thus, total eradication amounted to some 5,100 ha, equivalent to roughly 5% of opium poppy cultivation in 2005.

The overall area of opium poppy eradicated in 2005, as reported by Afghan governors, was substantially higher than the eradicated area verified by UNODC. Irrespective of these discrepancies, the findings of this report show that the threat of large-scale eradication has played a significant role in farmers' decisions not to plant opium poppy in 2005.

Cannabis cultivation estimated at 30,000 hectares

The village survey findings indicate that total cannabis cultivation could be around 30,000 ha in Afghanistan. To get a better idea of the extent of cannabis cultivation in Afghanistan, a separate survey would need to be implemented between June-September, which is the cultivation period of cannabis (farmers usually plant cannabis after the wheat or poppy harvest).

Opium Addiction

Survey findings indicate that 0.5% of the rural population is addicted to opium. This result is in line with the Rapid Assessment Survey, March 2005.

Methodology

The survey's methodology was based on a sampling approach which combined the analysis of satellite images and extensive field visits. More than 190 high-resolution IKONOS satellite images were used, covering 15 provinces -- a total of 214,000 ha of agricultural land, representing 16% of the total agricultural land in these areas. To assist

with the interpretation of the satellite images, a large amount of ground data, including crop types, GPS coordinates and photographs were collected from 260 different locations (segment analysis).

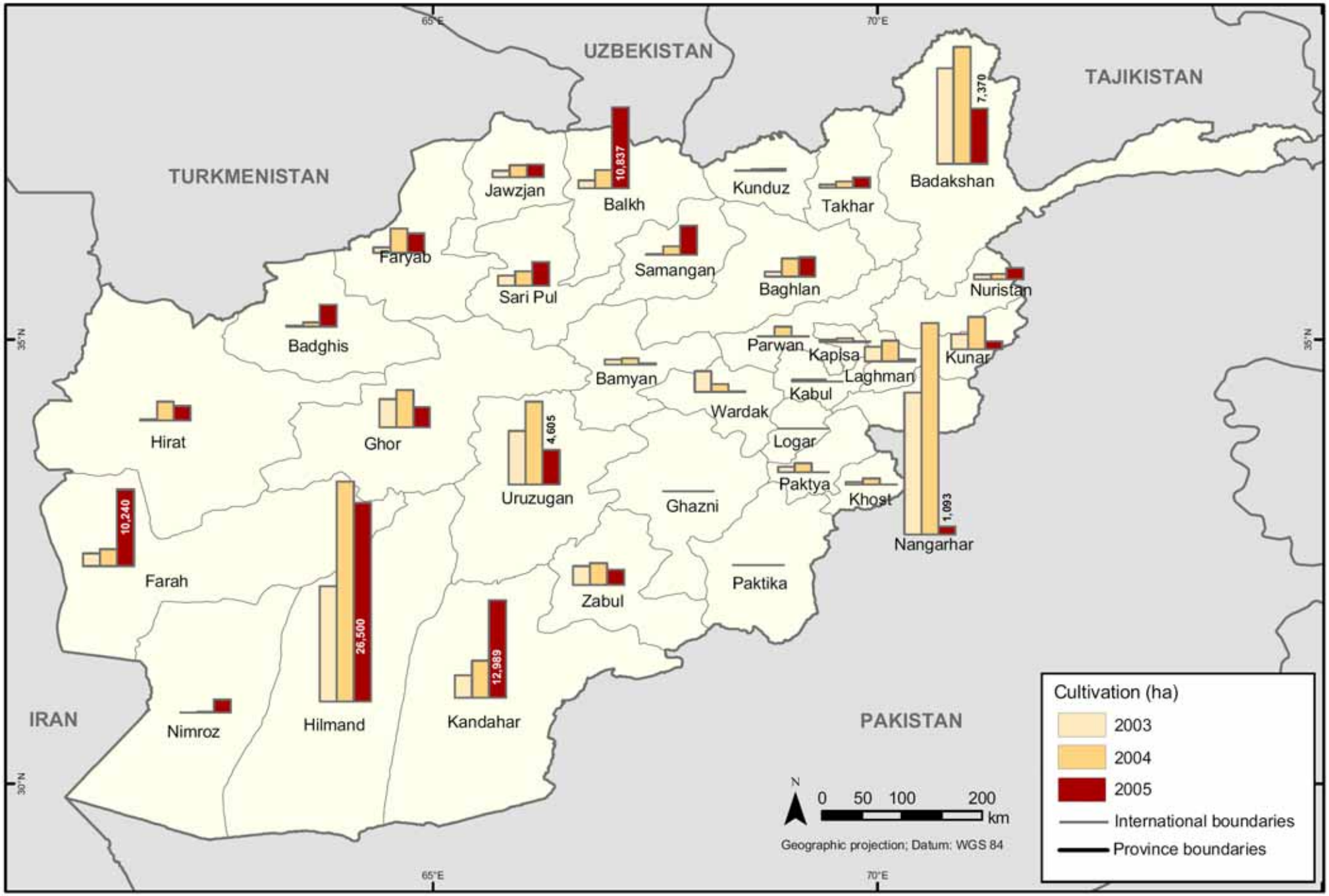
In addition to the sample of high resolution imagery, the whole of Hilmand, Kandahar, Farah, Uruzgan and Balkh provinces were covered with 10 meter resolution SPOT5 multi-spectral images. The objective was to determine the poppy areas by mid-resolution satellite imagery and at the same time to update the agricultural areas in these provinces, which served as the sampling frame. In addition, the census survey with SPOT5 images enabled the analysis of results at the district level.

At the same time, a sample of 1,900 villages was surveyed (out of a total of 30,706 villages) by 310 surveyors to collect socio-economic data. Over 6,000 capsules from 160 fields were measured and 5,700 farmers were interviewed. In the areas not covered by satellite images, the surveyors also collected data on the extent of opium poppy cultivation. Opium poppy cultivation estimated through the village survey in 17 provinces accounted for only 16% of the total area under opium poppy cultivation.

The survey was completed as planned despite widespread security problems. Instability in several regions impeded travel for the surveyors. Insecurity affected both the safety of the surveyors[5], as well as the farmers. Some non-compliance of the survey was due to farmers fear for their personal safety.

[5] No surveyors were injured during the 2005 Opium Survey.

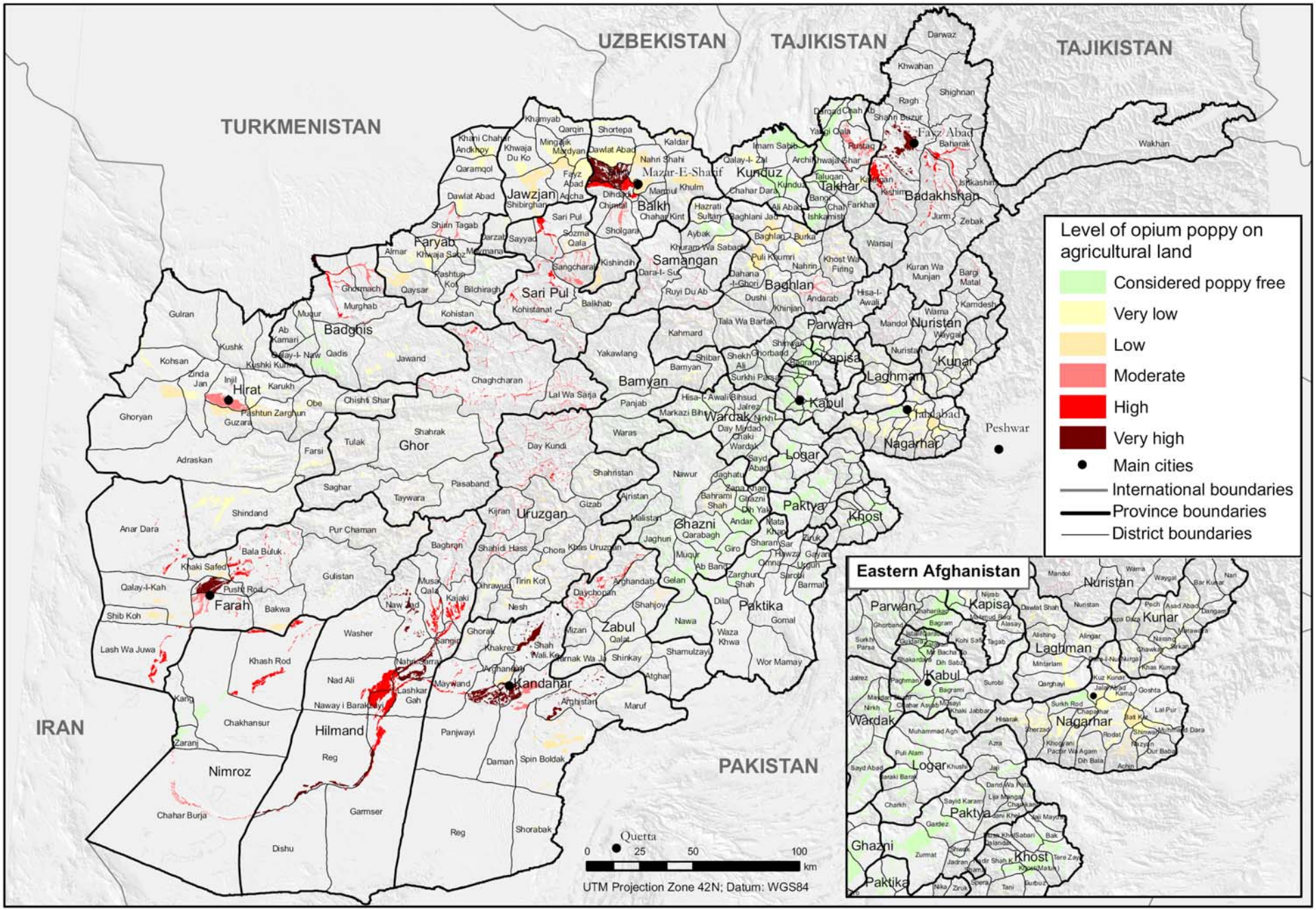
Opium poppy cultivation in Afghanistan by province, 2003-2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

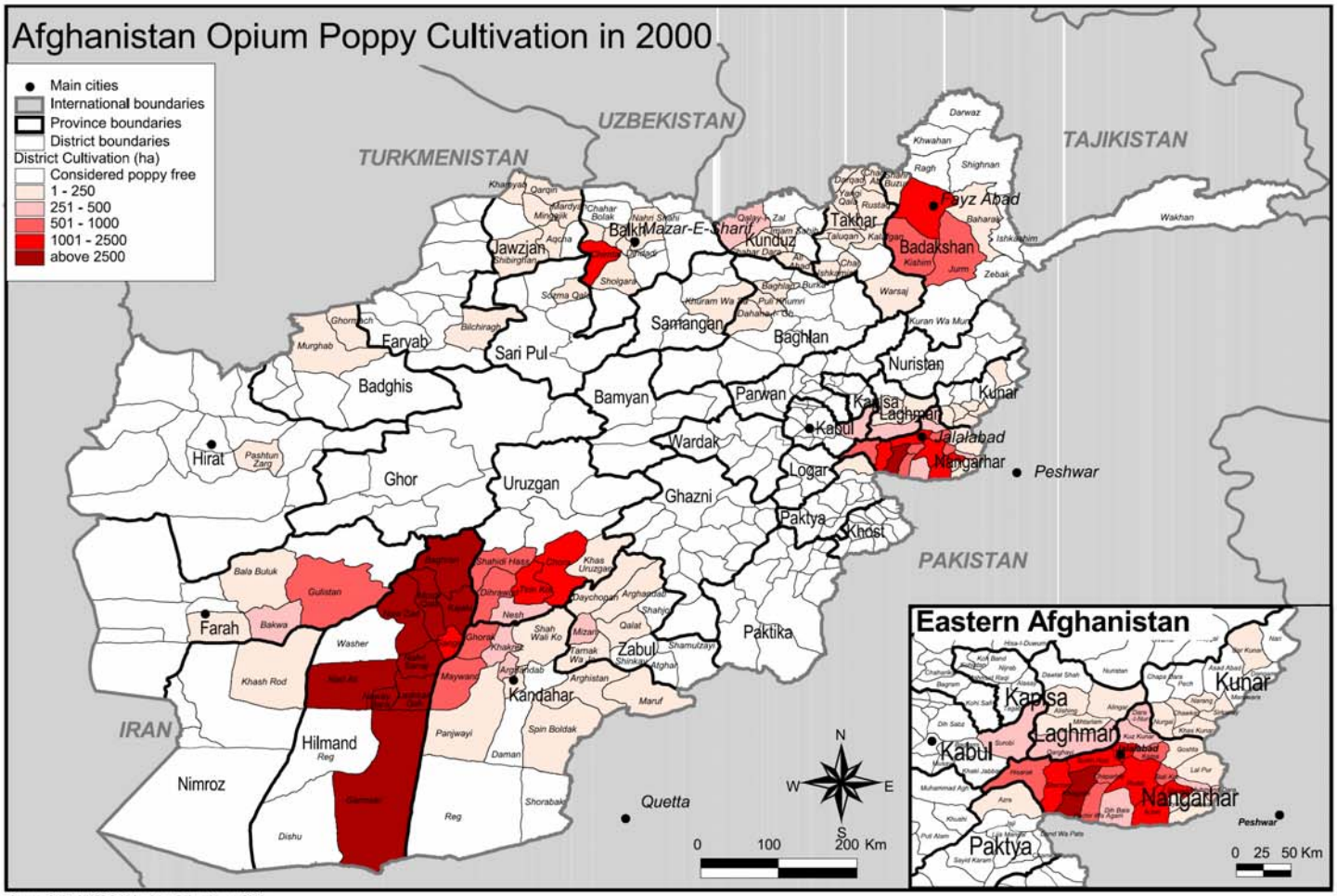
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Agricultural land and level of opium poppy cultivation in Afghanistan, 2005

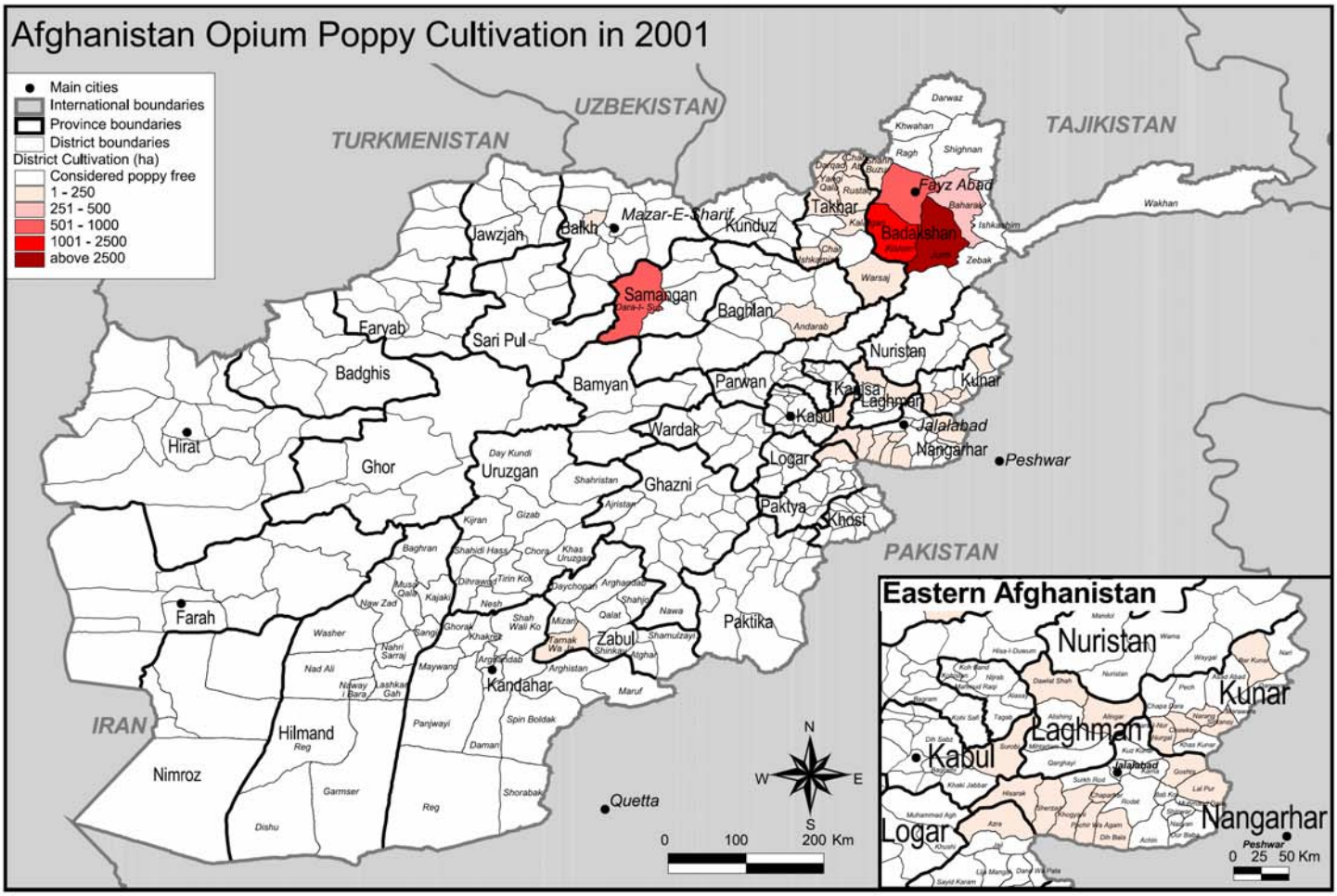


Source:MCN - UNODC Afghanistan Opium Survey 2005

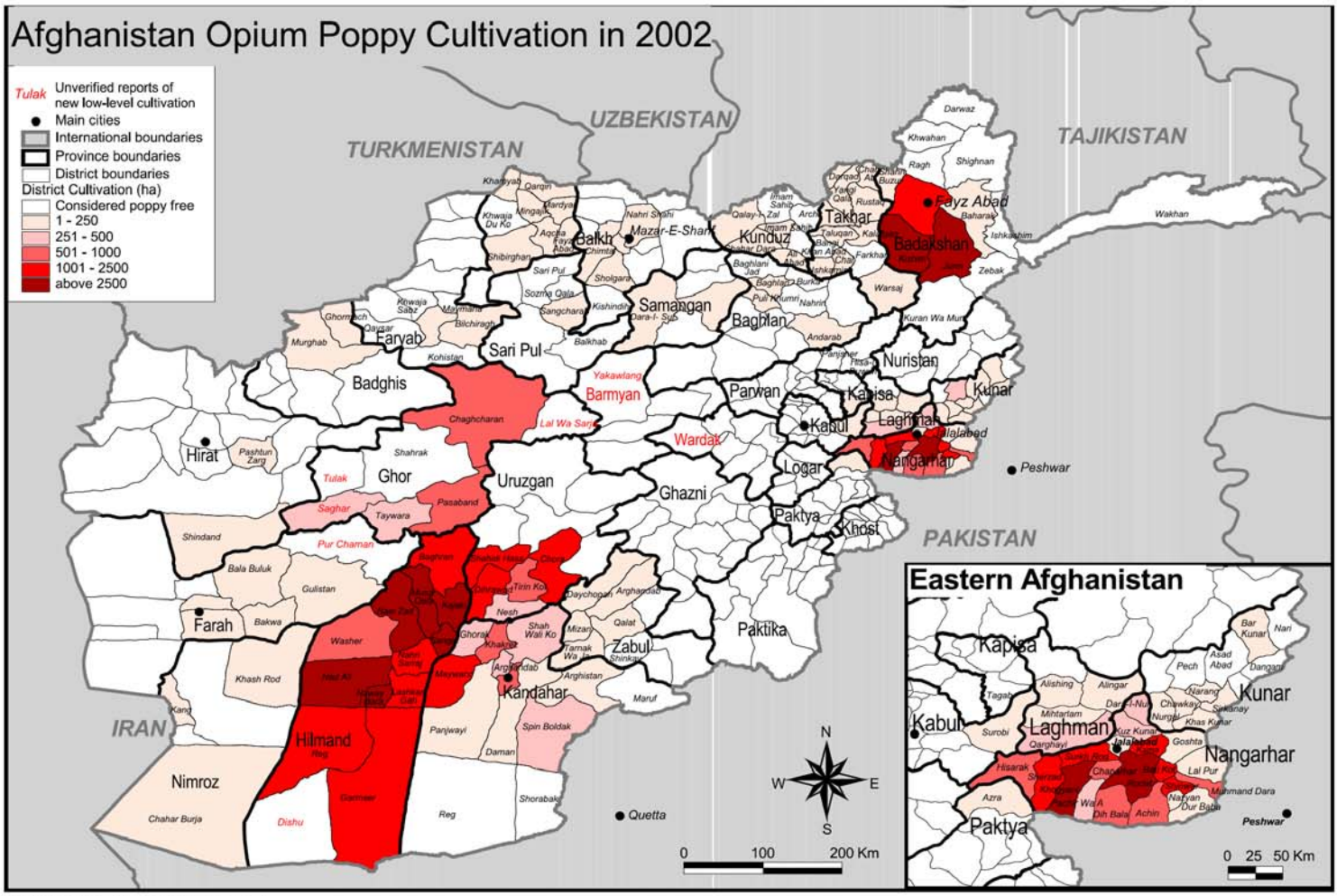
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.



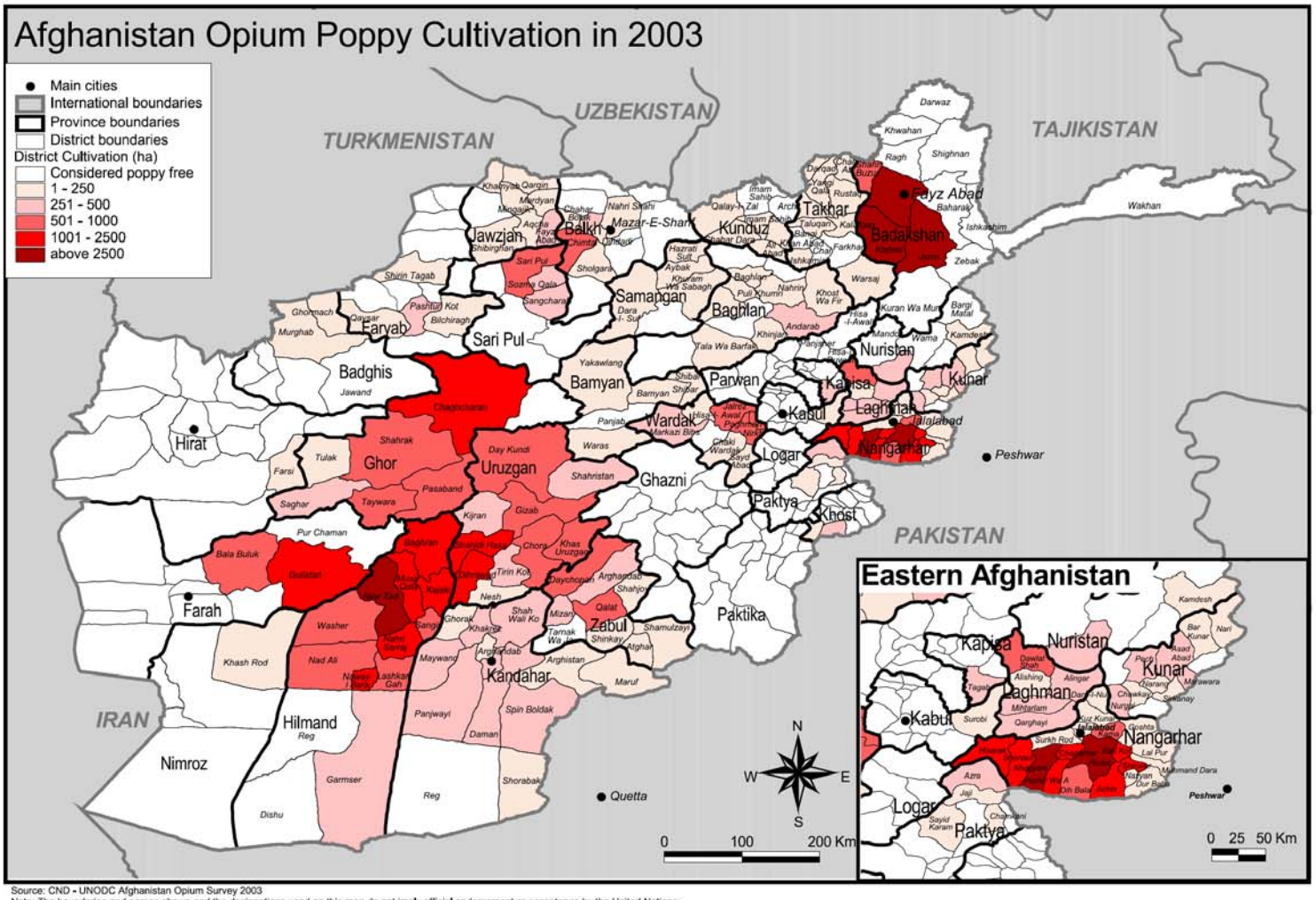
Source: CND - UNODC Afghanistan Opium Survey 2000
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The administrative boundaries have been downloaded from Afghanistan Information Management Service, United Nations (www.aims.org.af).



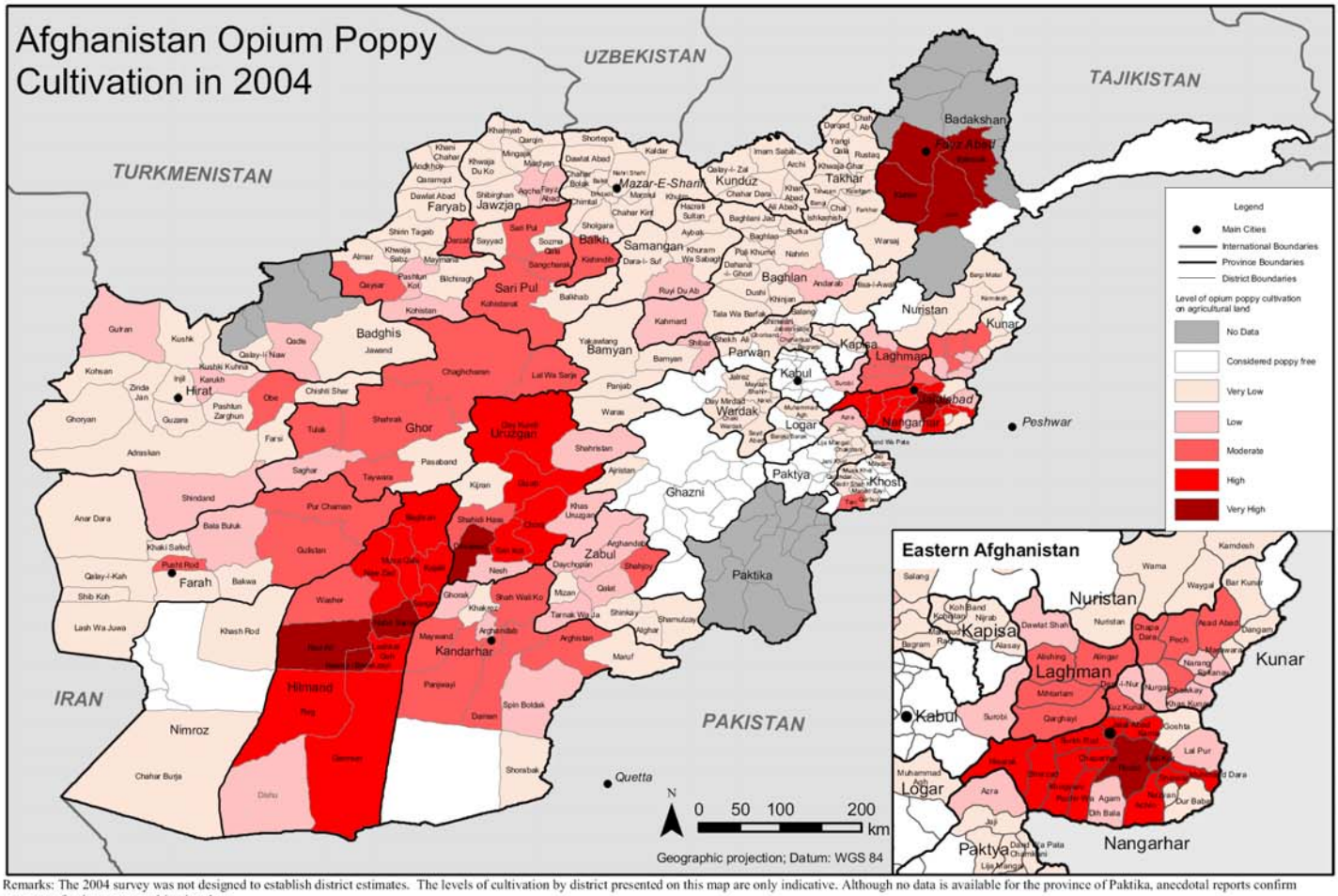
Source: CND - UNODC Afghanistan Opium Survey 2001
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The administrative boundaries have been downloaded from Afghanistan Information Management Service, United Nations (www.aims.org.af).



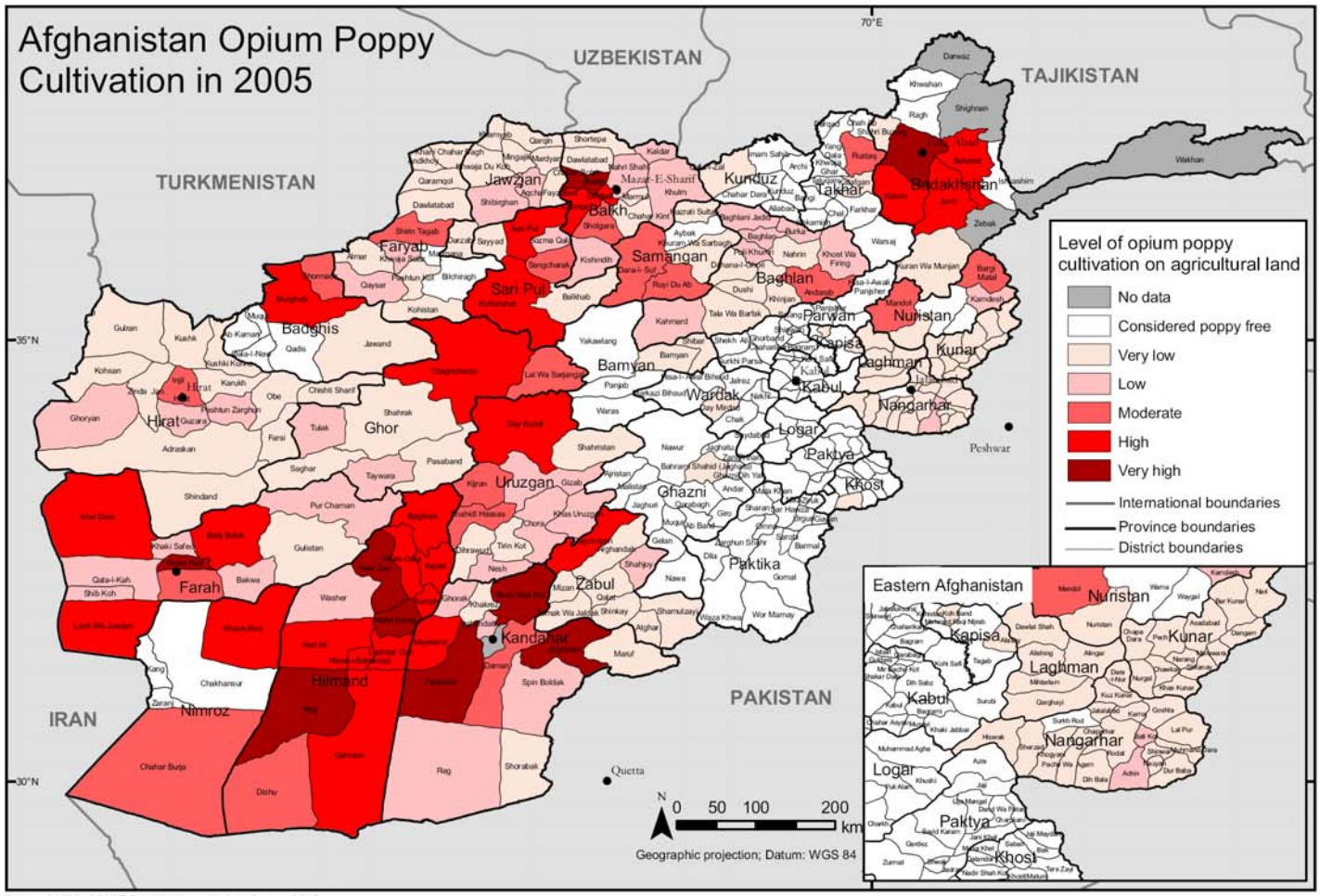
Source: CND - UNODC Afghanistan Opium Survey 2002
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The administrative boundaries have been downloaded from Afghanistan Information Management Service, United Nations (www.aims.org.af).



Source: CND - UNODC Afghanistan Opium Survey 2003
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The administrative boundaries have been dwnloeaded from Afghanistan Information Management Service, United Nations (www.aims.org.af).

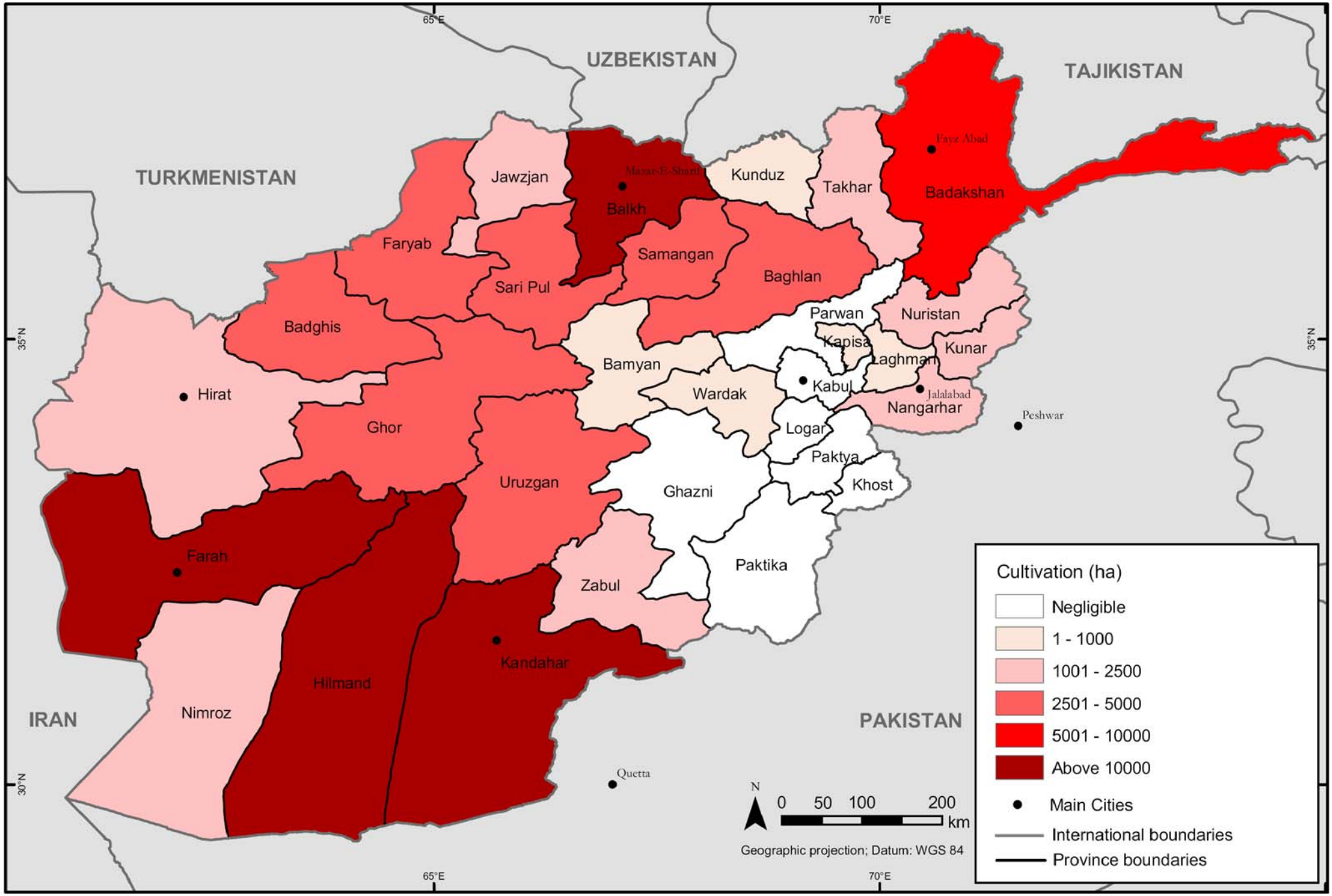


Remarks: The 2004 survey was not designed to establish district estimates. The levels of cultivation by district presented on this map are only indicative. Although no data is available for the province of Paktika, anecdotal reports confirm presence of opium poppy cultivation there.
Source: CND - UNODC Afghanistan Opium Survey 2004 (http://www.unodc.org/unodc/en/crop_monitoring.html)



Source: MCN - UNODC Afghanistan Opium Survey 2005
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations

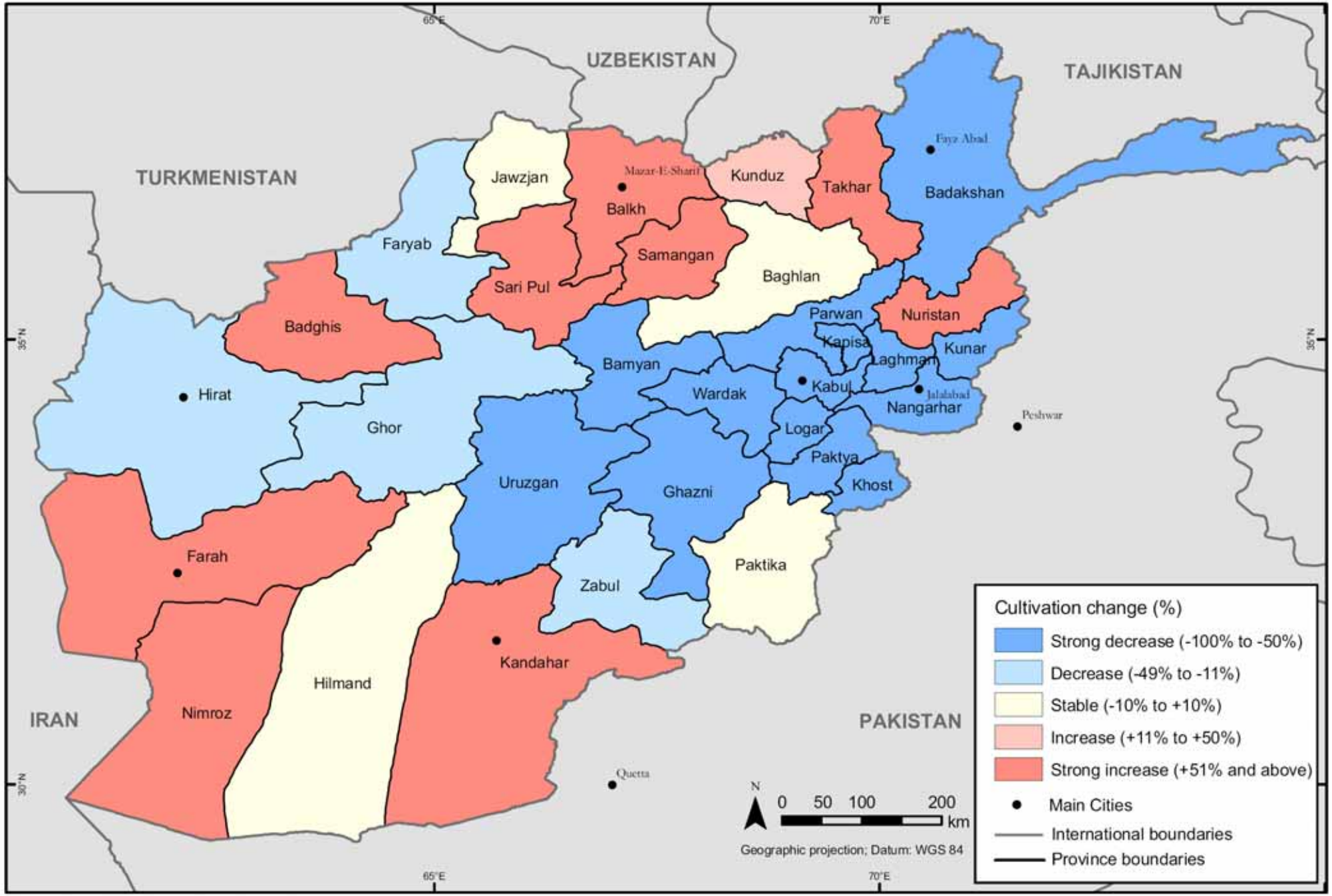
Opium Poppy Cultivation in Afghanistan, 2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

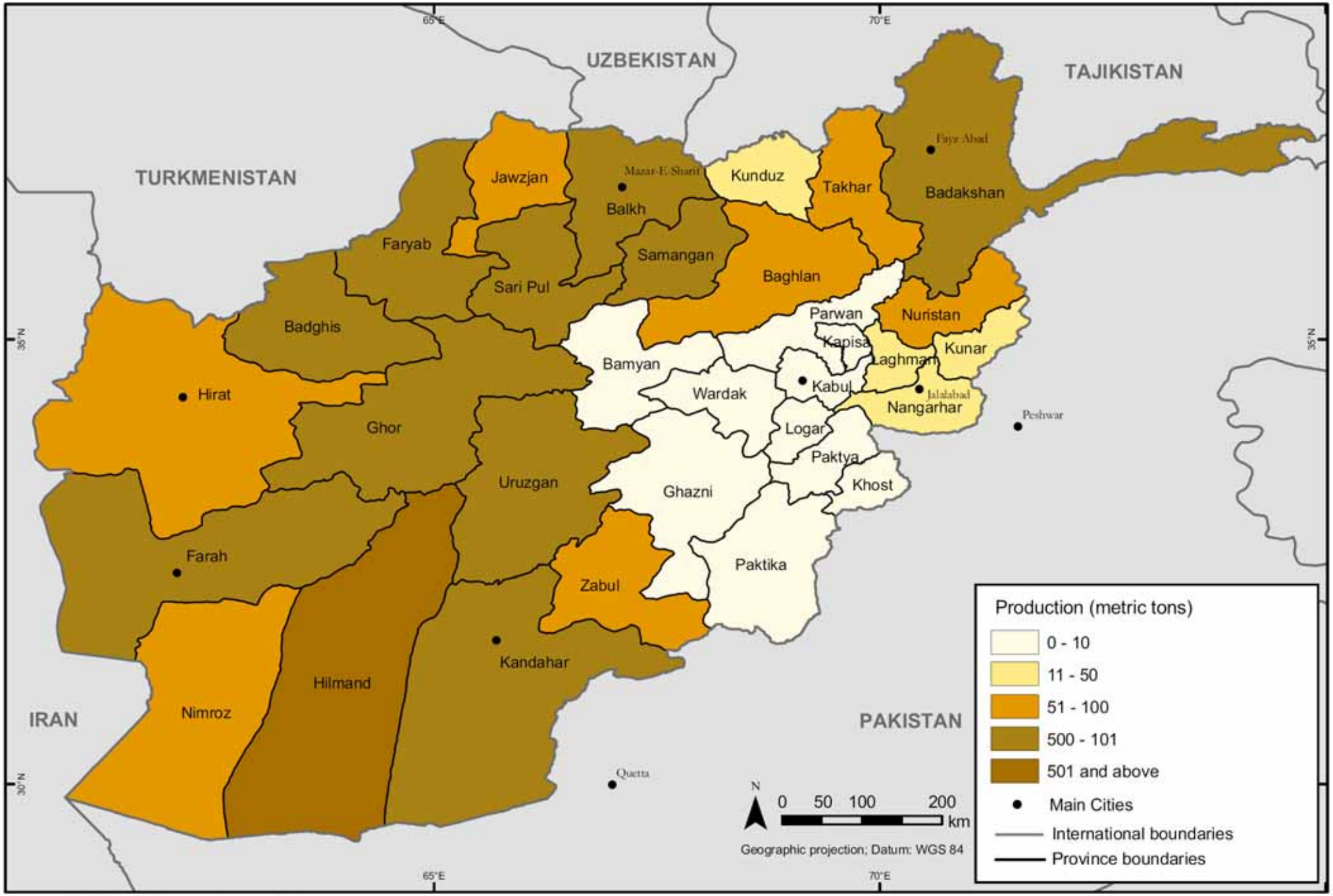
Opium poppy cultivation change in Afghanistan, 2004 - 2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

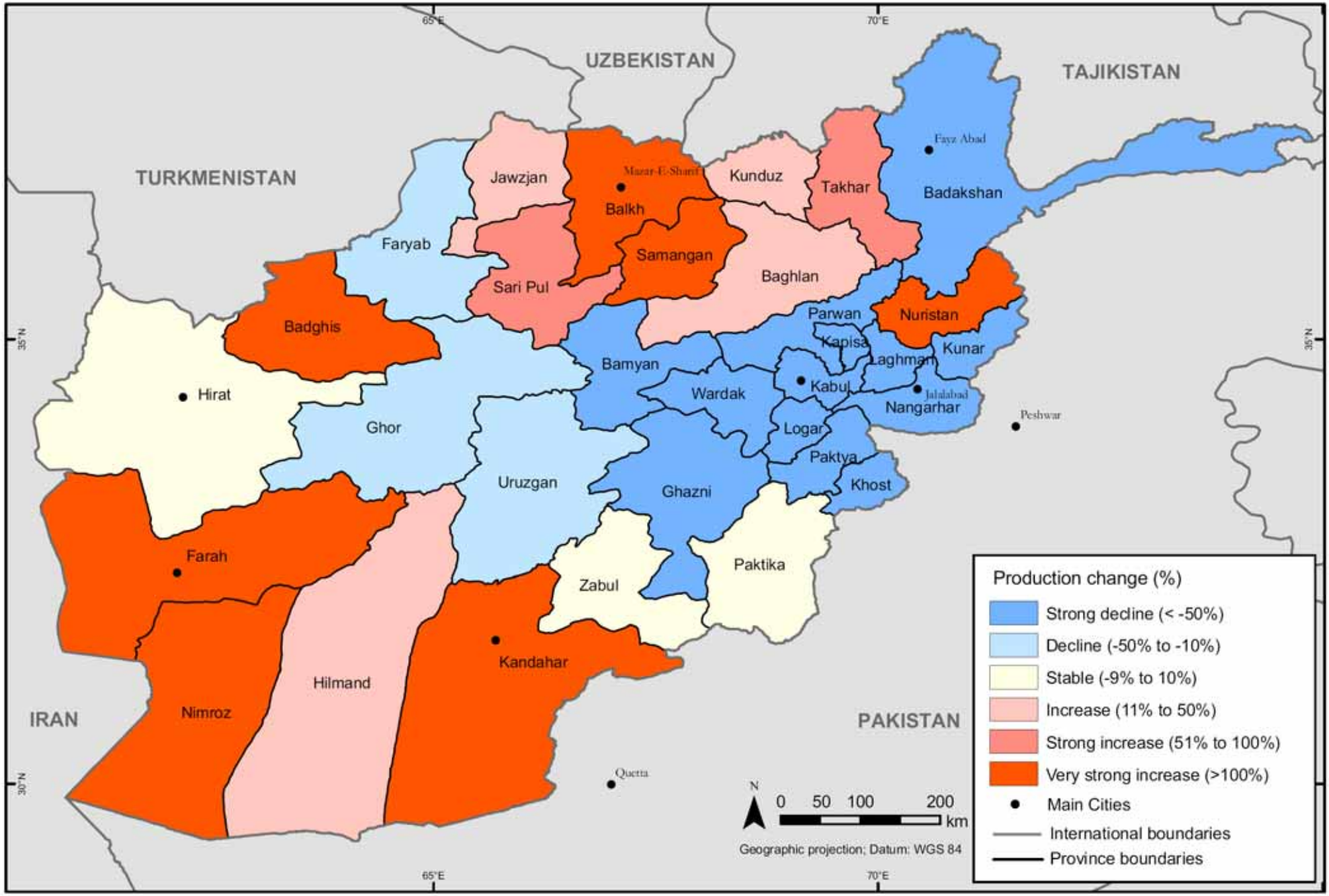
Opium production in Afghanistan, 2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

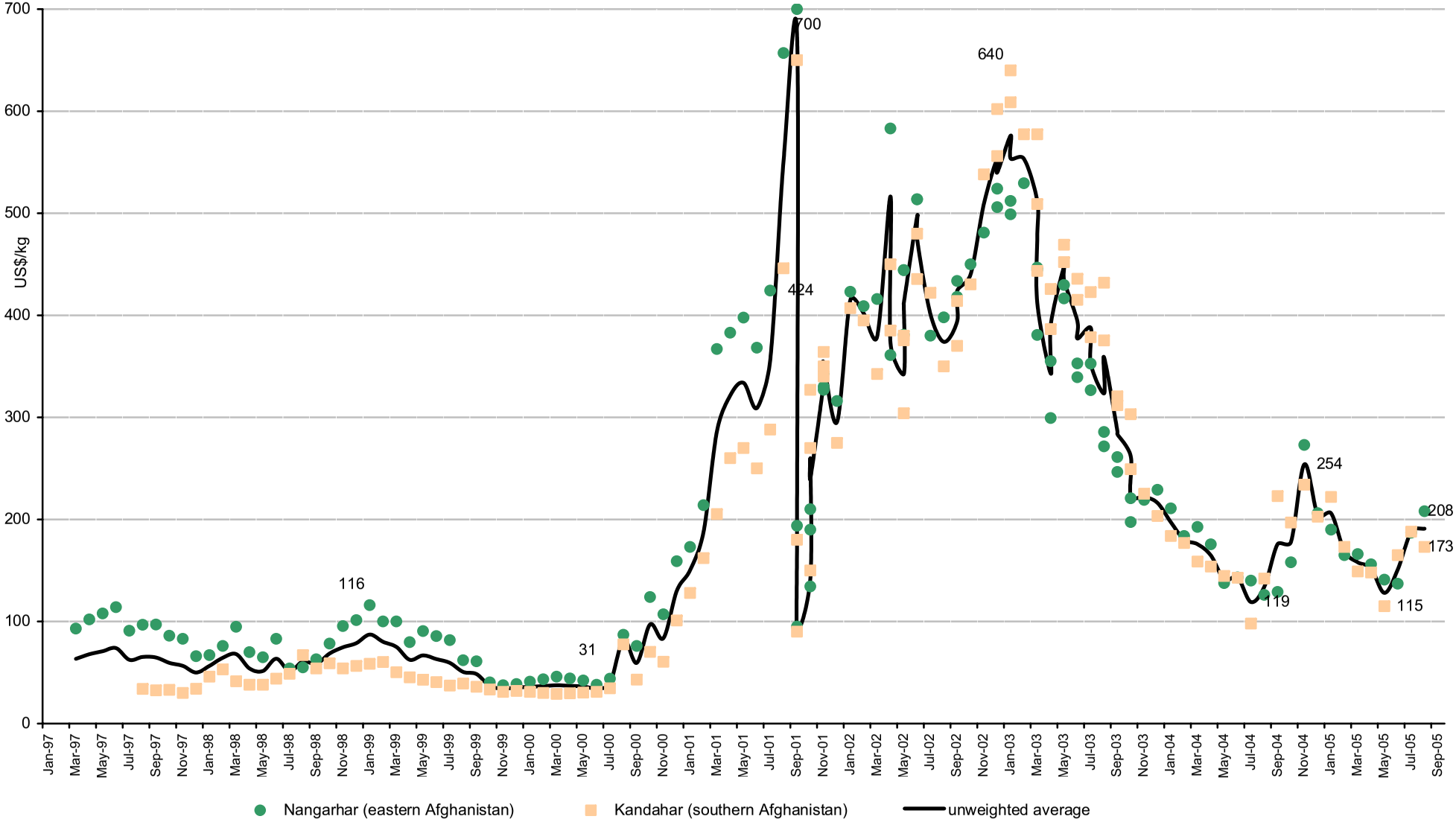
Opium production change in Afghanistan, 2004-2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Afghanistan, prices of dry opium in Nangarhar and Kandahar collected from traders, US$/kg, March 1997 - August 2005



1 INTRODUCTION

During the 1990s, Afghanistan established itself as the largest source of illicit opium and its derivative, heroin, in the world. By the end of the 1990s, Afghanistan provided about 70 % of global illicit opium, well ahead of Myanmar (about 22 %) and Lao PDR (about 3%). Since then the importance of Afghanistan as a supplier of illicit opiates has increased further, accounting for 86% of global illicit opium supply in 2004. The markets for these opiates are located primarily in South West Asia, Central Asia, East and West Europe, South Asia, the Arabian Peninsula and Africa. Illicit opiates of Afghan origin are consumed by an estimated 10-11 million abusers (or two thirds of all opiate consumers)—with more than 10,000 of them dying every year. It can be estimated that, all along the trafficking chain, more than half a million people are involved in the trade of illicit Afghan opiates in recent years.

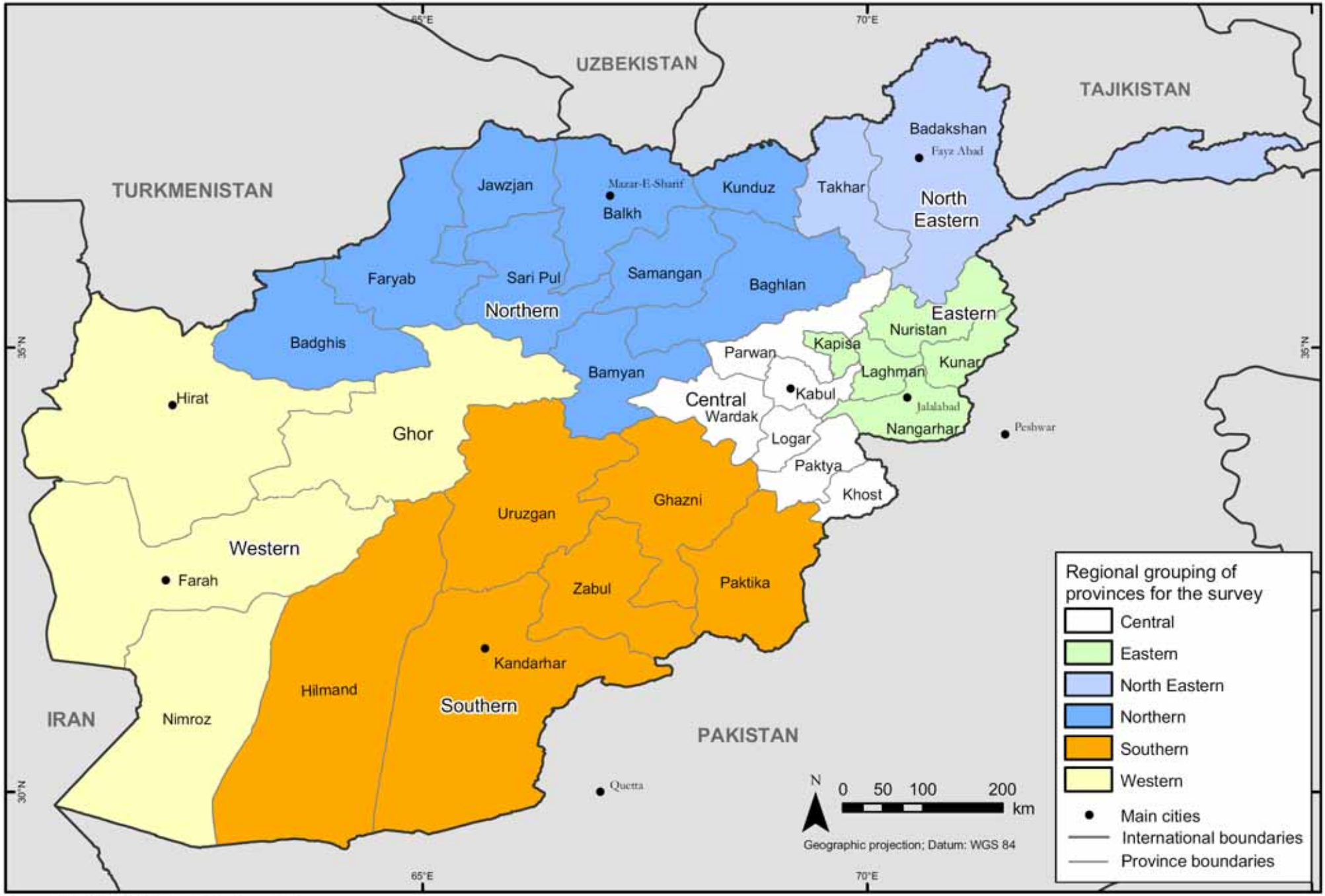
In 2001, following the ban imposed by the former Taliban regime, an abrupt decline of illicit opium poppy cultivation interrupted over two decades of overall increases in production. However, stimulated by a subsequent 10-fold increase in opium prices, cultivation resumed at a high level in 2002 and began to spread outside of the traditional areas. Although a new ban was issued in January 2002, the situation prevailing in Afghanistan hindered the efforts of the new Afghan government to curb opium poppy cultivation. In 2004, the area under cultivation increased by two-thirds, reaching a record level of 131,000 hectares. After his inauguration in December 2004, President Karzai renewed his commitment to reducing illicit cultivation and summoned local tribal government and religious leaders to a *loya jirga* on narcotics entitled the National Conference on Counter Narcotics. Shortly thereafter, the National Council of *Ulema*, a group of Afghanistan's most respected Muslim scholars, issued a fatwa, or religious declaration, against the drug production, trade and consumption. During this period, the Government launched a public awareness campaign and an eradication programme.

The Afghanistan opium survey is implemented annually by the United Nations Office on Drugs and Crime and, since 2003, in collaboration with the Afghan Government. It collects and analyses information on the location and extent of opium poppy cultivation, the potential production of opium, and the socioeconomic dimensions of the problem. The results provide a detailed picture of the outcome of the current year's opium season and, with previous years' data, enable the identification of mid- and long-term trends in the evolution of the illicit drug problem. This information is essential for planning, implementing and monitoring the impact of measures required for tackling a problem which has serious implications for both the country and the international community.

The opium survey is implemented in the technical framework of UNODC's Illicit Crop Monitoring Programme (ICMP). The objective of ICMP is to assist the international community in monitoring the extent and evolution of illicit crops in the context of the elimination objective adopted at the General Assembly Special Session on Drugs in June 1998. In the framework of ICMP, monitoring activities are presently supported by UNODC in the other five main countries affected by illicit opium poppy and coca bush cultivation (Myanmar and Lao PDR in Asia, and Colombia, Peru and Bolivia in Latin America), as well as in Morocco, where one of the main areas of illicit cannabis cultivation is located.

The 2005 opium survey in Afghanistan was implemented under the project AD/AFG/F98 "Monitoring of opium production in Afghanistan" and the project AD/GLO/C93 "Illicit Crop Monitoring Programme Support", with financial contributions from the Governments of the United Kingdom, Finland and Italy.

Regional grouping of provinces for the opium poppy survey in Afghanistan, 2005



Source: CND - UNODC Afghanistan Opium Survey 2005

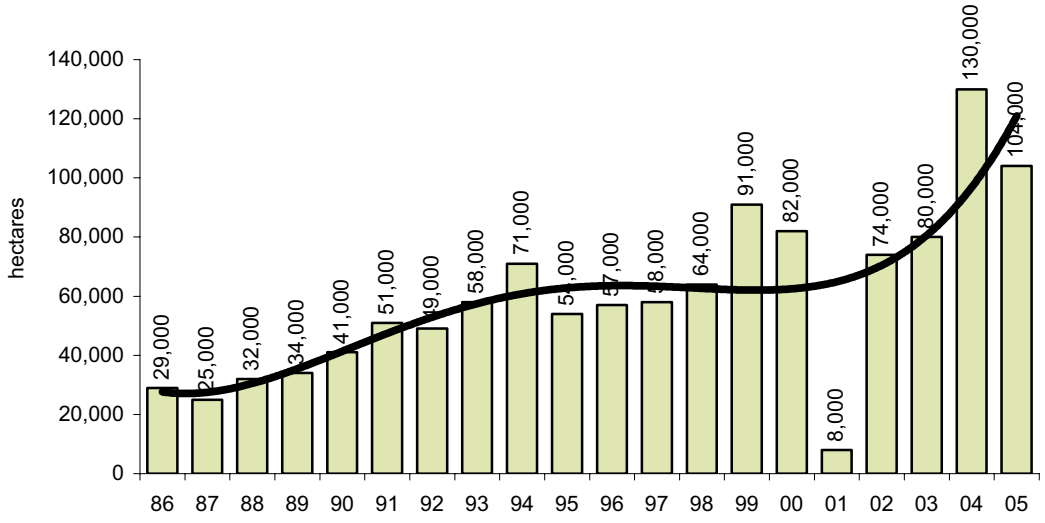
2 FINDINGS

2.1 Opium Poppy Cultivation

The estimated area under opium poppy cultivation in Afghanistan decreased by 21% to 104,000 hectares in 2005 (confidence interval: 95,000-113,000). In 2005, opium poppy cultivation was reported in 24 provinces. This represents the first contraction in many years and reverses the trend of previous years when opium poppy cultivation expanded into new provinces each year (24 provinces in 2002, 28 in 2003 and 31 in 2004). While the main opium production areas continue to be located in southern Afghanistan, cultivation in some northern provinces increased considerably.

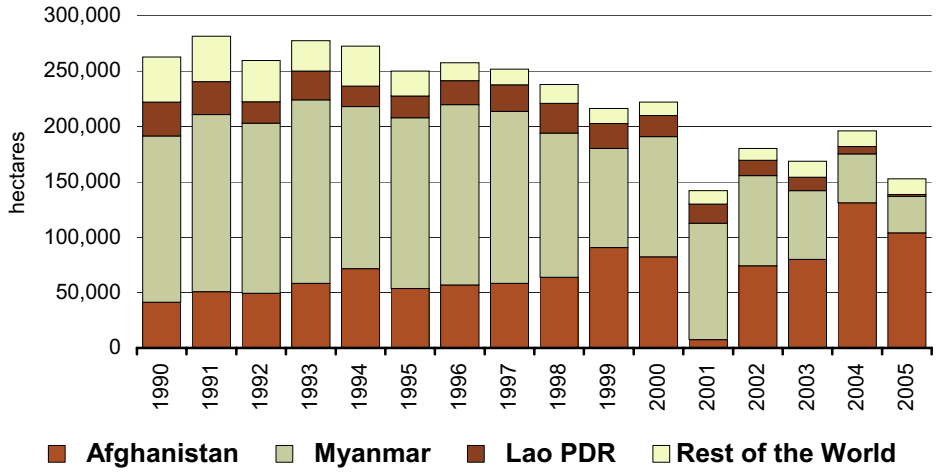
As a result of the decline in opium cultivation in Afghanistan in 2005, global opium poppy cultivation is estimated to fall by some 16%. The share of Afghanistan would remain almost stable at 67%.

Figure 1: Opium poppy cultivation in Afghanistan from 1986 to 2005



Sources: UNODC opium surveys for 1994-2005 and UNODC, Global Illicit Drug Trends 2001 for other years.

Figure 2: Global opium poppy cultivation in hectares, 1990-2005*



* For 2005, estimates for the "rest of the world" and Myanmar are still tentative

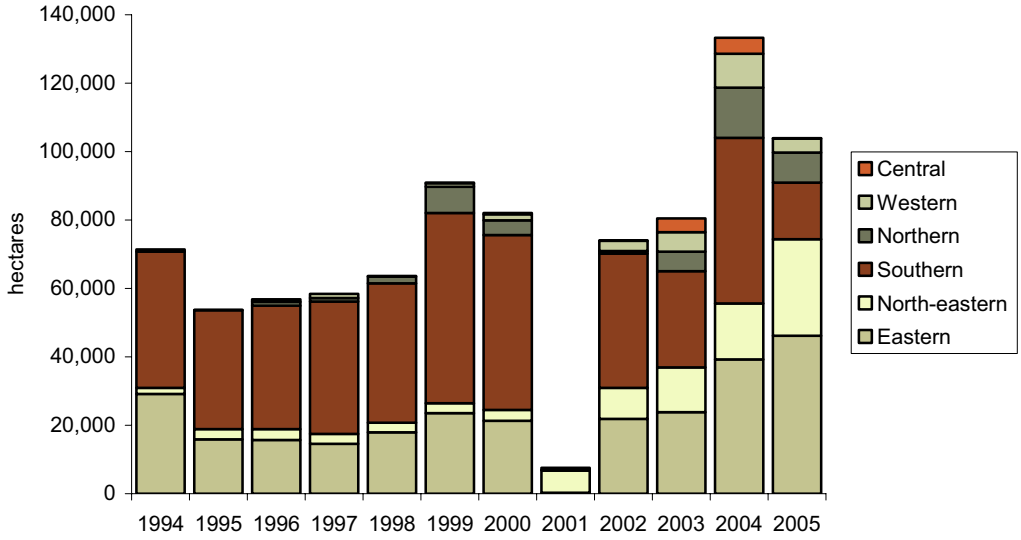
The regional distribution of opium poppy cultivation in Afghanistan shifted in 2005. While a major decrease of 89% was found in the eastern region, significant increases took place in the northern and western regions: 93% and 67% respectively. Opium poppy cultivation in the southern region remained almost stable (-5%).

A map presenting the regional grouping used for the opium survey 2005, is presented on page 22.

Table 1: Regional distribution of opium poppy cultivation in 2004 and 2005

Region	2004 (ha)	2005 (ha)	Change 2004 2005	share of total in 2004 (%)	share of total in 2005 (%)
South	48,431	46,147	-5%	37%	44%
North	14,627	28,282	93%	11%	27%
West	9,917	16,543	67%	8%	16%
North-East	16,369	8,734	-47%	12%	8%
East	36,621	4,095	-89%	28%	4%
Central	4,671	106	-98%	21%	0%
Rounded Total	**131,000**	**104,000**	**-21%**	**100%**	**100%**

Figure 3: Regional distribution of opium poppy cultivation since 1994



Opium poppy cultivation decreased in 19 provinces in 2005. The largest declines -in absolute terms- were found in Nangarhar (27,120 ha), Badakshan (8,237 ha) and in Uruzgan (6,475 ha). A very sharp decrease of 96% was observed in Nangarhar, which had the second largest area under cultivation in 2004 (28,213 ha). Badakshan and Uruzgan, with the third and fourth largest areas under opium poppy cultivation in 2004, dropped to the fifth and sixth place in 2005. Opium cultivation in Central Afghanistan (Parwan, Paktya, Wardak, Khost, Kabul and Logar) almost disappeared in 2005: from 4600 ha in 2004 to 106 hectares in 2005. Hilmand remained the province with the largest area under cultivation, although cultivation decreased an encouraging 10%.

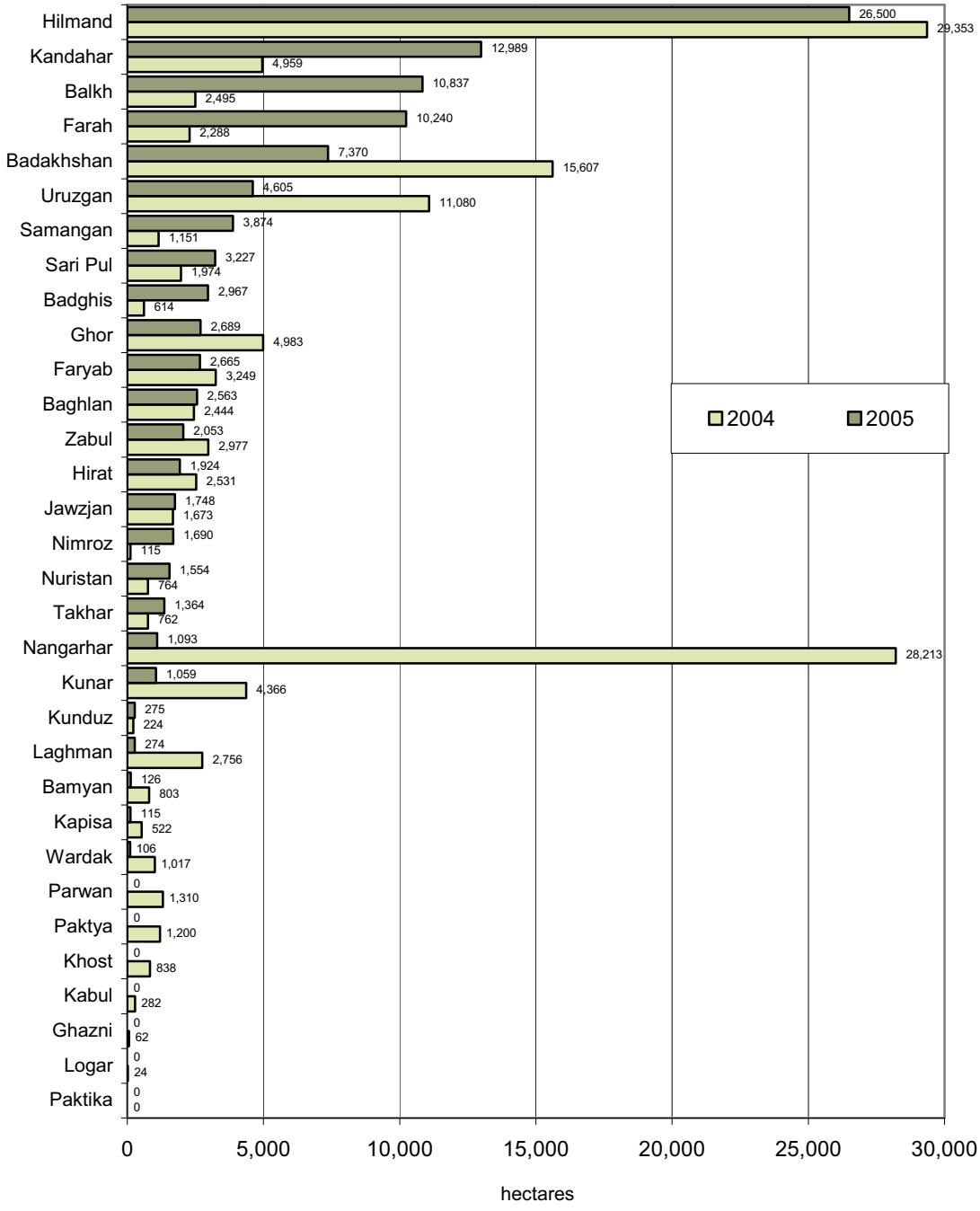
Increases of more than 10% were seen in 10 provinces. Major increases –in absolute terms- were found in Balkh (8,342 ha), Kandahar (8,030 ha) and Farah (7,952 ha). Poppy cultivation in Kandahar increased 162% to 12,989 ha. Kandarhar now has the second largest area under opium poppy cultivation. Worryingly, cultivation in Balkh increased 334%. The province became the number three opium poppy producing province, followed by Farah at 10,240 ha. Neither province was an important opium poppy growing region in 2004 or in previous years. In general, in 2005, opium poppy cultivation moved from traditional growing areas (Hilmand, Laghman, Nangarhar, Uruzgan) to new provinces (Badghis, Balkh, Farah, Samangan).

Five provinces accounted for 65% of the total opium poppy cultivation in 2005. Hilmand continues to have the largest area under cultivation. Nangarhar, which was the second largest poppy cultivating province in 2004, is amongst the provinces with the lowest cultivation levels in 2005.

Table 2: Change of area under opium poppy cultivation in main cultivation provinces, 2003-2005 (hectares)

Province	2003	2004	2005	Change 2004-2005	% of total in 2005	Cumulative %
Hilmand	15,371	29,353	26,500	-10%	25%	25%
Kandahar	3,055	4,959	12,989	162%	12%	38%
Balkh	1,108	2,495	10,837	334%	10%	48%
Farah	1,700	2,288	10,240	348%	10%	58%
Badakhshan	12,756	15,607	7,370	-53%	7%	65%
Nangarhar	18,904	28,213	1,093	-96%	1%	66%
Rest of the Country	46,010	76,298	36,064	-53%	35%	100%

Figure 4: Afghanistan opium poppy cultivation change 2004-2005 per province (hectares)



In 2005, record cultivation levels were reported for nine provinces. With the exception of Kandahar, these were all provinces with low cultivation levels in previous years, supporting the thesis that opium poppy cultivation remains a highly dynamic phenomenon in Afghanistan.

Table 3: Record years for level of opium poppy cultivation at province level, 1994-2005

Record year	Number of provinces	Provinces
2005	9	Baghdish, Baghlan, Balkh, Kandahar, Nimroz, Nuristan, Samangan, Saripul, Takhar
2004	15	Uruzgan, Zabul, Kunar, Laghman, Badakhshan, Faryab, Bamyan, Ghor, Hirat, Farah, Parwan, Paktya, Khost, Kabul, Logar.
2003	1	Wardak
2002	0	
2000	1	Kunduz
1999	2	Hilmand, Jawzjan
1994	2	Ghazni, Nangarhar,

SOUTHERN REGION (Hilmand, Uruzgan, Kandahar, Zabul, Ghazni, Paktika)

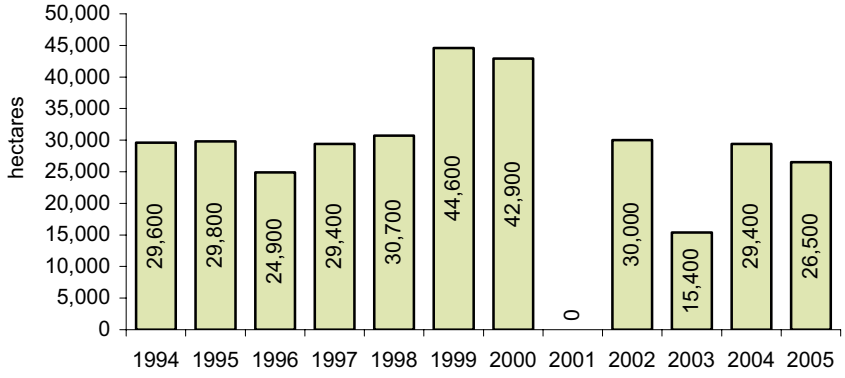
Province	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Hilmand	29,579	29,754	24,910	29,400	30,672	44,552	42,853	-	29,950	15,371	29,353	26,500
Kandahar	3,624	2,127	3,057	4,122	5,229	5,522	3,034	-	3,970	3,055	4,959	12,989
Uruzgan	6,254	2,908	7,880	4,986	4,661	4,989	4,725	1	5,100	7,143	11,080	4,605
Zabul	54	-	255	154	161	537	585	1	200	2,541	2,977	2,053
Gazni	313	-	-	-	-	-	-	-	-	-	62	-
Paktika	-	-	-	-	-	-	-	-	-	-	-	-

Hilmand

From 2004 to 2005, opium poppy cultivation in Hilmand declined by 10% to 26,500 ha. Although this is the fourth lowest level of cultivation since 1994, the province still has the largest area under cultivation in Afghanistan. Hilmand accounted for 25% of the country's total poppy cultivation in 2005, compared to 23% in 2004, 19% in 2003 and 40% in 2002.

While the 2005 survey was not designed to provide estimates at district level, field work provided clear indications of higher levels of cultivation in the northern and southern parts of the province, as compared to the central districts.

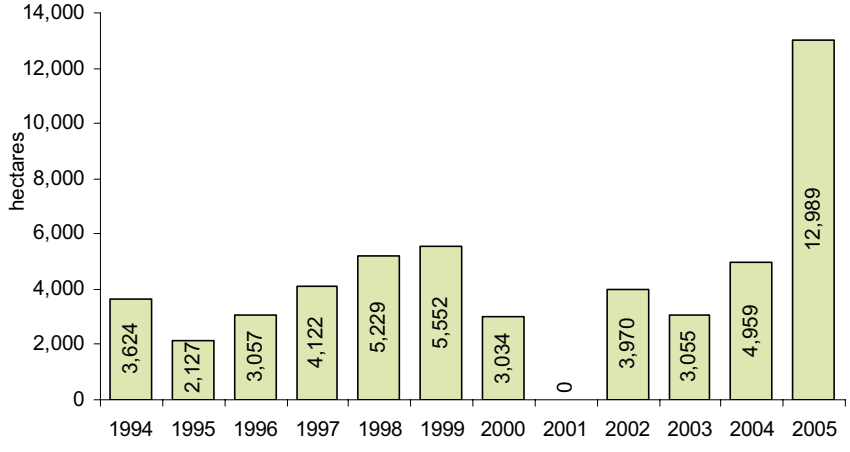
Figure 5: Opium poppy cultivation in Hilmand province



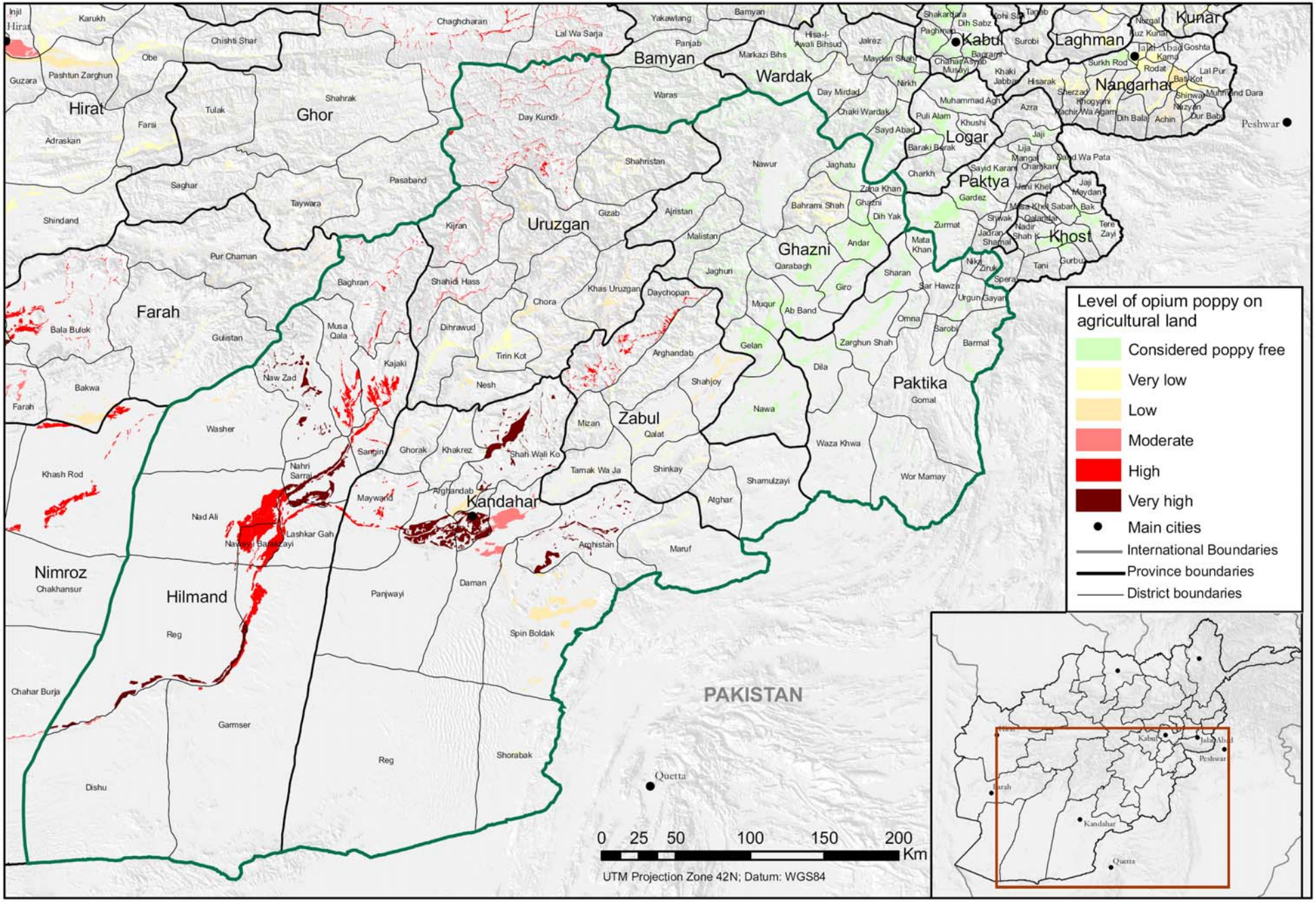
Kandahar

In 2005, opium poppy cultivation amounted to 12,989 ha in Kandahar, which is a 162% increase as compared to 2004. This is the highest level of opium poppy cultivation in Kandahar on record.

Figure 6: Opium poppy cultivation trends in Kandahar province



Agricultural land and level of opium poppy cultivation in the Southern region in Afghanistan, 2005



Source:MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

EASTERN REGION (Nangarhar, Kunar, Laghman, Nuristan , Kapisa)

Province	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Nangarhar	29,081	15,724	15,645	14,567	17,821	22,990	19,747	218	19,780	18,904	28,213	1,093
Kunar	115	152	18	-	75	288	786	82	972	2,025	4,366	1,059
Laghman	-	-	-	-	77	297	707	15	950	1,907	2,756	274
Nuristan	-	-	-	-	-	-	-	-	-	648	764	1,554
Kapisa	-	-	-	-	-	5	104	-	207	326	522	115

Nangarhar

Poppy cultivation in Nangarhar decreased sharply from 28,213 ha in 2004, to 1,093 ha in 2005 (-96%). Nangarhar was almost poppy free in 2005, except in parts of Achin and Shinwar districts and in some mountainous regions.

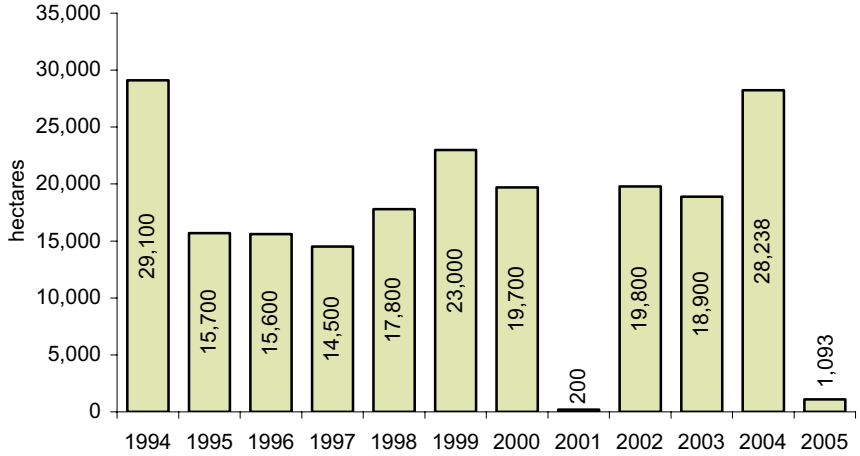
The survey findings reveal that only 0.7% of 2004's opium poppy fields were cultivated again with opium poppy in 2005. In addition, as part of the project 'Support to the Verification Process of Opium Poppy Eradication,' UNODC verified the eradication of 1,860 ha of opium poppy in Nangarhar province. When villagers were asked why they reduced or stopped opium cultivation, most reported that they feared eradication (42%) or imprisonment (31%). Others (24%), referred to the opium poppy ban directly. Before the 2004-5 growing season, the Nangarhar Governor had informed the district authorities that they would be held responsible for the level of opium poppy cultivation in their area and, at the start of the planting season, district administrators and security chiefs had called tribal elders and the shura members from each village to the district centre and informed them that they should not cultivate poppy.

March 2004, opium poppy

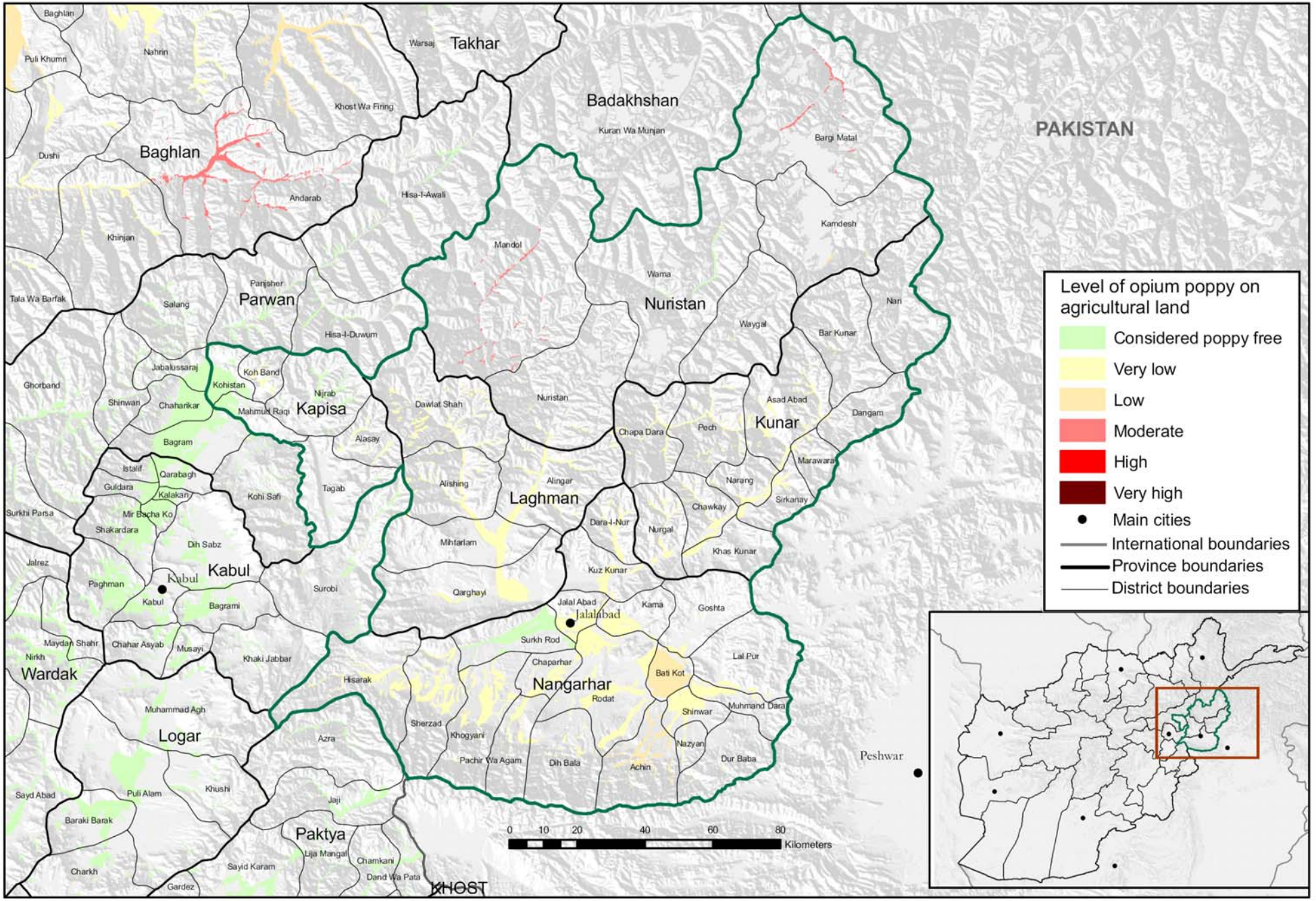
March 2005, wheat

Change of cultivation in Bati Kot district, Nangarhar province in 2004 and 2005

Figure 7: Opium poppy cultivation in Nangarhar province



Agricultural land and level of opium poppy cultivation in the Eastern region in Afghanistan, 2005



Source:MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Laghman, Kunar, Nuristan

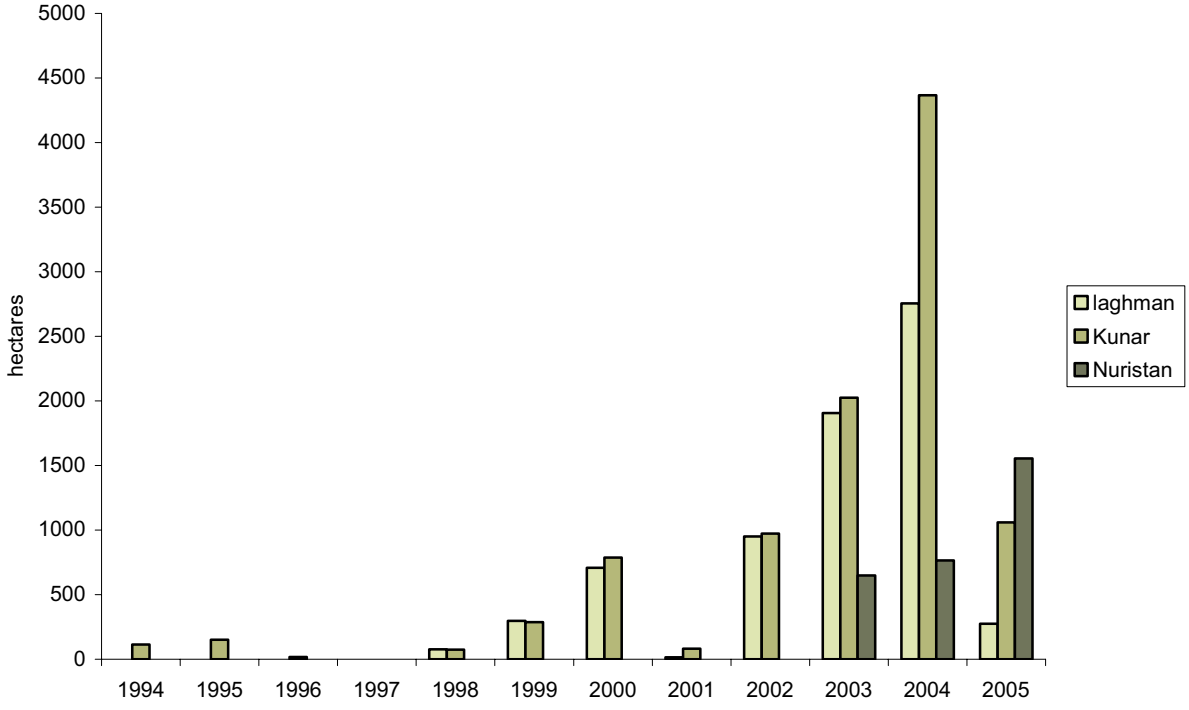
Opium poppy cultivation decreased significantly in Laghman (90%) and Kunar (76%) but increased sharply in Nuristan province in 2005 (103%). The area under opium poppy cultivation amounted to 274 ha in Laghman, 1,059 ha in Kunar and 1,554 ha in Nuristan. With the exception of a few remote and mountainous areas, Laghman province was almost opium poppy free in 2005. In Nuristan, by contrast, the level of opium poppy cultivation was higher than ever before.

March 2004, opium poppy

March 2005, wheat

Agricultural fields in Qarghyi District (Laghman) in 2004 and 2005 (same location)

Figure 8: Opium poppy cultivation in Lagman, Kunar and Nuristan provinces



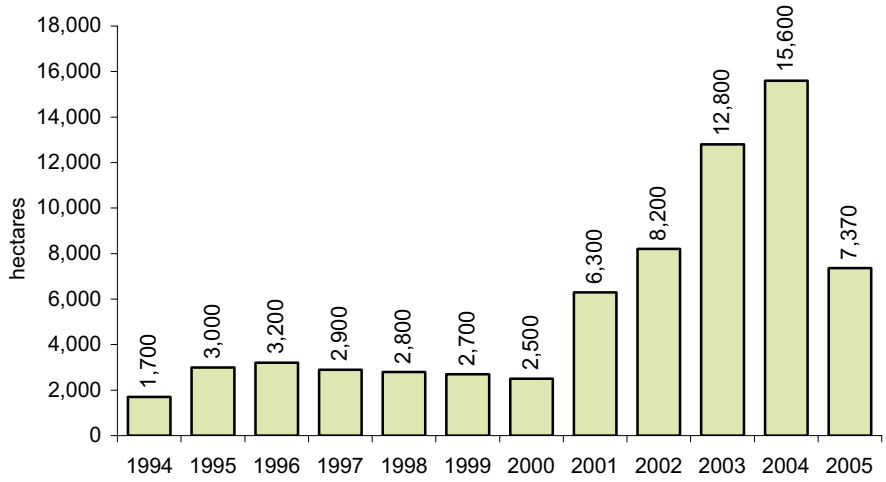
NORTH-EASTERN REGION (Badakhshan, Takhar)

Province	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Badakhshan	1,714	2,966	3,230	2,902	2,817	2,684	2,458	6,342	8,250	12,756	15,607	7,370
Takhar	-	-	-	-	-	201	647	211	788	380	762	1,364

Badakhshan

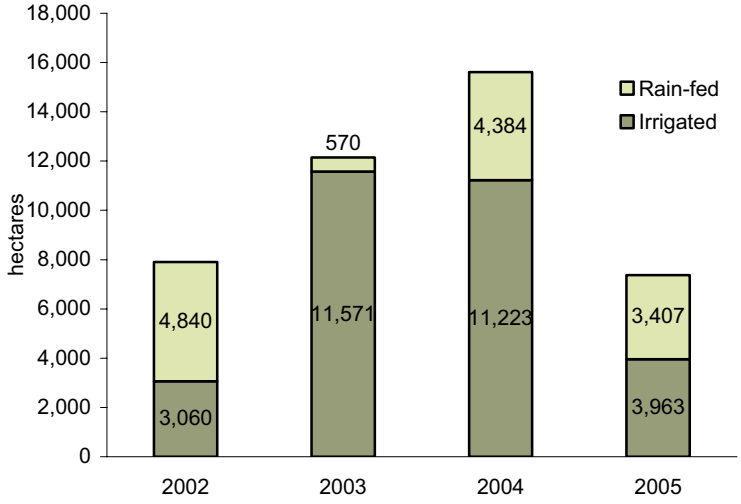
Poppy cultivation in Badakshan declined 53% to 7,370 ha in 2005, a reversal of four years of significant and steady increases. The survey showed that opium poppy cultivation moved from the main irrigated valleys to rain fed areas and side-valleys. Unlike in other regions in Afghanistan, there were some reports of disease and insect damage to the poppy crop.

Figure 9: Opium poppy cultivation in Badakhshan province, 1994-2005

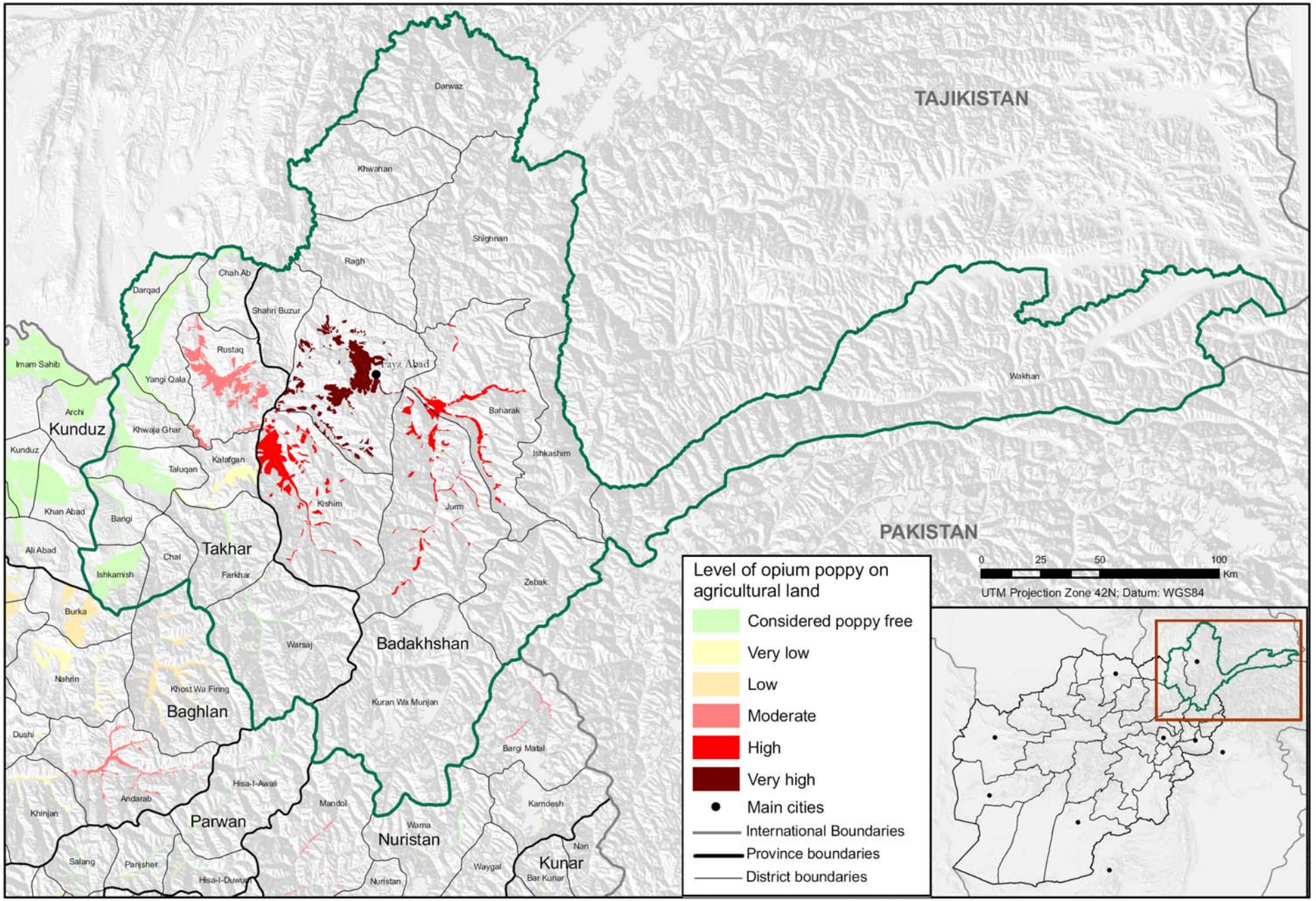


Given a decline of opium poppy cultivation on irrigated land, the contribution of rain fed cultivation to total opium poppy cultivation increased from 28% in 2004 to 46% in Badakhshan in 2005. Favourable weather conditions assisted in the increase of opium poppy cultivation in rain fed areas. Farmers reported that they reduced opium cultivation, mainly in irrigated areas, because of the Government ban on opium cultivation and fear of eradication.

Figure 10: Distribution of irrigated & rain-fed poppy cultivation in Badakhshan



Agricultural land and level of opium poppy cultivation in the North Eastern region in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

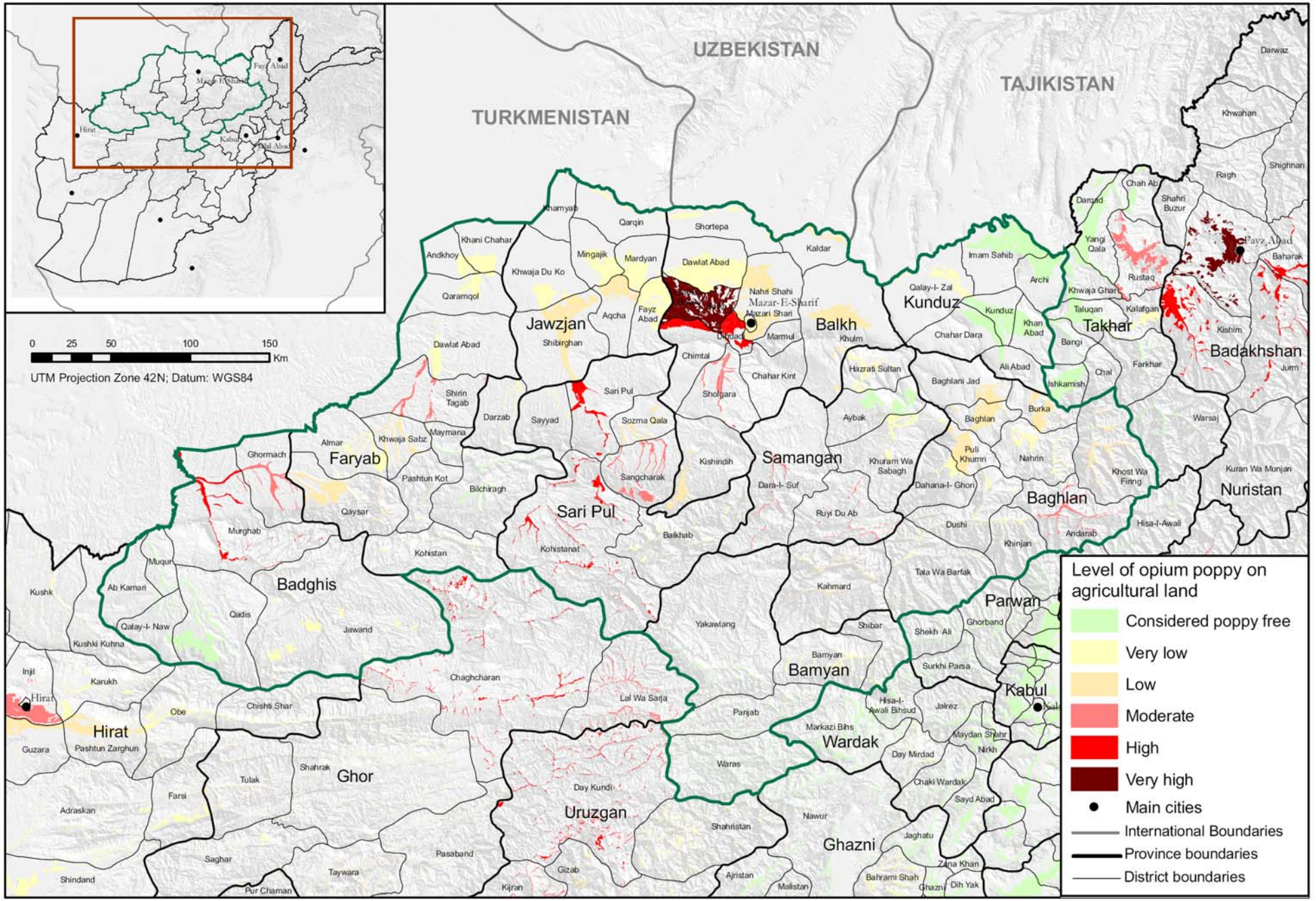
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Rainfed opium poppy field in Badakhshan, June 2005

Takhar

In 2005, total opium poppy cultivation in Takhar reached 1,364 ha, a 70% increase from 2004. Most of the opium poppy cultivation in 2005 took place in rain fed and remote areas of Takhar.

Agricultural land and level of opium poppy cultivation in the Northern region in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

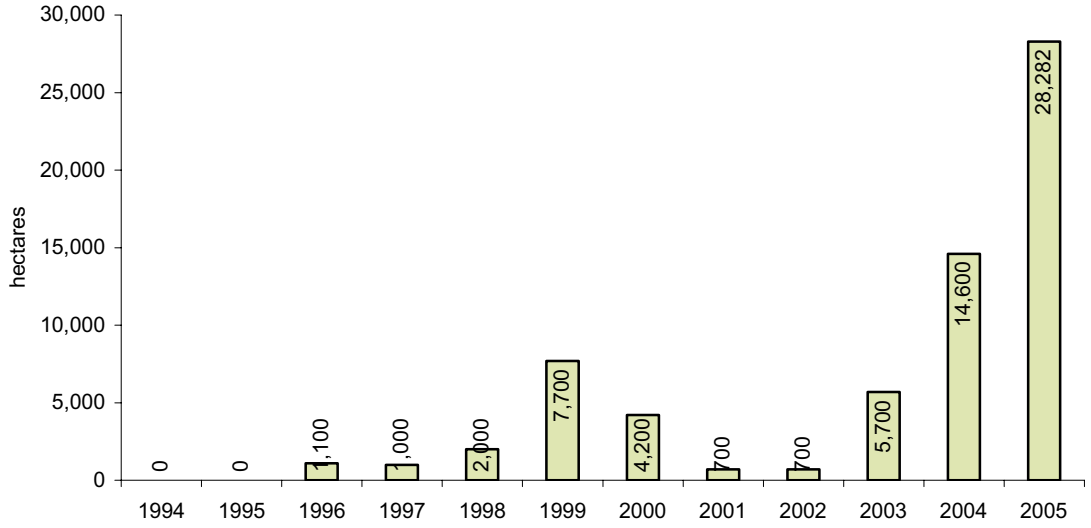
NORTHERN REGION (Faryab, Balkh, Sari Pul, Baghlan, Jawzjan, Badghis, Samangan, Bamyan, Kunduz)

Table 4: Opium poppy cultivation in Northern Provinces (hectares), 1994-2005

Province	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Balkh	-	-	1,065	710	1,044	4,057	2,669	4	217	1,108	2,495	10,837
Bagdish	-	-	-	-	-	-	41	-	26	170	614	2,967
Faryab	-	-	-	-	-	-	36	-	28	766	3,249	2,665
Baghlan	-	-	-	328	929	1,005	199	82	152	597	2,444	2,563
Jawzan	-	-	-	-	-	2,593	600	-	137	888	1,673	1,748
Saripul	-	-	-	-	-	-	146	-	57	1,428	1,974	3,227
Samangan	-	-	-	-	-	-	54	614	100	101	1,151	3,874
Kunduz	-	-	-	-	-	38	489	-	16	49	224	275
Bamyan	-	-	-	-	-	-	-	-	-	610	803	126
Total	**-**	**-**	**1,065**	**1,038**	**1,973**	**7,693**	**4,234**	**700**	**733**	**5,717**	**14,627**	**28,282**

The percentage of opium poppy cultivation in the northern region of the total area under opium poppy cultivation in Afghanistan continued to increase from 11% in 2004 to 27% in 2005. The total amount of cultivation rose from 14,627 ha in 2004 to 28,282 ha in 2005 (+93%).

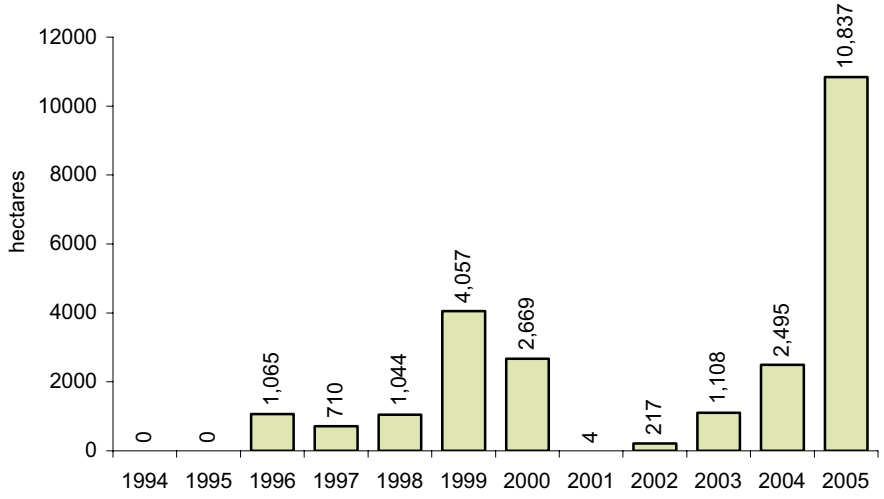
Figure 11: Opium poppy cultivation in the Northern Region, 1994-2005



Balkh

In Balkh, opium poppy cultivation increased significantly to 10,837 ha in 2005, up from 2,500 ha in 2004, 1,100 ha in 2003 and 220 ha in 2002. Between 2004 and 2005, opium poppy cultivation rose 334%.

Figure 12: Opium poppy cultivation in Balkh province, 1994-2005



Healthy opium poppy field at flowering stage in Mazar-E-Sharif, Balkh province (June 2005)

Baghdish

Opium poppy cultivation in Baghdish began in 2000 and has increased significantly since then. Cultivation rose from 614 ha in 2004 to 2,967 ha in 2005 (+383%).

Faryab

Opium poppy cultivation was reported for the first time in Faryab in 2000. Between 2004 and 2005, opium poppy cultivation fell from 3,249 ha to 2,665 ha (-18%).

Samangan

In Samangan province, opium poppy cultivation also started in the year 2000. After a very significant increase (+1051%) in 2004 to 1,151 ha, cultivation continued to rise and reached 3,874 ha in 2005 (+237%). Good weather conditions helped farmers, who grow opium poppy predominantly in areas far from the main roads.

Saripul

Similar to other provinces in the northern region, opium poppy cultivation started in 2000 in Saripul. The area under opium poppy has increased significantly from 57 ha in 2002, to 1,428 ha in 2003, to 1,974 ha in 2004 and to 3,227 ha in 2005.

Opium poppy harvesting in Ghormarch district, Badgish (May 2005)

Opium poppy in Saripul Province (May 2005)

Opium poppy in Shorjar district, Jawzjan Province (April 2005)

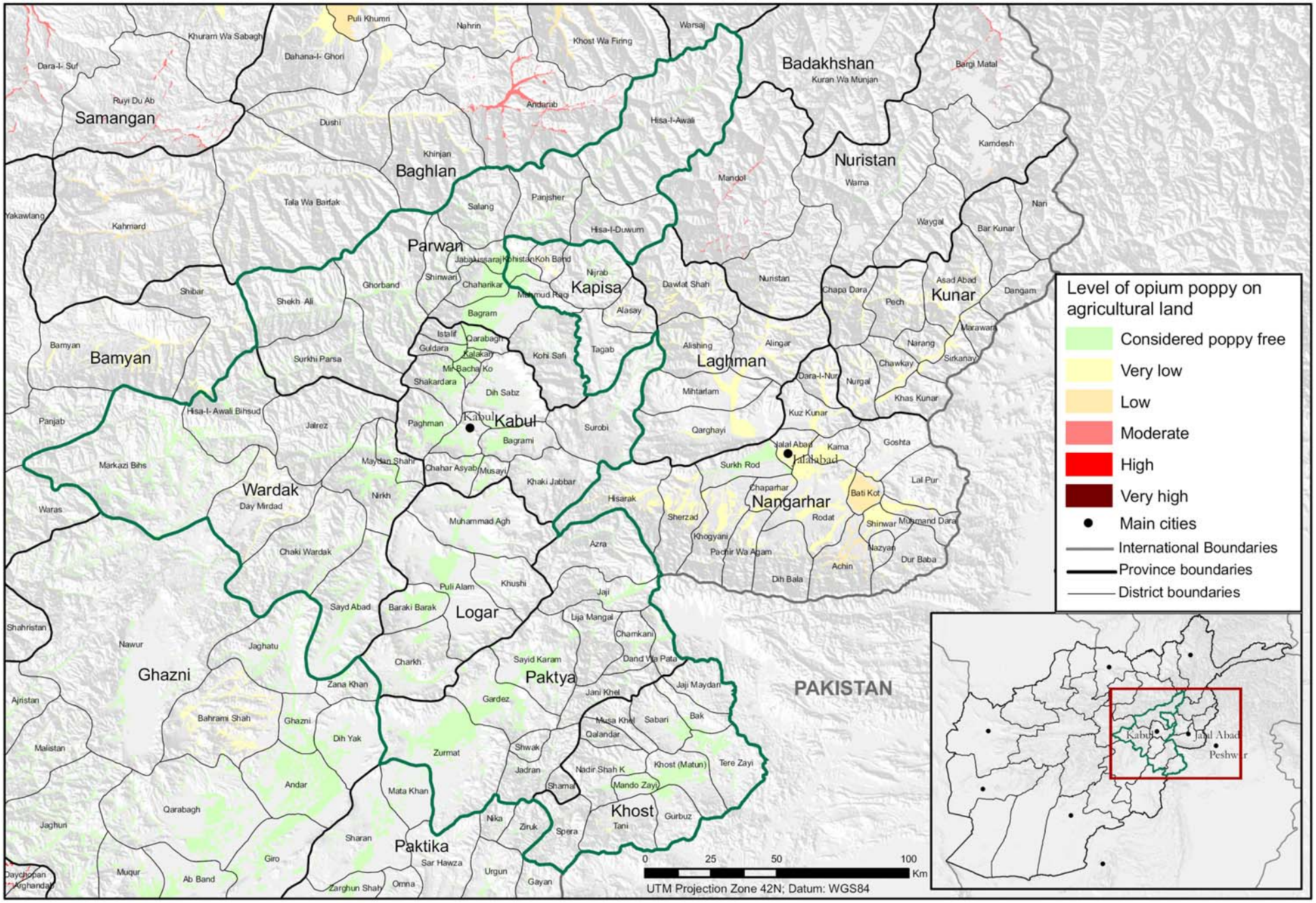
Opium poppy in Hazreti Sultan district, Samangan Province (May 2005)

CENTRAL REGION (Parwan, Paktya, Wardak, Khost, Kabul, Logar)

Province	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Wardak										2,735	1,017	106
Khost	-	-	-	-	-	-	-	6	-	375	838	-
Parwan	-	-	-	-	-	-	-	-	-	-	1,310	-
Paktya	-	-	-	-	4	29	46	1	38	721	1,200	-
Kabul	-	-	-	-	-	132	340	29	58	237	282	-
Logar	-	-	-	-	-	-	-	-	-	-	24	-

The total amount of opium poppy cultivation in Central Afghanistan was almost negligible in 2005. While in 2004, a total of 4,671 ha was estimated, cultivation fell significantly to 106 ha in 2005. Historically, farmers in the central region do not grow opium poppy. In 2005, farmers reported that they reduced or stopped opium poppy cultivation due to fear of eradication and because the opium ban makes it illegal.

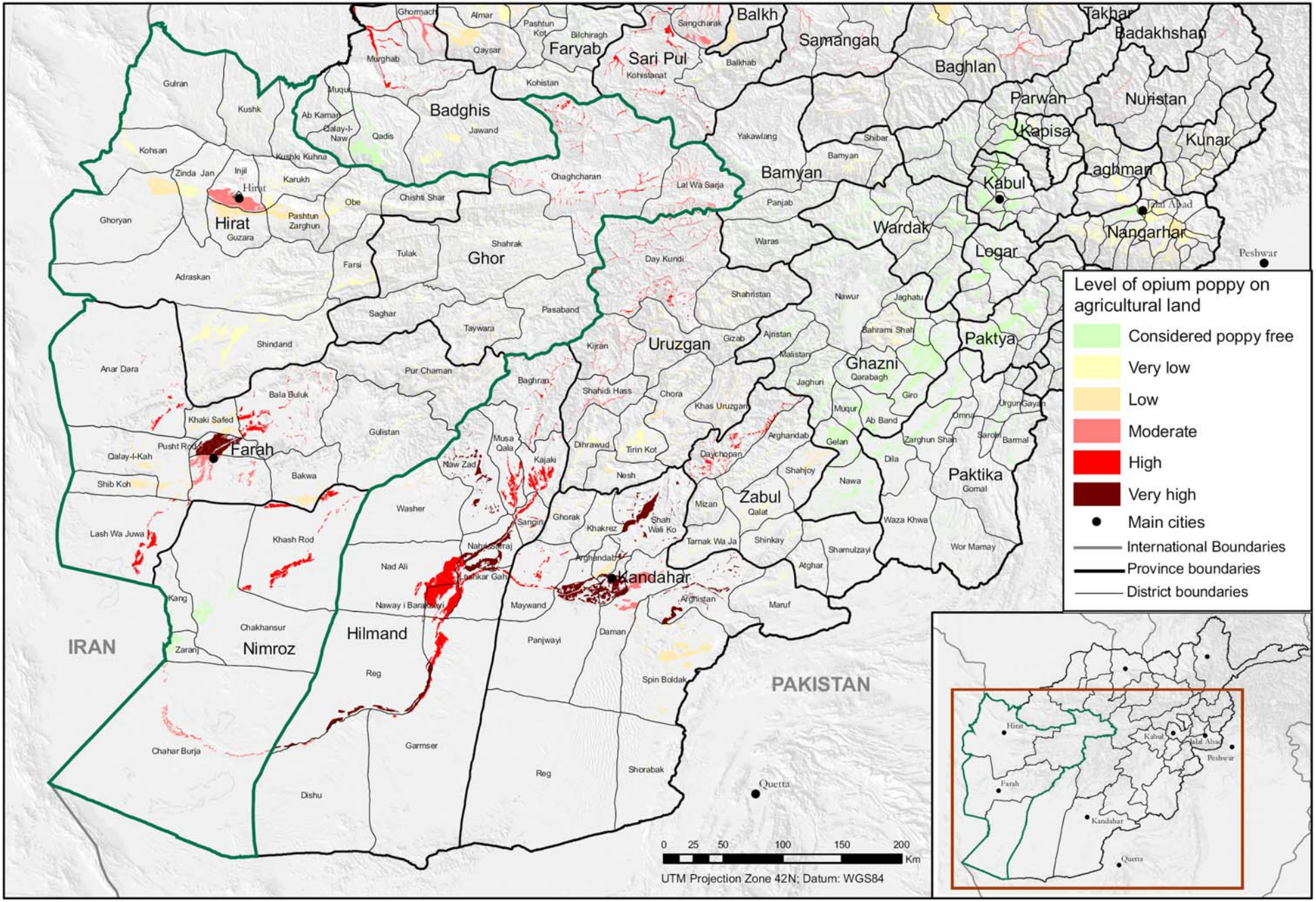
Agricultural land and level of opium poppy cultivation in the Central region in Afghanistan, 2005



Source:MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Agricultural land and level of opium poppy cultivation in the Western region in Afghanistan, 2005



Source:MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

WESTERN REGION (Ghor, Hirat, Farah, Nimroz)

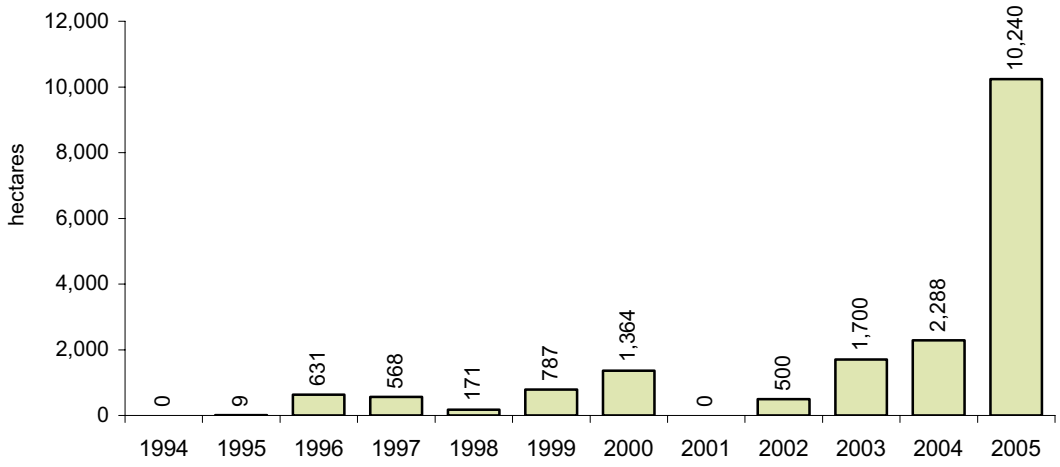
Province	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Farah	-	9	631	568	171	787	1,364	-	500	1,700	2,288	10,240
Ghor									2,200	3,782	4,983	2,689
Hirat	-	-	-	38	-	-	184	-	50	134	2,531	1,924
Nimroz	682	119	136	642	11	203	219	-	300	26	115	1,690

In the western region, cultivation decreased in Hirat and Ghor provinces, but increased significantly in Nimroz and Farah provinces in 2005. The total amount of poppy cultivation reached 16,543 ha (16% of total opium poppy cultivation in Afghanistan), with an increase of 67% over 2004.

Farah

Opium poppy cultivation in Farah has increased significantly since 2003. Total opium poppy cultivation amounted to 10,240 ha in 2005, an increase of 348% compared to 2004. Farah now has the fourth largest area under opium poppy cultivation in Afghanistan.

Figure 13: Opium poppy cultivation in Farah province, 1994-2005



Nimroz

Nimroz always had low levels of opium poppy cultivation. In 2005, cultivation increased to 1,690 ha from 115 ha in 2004. Nimroz lies along an important opium and heroin trafficking route leading to Iran**.**

Hirat and Ghor

Opium poppy cultivation decreased 24% in Hirat to 1,924 ha in 2005. Similarly, cultivation in Ghor fell from 4,983 ha in 2004 to 2,689 ha in 2005. Although reasons for decreasing or stopping cultivation were in line with the overall findings of the survey (most farmers reported that they feared eradication or imprisonment), last year's poor opium yields may also have played a role in that region.

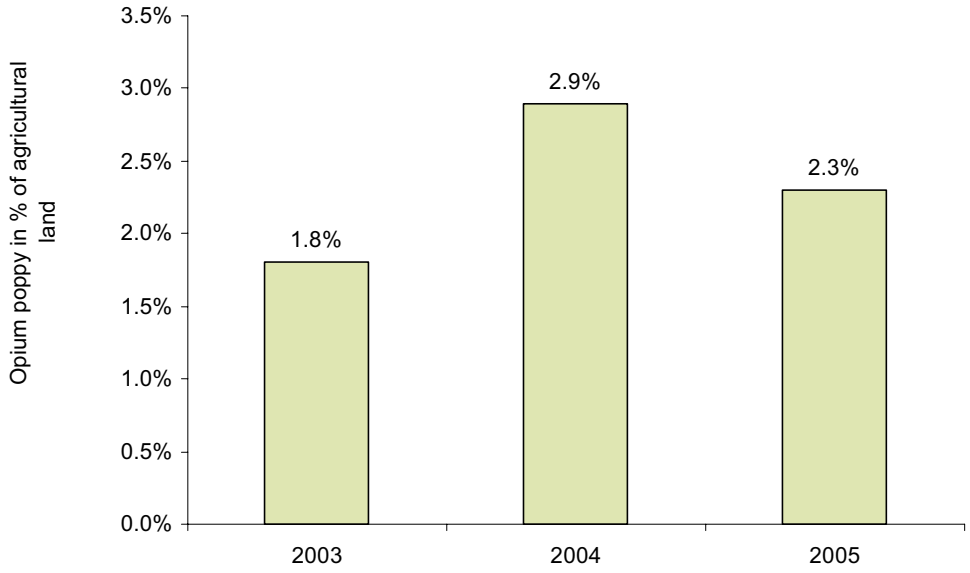
2.2 Opium poppy and Agricultural land

Of a total land area of 65 million ha, the land potentially available for crop cultivation in Afghanistan amounts to 8.05 million hectares (FAO) [6]. The Afghan Ministry of Agriculture currently estimates the land under actual cultivation at around 4.55 million ha[7]. Based on these data, the area under opium poppy cultivation covered 2.3% of the total land used for agriculture in 2005, down from 2.9% in 2004.

In 2005, cereal cultivation increased by 35%. The area under opium poppy cultivation is equivalent to 3.5% of the land under cereal cultivation, as compared to 5.9% in 2004. FAO[8] reports that farmers in Afghanistan are looking forward to a bumper cereal harvest in 2005, due to: (1) above normal precipitation; (2) improved Integrated Pest Management; and (3) use of agricultural inputs, irrigation and improved crop husbandry practices. The production of cereal in 2005 will be roughly 5.24 million tonnes, which covers about 90% of Afghanistan's needs.

Cultivation of wheat increased by 33% to 2,342,000 ha in 2005 -- especially encouraging following the almost 50% decline in 2004. The relative importance of poppy for the different provinces can be highlighted by comparing it to the land dedicated to wheat production in 2005. This shows that the largest "relative importance" of opium poppy cultivation is in Farah, Kandahar, and Hilmand, with the area under poppy equivalent to 30-40% of the area under wheat cultivation. The lowest "relative importance" of poppy cultivation is in the west (Badghis 2.4%, Hirat 0.9%) and the north (Badakshan 5.9%, Balkh 2%). As compared to 2004, major decreases of the "relative importance" of opium poppy took place in the east (Nangarhar, Kunar, Laghman)

Figure 14: Opium poppy in actual land cultivated in Afghanistan, 2003-2005



[6] *http://faostat.fao.org/faostat/collections?version=ext&hasbulk=0&subset=agriculture*

[7] *http://www.agriculture.gov.af/agriculture.htm*

[8] *FAO/ministry of Agriculture, Animal Husbandry and Food, Agriculture Prospects Report, June/July 2005*

Table 5: Area under cultivation of opium poppy and cereals in Afghanistan (in `000 hectares)

Crop	2003	2004	2005	Change 2004-2005
Wheat	2,294	1,766	2,342	33%
Rice	145	185	160	-14%
Maize	104	90	261	190%
Barley	276	180	240	33%
Cereals (subtotal)	2,819	2,221	3,003	35%
Opium poppy	80	131	104	-21%
Opium poppy as % of cereals	2.8%	5.9%	3.5%	

Sources: UNODC, Opium Survey results and Ministry of Agriculture Animal Husbandry and Food, Agriculture Prospects Report (June/July 2005) .

Table 6: "Relative importance" of opium poppy cultivation over wheat cultivation in 2004-2005

Province	2005			2004
	Opium poppy (ha)	Wheat (ha)	Opium poppy as % of wheat	Opium poppy as % of wheat
Ghazni	0	16,000	0	0
Kabul	0	22,000	0	2%
Khost	0	57,000	0	5%
Logar	0	22,000	0	0%
Paktika	0	12,000	0	na
Paktya	0	18,000	0	7%
Parwan	0	34,000	0	7%
Wardak	106	28,000	0%	7%
Kapisa	115	10,000	1%	5%
Bamyan	126	16,000	1%	4%
Laghman	274	14,000	2%	20%
Kunduz	275	107,000	0%	0%
Kunar	1,059	8,000	13%	36%
Nangarhar	1,093	51,000	2%	76%
Takhar	1,364	185,000	1%	0%
Nuristan	1,554	1,000	na	na
Nimroz	1,690	14,000	12%	1%
Jawzjan	1,748	145,000	1%	4%
Hirat	1,924	207,000	1%	2%
Zabul	2,053	12,000	17%	30%
Baghlan	2,563	128,000	2%	2%
Faryab	2,665	224,000	1%	2%
Ghor	2,689	61,000	4%	13%
Badghis	2,967	123,000	2%	1%
Sari Pul	3,227	140,000	2%	3%
Samangan	3,874	143,000	3%	1%
Uruzgan	4,605	33,000	14%	43%
Badakhshan	7,370	125,000	6%	16%
Farah	10,240	24,000	43%	11%
Balkh	10,837	243,000	4%	2%
Kandahar	12,989	39,000	33%	13%
Hilmand	26,500	80,000	33%	40%
TOTAL	**103,907**	**2,342,000**	**4%**	**7%**

Sources: UNODC, Opium Survey results and Ministry of Agriculture Animal Husbandry and Food, Agriculture Prospects Report (June/July 2005) .

2.3 Cannabis cultivation

The survey results provide a tentative estimate of about 30,000 ha of cannabis in Afghanistan. This information was derived from farmers' interviews (two farmers per village, randomly selected, with the results per farmer at the provincial level extrapolated to the rural population per province). The information gathered during the survey refers to cannabis cultivation in the previous year (2004) because cannabis is cultivated after the wheat and poppy harvest. Based on farmers' interviews, the bulk of the cannabis in 2004 was cultivated in three provinces: Sari Pul (33%) and Balkh (18%) in northern Afghanistan and in Paktya (17%), i.e. in central Afghanistan according to UNODC's classification. Other important cannabis producing provinces include Kunduz (10%), Zabul (4%), Uruzgan (3%), Samangan (3%), Nangarhar (3%), Hirat (3%) and Ghazni (3%). Lower levels of cannabis production have been reported by farmers from Kandahar (1.8%), Hilmand (0.9%), Faryab (0.6%), Bamyan (0.2%) and Farah (0.1%). In addition, reports of the Afghan Government indicate that Paktika is an important cannabis producing province, however the survey could not confirm this due to unreliable reporting in this province.

The survey was not designed to verify the extent of cannabis cultivation by surveyors in the field or by satellite photos. Results must thus be treated with caution. Moreover, surveyors reported that many farmers were reluctant to discuss the issue of cannabis cultivation, which is likely to have resulted in some under-estimates. Keeping these caveats in mind, data collected are, nonetheless, sufficient to establish that cannabis cultivation is widespread in Afghanistan (though less than opium poppy), and that it takes place in a variety of locations across the country.

At the time of the survey, farmers indicated that about 40% less cannabis was under cultivation than in 2004. However, these results could be misleading as cannabis is usually planted after wheat or poppy. So, overall results for 2005 could still change substantially once farmers start planting cannabis after the wheat or opium harvest. To estimate the actual trend of cannabis cultivation, it would have been necessary to implement a separate survey during the cannabis cultivation period (July-September).

Based on headmen interviews, even more provinces could be established to have cannabis production (22 out of 32 provinces) than based on farmers' interviews. In 12% of all villages surveyed, headmen reported cannabis cultivation. This is a significant proportion, though less than the corresponding one for poppy planting villages (42%). The analysis reveals that 9% of the villages are both cannabis and opium producing villages; just 3% are 'cannabis only' producing villages. The distribution pattern based on information gathered from the headmen were somehow different from the results of the farmers' interviews - and the overall results based on headmen interviews turned out to be lower. However, there seems to have been a considerable under-reporting of the area under cannabis cultivation by the headmen. In many villages the two farmers selected per village provided higher cannabis cultivation figures than the headmen for the village as a whole - and there are usually more than two farmers in a village. Thus, the detailed headmen estimates must be interpreted with an even greater degree of caution.[9]

[9] The headmen interviews suggested that the largest cannabis cultivation took place in Sari Pul (35%), followed by Kandahar (15%), Balkh (10%), Paktya (10%) and Nangarhar (9%). Smaller amounts were reported from Hilmand (4%), Faryab (3%), Zabul (2%), Samangan (2%), Kunduz (2%) and Uruzgan (2%). In addition, cultivation was also reported from Hirat (1.4%), Gazni (1.2%), Jawzan (0.7%), Badghis (0.6%), Baghlan (0.6%), Bamyan (0.6%), Khost (0.6%), Logar (0.1%) and Farah (0.1%) as well as, at lower levels, from Badakshan and Takhar.

2.4 Opium Yield

In 2005, the average dry opium yield in Afghanistan, weighted by cultivation area, was estimated at 39.3 kg/ha (confidence interval: 35.4-43.2). As in previous years, the yield estimate was derived from capsule measurements in the field (160 fields across the country in 2005). There was not much variation in opium yield across Afghanistan this year, unlike in 2004 when drought and disease played an important role. In 2005, the highest average yields were found in Eastern Afghanistan (44 kg/ha) and the lowest in central Afghanistan (36.1 kg/ha). In southern Afghanistan, where the main opium poppy growing areas are found, yield increased by 36% compared to 2004.The results of the yield survey were confirmed by the village survey (2,200 villages visited), which found similar yield figures based on farmer reports.

Table 7: Opium yield by region in 2004 and 2005

Region	2004 Average Yield (kg/ha)	2005 Average Yield (kg/ha)
Central (Parwan, Paktya, Wardak, Khost, Kabul, Logar)	17.5	36.1
Eastern (Nangarhar, Kunar, Laghman, Nuristan, Kapisa)	32.5	44.0
North-Eastern (Badakhshan, Takhar)	44.2	41.8
Northern (Bamyan, Jawzjan, Sari Pul, Baghlan, Faryab, Balkh, Samangan, Badghis, Kunduz)	36.4	38.8
Southern (Hilmand, Uruzgan, Kandahar, Zabul, Ghazni, Paktika)	27.8	37.9
Western (Ghor, Hirat, Farh, Nimroz)	34.9	41.4
National average *	**32.0**	**39.3**

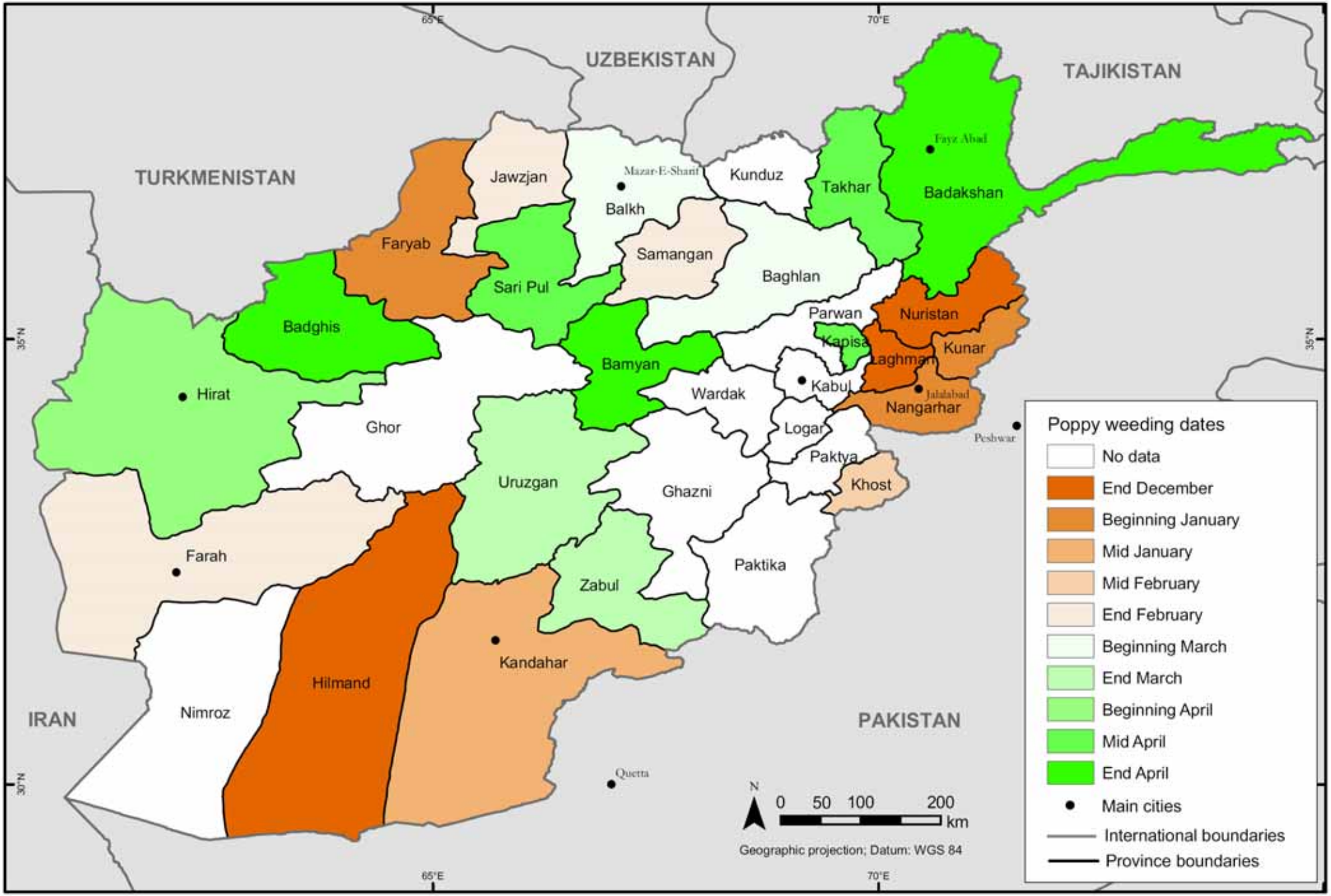
**Weighted by cultivation area*

Crop Rotation

During the Rapid Assessment survey in February 2005, only 14% of the villagers reported that they plant opium poppy every year in the same field. However, according to the segment survey results, the location of 22% of the poppy fields in Hilmand and 50% of the poppy fields in Kandahar did not change between 2004 and 2005. This indicates that farmers in Kandahar and Hilmand did not follow a full crop rotation, which could have a negative impact on opium poppy yield.

Poppy field being weeded by an Afghan family (Balkh, 2005)

Opium poppy weeding dates in Afghanistan, 2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Lancing

Yield surveys results indicate that, on average, farmers lanced poppy capsules five times this year. The lowest number of lancings was 2 times in Bagdish and 3 times in Takhar and Zabul. The highest number of lancings was 11 times in Badakhshan. While farmers in Badakhshan visited the field 4-6 times to harvest, the high number of lancings is due to lancing more than one time per capsule per visit.

Table 8: Average opium poppy capsule lancing times

Province	Average Number of Lancings
BADAKHSHAN	11
BADGHIS	2
BAGHLAN	7
BALKH	7
BAMYAN	4
FARAH	4
FARYAB	7
HILMAND	4
HIRAT	4
JAWZJAN	6
KABUL	6
KANDAHAR	5
KAPISA	6
KHOST	6
KUNAR	6
LAGHMAN	5
NANGARHAR	6
NURISTAN	8
SAMANGAN	6
SARI PUL	6
TAKHAR	3
URUZGAN	4
ZABUL	3
Overall	5

Lancing of opium poppy capsules with a neshtar[10], Baghlan, 2005

Latex oozing out of cut opium poppy capsule, Zabul, 2003

[10] *A* neshtar *is the tool commonly used to lance poppy capsules.*

In 2004, it was reported that disease and pests were the main reasons for lower yields. Therefore, UNODC included a disease monitoring component in the 2005 Opium Survey. Five crop disease/agricultural experts visited around 150 villages during the poppy growing season and collected samples of infested plants, interviewed farmers and looked at the impact of disease on opium yield. However, except for North Eastern Afghanistan, there were no reports of significant poppy disease or pest infestation. As compared to 2004, the yield increased in all regions except for North Eastern Afghanistan (Badakshan, Takhar), where lower yields were reportedly due to disease and increased rain fed cultivation (which usually gives lower yields than irrigated cultivation). The disease and insect infestations reported in Badakhshan included: Mosaic, Sun pest, Cut Worm and Aphid disease.

The following diseases and insects are common in Afghanistan (though they were not significant this year):

- **Blight:** A variety of fungal and bacterial diseases, which causes yellowing and brown spots on poppy leaves.
- **Mosaic:** A viral disease which causes discoloration and deformed leaf growth, stunted plant growth and deformed capsules.
- **Fusarium Wilt:** A soil-borne fungal disease that suddenly appears on poppy plants, causing wilting and yellowing of leaves and stems.
- **Powdery Mildew:** A fungal disease that looks like dust and can be seen on the shoots of poppy plants.
- **Leaf and Stem Spots:** Brown and black spots that appear on upper side of leaves and on stems due to infection by a fungal parasite
- **Aphids:** Insects that excrete a sticky, sweet liquid onto plant leaves. The liquid attracts ants that cause distortion and yellowing of the leaves. Aphids are a major pest of the opium poppy.
- **Cut Worms:** Worms that attack the root system of the poppy plant. Cut worm infestation can destroy an entire poppy crop and can also affect other crops.
- **Sun Pest:** An insect pest that damages the poppy capsules through sucking the sap in the outer layers of the capsule. It may also transmit some viral diseases. Sun pest infestation generally kills the host plant
- **White Grub:** An insect larvae that feeds on the roots of poppy, causing the plant to completely dry out.
- **Capsule Caterpillar:** The caterpillar enters the capsule and feeds on the contents. These larvae exist in most capsules that have holes in them.
- **Root Knot Nematodes:** These organisms can be seen on poppy roots, damaging them by causing root deformation (knots).

Aside from disease and pests, climactic factors can cause physiological disorders in opium poppies. Fluctuations in temperature can cause distortion of poppy capsules.

Figure 15: Common Disease and Insects on Opium Poppy in Afghanistan

Sun Pest Disease

Aphids

Root Worms

Blight

Fungal Disease

Mosaic

Fusarium Wilt

Poppy varieties

During the yield survey, information was collected in 160 villages on the variety of opium poppy planted by the farmers. Different varieties can vary in many aspects such as: appropriate soils, maturation date, resistance to disease, need for inputs like water, fertilizer, labour requirements, etc.

Most farmers (42%) preferred the "Watani Soorgulai" variety. The second variety (18%) cultivated by farmers is "Watani Spingulai", closely followed by Bahrami Soorgulai (15%).

Table 9: Poppy varieties in Afghanistan,2005

Poppy Variety	Farmers' Choice
Watani Soorgulai	42%
Watani Spingulai	18%
Bahrami Soorgulai	15%
Bahrami Baragai	7%
Manani	4%
Qodosi	4%
Others	10%

The flower of Watani Soorgulai is generally pink, red or red and white. It is reported to mature later than the Watani Spingulai variety and it typically has small capsules making it harder to lance and thus requiring more labour. Farmers reported that Watani Soorgulai produces good quality opium with low moisture content, but that the quantity of the yield is low in comparison to other varieties.

Watani Soorgulai

The Watani Spingulai has a white flower and was found to be grown on both sandy and clay loam soils. The capsules of Spingulai are more elongated than other varieties. Spingulai is an early maturing variety of opium poppy that is relatively resistant to both disease and poor weather. Also it was reported that Spingulai is a low input crop, requiring less fertilizer, irrigation and labour than other varieties.

Watani Spingulai

2.5 Eradication

The opium survey as such neither monitors the activities, nor assesses the results of the eradication campaign launched by the Afghan authorities during the opium growing season. As in previous years, the survey's methodology was designed to capture what was left for harvest in the fields. However, at the request of the Afghan Government, UNODC implemented a separate project: *Support to the Verification Process of Opium Poppy Eradication*, together with the Ministry of Counter Narcotics (MCN) and the Ministry of Interior (MoI). This project supported the verification of Governor-led eradication in Afghanistan, which took place between February –July 2005. UNODC announced the results of the eradication in August 2005.

UNODC verified the eradication of some 4,000 hectares of opium poppy by the provincial governors. The majority of governor led eradication activities took place in the provinces of Nangarhar (46%) and Hilmand (26%), the two main opium producing provinces in 2004. In addition, the central government undertook separate eradication, run by a special-purpose Central Poppy Eradication Force (CPEF) and by the Afghan National Police (ANP). These campaigns reported the eradication of 200 ha by CPEF and of 900 ha by ANP. Total eradication amounted to some 5,100 ha, equivalent to roughly 5% of the 2005 opium poppy cultivation.

Table 10: Eradication in Afghanistan,2005

Province Name	Governor led eradication (ha) - verified by UNODC	CPEF (ha)- not verified by UNODC	ANP (ha)- not verified by UNODC	Total (ha)
NANGARHAR	1,860	0	0	1,860
HILMAND	1,031	15	0	1,046
BALKH	181	127	532	840
LAGHMAN	360	0	0	360
HIRAT	156	0	0	156
BADAKHSHAN	0	7	137	144
KUNAR	126	0	0	126
URUZGAN	126	0	0	126
SARI PUL	0	0	112	112
TAKHAR	88	12	0	100
FARAH	42	0	44	86
BAGHLAN	0	0	63	63
KANDAHAR	0	48	0	48
KAPISA	21	0	0	20
SAMANGAN	16	0	0	16
BADGHIS	0	0	0	0
BAMYAN	0	0	0	0
DAYKUNDI	0	0	0	0
FARYAB	0	0	0	0
GHAZNI	0	0	0	0
GHOR	0	0	0	0
JAWZJAN	0	0	0	0
KABUL	0	0	0	0
KHOST	0	0	0	0
KUNDUZ	0	0	0	0
LOGAR	0	0	0	0
NIMROZ	0	0	0	0
NURISTAN	0	0	0	0
PAKTIKA	0	0	0	0
PAKTYA	0	0	0	0
PARWAN	0	0	0	0
WARDAK	0	0	0	0
ZABUL	0	0	0	0
Total	**4,007**	**209**	**888**	**5,103**

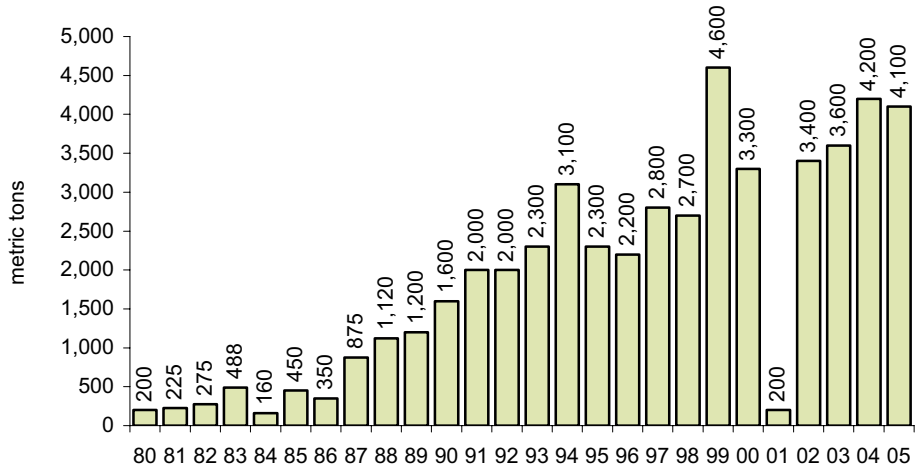
2.6 Potential Opium Production

Potential opium production was estimated by multiplying the average dry opium yield per region by the cultivation level per region and adding up the results to arrive at a national total. The result shows a potential opium production of around 4,100 metric tons (confidence interval: 3,560-4,610 metric tons) for 2005.

Although opium poppy cultivation decreased by 21%, potential opium production only decreased by 2.4% compared to 2004, due to improved weather conditions and low prevalence of plant disease. Opium production in 2005 was the third highest on record after the peaks of 4,600 tons in 1999 and 4,200 tons in 2004.

As a result of the decline in opium production in Afghanistan, global opium production will have fallen by some 3% in 2005.[11] The proportion of Afghanistan in global opium production is likely to remain at around 87%.

Figure 16: Opium production in Afghanistan from 1980 to 2005



Sources: UNODC, The Opium Economy in Afghanistan, an International Problem; and UNODC Opium Surveys, 1994-2005.

The overall decline of opium production in 2005 masks significant regional differences. Opium production increased in northern (+106%), western (+98%) and southern (+30%) Afghanistan, but declined in central (-95%), eastern (-85%) and north-eastern (-50%) Afghanistan. The strongest declines were found in eastern Afghanistan, followed by north-eastern Afghanistan. Southern Afghanistan produced 43% of the country's total production, up from 32% in year 2004.

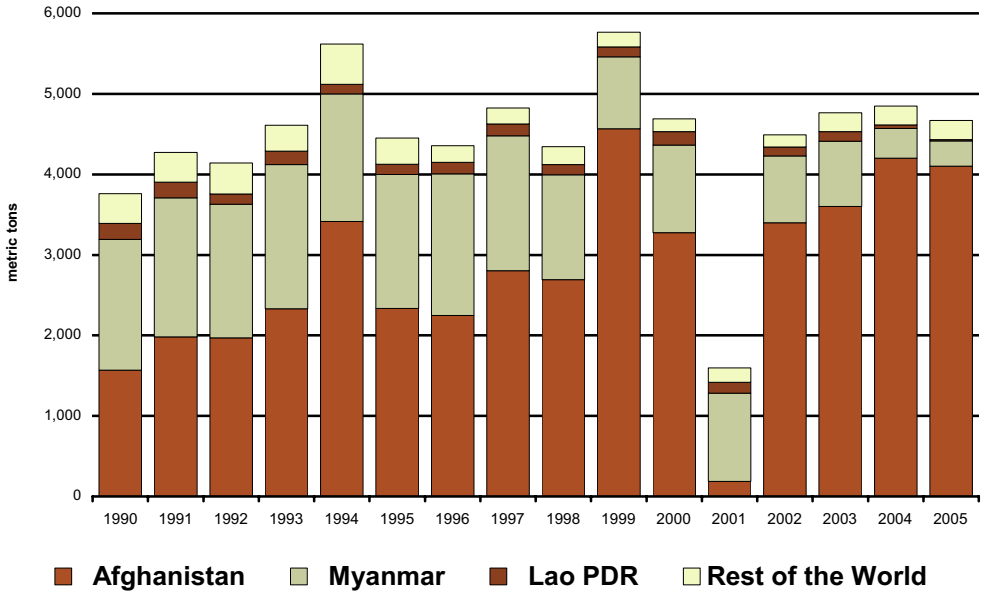
The single largest opium producing province in 2005 was Hilmand (25% of total), followed by Kandahar (12% of total), Balkh (11% of total) and Farah (10% of the total). These four provinces accounted for 59% of total opium production in Afghanistan in 2005. The relative importance of Nangarhar, Badaskhan and Uruzgan, which were major producing provinces in 2004, has diminished. The share of the total 2005 opium production was 1% for Nangarhar (23 % in 2004), 9% in Badakshan (18% in 2004) and 3% in Uruzgan (8% in 2004).

Seizures in Afghanistan and neighbouring countries (2002-2004) suggest that – expressed in heroin equivalents – 71.5% is transformed into morphine and/or heroin in Afghanistan, and the rest is sold and (mostly) consumed in the form of opium (mainly in Iran and, to a lesser extent, in several other countries of the region). The debriefing sessions with the surveyors revealed that, on average, about 7 kg of opium are used to produce 1 kg of morphine/heroin in Afghanistan. This suggests that the morphine/heroin produced in Afghanistan out of the country's 2005 opium production amounted to some 420 metric tons (90% confidence interval: 360–470mt), down from 430 metric tons (90% confidence interval: 350–510mt)[12] a year earlier.

[11] This estimate is based on declines of opium production in Afghanistan and Laos and the 2004 estimates for other opium producing countries.

[12] The estimate for the year 2004 of previously 500 metric tons was re-adjusted to 430 metric tons, taking the heroin/morphine share (71.5%) as well as the 7:1 opium to morphine/heroin ratio into account.

Figure 17: Global opium production 1990-2005*



** For 2005, estimates for the "rest of the world" and Myanmar are still tentative*

Table 11: Potential opium production by region in Afghanistan in 2004 and 2005

Region	Production in 2004 (mt)	Production in 2005 (mt)	Change in metric tons	Change in %	Share of total production in 2005
Southern	1,346	1,749	403	30%	43%
Northern	532	1,098	566	106%	27%
Western	346	685	339	98%	17%
North-Eastern	724	365	-359	-50%	9%
Eastern	1,190	180	-1,010	-85%	4%
Central	82	4	-78	-95%	0.1%
Total (rounded)	**4,200**	**4,100**	**-100**	**-2%**	**100%**

Table 12: Largest opium producing provinces (% of total production)

Province	2004	2005
Hilmand	20%	25%
Kandahar	3%	12%
Balkh	3%	11%
Farah	2%	10%
Badakhshan	18%	10%
Uruzgan	8%	3%
Nangarhar	23%	1%
Kunar	4%	1%

2.7 Opium Farmers

In 2005, the survey collected data on the number of families cultivating opium poppy in Afghanistan. At the national level, it was estimated that 309,000 families (confidence interval : 278,000-340,000) were involved in opium cultivation, compared with 356,000 families in 2004. This is a decrease of 13%. Given an average of 6-7 members per family[13], 309,000 families represent an estimated total of about 2 million persons, or 8.7% of Afghanistan's 23 million total population[14]. This means that 11% of the rural population are involved in poppy cultivation, down from 13% in 2004.

Figure 18: Number of families involved in opium production in Afghanistan, 2003-2005

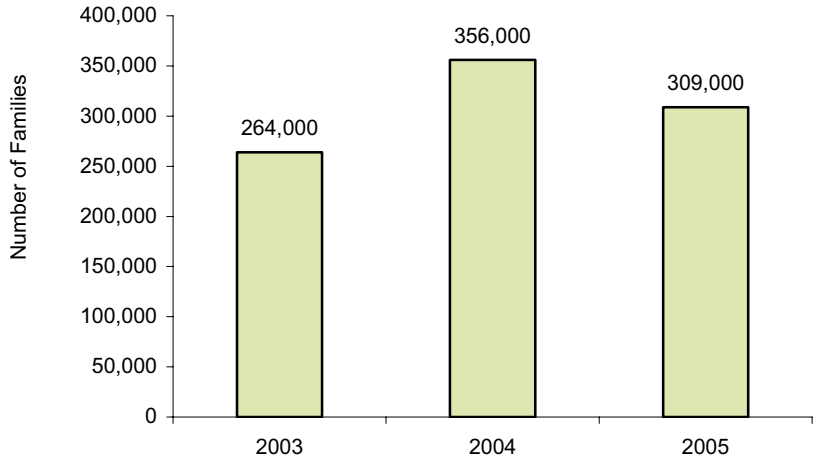


Table 13: Proportion of families involved in opium production in 2005

Region	2005 Cultivation (ha)	Total number of poppy farming households	Percent of total	Average size of poppy field per poppy growing household (ha)
Central	Negligible	Negligible		Negligible
Eastern	4,095	22,169	7%	0.18
North-Eastern	8,734	37,241	12%	0.23
Northern	28,282	101,266	33%	0.28
Southern	46,147	89,468	29%	0.52
Western	16,543	58,869	19%	0.28
Total	**104,000**	**309,238**	**100%**	**0.34**

The average land area dedicated to poppy cultivation per family amounted to 0.34 ha in 2005 compared with 0.37 ha in 2004. In the main opium producing provinces the average area under poppy cultivation reached 0.52 ha per household; while in the other provinces the average area under poppy cultivation was about half as large (0.18-0.28 ha per household).

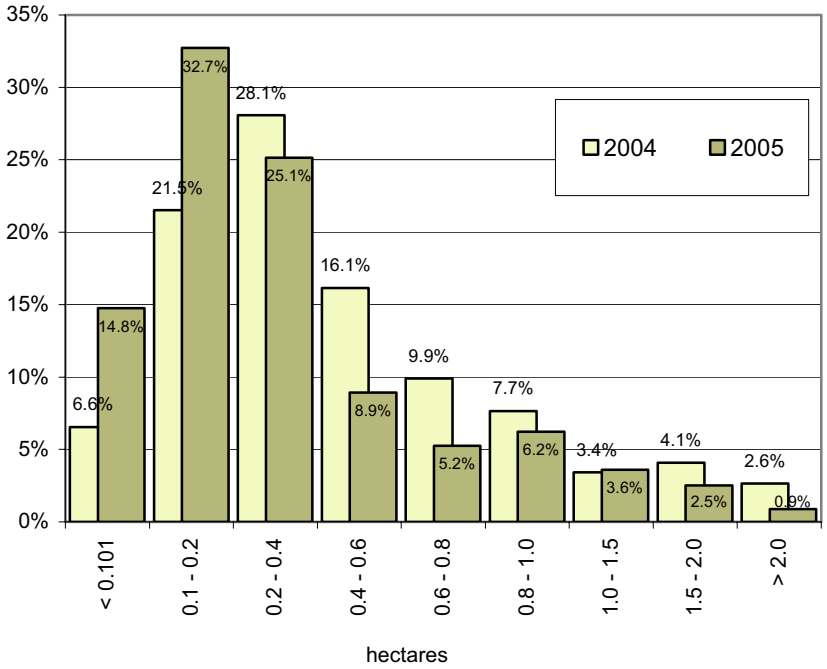
The distribution of opium poppy cultivation remains very skewed. Almost half of all Afghan farmers (48%) have not used more than 0.2 ha for the cultivation of opium poppy this year and almost three quarters (73%) of Afghan

[13] FAO activities update in Afghanistan, N° 2, p. 2, Jan 2003

[14] The Central Statistics Office of the Interim Government of Afghanistan undertook a review and estimated the population at 22.2 million people in 2003. Population growth is estimated at 1.9% a year, resulting in a population estimated at 22.6 million in 2004.

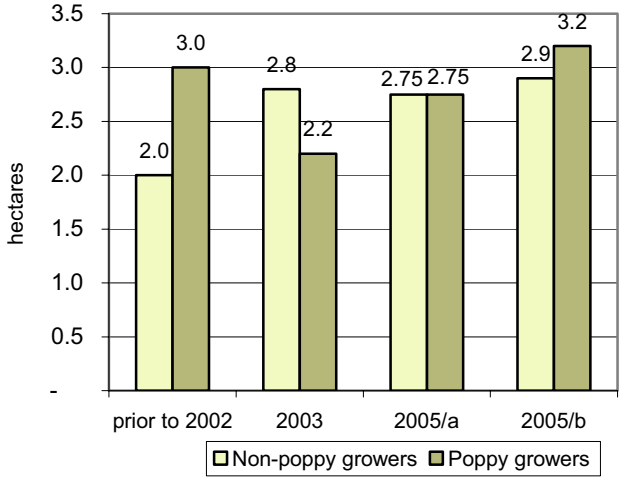
poppy farmers cultivated opium on less than 0.4 hectares in 2005. About a quarter (27%) of the farmers reported poppy fields of more than 0.4 hectares with the largest size of poppy fields around 4 hectares. For the year 2004, 44% of the farmers (based on this years' interviews) reported to have cultivated opium poppy on more than 0.4 hectares. Such changes in the distribution pattern suggest a general decline in the area under poppy cultivation per farmer in 2005.

Figure 19: Distribution of land dedicated to opium poppy cultivation per opium producing farmer in 2004 (n=1,816) and 2005 (n = 1,030) based on information from 3,715 farmers in 2005



In the past, poppy farmers tended to have smaller land-holdings than non-poppy farmers in Afghanistan. UNODC's Farmers Intention Survey 2003/04 revealed that 'traditional' poppy farmers, defined as those operating prior to 2002 in the opium sector, possessed, on average, 2 hectares of land while the rest had, on average, 3 hectares of land. This, however, has changed over the last few years as a significant number of larger landowners entered the lucrative opium business (notably in several of the northern provinces). A comparison of poppy and non-poppy farmers in 2005 shows that both had, on average, 2.75 hectares of land at their disposal at the national level.

Figure 20: Average land owned/cultivated by poppy and non-poppy farmers

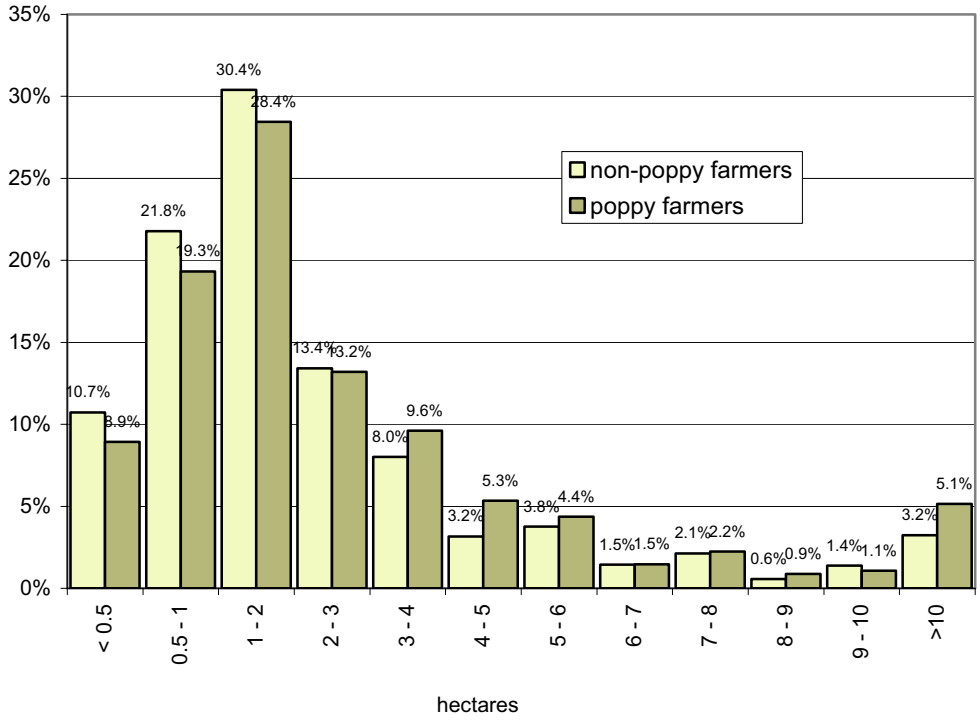


2005/a --adjusted to sampling frame, 2005/b -- raw-data; non-adjusted

If the raw data of the sample are used (without any adjustments to the sampling frame), data suggest that poppy farmers possessed, on average, already more land than non-poppy farmers in 2005. This is also reflected in the distribution pattern of landholdings, even though the most striking characteristic remains the highly skewed distribution of landholdings in Afghanistan. Most poppy farmers (57%) and most non-poppy farmers (63%) do not have more than 2 hectares of land at their disposal and about a third has to live on less than 1 hectare of land. However, one finds proportionally more poppy farmers (30%) than non-poppy farmers (24%) with more than 3 ha. Among those having landholdings of more than 10 ha, the difference is even more pronounced: 5% of poppy farmers versus 3% of non-poppy farmers possess land of more than 10 ha.

Data collected also confirm that the overall size of landholdings in Afghanistan is rather small. In the USA, for instance, the average size of a farm was 179 hectares in 2003[15], and for a highly populated West European country, such as Germany, data show an average size of a farm of 40 hectares (2003)[16]. Only 8% of German farms have less than 2 ha versus close to 60% in Afghanistan, and 60% of German farms operate on more than 10 ha versus 4% in Afghanistan.

Figure 21: Distribution of land owned by opium poppy farmers (n = 1,030) and non-poppy farmers (2,685) in 2005, based on information from 3,715 farmers

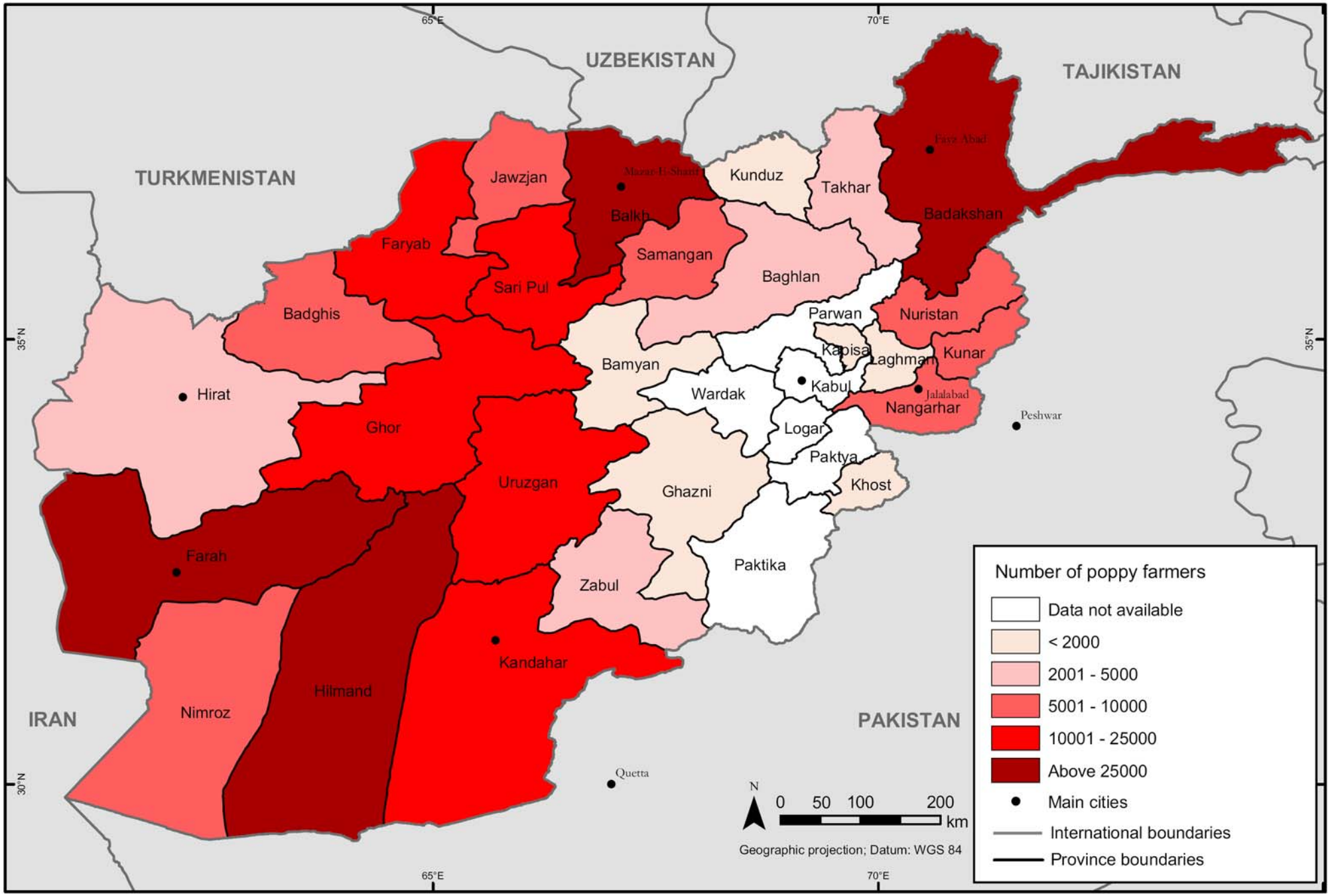


Another interesting finding of the survey was that the decline in the number of poppy farmers in 2005 concerned primarily those who had not been so deeply involved in opium production in 2004. Farmers who stopped growing opium had, on average, received 13% of their total income from opium in 2004. In contrast, farmers who continued growing opium poppy in 2005 had obtained, on average, 28% of their total income from opium in 2004.

[15] US Census Bureau, USA Statistics in Brief--Agriculture and Business *(http://www.census.gov/statab/www/agbus.html)*

[16] Statistisches Bundesamt Deutschland, Land und Forstwirtschaft, Betriebsgrößenstruktur landwirtschaftlicher Betriebe *(http://www.destatis.de/basis/d/forst/forsttab1.php).*

Number of farmers involved in poppy cultivation in Afghanistan, 2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: 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 Reasons for reducing or increasing opium poppy cultivation

As part of the survey, 2,073 farmers in 1,243 villages across Afghanistan were asked why they were increasing or decreasing opium poppy cultivation in 2005. A total of 1,922 farmers (93%) provided reasons for a decline or the non-cultivation of opium poppy. Only 151 farmers (7%) provided reasons for an increase of opium poppy cultivation in 2005. The main reasons quoted by farmers for not cultivating or reducing opium poppy cultivation in 2005 were:

- Fear of eradication (35%)
- Fear of imprisonment (20%)
- Forbidden by Islam (16%)
- Poppy ban (15%)
- Lower prices and less demand (10%)

The same question was asked as part of the UNODC's Farmers Intention Survey 2003/04, though at an earlier stage of the crop cycle, before the farmers had actually planted the opium poppy. At that time, in October 2003, the number of farmers reporting that they would reduce opium poppy cultivation was significantly lower (4%) and the main reasons for reducing opium poppy cultivation were: 'forbidden by Islam' and 'poppy ban'. In 2004/05, 'fear of eradication' gained strongly in importance as a deterrent to cultivating opium poppy.

Figure 22: Reasons for reducing or not cultivating opium poppy in 2005 (N = 1,922 farmers from 1118 villages)

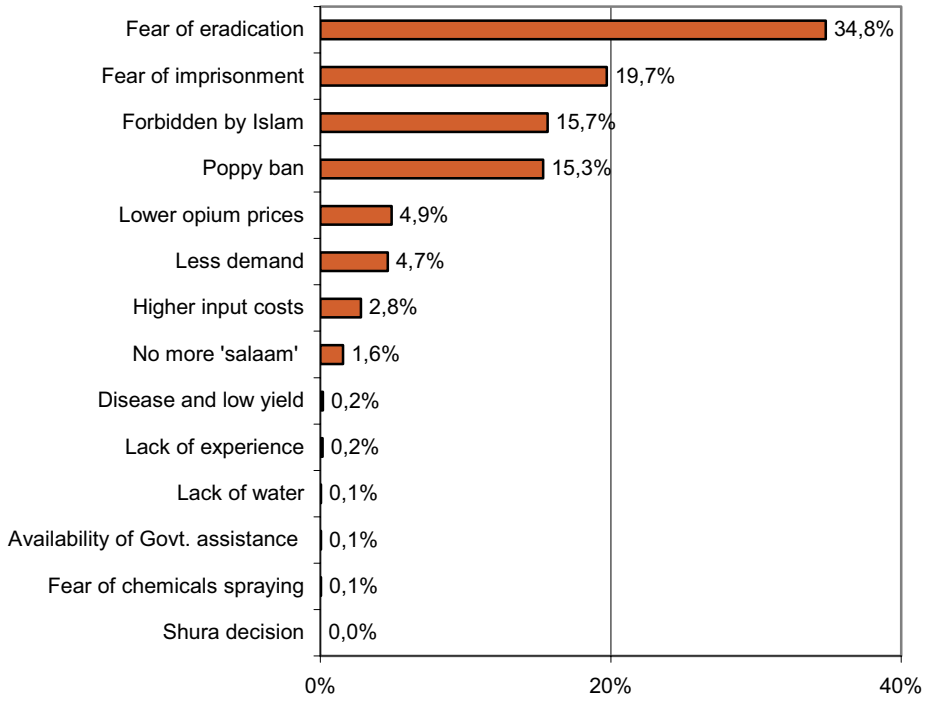
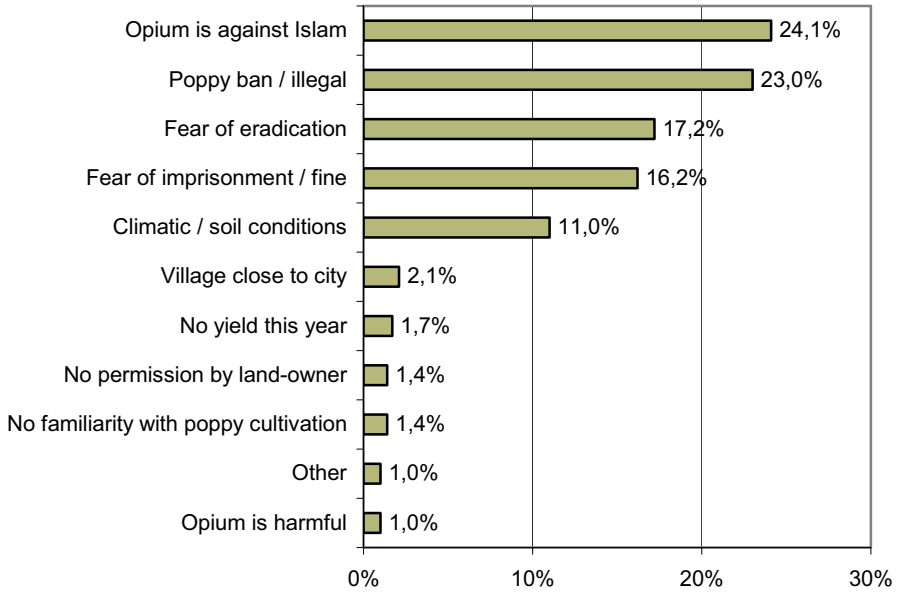


Figure 23: Farmers' intentions in 2003/04: reasons for not cultivating opium poppy (N=110)



The main reasons quoted by farmers for having increased opium poppy cultivation in 2005 were:

- Higher opium prices and higher demand for opium (40%)
- Personal consumption requirements (21%)
- High cost of wedding (16%)

As in the UNODC's Farmers Intention survey 2003/04 findings, the high price of opium was one of the main reasons for increasing opium poppy cultivation. The need to engage in opium production to satisfy personal consumption requirements, which was not mentioned in 2003/04, showed a surprisingly high percentage this year. However, these results and those described below should be treated with some caution as the sample of farmers admitting to increasing opium poppy cultivation in 2005 was rather small.

The possibilities of obtaining 'salaam' (credit) due to opium poppy cultivation (9%), did not show up prominently in this survey (rank 7) though in the 2003/04 Farmers Intention Survey 'credit' was still the third most frequently mentioned reason for increasing opium poppy cultivation. Money lenders have possibly become more cautious in relying on opium poppy cultivation as a security for the repayment of such loans. The 'need to engage in opium production to satisfy personal consumption requirements' ranked surprisingly high (34%). This is an important finding and, given the caveat described above, merits further inquiries. In addition, the 'high cost of wedding' gained in importance as a reason for opium poppy cultivation. Relatively high were expectations to obtain funds in compensation for eradication (12%), though such compensation schemes only existed in 2002 and were not resumed thereafter. External pressure to grow opium, in contrast, remained only marginally important (3%).

Figure 24: Reasons for increasing cultivation of opium poppy in 2005 (N = 151 farmers from 125 villages)

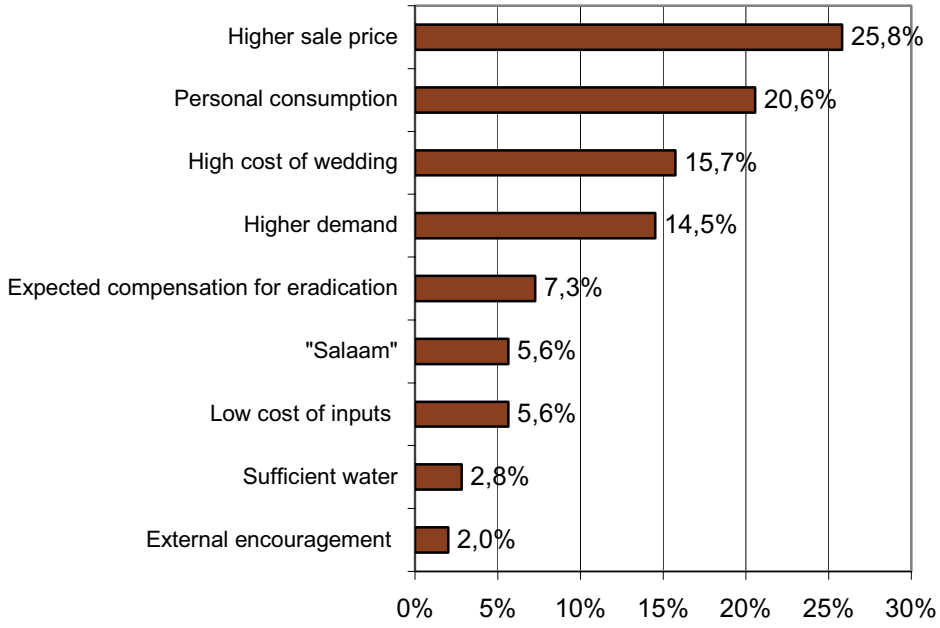
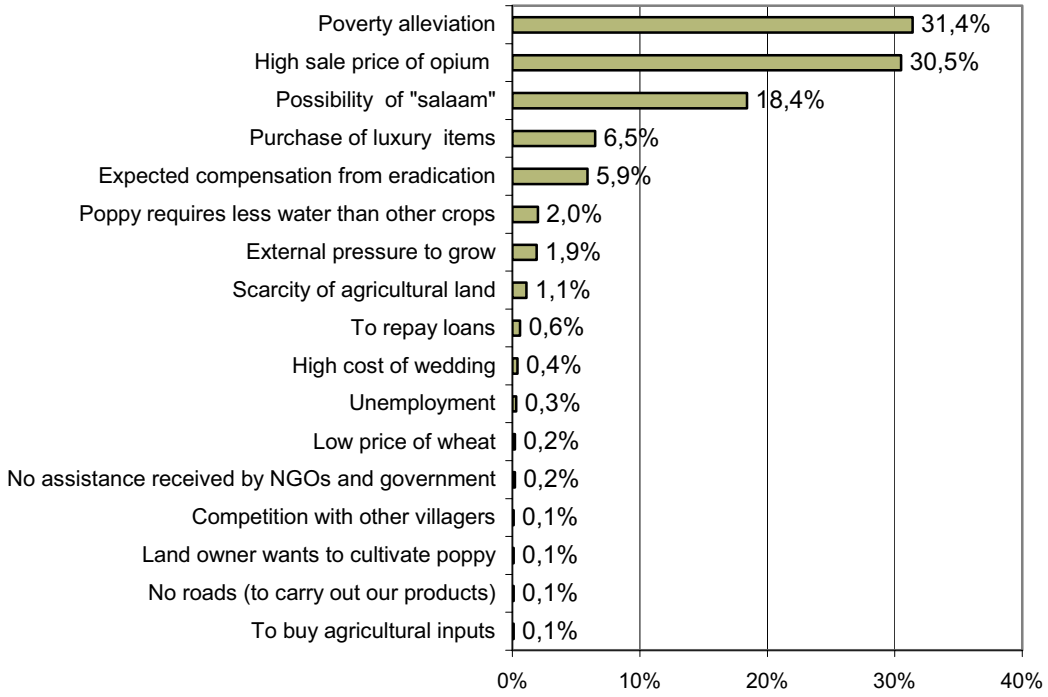


Figure 25: Farmers' intentions in 2003/04: reasons for cultivating opium poppy (N=801)



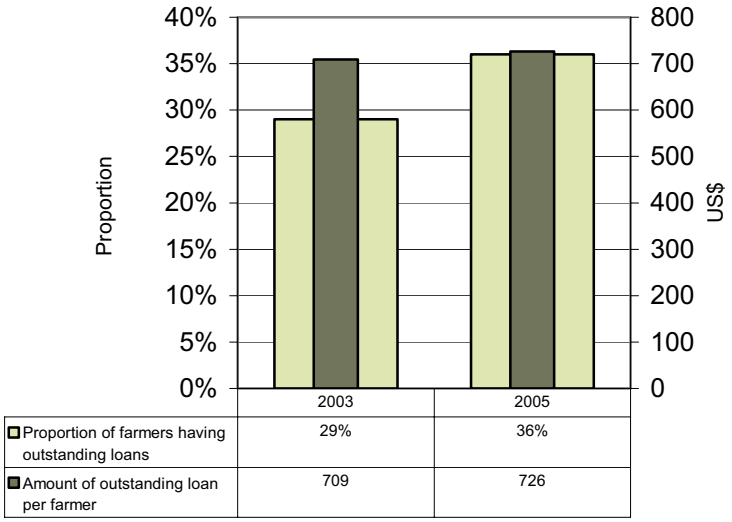
2.9 Loans

Outstanding loans

As part of the survey, farmers were also asked whether they had outstanding loans and whether they took out a new loan in 2005. These questions are of relevance as past research indicated that the lack of properly working financial institutions in Afghanistan, in combination with the need of farmers to bridge the gap until the next harvest, was one of the key reasons for farmers to engage in opium poppy cultivation. Notably 'salaam' arrangements, i.e. the advance sale of opium prior to harvest, which obliges farmers to plant and harvest opium in order to repay their debts, were identified in the past as a major driving force for poppy cultivation.

Out of 3,772 farmers who provided information 36% reported to have one or several outstanding loans. This is a higher proportion than the results obtained in UNODC's 2003/04 Farmers' Intention Survey where 29% of the interviewed farmers reported to have one or several outstanding loans. The average amount of the outstanding loans per farmer from previous period was US$726 in 2005. The average amount of outstanding loans has been equivalent to about three times the per capita GDP in Afghanistan (US$226 in 2004/05). The average amount of outstanding loans has remained largely stable since 2003 ($709 in 2003).

Figure 26: Outstanding loans from previous years among farmers



Poppy farmers (including farmers who produced poppy in 2004) have had, on average, slightly higher outstanding loans (+4%) than non-poppy farmers in 2005. In contrast, UNODC's 2003/04 Farmers Intention Survey revealed that poppy farmers had, on average 60% higher outstanding loans (US$740) than non poppy farmers (US$460). Survey data thus suggest that the average amount of outstanding loans fell slightly for poppy farmers, possibly as a result of good harvests and high opium prices over the last few years, but increased strongly for non-poppy farmers over the 2003-2005 period. This may, at least partially, explain why poppy farmers gave a lower priority to access to loans this year as compared to the 2003 results in UNODC's Farmers Intention Survey.

The outstanding loans, per farmer, are highest in the two main traditional opium producing regions of the country, eastern Afghanistan (US$861), followed by southern Afghanistan (US$818). Eastern Afghanistan also has the highest proportion of farmers, who have outstanding loans (53%). This is potentially problematic scenario as outstanding loans in combination with the strong decline of opium production in eastern Afghanistan this year, are likely to put severe financial pressure on to farmers to resume opium production next year in order not to default.

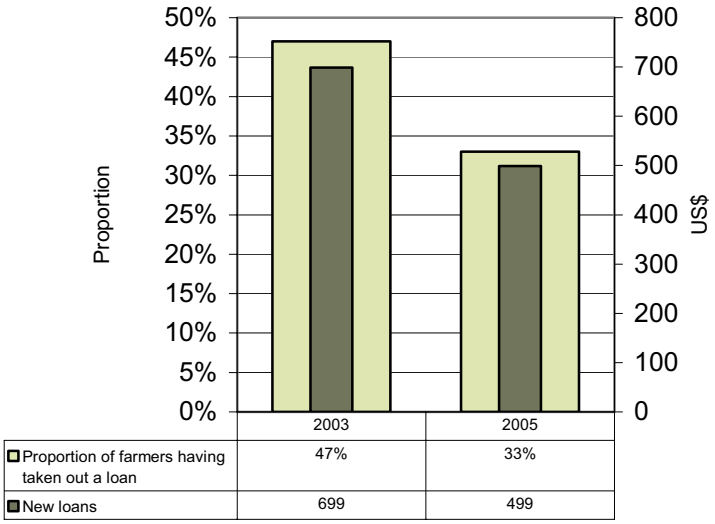
Table 14: Regional breakdown of outstanding loans

Region	Proportion of farmers having outstanding loans	Average amount of outstanding loans per farmer in US$
Eastern	53%	861
Southern	35%	818
Central	36%	814
Northern	29%	796
North-eastern	40%	474
Western	34%	388
TOTAL	36%	726

New Loans

The amount of new loans taken out in 2005 was, on average, US$500 per farmer (poppy and non-poppy farmer), equivalent to about twice the per capita GDP of Afghanistan (US$226 in 2004/05). The amounts ranged from less than US$1 to US$10,000 (median: US$318). As compared to 2003, the average loan size declined significantly (-29%), apparently reflecting a strategy by money lenders to reduce risk.

Table 15: New loans taken out by farmers



New loans were taken out by 33% of the interviewed farmers, a smaller proportion than in 2003 (47%). All of this also adds to the explanation why farmers gave access to credit a lower priority this year than in 2005. The promise by farmers to grow opium in the next season, in order to repay their debts, was less trusted by money lenders than in the past.

The highest proportions of farmers taking out new loans were found in north-eastern (53%), eastern (41%) and central Afghanistan (36%), i.e. in those regions which experienced significant declines in opium poppy cultivation in 2005, and where farmers were thus desperate to cover their basic financial needs. In terms of loan size, farmers in northern Afghanistan ranked first (US$711). This could reflect a perception by money lenders that repayment of loans in these provinces, where the opium ban *de facto* has not been implemented this year, has a higher likelihood than in other parts of the country, so that they can act more generously granting such loans.

The increased risk perception by money lenders may also reflect the fact that the average loan granted to poppy farmers has been just 4% higher than the average loan given to a non-poppy farmer in 2005. Back in 2003, poppy growers obtained, on average, loans that were almost 60% higher (US$724, on average) than non-poppy growers (US$461).

Table 16: Regional breakdown of new loans taken out in 2005

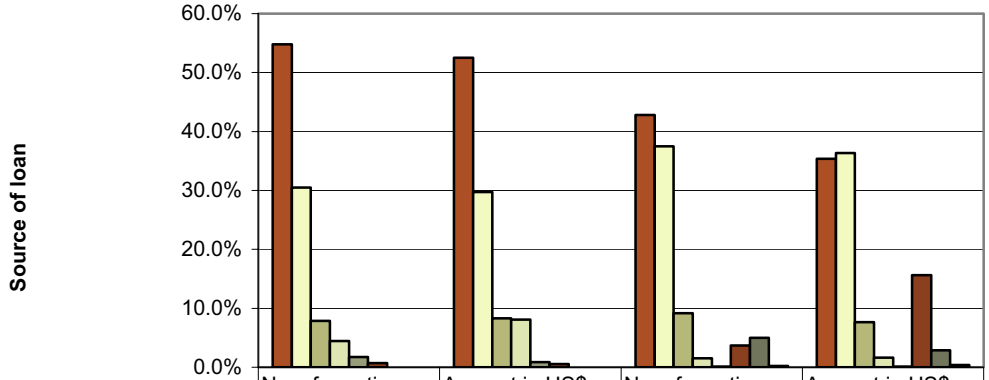
Region	Average amount of new loans taken out per farmer in US$ (n = 1,241)	Proportion of farmers who took out a new loan in 2005 (n = 3,767)
North-eastern	403	53%
Eastern	575	41%
Central	387	36%
Northern	711	28%
Southern	547	26%
Western	238	25%
TOTAL	**499**	**33%**

Sources of new loans

55% of the poppy growing farmers reported to have obtained their loans from shopkeepers and traders (who are often involved in the opium business). The next most frequent source were relatives (30%). Other sources included fellow villagers, such as neighbours, headmen and shura chiefs (8%), land-owners (5%), farmer cooperatives (2%) and NGOs (less than 1%). In terms of funds obtained, poppy farmers reported that 53% of their total loans came from shopkeepers & traders and 30% from relatives.

In the case of non-poppy farmers, 36% of the total amounts have been received from relatives and 35% from shopkeepers & traders. Thus, the amounts received from shopkeepers & traders continued to be smaller for non-poppy farmers than for poppy farmers. The third largest source of credit for non-poppy farmers were NGOs (16% of total amount); in this context, the Aga Khan Foundation, Focus NGO, Okandan NGO and Area NGO were frequently mentioned. 3% of the funds were obtained through the Agriculture Development Bank.

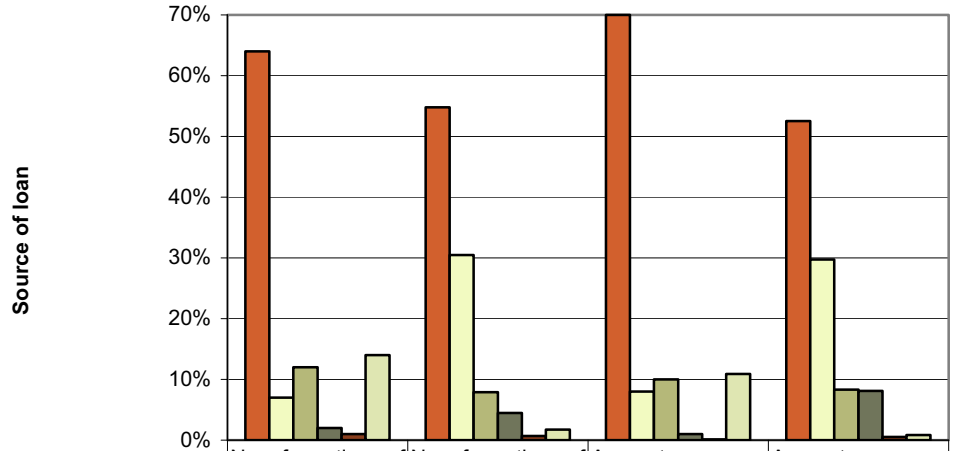
Figure 27: Sources of loans obtained by farmers in 2005



	Poppy farmers		Non-Poppy farmers	
SHOPKEEPERS/TRADERS	54.8%	52.5%	42.8%	35.4%
RELATIVE	30.5%	29.7%	37.5%	36.4%
FELLOW VILLAGERS	7.9%	8.3%	9.2%	7.7%
LAND OWNER	4.5%	8.1%	1.5%	1.7%
CO-OPERATIVE	1.7%	0.8%	0.1%	0.1%
NGOs	0.7%	0.5%	3.7%	15.6%
FINANCIAL INSTITUTIONS			5.0%	2.9%
GOVERNMENT			0.2%	0.4%

A comparison with the results of UNODC's 2003/04 Farmers Intention Survey shows that for poppy farmers the importance of shopkeepers and traders as a source for their loans declined. While 70% of loans of poppy farmers in 2003 came from shopkeepers and traders, the corresponding proportion fell to 53% in 2005, reflecting increased risk perceptions of these groups to provide money to farmers who might be the target of eradication in the next season. Fellow villagers also grew more suspicious and reduced their lending operations to poppy farmers. Thus, poppy farmers were forced to reduce their overall borrowing activities and had to turn to relatives to obtain funds. Their share as a source of loans increased from 8% to 30%. There was also an increase in the funds obtained from land-owners (from 1% to 8%), as they – apparently - did not want to loose their tenants.

Figure 28: Sources of loans obtained by poppy farmers in 2003 and 2005

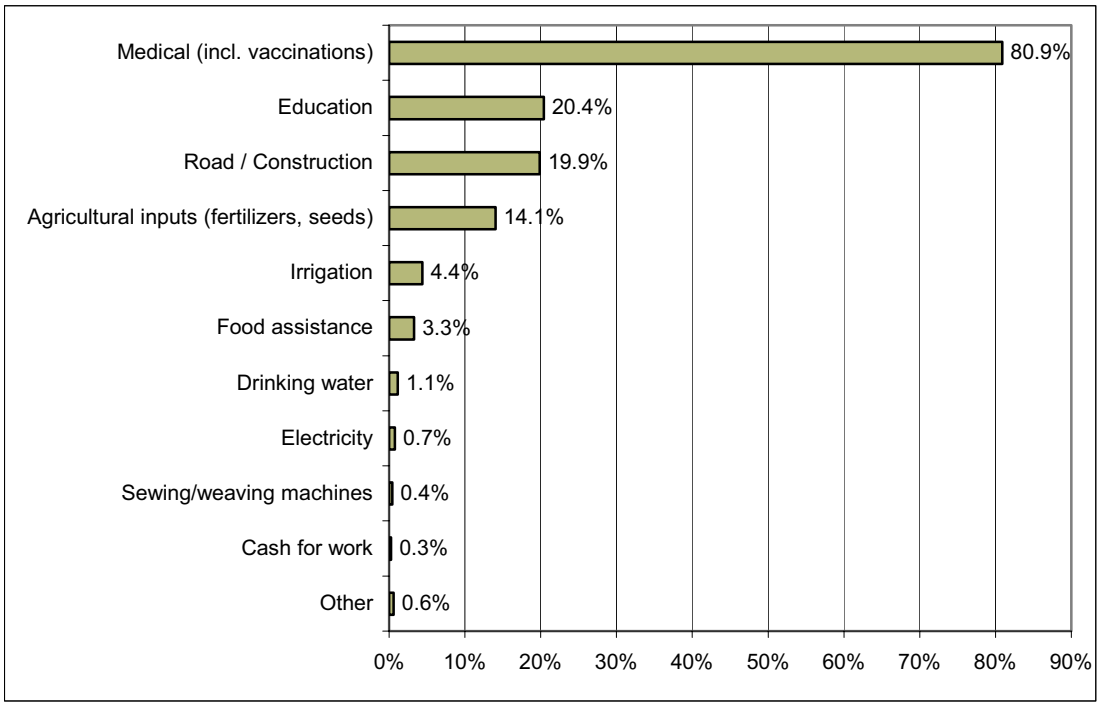


	No. of mentions of 2003	No. of mentions of 2005	Amount 2003	Amount 2005
SHOPKEEPERS/TRADERS	64%	55%	70%	53%
RELATIVE	7%	30%	8%	30%
FELLOW VILLAGERS	12%	8%	10%	8%
LAND OWNER	2%	4%	1%	8%
NGOs	1.0%	0.7%	0.1%	0.5%
Other	14%	2%	11%	1%

2.10 External assistance

One question to the headman was whether the surveyed village had received external assistance. Out of 1878 villages which provided information on this question, the headmen of 1649 villages (88%) confirmed to have received some form of external assistance over the last few years. Most assistance was in the field of medicine, (81%), followed by education (20%), construction activities (20%), agricultural inputs (14%) and irrigation (4%).

Figure 29: External assistance interventions - mentions by headmen (n = 1878 villages)



Linking information on the status of a village with regard to opium production in 2005 and assistance received, data suggest that about the same assistance was given to opium poppy and non-opium poppy villages in 2005: 86% (35.1%/40.9%) of the opium producing villages received economic assistance in 2005, versus 89% (52.9%/59.1%) of the non-opium producing villages. Based on the headmen interviews (n = 1087) it appears that about 40% of external assistance interventions went to opium poppy producing villages and 60% to non-opium producing villages in 2005. (In this calculation, all types of external assistance have been assumed to be of equal importance; the actual amounts spent were not considered).

Table 17: External assistance and poppy status of village as reported by headmen (n = 1087 villages)

Assistance received	No opium cultivation in 2005	Opium cultivation in 2005	Total
No	6.4%	5.8%	12.2%
Yes	52.7%	35.1%	87.8%
Total	59.1%	40.9%	100.0%

It is difficult to judge whether the assistance had any direct impact on the farmers' decision to reduce the area under poppy cultivation in 2005. Nonetheless, based on information from 1066 villages which provided information on changes in the area under poppy cultivation (obtained through interviews of two randomly selected farmers per village) and information on assistance received from the headmen, it seems that external assistance was a conducive factor for the stabilization or reduction of opium poppy cultivation in 2005. In 78% of all villages, external assistance received went hand in hand with a reduction in the area under poppy cultivation, while only in

9% of the villages, farmers reported to have increased opium poppy cultivation though the village had obtained external assistance.

Table 18: External assistance and change in poppy cultivation reported by farmers (n = 1066 villages)

Assistance received	Stabilization or decline of poppy of cultivation in 2005*	Increase of poppy cultivation in 2005*	Total
No	11.0%	1.8%	12.8%
Yes	77.9%	9.4%	87.2%
Total	88.8%	11.2%	100.0%

If the change in opium poppy cultivation reported by farmers is calculated, data suggest that in villages that received external assistance, the decline in the area under poppy cultivation amounted to, on average, 0.37 hectares per poppy farmer in 2005 (based on interviews of two randomly selected farmers per village), almost 50% more than the decline in villages that had not received external assistance (0.25 ha). This pattern of a stronger decline of opium poppy cultivation in villages that had received external assistance, was observed in most regions of the country. Even though the overall numbers, based on self-reports, apparently over-state the decline in poppy cultivation (as can be seen by a comparison with data gathered through satellite images), this does not change the basic argument that the decline in the area under poppy cultivation in villages receiving external assistance was apparently larger than in villages that had not obtained such assistance.

Table 19: External assistance as reported by headmen and change in the area under poppy cultivation as reported by poppy farmers in 2005

	Change in hectares per poppy farmer in 2005	
	No external assistance received	External assistance received
North-eastern	-0.29	-0.56
Southern	0.00	-0.50
Northern	-0.24	-0.40
Central	-0.35	-0.29
Eastern	0.00	-0.22
Western	0.01	-0.15
All Afghanistan	-0.25	-0.37

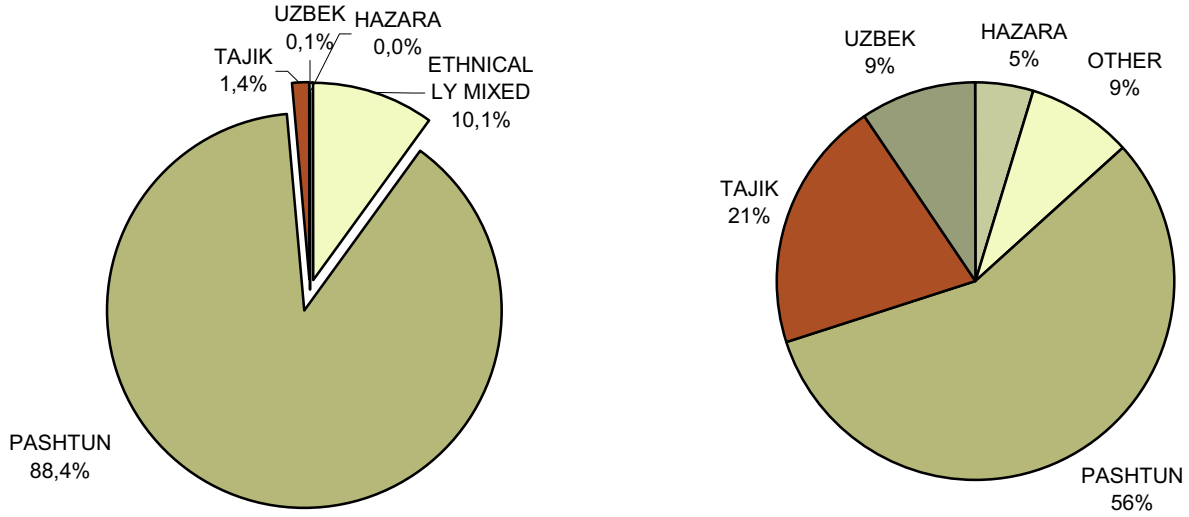
2.11 Ethnic distribution

As part of the village survey, data was collected from the village headman in 1,842 villages on the ethnic/linguistic distribution among the surveyed population. The findings are in line with existing information and show the predominance of Pashtun population in the southern and eastern parts of the country and of Tajik/Dari/Farsi speaking population in the northern and western parts of Afghanistan, as well as of Hazara population in some provinces in central Afghanistan. Perhaps more interesting, they also confirm the ethnic diversity within many provinces, which facilitates communication and transactions, including trafficking, across the country.

In terms of production, available data for 2005 suggest that more than half of the country's opium production (56%) originated from Pashtun farmers, followed by Tajik/dari-speaking farmers (21%) and Uzbek farmers (9%). A comparison with data collected in 1994 shows a clear increase of opium production among Tajik, Uzbek, Hazara and other ethnics while the proportion of opium production among the country's Pashtun population declined (from 88% to 56%). This is due to a combination of factors including the strong decline of opium production in eastern Afghanistan in 2005, and the increase of opium production – as compared to a decade earlier – in the northern and western parts of the country.

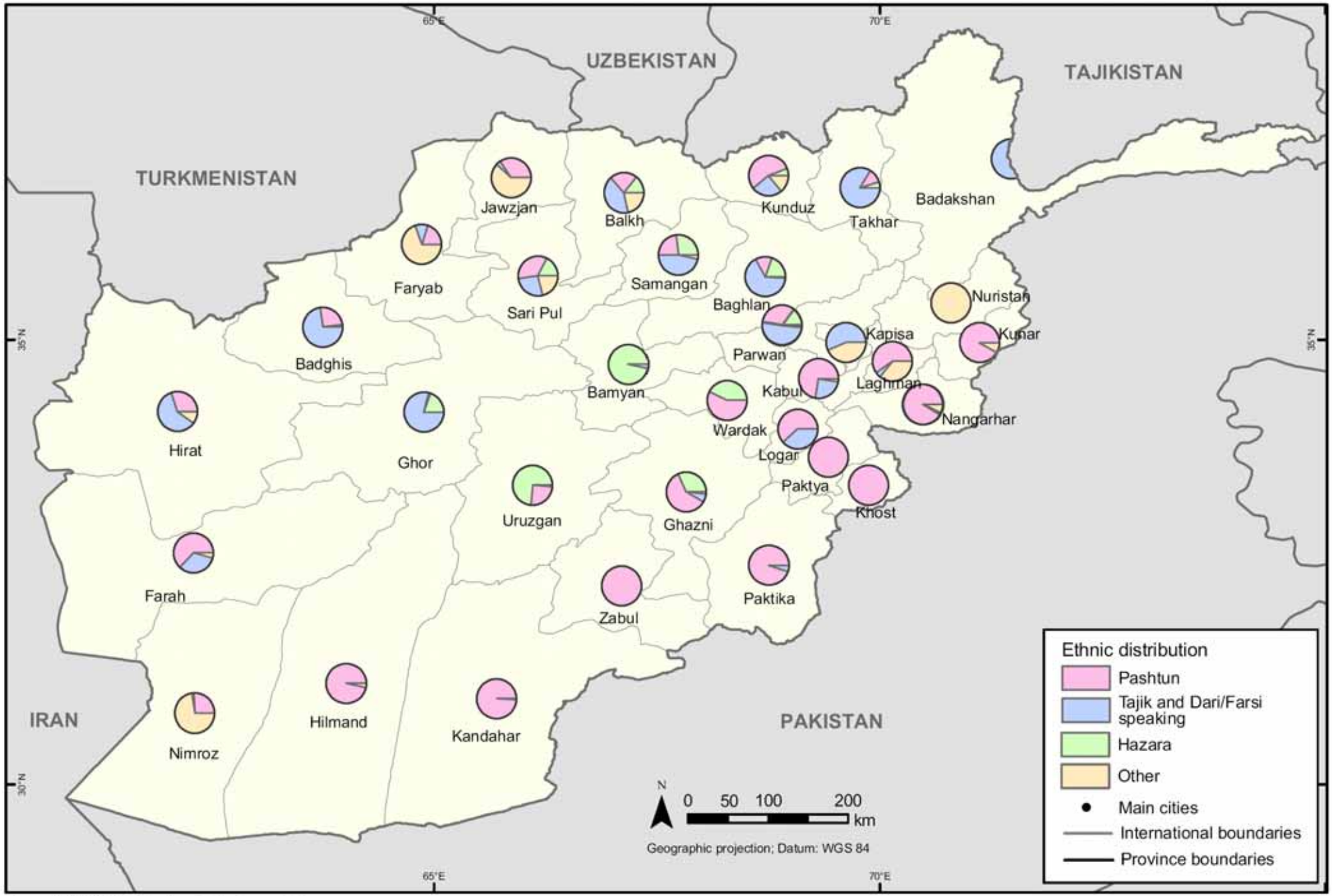
While the overall trend is clear, the percentages of the ethnic distribution of opium farmers presented here must be treated with caution. The results were derived by distributing provincial opium production according to the distribution of the population in opium producing villages. This assumes a homogeneous distribution of poppy farmers in villages of mixed ethnic composition – which is not necessarily the case.

Figure 30: Ethnic distribution of population in opium producing villages in 1994 and 2005



1994 **2005**

Ethnic/linguistic distribution among surveyed population in rural Afghanistan, 2005 (at province level)



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

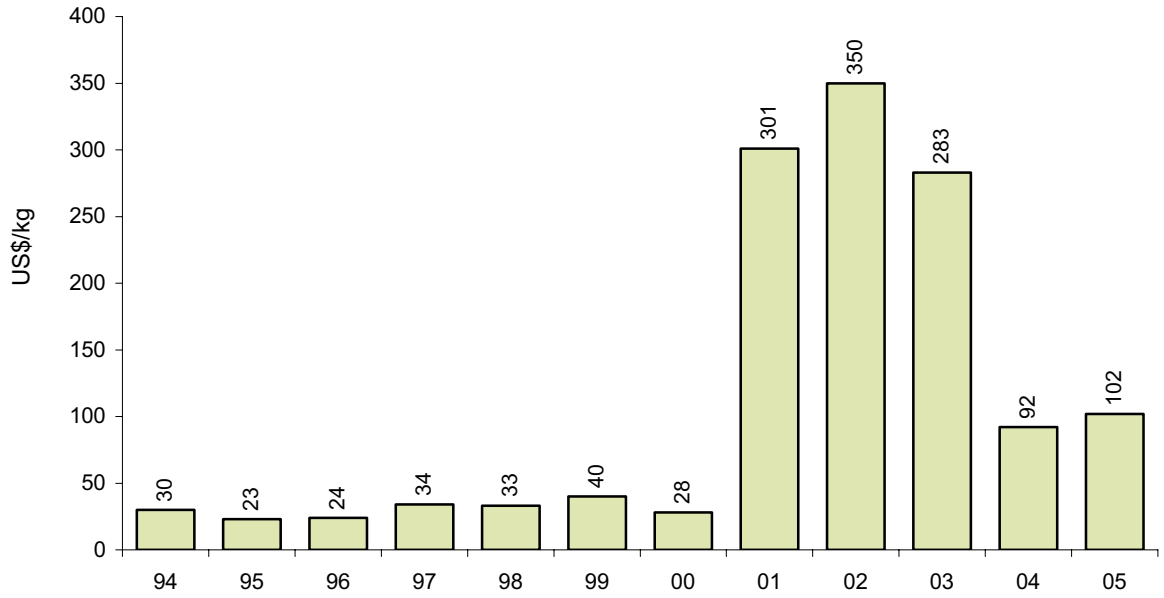
2.12 Opium Prices

Based on interviews in 1,842 villages, the average fresh opium price was calculated at US$107/kg. If the prices are weighted by regional opium production (as done in previous years), the average price for fresh opium was US$102 (+/- US$17). As compared to a year earlier, fresh opium prices were 16% higher than at harvest time in 2004 and still two to three times higher than in the second half of the 1990s, though significantly lower than over the 2001-2003 period (around US$300).

The prices of dry opium remained basically stable with a simple average of $148/kg, or $138/kg (+/- US$14). If weighted by regional opium production (US$142 in 2004). There continue to be, however, important regional differences. The lowest prices were found in Northern Afghanistan (US$112), reflecting strong increases in production. The highest prices were encountered in Central Afghanistan (US$235), where production basically ceased in 2005. Above average prices were also reported from Eastern Afghanistan, due to law enforcement activities, and from Western Afghanistan (US$164), reflecting high opium prices in neighbouring Iran.

In order to minimize the cost, opium is usually transformed into morphine/heroin rather close to the area of production and the final product (morphine/heroin) is then trafficked to the closest border. A major exception to this "rule" is opium produced in northern Afghanistan. Most of this opium is trafficked from the northern to the southern region. Traffickers from the southern region either visit markets in the north or place orders. Although the cost of transporting opium from the North to Southern Afghanistan is high, the disparity in opium prices between the two regions makes trafficking to the South worthwhile.

Figure 31: Fresh opium farm-gate prices at harvest time (weighted by production) in Afghanistan, 1994-2005 (US$/kg)

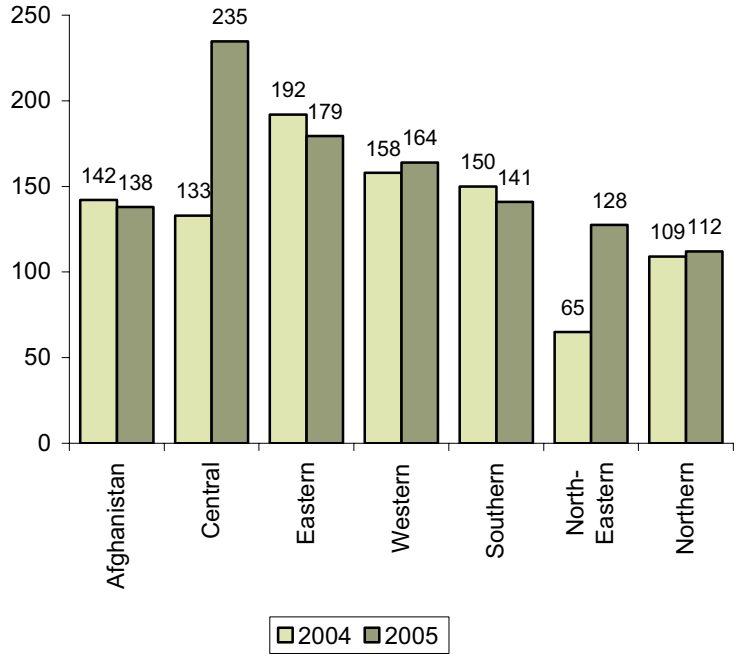


Sources: UNODC, Opium Surveys 1994-2005

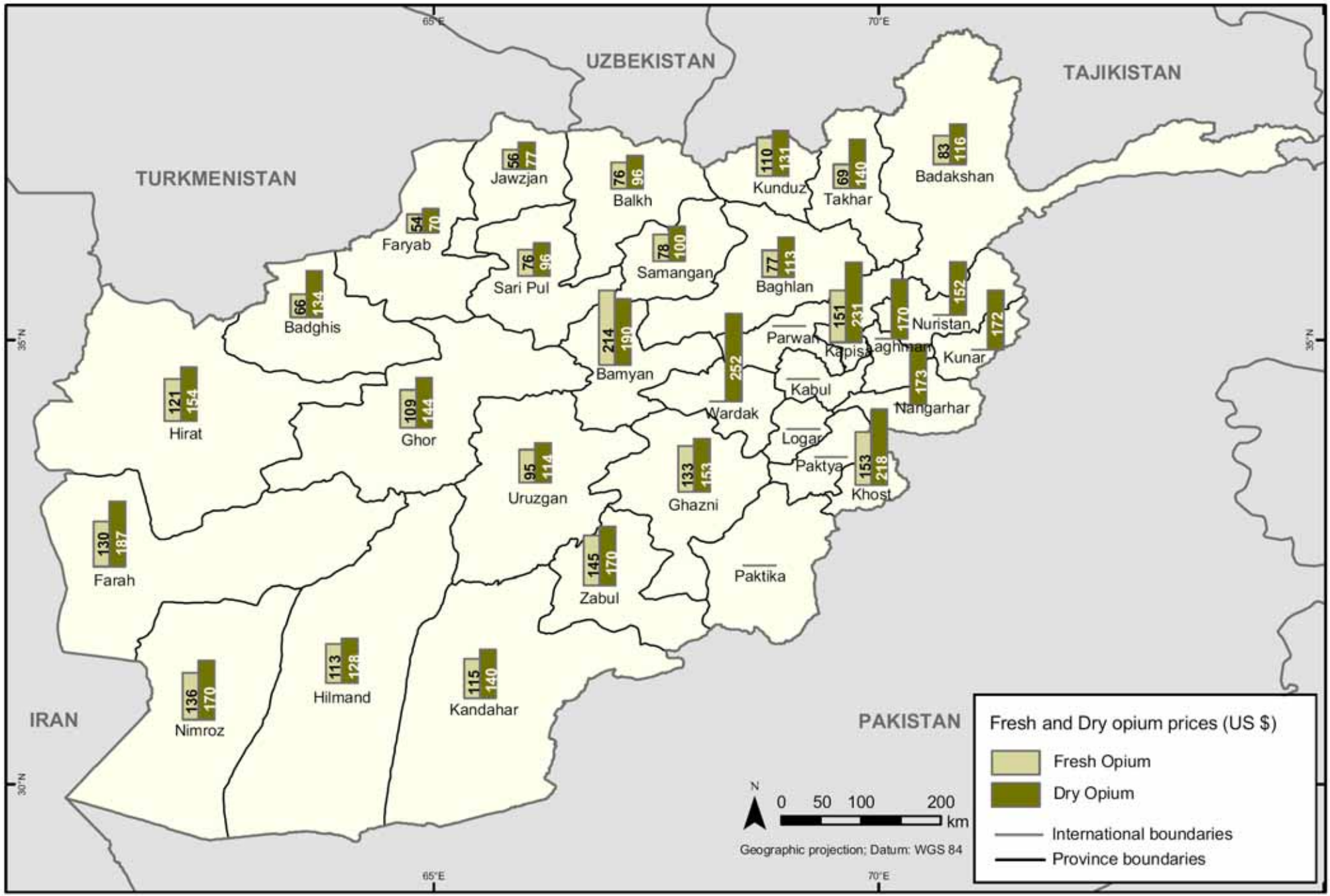
Table 20: Opium prices in Afghanistan in US$ per kilogram at harvest time in 2005 – regional breakdown

Region	Average Fresh Opium Price (USD) - 2004	Average Fresh Opium Price (USD) - 2005	Change	Average Dry Opium Price (USD)-2004	Average Dry Opium Price (USD)-2005	Change
North-Eastern (Badakhshan, Takhar)	42	76	81%	65	128	97%
Northern (Bamyan, Jawzjan, Sari Pul, Baghlan, Faryab, Balkh, Samangan, Badghis, Kunduz)	66	90	36%	109	112	3%
Central (Parwan, Paktya, Wardak, Khost, Kabul, Logar)	97	153	58%	133	235	77%
Southern (Hilmand, Uruzgan, Kandahar, Zabul, Ghazni, Paktika)	123	120	-2%	150	141	-6%
Western (Ghor, Hirat, Farh, Nimroz)	106	124	17%	158	164	4%
Eastern (Nangarhar, Kunar, Laghman, Nuristan, Kapisa)	94	151	61%	192	179	-7%
Unweighted average	86	107	24%	138	148	7%
National average price weighted by production	**92**	**102**	11%	**142**	**138**	-3%

Figure 32: Dry opium farm-gate prices at harvest time, regional breakdown, US$/kg



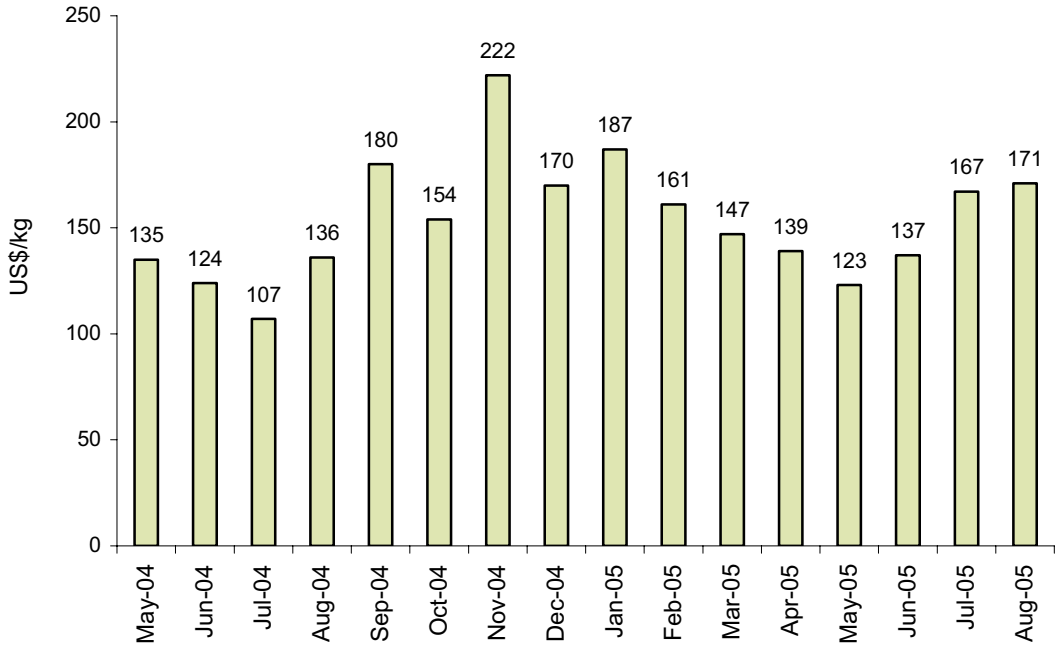
Dry opium prices (US $) in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

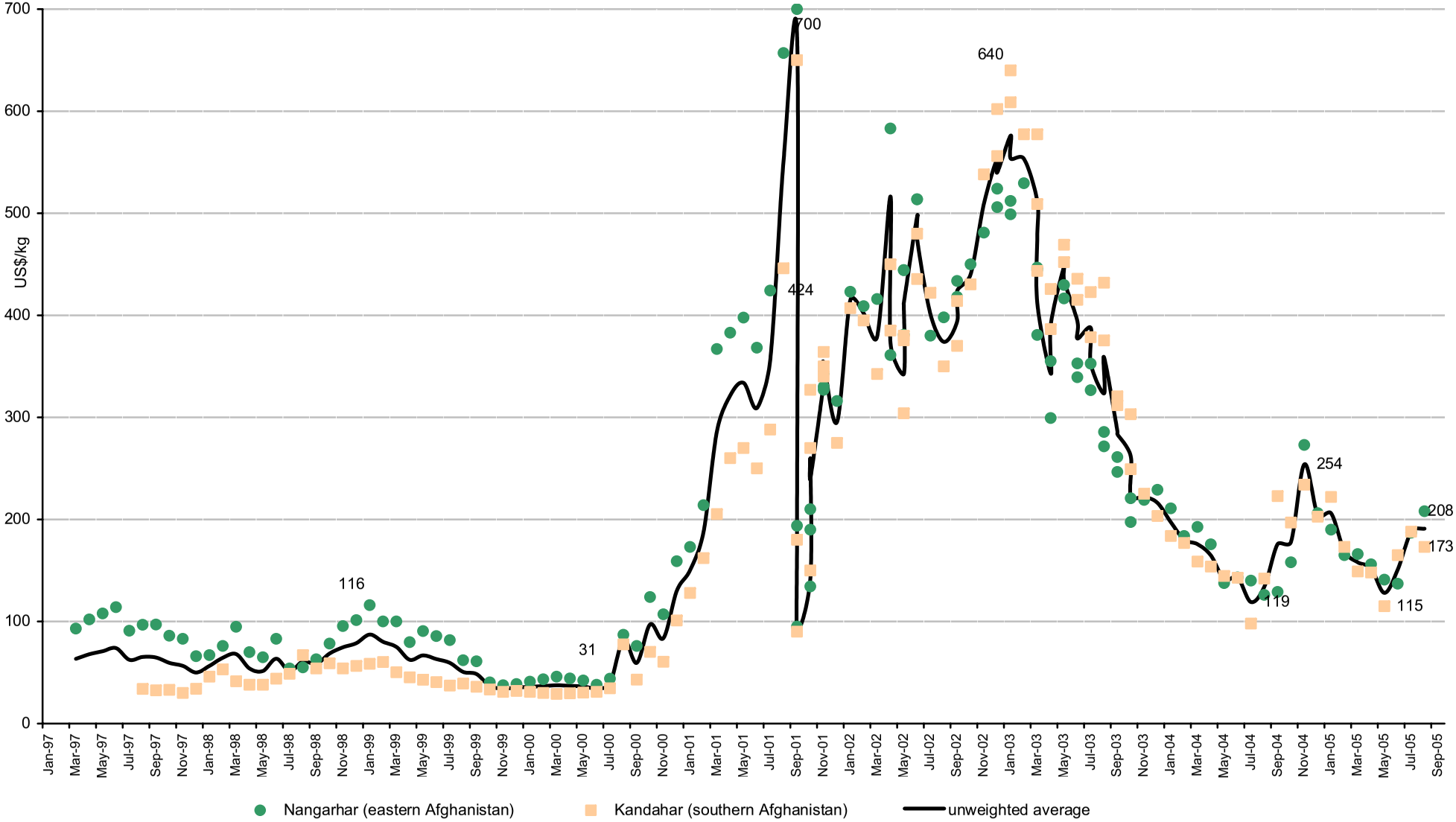
Figure 33: Dry opium prices between May 2004-August 2005 in Afghanistan (US$ per kg)



Opium prices have been regularly collected since 1997 in selected parts of Nangarhar (eastern Afghanistan) and Kandahar (southern Afghanistan), as part of UNODC/ICMP project on Monitoring Opium Production in Afghanistan. Beginning a few years ago, prices have also been collected in Badakhshan, Balkh, Hilmand and Hirat, from both poppy farmers and local opium traders.

At the end of August 2005, the average price for one kilo of dry opium in Afghanistan at the farm gate level amounted to US$ 171, a 2% increase over prices recorded a month earlier. Dry opium prices increased 39% between May-August 2005. Dry opium prices collected from traders amounted to US$ 176 with a 5% increase in August 2005. Trader prices for dry opium increased in all regions in Afghanistan.

Afghanistan, prices of dry opium in Nangarhar and Kandahar collected from traders, US$/kg, March 1997 - August 2005



2.13 Potential value and income to farmers

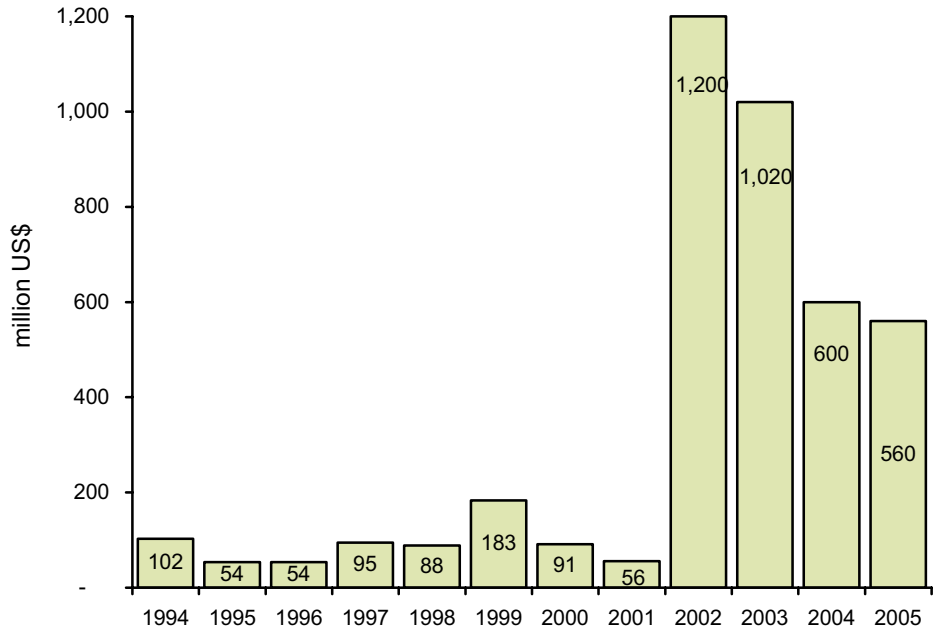
Based on opium production estimates and reported opium prices the farm-gate value of the opium harvest can be estimated at around US$560 million (90% confidence interval: US$470 to US$655 million). The bulk of the income was earned by farmers in southern and northern Afghanistan, accounting for two thirds of total income from opium production.

Table 21: Farm-gate value of opium production in 2005

Region	Production of dry opium in kg	Price of dry opium per kg in US$	Farmgate value in million US$
Southern	1,749	141	246.52
Northern	1,098	112	123.11
Western	685	164	112.29
North-Eastern	365	128	46.60
Eastern	180	179	32.36
Central	4	235	0.90
Total	**4,082**	**138**	**561.77**
Total rounded	**4,100**		**560**
90% confidence interval	**3,560 – 4,610**	**+/- 14**	**470 - 655**

Given slightly lower production and slightly lower dry opium prices, the overall farm-gate value of opium production was some 7% lower than in 2004 and some 55% lower than in 2002. Nonetheless, the income from opium production was still three times higher than in 1999 and six times higher than in 2000.

Figure 34: Estimated value of opium production at farm-gate level in Afghanistan, 1994-2005



The gross income to farmers from poppy cultivation of US$560 million would be equivalent to more than twice the size of total domestic revenues of the Government (US$259 million in 2004/05 according to World Bank estimates).[17] Expressed as a percentage of licit GDP (US$5.2 billion excluding the opium sector in 2004/5[18]), the farm-gate value of opium production is equivalent to around 11% of GDP (down from 22% in 2003 and 13% in 2004). Compared to agriculture, the farm-gate value of opium production has been equivalent to some 24%[19] of the value added of the licit agricultural sector (down from 46% in 2003 and 27% in 2004).

Reflecting higher yields, average gross family income per poppy farmer was US$1,800 in 2005, slightly more than in 2004 (US$1,700), though still down from US$3,900 in 2003 when opium prices had been substantially higher. Similarly, average gross per capita income of all family members of poppy farmers declined from around US$600 in 2003 to US$260 in 2004 and recovered only slightly to US$280 in 2005. Nonetheless, opium related gross income was with US$280 per head of poppy growing families about 23% above per capita GDP in Afghanistan (US$226 in 2004/05).

Income from opium accounts, in general, only for a proportion of total farmers' income. Farmers who grew opium poppy in both 2004 and 2005 reported that on average 28% of their total income in 2004 resulted from the sale of the opium which they produced. This was a higher proportion than for farmers who gave up producing opium in 2005; for them the income was, on average, just 13% of total income in 2004.

Table 22: Average family and per capita income of poppy growing families from opium production in 2003, 2004 and 2005

	2003	2004	2005
Gross income in million US$	$1,020	$600	$560
Estimated No. of poppy farmers	264,000	356,000	309,000
Average income per poppy farmer	$3,864	$1,685	$1,813
Rounded	**$3,900**	**$1,700**	**$1,800**
No. of farmers and members of their families	1,716,000	2,314,000	2,008,500
Per capita income of poppy growing families	$594	$259	$279
Rounded	**$600**	**$260**	**$280**

[17] Source: World Bank, *Administrator's Report on the Financial Status of the ARTF*, May 2004.

[18] Afghan Government, Central Statistics Office: GDP figures for the year 1382 (2003/2004): Afs 223,629 millions and for the year 1383 (2004/2005): Afs : 254,487 millions.

[19] The contribution of the agricultural sector to GDP, excluding opium, was 47% in 2003 according to World Bank data, which – based on a GDP estimate of US$5.2 bn would give a figure of US$2.4 bn for 2004/05. Based on data provided by the Economist Intelligence Unit, the value added of the agricultural sector amounted to US$2.2 bn in 2004/05. (World Bank, *Afghanistan, State Building, Sustaining Growth and Reducing Poverty, Country Economic Report,* September 9, 2004, p. 127 and Economist Intelligence Unit, *Afghanistan Country Report*, August 2005, p. 5.)

The difference in accumulated 'wealth' between opium poppy growing ('this year or in previous years') and non-opium poppy growing farmers ('never in their life') becomes more pronounced if the actual possession or non-possession of consumer goods or capital goods is analysed:

- In Nangarhar province, for instance, 3% of the interviewed poppy farmers (n=166) had a tractor and 7% had a car while none of the interviewed non-poppy growing farmers had a tractor or a car. Similarly, 7% of the poppy growing farmers had a TV and 2% had a satellite receiver while only a few TVs and no satellite receivers were reported among non-poppy growing farmers.
- In Hilmand province, 2% of the poppy growing farmers (n = 149) had a tractor and 15% had a car while no such items were found among non-opium growing farmers.
- In Kandahar province 26% of the interviewed poppy growing farmers (n = 174) had a tractor versus 16% among non-opium growing farmers; 3% of the opium poppy growing farmers had a car while none of the non-opium producing farmers had one.
- In Balkh province (n = 72) 11% of the opium poppy growing farmers possessed a tractor versus 2% among the non-poppy growing farmers.
- In Badakhsan province 5% of the poppy growing farmers (n = 120) had a motorcycle versus none among the non-opium producing farmers.
- In Uruzgan province 29% of the interviewed poppy growing farmers (n = 185) had a motorcycle, 4% a car, 3% a tractor while among the interviewed non-poppy growing farmers none had a car, none had a tractor and only 10% had a motorcycle.

At the same time, the analysis for Afghanistan as a whole reveals that opium poppy farmers (n = 2208) are, in general, not wealthier than non-poppy growing farmers (n = 1490), reflecting the fact that opium poppy is grown in several of the more backward or disadvantaged regions of the country: For example, in central Afghanistan, where opium cultivation was never important and almost disappeared in 2005, farmers seem to be wealthier than farmers in traditional poppy growing areas: in Ghazni 11% of the farmers had car, 18% in Paktya and 28% in Khost. This is much higher than the Afghan average for both opium growing and non-opium poppy growing farmers.

Overall findings confirm that opium poppy farmers are not wealthier than non-poppy growing farmers: 5% of the interviewed opium poppy growing farmers had a tractor - the same proportion as for the interviewed non opium poppy growing farmers. For some of the other items, possession of consumer goods among opium poppy farmers at the national level was even slightly less common than among non opium poppy producing farmers:

- 4% of the interviewed opium poppy growing farmers had a car versus 6% of non opium poppy growing farmers;
- 9% of opium poppy farmers had a TV versus 10% among non opium poppy farmers;
- 1% of opium poppy growers had a satellite dish versus 2% among non opium poppy growing farmers.

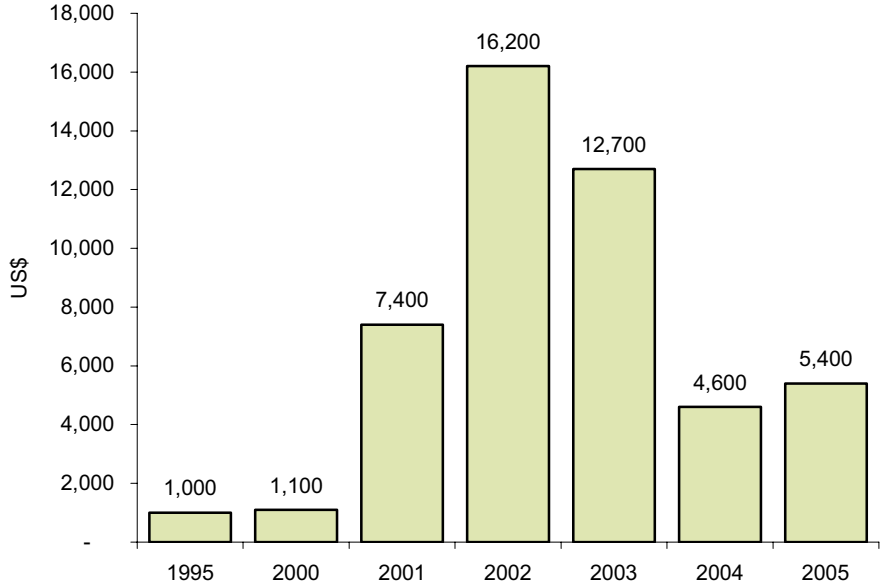
Only in the case of motorcycles the pattern was different. Opium poppy farmers had clearly higher numbers at their disposal, reflecting the fact that poppy farmers tend to be younger than non-poppy farmers and that a motorcycle is status object for the younger generation: 27% of poppy growing farmers had a motorcycle versus 17% of non opium poppy farmers.

Table 23: Possession of consumer/capital goods among surveyed population in Afghanistan, 2005

	% of opium poppy growing farmers ('ever') who possess a:			% of non-opium poppy growing farmers ('never') who possess a:		
	motorcycle	tractor	car	motorcycle	tractor	car
Afghanistan average	**27%**	**5%**	**4%**	**17%**	**5%**	**6%**
Nangarhar	3%	3%	7%	0%	0%	0%
Hilmand	56%	2%	15%	n.a.	0%	0%
Kandahar	58%	25%	3%	30%	16%	0%
Balkh	38%	11%	11%	0%	2%	0%
Badakhshan	5%	n.a.	1%	0%	0%	0%
Uruzgan	29%	3%	4%	10%	0%	0%

Gross income of opium poppy cultivation per hectare amounted to US$5,400 (yield of 39 kg of dry opium per ha × price of US$138 of dry opium per kg). The income from a hectare under cultivation was slightly higher than a year earlier (US$4600), reflecting a better yield than in the previous year. Nonetheless, opium income per hectare was still less than over the 2001-2003 period, less than half the income in 2003, though five times more than in the 1990s or in the year 2000. A family cultivated, on average, 0.33 hectares of opium poppy in 2005.

Figure 35: Gross income of poppy cultivation per hectare in US$



The difference between the gross income from a hectare under wheat as compared to a hectare under poppy cultivation remained important (10:1 ratio), but it continued declining. While in 2003 a hectare under poppy cultivation would bring a farmer 27 times more in gross income than a hectare under wheat production, the respective ratio declined to 12 in 2004 and to 10 in 2005. The comparison is based on the gross income from a hectare under poppy cultivation and the expected gross income from a hectare of an irrigated wheat field.

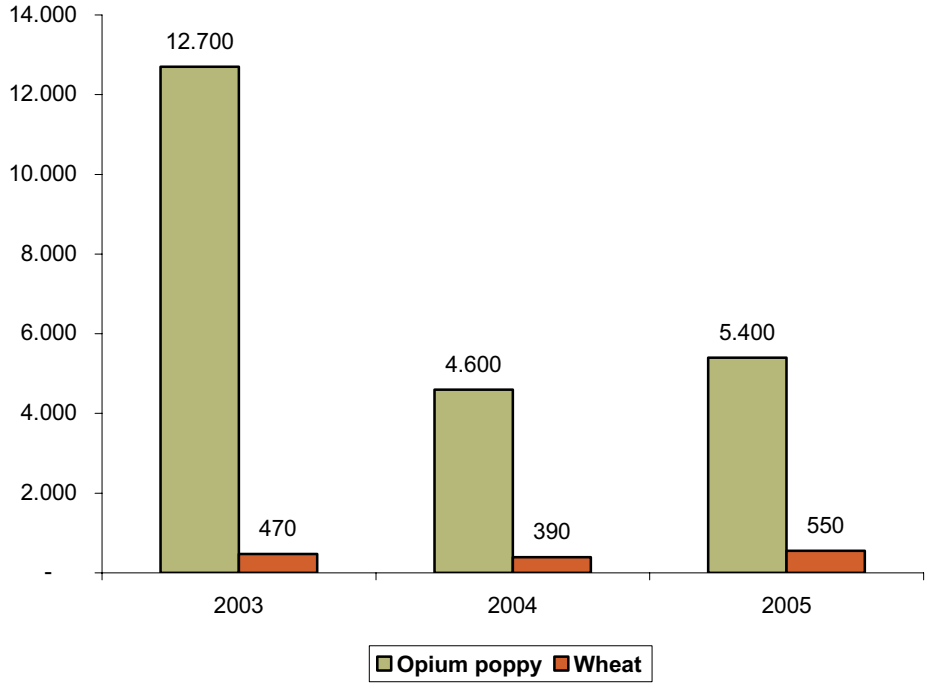
Even though the differences in the net income are much less, opium poppy remains an attractive option for farmers. In order to arrive at the net income figures, a number of cost items (labour, fertilizers, seed, fuel, depreciation for tractors and other agricultural equipment as well as taxes to local commanders and various bribes) would have to be deducted. These costs can be important for opium[20] and are, in general, higher than for the cultivation of wheat or other agricultural products. Farmers reported, for instance this year that they had to spend $80 per jerib (0.2 ha) on fertilizers, i.e. 66% more than for the cultivation of wheat ($48 per jerib). In the case of labour, previous studies suggested that 350 person-days were needed to cultivate 1 ha of opium poppy as compared to 41 person days for the cultivation of wheat.[21] Salaries paid to itinerant workers assisting with the harvesting of opium poppy are usually also higher than salaries paid to itinerant workers assisting in the

[20] According to information gathered in *UNODC's 2003/04 Farmers Intention Survey*, some 45% of gross income in 2003 was spent on various input costs. *A* poppy farmer in 2003 could reckon with a gross income of $12,700 per hectare if he sold opium at harvest time. The actual gross income of farmers, selling later (and thus at lower prices) and/or at lower prices due to salaam arrangements, was more than 30% less ($8,700 per ha). The overall self-reported net-income of a poppy farmer, cultivating on average 0.45 ha in the sample, amounted to $2,128; the net income for 1 ha under poppy cultivation would thus have been equivalent to $4730, or 54% of gross income. In other words, about half (46%) of gross income was apparently spent by farmers on labour costs, fertilizer, seed, payments to commanders, etc. Payments to local commanders were usually equivalent to around 10%, though going up to 40% of the value of the opium sold in some districts. (UNODC/Govt. of Afghanistan (Counter Narcotics Directorate), Farmers Intention Survey 2003/2004, February 2004.)

[21] *UNODC, The Opium Economy in Afghanistan*, New York 2003, p. 100.

harvesting of wheat. The salaries paid to itinerant workers working on poppy farms amounted, on average, to about US$6 per day (plus 2-3 meals per day) this year which was similar to the salaries reported last year though higher than the $2-$3 reported in previous years and significantly more than itinerant workers could expect from working on a wheat field (some US$4). For the typical farmer with 0.33 ha under poppy cultivation, labour demand amounted to some 117 labour days per year. Such labour demand can be managed by a family. There is, however, a concentration of labour demand during harvest time. Farmers reported this year that there is, in general, a demand for 6-7 people per jerib working over a two weeks period on poppy fields to harvest opium (i.e. 10-12 people per 0.33 ha). For farmers with up to 1 jerib under poppy cultivation, the extended family is usually large enough to meet the necessary labour demand; for larger areas, however, itinerant workers are needed to assist. But this appears to have reduced the income of farmers from poppy cultivation by about half (labour costs: 6.5 persons per jerib x US$6 x 14 days = US$546 per jerib or U$2,730 per ha). Nonetheless, the net income from opium poppy remains significantly higher than the net income from wheat production and cultivation of opium remains thus an economically attractive option for farmers in Afghanistan.

Figure 36: Gross income of opium poppy and wheat per hectare in 2003, 2004 and 2005



Sources: UNODC, FAO/WFP.

2.14 Opium and heroin trafficking

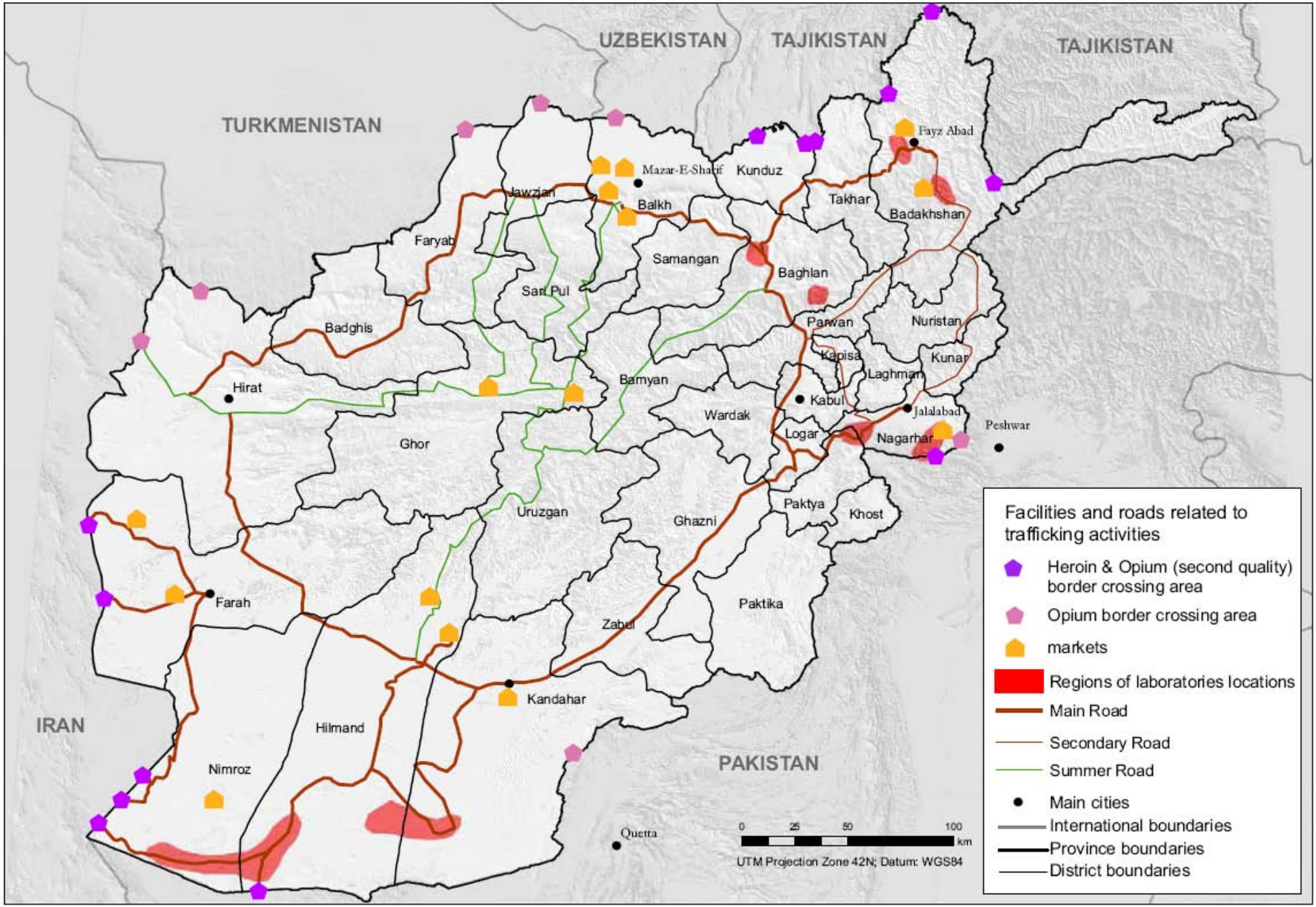
An overview map of trafficking activities in Afghanistan is provided on page 76. Though the opium survey is not designed to collect intelligence on trafficking, some information on opium and heroin trafficking was provided from experienced surveyors in the debriefing sessions, based on reports from informants. The information displayed in the map, showing main opium markets, morphine/heroin producing centers and transit points, refers to the March-July 2005 period. The map shows, for instance, the main morphine/heroin producing centers to be located in south/south-western Afghanistan (Hilmand, Nimroz and Kandahar). Other major production centers are in Nangarhar and Badakshan. In addition, some production facilities were reported from Baghlan province.

Southern Afghanistan was not only the main opium producing region but also emerged in 2005 as the main location of morphine/heroin production in the country. As a consequence the bulk of opiates (close to 60%) is estimated to have left the country via Iran (up from 40% in 2004).

With the decline of opium production in eastern Afghanistan, trafficking of opiates towards Pakistan fell in 2005. About 20% of all opiates are estimated to have left the country via Pakistan, down from 37% a year earlier. Some increase in control along the Afghan/Pakistan border also appears to have contributed to the decline.

Overall exports of opiates to Central Asia also declined as a result of falling opium production in Badakhshan (19%, down from 24% in 2004). There was a significant increase of opium production in northern Afghanistan (including Balkh province), but high opium prices in southern Afghanistan and Iran, led to a strong rise in the trafficking of opium from the northern provinces to western and southern Afghanistan. Surveyors reported that around 70% of the opium produced in the northern provinces left the provinces southward. Traffickers usually preferred the mountains and difficult accessible roads during the summer time to transport the opium from North to South (through Saripul, Ghor, Day Kundi and Hilmand). This was in contrast to general findings, that traffickers choose the closest border crossing (as they can thus avoid paying ‘transit fees’).

Heroin and opium trafficking in Afghanistan



Source: MCN - UNODC Afghanistan Opium Survey 2005
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

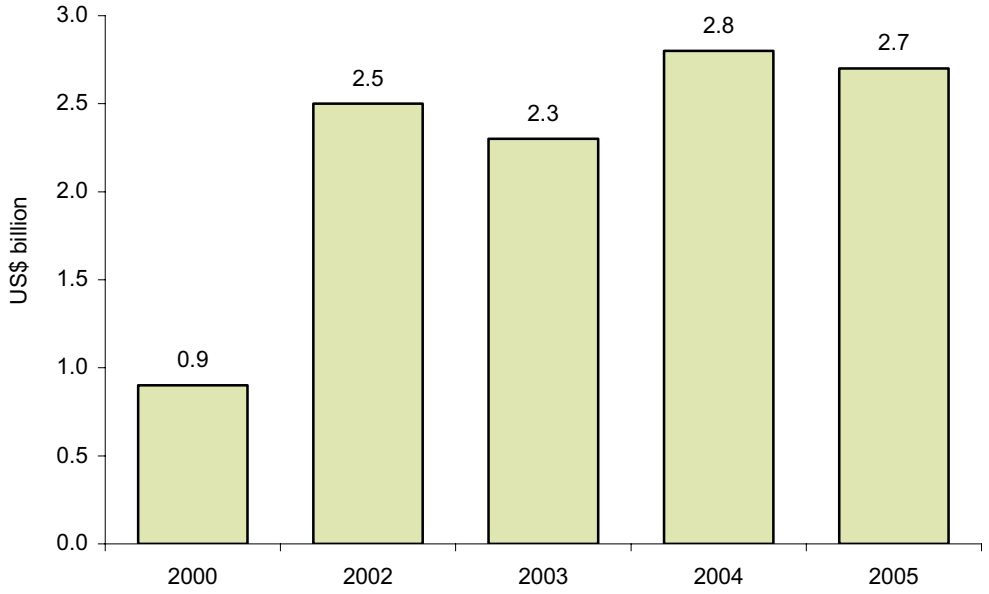
2.15 Potential Value and Income to the Afghan economy

The potential value of Afghanistan's 2005 opium harvest was calculated to have reached about US$2.7 billion (range: US$2.2bn – US$3.1bn), compared with US$2.8 bn in 2004. Given significantly higher prices in neighbouring countries, the overall income is, however, still three times as high as in 2000.

The potential national income from opium production is based on the value of opiates exports (opium, morphine and heroin) at prices in the border areas of neighbouring countries. This approach is based on the observation that Afghan traffickers are heavily involved in shipping opiates across the borders, but from there onwards traffickers from neighbouring countries usually take over the drug shipments. The methodology for calculating the overall gross income estimates from opium production for the Afghan economy was, for the first time, developed in UNODC's report on *The Opium Economy in Afghanistan – An International Problem (New York 2003)* and repeated in last year's opium survey report. A number of variables (production, extent and degree of involvement of Afghan traffickers in shipping opiates abroad, proportion of the transformation of opium into heroin & morphine in Afghanistan, conversion rate of opium into heroin, prices in main export markets etc.) have been taken into account to arrive at the estimates. Detailed explanations of the calculations are found in the methodology section of this report. It should be noted that the results reflect the prices at the time of the study (March-June 2005). The results are thus preliminary in nature. The overall value of the gross income from opium production could still change if prices in neighbouring countries were to change in subsequent months. A recalculation of last year's results with updated prices for the year as a whole and additional new information (such as updated seizure patterns) found however no change in the overall results.

The average export price of opium obtained by Afghan traffickers in neighbouring countries in the border regions with Afghanistan amounted to around U$890 per kilogram in 2005 and was thus higher than the average export price calculated in last year's report (US$725), reflecting higher opium prices in Iran. In contrast, the average export price for Afghan morphine/heroin in the border regions of neighbouring countries with Afghanistan amounted to US$3,860 per kilogram and was thus slightly lower than the average price a year earlier (US$4,170). This was mainly a consequence of lower heroin prices in Central Asia which in turn seems to reflect rising levels of opium and heroin production in northern Afghanistan.

Figure 37: Potential income from opium production, 2000-2005 (gross income for farmers and Afghan traffickers)



Sources: UNODC, The Opium Economy in Afghanistan, UNODC, Afghanistan Opium Survey 2003, 2004 and 2005.

Expressed as a percentage of licit GDP (US$5.2 billion[22] in 2004/5), the overall potential value-added of the opium sector for Afghanistan in 2005 is estimated to have been equivalent to some 52% of licit GDP (range 42-60%) or 34% of the overall economy, if the opium sector is included in the economy.

The results show that the main beneficiaries from opium production in Afghanistan have been - once again - the traffickers. About 79% of the total income from Afghanistan's opium economy was reaped by traffickers (including laboratory owners) and 21% by farmers. Gross profits of Afghan traffickers appear to have decreased marginally, from around US$2.2 billion in 2004 to US$2.14 billion in 2005 (equivalent to 41% of licit GDP). These are still substantial amounts that are in the hands of organized crime in Afghanistan. Given the positive growth of licit GDP, the overall size of the illicit opium industry in Afghanistan, declined, however, from 61% to 52% of licit GDP in 2005.

Figure 38: The licit economy and the opiate industry in Afghanistan in 2005

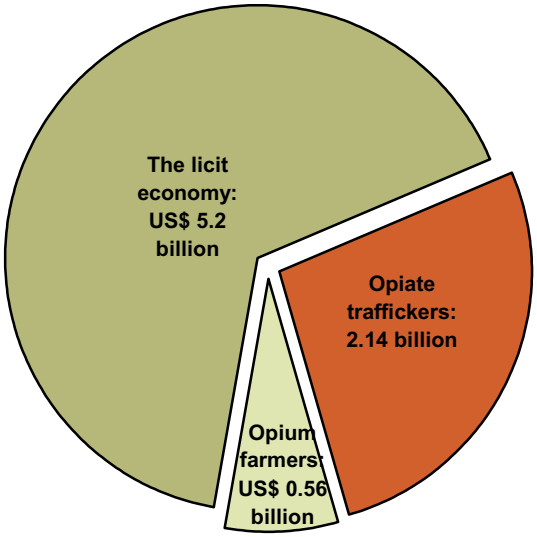
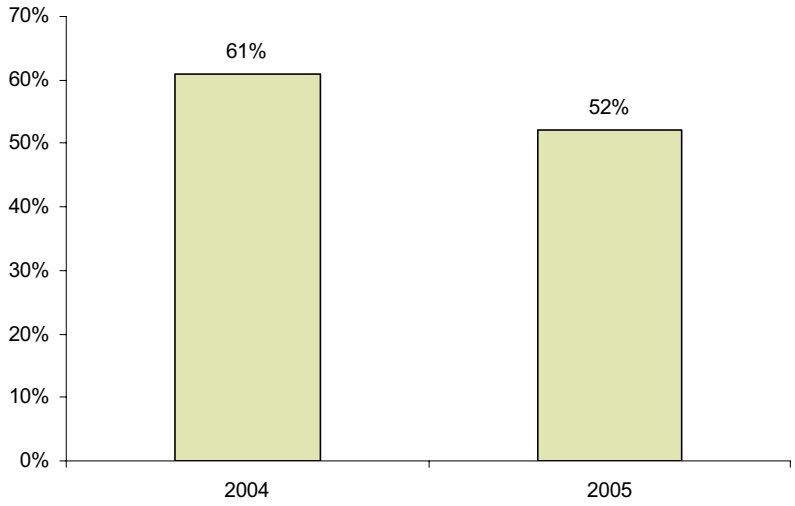


Figure 39: The Afghan opiate industry compared with the licit economy (as a percentage of licit GDP)



[22] Afghan Government, Central Statistics Office: GDP figures for the year 1382 (2003/2004): Afs 223,629 millions and for the year 1383 (2004/2005): Afs : 254,487 millions.

2.16 Addiction

Data on opium and heroin addiction were also collected during the village survey. Results, based on headmen reports of opium addiction (daily use), suggest that opium addiction affects 0.5%[23] of the rural population in Afghanistan (95% confidence interval: 0.4%-0.6%). Overall addiction to opium thus appears to have increased in recent years. A previous study, done in rural communities in 2000, suggested that opium addiction affected 0.3% of the population.[24] Heroin related addiction levels, in contrast, are still significantly smaller (0.03% of the total population).

In general, there is a strong correlation between opium poppy cultivation and opium addiction:

- Villages producing opium poppy had, on average, opium addiction rates 7 times higher than the opium addiction rates in villages that did not produce opium poppy.
- While 27% of the headmen of opium producing villages reported opium addiction in their village, the corresponding share in non-opium producing villages was significantly lower (11%).

The size of the villages, in contrast, hardly affects the level of opium addiction. For heroin, on the other hand, data suggest that heroin addiction is less widespread in small villages (less than 500 people) than in larger ones.

The geographic distribution, shown in the map on opium addiction among surveyed population, revealed rather high levels in some of the northern provinces. In contrast, low levels were reported from villages in central and eastern Afghanistan (significantly lower than a similar survey undertaken in 2000)[25], which could have been the result of some underreporting among headmen in villages affected by the poppy ban.

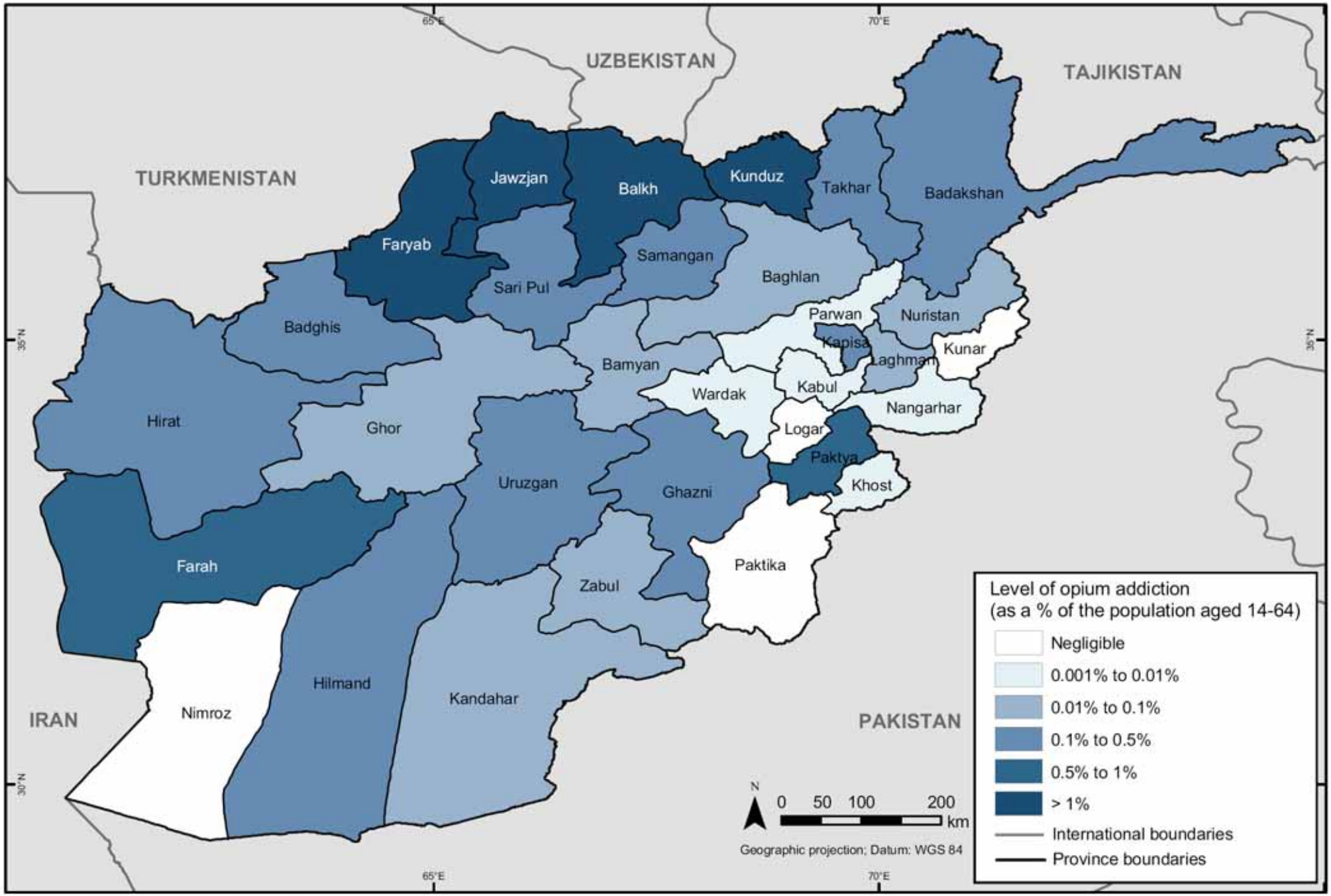
UNODC has implemented a separate national survey on addiction in August 2005 and its results are expected by the end of 2005.

[23] Expressed as a percentage of the population age 15-64, opium addiction affects about 1% of the population.

[24] UNODC, *The Opium Economy in Afghanistan, January 2003, p. 74.*

[25] In this survey, the prevalence of opium addiction in the rural areas of eastern Afghanistan was found to affect 0.3% of the population. (*UNDCP, Community Drug Profile #4, An Assessment of Problem Drug Use in Rural Afghanistan: the GAI target districts, February 2001*).

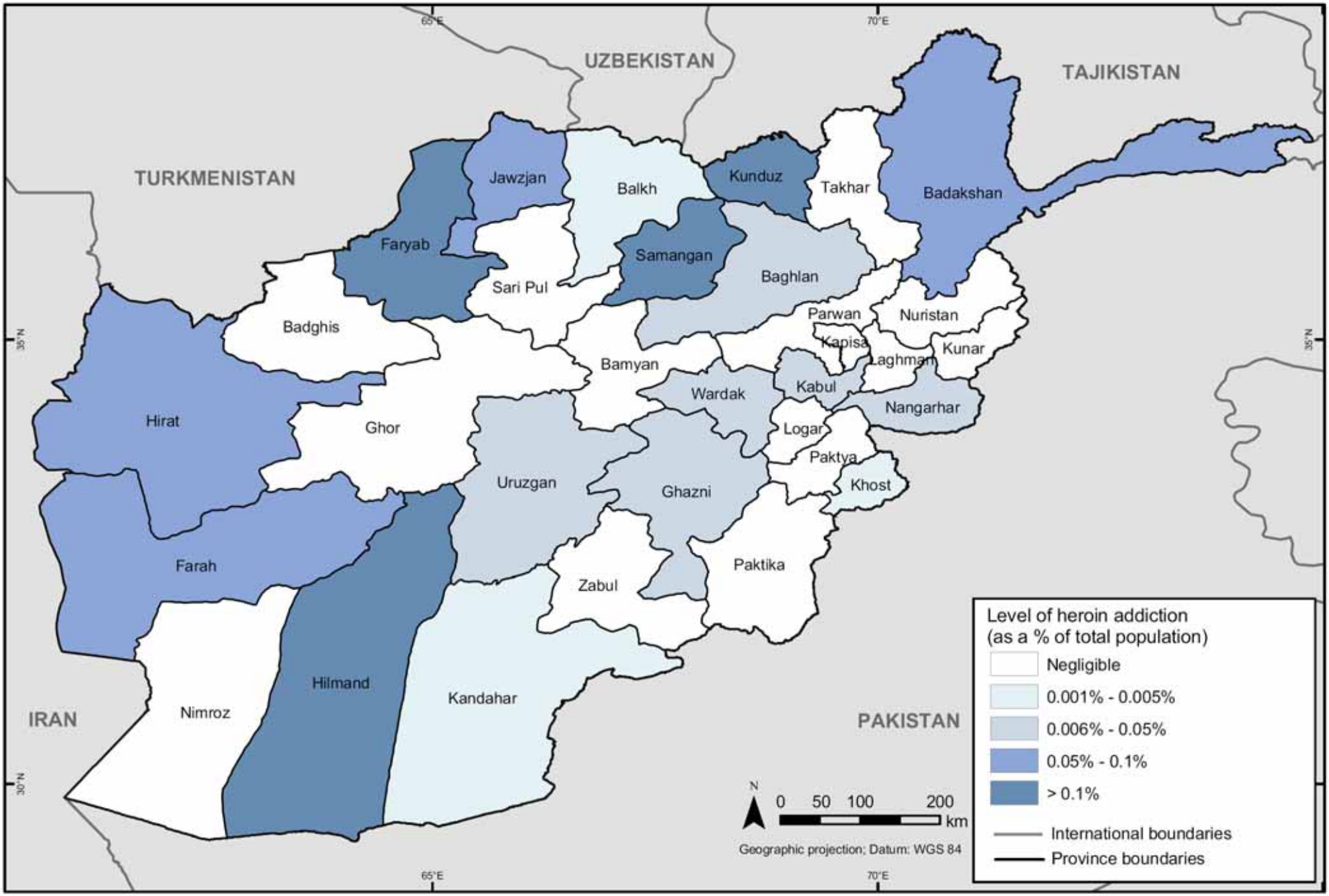
Opium addiction (daily use) among surveyed population in rural Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Heroin addiction among surveyed population in rural Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: 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

The methodology of the Opium Survey in 2005 covers various aspects such as estimations of the extent of opium poppy cultivation, opium yield and production, opium prices and the opium poppy growth calendar. It also covers socio-economic aspects such as the number of families involved in opium poppy cultivation, the number of opium addicts in Afghanistan and the income from opium to farmers and traffickers. The survey methodology was based on a sampling approach that combined the use of satellite imagery and extensive field visits.

UNODC has a cooperation agreement with the National Soil Resource Institute, Cranfield University (United Kingdom) to develop new survey techniques and to improve the survey methodology. As a result of this cooperation, the 'bootstrap' technique was introduced for the first time in 2004 for calculation of the variance of the cultivation estimates. To further improve the accuracy of the overall results, the area under opium poppy cultivation was estimated at the provincial level instead of the district level. In addition to this, a national sampling frame (10x10 km grids for entire Afghanistan) was introduced to the survey, instead of provincial sampling frames. In 2005, a "bias correction" method was introduced to further improve poppy area estimates. The bias correction method makes use of ground reference data to calibrate the estimates from the satellite imagery.

3.1 Opium Poppy Cultivation

A remote sensing approach has been used by UNODC since 2002 to monitor the extent of poppy cultivation in the main opium growing areas of Afghanistan, because satellite imagery supported with good ground reference information offers an objective tool for the estimation of opium poppy cultivation and, more importantly, minimizes the security problems faced by the surveyors in the field.

In 2005, a total of 190 high-resolution satellite images were acquired for 79 sample locations covering 15 provinces. These images covered 214,000 ha of agricultural land, i.e. 16% of the total agricultural land in 15 provinces. This is an increase of satellite coverage compared to 2004, when 112 images at 56 sample locations were processed to cover 10 provinces accounting for 131,000 ha agricultural land. The fifteen provinces surveyed using satellite data accounted for 84% of the opium poppy cultivation of the country in 2005. In the remaining 17 provinces[26], opium poppy cultivation was estimated from the surveyors' assessment of the extent of opium cultivation in sampled villages.

Establishment of the sampling frame for satellite imagery

The sampling frame was established by extracting the potential land available for opium poppy cultivation in 15 provinces. Arable land was delineated from 2002 and 2003 Landsat-7 images. The arable land in the sampling frame covers mostly irrigated areas, except in Badakshan province, where rain fed land is also included. The total arable land in the 15 provinces amounted to 13,306 km^2 (or 1,330,600 ha), which is equivalent to 30% of the total irrigated agricultural area in Afghanistan. Land use maps of Hilmand, Kandahar, Balkh, Farah, Uruzgan and Nangarhar provinces were updated using SPOT imagery (10m resolution) of 2005.

The area under opium poppy cultivation was interpreted based on high-resolution IKONOS satellite images, which cover 10 x 10 km on the ground. The IKONOS image locations were randomly selected from a 10x10 km grid that was overlaid on the map of arable land. Cells with less than 1% arable land were removed in order to cover the maximum arable land with a minimum number of cells. The final sampling frame consisted of 1526 cells for 15 provinces. Optimizing the sampling frame reduces the probability of selecting a cell containing marginal areas of arable land, which ensures optimal use of the high-resolution satellite images.

Sample selection

For each collected cell, IKONOS images were acquired for the pre-harvest and a post-harvest period, which aided in the discrimination of poppy from other crops. In view of the available budget, the total number of IKONOS

[26] In 2005, the Afghan Government restructured the country into 34 administrative provinces. However, for the purpose of the 2005 opium survey, the previous administrative division into 32 provinces was used because the boundaries of the 34 provinces were not officially announced by the Government.

images was limited to 79 pairs (190 multi-spectral images[27]) well distributed within 15 provinces. The distribution was based on the number of cells in the sampling frame and total arable land in each province.

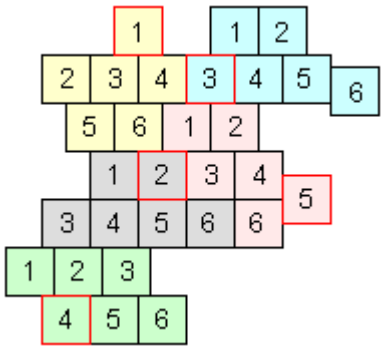
Table 24: Agricultural land sampled by province

Province	Total Arable land (km^2)	Total	Selected	% of selected cells over total cells	Arable land in selected cells	sample size (% of arable land in selected cells)
		# cells	# cells		(km^2)	
Hilmand	2,055	115	11	10%	340	17%
Balkh	1,600	70	6	9%	363	23%
Hirat	1,509	223	6	3%	309	20%
Kandahar	1,226	121	7	6%	250	20%
Farah	990	132	5	4%	171	17%
Nangarhar	971	53	8	15%	149	15%
Badakhshan	964	52	4	8%	227	24%
Baghlan	907	110	4	4%	85	9%
Uruzgan	816	181	7	4%	63	8%
Ghor	617	184	5	3%	31	5%
Zabul	506	82	4	5%	25	5%
Saripul	486	70	4	6%	59	12%
Laghman	233	23	3	13%	34	15%
Kunar	220	28	3	11%	28	13%
Day Kundi*	206	56	2	4%	8	4%
Total	**13,306**	**1500**	**79**	**6%**	**2,142**	**16%**

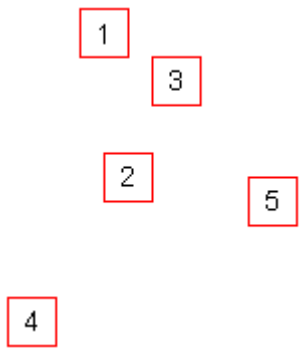
*Day Kundi is part of Uruzgan province

To ensure adequate geographical distribution of the sample throughout the province, the cells were grouped in clusters. The number of clusters was equivalent to the number of images to be selected for the sample in each province. Consequently, one cell was randomly selected from each cluster. For example, to select 5 cells, 30 cells from a province were grouped in 5 clusters containing 6 cells each (Fig. 33 left). From each cluster, one cell was randomly selected (Fig. 33 right).

Figure 40: Cells selection



Sampling frame covering agricultural area

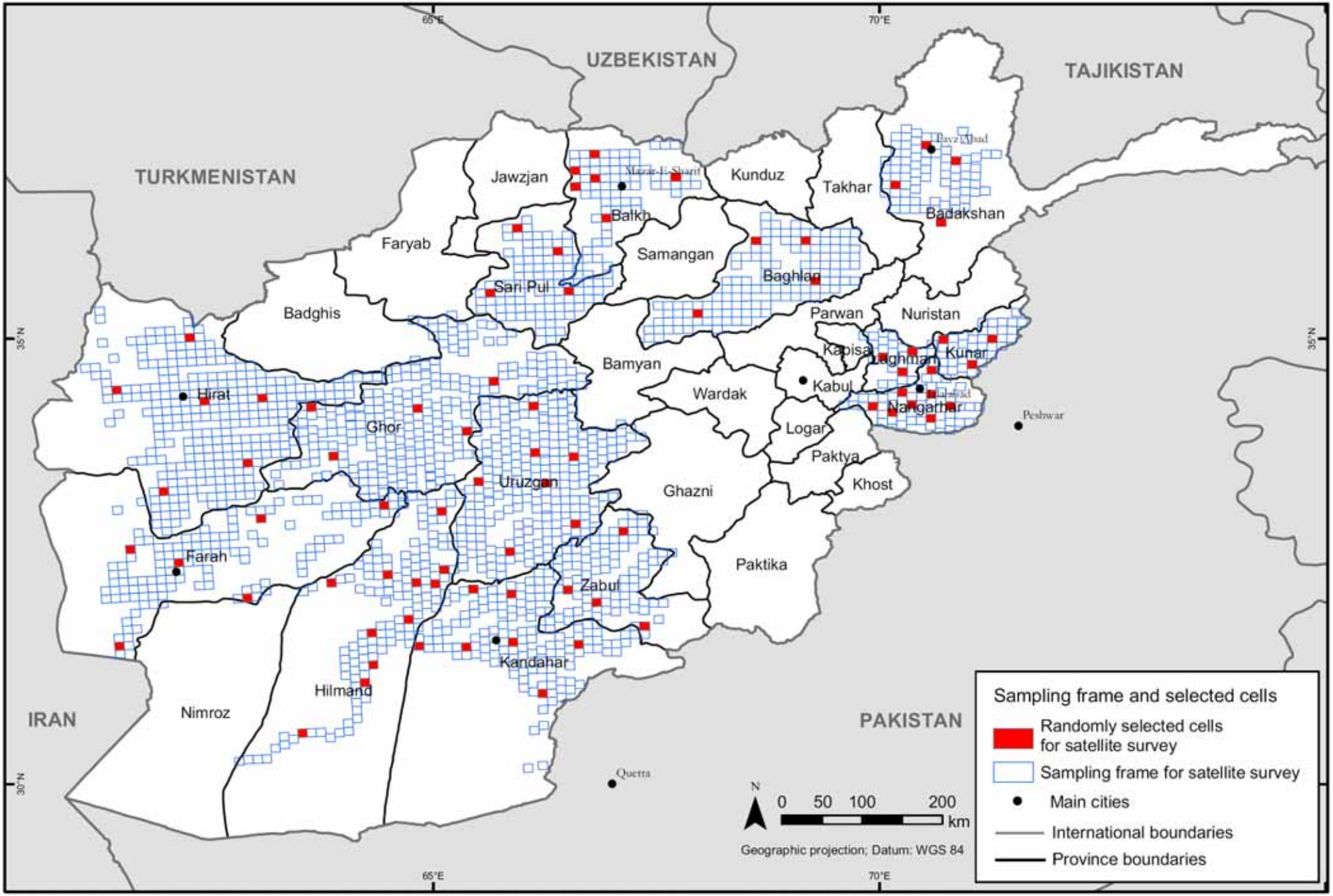


Randomly selected cells locations

Finally, 79 pairs were selected for the sample, covering 214,200 ha of arable land and representing a sampling ratio of 16% of the total arable land of the 15 provinces.

[27] *Some locations of survey were used for the "Support to the Verification Process of Opium Poppy Eradication" project and therefore these locations were collected 3 times.*

Sampling frame and selected cells for satellite survey in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Image processing steps

The image processing steps can be summarized as follows:

- Geometric rectification of the second dated images to the first dated images (image to image registration) to facilitate the overlaying of both images for logical classification. The Root Mean Square (RMS) error[28] was mostly within one pixel accuracy. In a few cases the accuracy was higher than one pixel due to terrain conditions. In cases of higher RMS errors, images were subdivided into two convenient parts and rectified separately. If images did not match, they were visually interpreted by comparing both images;

- Identification of 'training areas' of various land cover types, with emphasis on poppy and cereals, to be classified from the imagery;

- Supervised classification of the land use features of pre-harvest and post-harvest images;

- Logical classification based on pre-harvest and post-harvest classifications;

- Masking of non-agricultural areas;

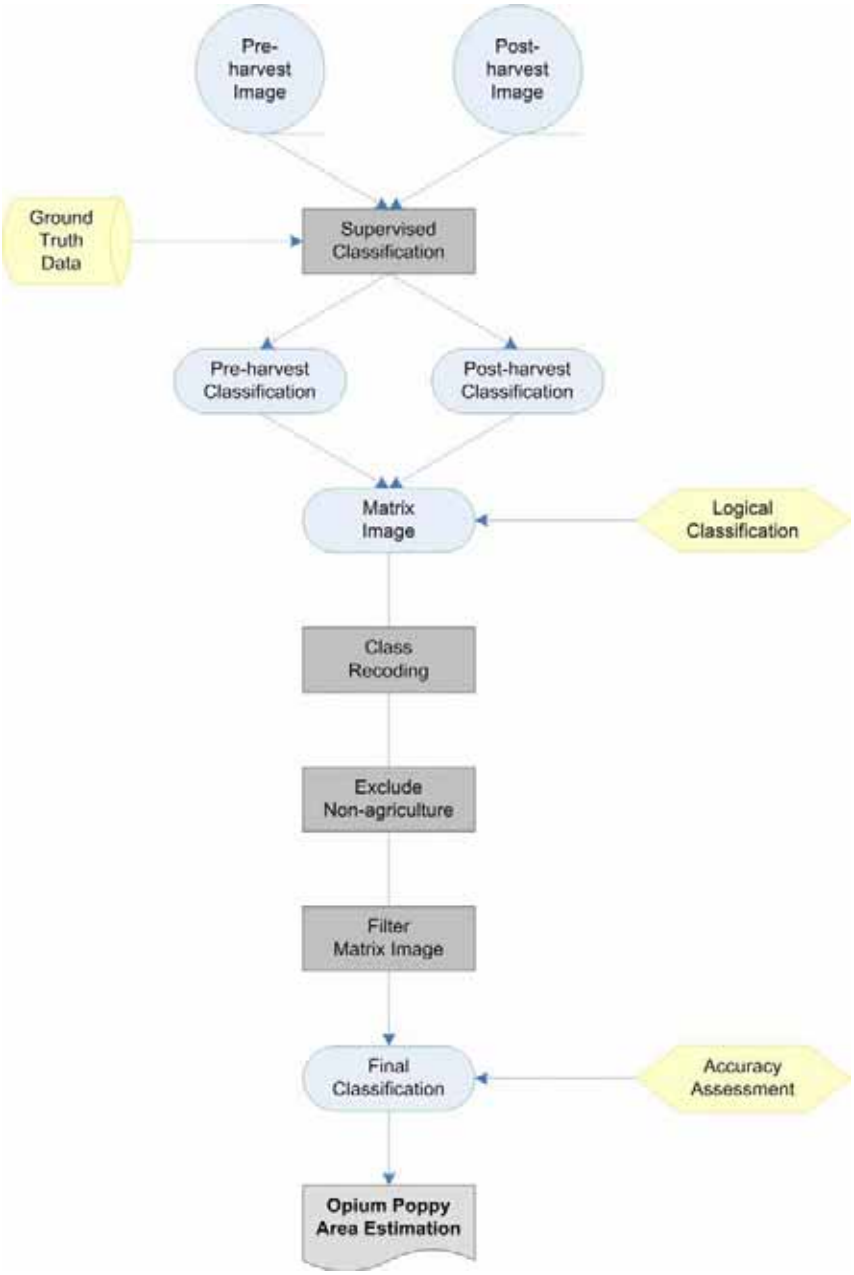
- Applying 3x3 pixel filtering to the classified images to reduce the noise;

- Assessing the accuracy of the classification process using segment data;

- Calculating poppy cultivation in each cell.

[28] The Root Mean Square (RMS) error is a measure calculated when registering one image to another image, indicating the discrepancy between known control points in both images. The RMS error provides a guideline for the inaccuracy while performing geometric registration between two images.

Figure 41: Image classification methodology for estimating opium poppy cultivation area

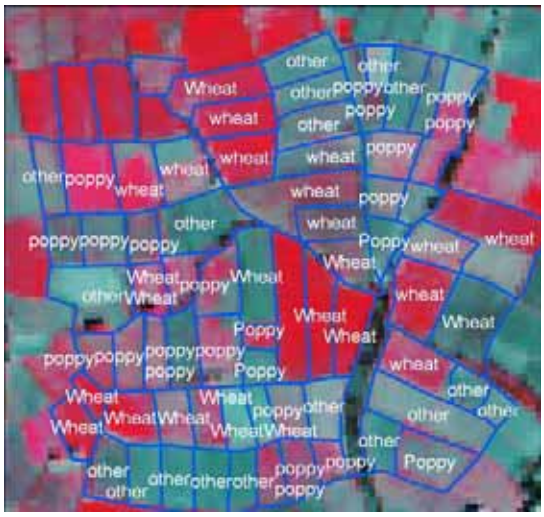


Interpretation of opium poppy cultivation from satellite images

To reduce confusion between opium poppy and cereal fields, two images were acquired over the same area. The first image was acquired during the main opium-growing period, and the second image after the opium harvest. Figure 35 shows an image pair acquired on two different dates. Wheat appears mostly bright red on the first image (full coverage with vegetation shows up as red, bare soil as gray/green), opium poppy fields show faint red. While during the first acquisition there could be some confusion between poppy and wheat, the second acquisition imagery makes feature class separation possible because poppy has been harvested and the fields appear gray/green. The different phenological stages described above, are shown in figure 38 (field photographs of poppy, wheat and clover on different dates).

The first and second dates images were classified separately using a maximum likelihood algorithm (figure 36). Opium poppy fields are eventually interpreted as the result of a logical classification technique between the classification of first date and second date images.

Figure 42: Pre- and post-harvest satellite imagery



Shortepa, Balkh (21 March 2005)

Shortepa, Balkh (06 June 2005)

Figure 43: Classification results from pre- and post-harvest imagery

Logical Classification

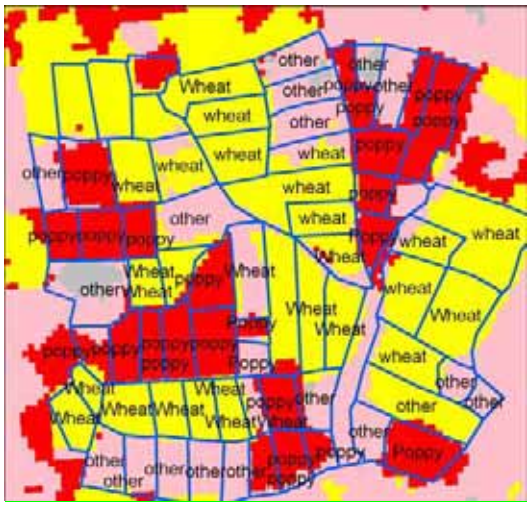
Once each image had been classified, the classes of the first date image were crossed with the classes of the second date image. This allows logical classification resulting in a thematic map indicating the opium poppy fields. The look-up table (Table 19) shows an example of the combination between feature characteristics between the pre-harvest and post-harvest images. Segment (ground reference) data helped to resolve conflicts in the classification decision logic. The look-up tables are region-specific due to unique local environmental conditions, image acquisition dates and poppy growth cycle.

Table 25: Example of logical classification look-up table (Balkh Province, Shortepa district)

	Class (post-harvest)				
Class (pre-harvest)		**Dark Green**	**Green**	**Yellow/Brown**	**Pink**
	Red	Poppy	Other	Cereal	Other
	Green	Poppy	Other	Cereal	Cereal
	Dark Green	Fallow	Other	Other	Cereal
	Pink	Poppy	Other	Cereal	Other

The thematic images were simplified using a low-pass mode filter prior to extracting the final poppy cultivation area. A mode filter (3x3 window size) is commonly used to remove outliers from a classification while maintaining the integrity of the classification.

Figure 44: Final classification results



Once the logical classification was completed, the area statistics for each cell were used to calculate the provincial level cultivation estimate.

Figure 39: Illustrations of opium poppy and wheat growth cycles


February 21, Poppy, Emergent Stage


February 21, Wheat, Emergent Stage


February 21, Clover, Emergent Stage


March 13, Poppy, Cabbage Stage


March 13, Wheat, Cabbage Stage


March 13, Clover, Cabbage Stage


April 7, Poppy, Steam Elongation


April 7, Wheat, Steam Elongation


April 7, Clover, Steam Elongation


April 19, Poppy, Flowering Stage


April 19, Wheat, Flowering Stage


April 19, Clover,


May 5, Poppy, Lancing Stage


May 5, Wheat, Maturity Stage


May 5, Clover


May 21, Poppy, Lancing completed


May 21, Wheat, Senescing


May 21, Clover


June 06, Poppy Field ploughed


June 06, Wheat Harvest Completed


June 06, Clover, Harvested

Figure 46: Spectral reflectance of Poppy and Other crops

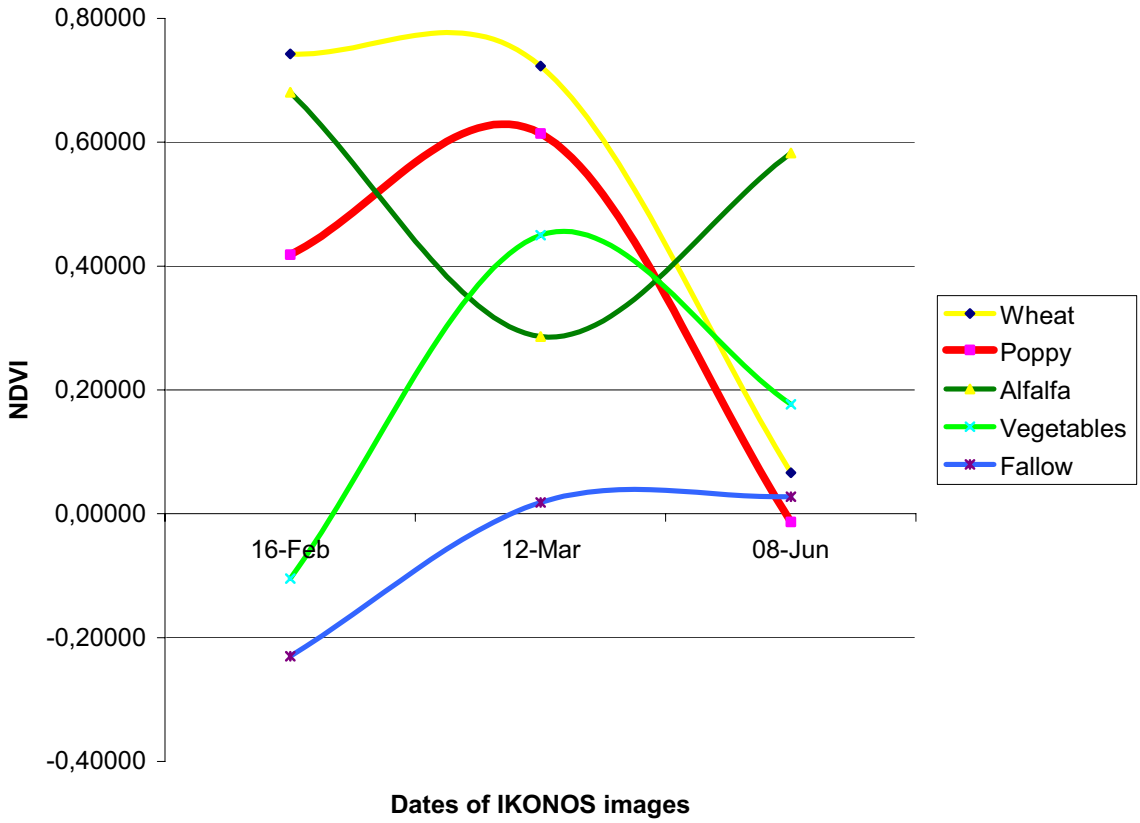


Figure 38 illustrates the crop cycle between February and June for the various crops *viz*. poppy, wheat and alfalfa/clover. Figure 40 illustrates the spectral characteristics (NDVI) of poppy and other crops between February and June. Wheat and poppy have the same kind of vegetation cycle between March and June as can be observed in the figure. The spectral differences between these two crops are higher in the earlier stages. Farmers plough poppy fields right after the harvest, whereas wheat remnants are still in the field. This explains the collection of two date images for the same location, one before harvest and one after harvest.

Area estimation from satellite imagery

The poppy area figures obtained from classification of two-date IKONOS images were subjected to a 'bias correction' using ground reference data. The bias correction methodology is explained subsequently in a separate section.

Ratio estimation formulae were used to estimate the extent of the poppy cultivation at the province level using equation 1 and equation 2.

Equation 1: Estimation of poppy cultivation within each cell

$$\bar{p} = \sum x / X$$

where,

$\bar{p}$ = Average proportion poppy cultivation in province

x = Total poppy area in each cell

X = Total agricultural area in cell

To estimate the total poppy in the province, Equation 2 was used:

Equation 2: Estimation of total poppy cultivation

$$\hat{X} = \bar{p}N_A$$

where,

$\hat{X}$ = Total poppy area in province

N_A = Total agricultural area (sampling frame) in province

The results for provinces with more than 5 cells selected were refined by the bootstrap method with 10,000 iterations. The main reason for using bootstrapping is to calculate the standard error of the estimator. The sample items having different size (the total agricultural land differing in each cell), it is not appropriate to calculate the standard error using simple random formulae. The bootstrap technique does not have a significant effect on the estimation of the mean. In provinces with less than five cells, the smaller sample size did not allow bootstrapping. For these provinces, the simple random sampling formulae were applied.

Bootstrapping with 10,000 iterations found a 90% probability that the area under opium poppy cultivation (estimated from satellite imagery) was between 81,000 ha and 93,000 ha, with a mean estimate of 87,419 ha. It should be noted that the upper and lower estimates do not lie symmetrically around the mean estimate obtained for these 15 provinces because of the use of the bootstrap method. The mean estimate for the 15 provinces where a satellite survey was conducted, represented 84% of the total area under opium poppy cultivation in 2005.

Accuracy assessment

Ground reference data were used to develop an understanding of the satellite images for image interpretation and for assessing the classification accuracy.

Ground reference data were collected from selected locations covering 250x250m in 79 cells. These locations are henceforth referred to as 'segments'. Three to four segments were randomly selected over the agricultural area in each of the 79 cells. The surveyors visited these segments to collect detailed information in each parcel. This work was carried out by 13 teams comprising of a total of 34 surveyors, trained by UNODC. Most of the surveyors trained and assigned to the segment survey already had experience in conducting such a survey due to their participation in the 2004 segment survey. The information collected during the segment survey included crop type, plant height, GPS coordinates and photographs.

Due to the security constraints only 230 of the planned 296 segments could be surveyed. For this reason, no segments could be surveyed in Zabul province. Each survey team was equipped with an orientation map to assist locating segments in 79 cells, as well as a detailed segment map showing individual land parcel and a manual with instruction for ground data collection, prepared jointly by UNODC and Cranfield University, UK.

Table 26: Total number of segments surveyed

Province	Number of segments	
	Total	Surveyed
Badakhshan	16	16
Ghor	15	8
Hilmand	43	38
Kandahar	28	26
Kunar	12	11
Laghman	12	9
Nangarhar	36	32
Uruzgan	28	26
Hirat	16	8
Zabul	16	0
Baghlan	16	13
Saripul	16	12
Farah	20	16
Balkh	16	13
Day kundi	6	2
Total	**296**	**230**

The following confusion matrix indicates the producer's accuracy (horizontal) and the user's accuracy (vertical). The producer's accuracy indicates that 80% of the pixels classified as poppy by the computer were found to be actually opium poppy (on the ground), whereas the user's accuracy indicates 84% of the area identified as poppy on the ground were correctly classified as opium poppy using satellite images. The overall accuracy of the classification for all classes was 80%.

Table 27: Confusion matrix for all blocs

		Classification of satellite images				
		poppy	wheat	other	Total	Producer`s Accuracy
Ground Reference Data	poppy	880,978	112,483	104,313	1,097,775	**80%**
	wheat	91,276	1,777,182	747,322	2,615,780	68%
	other	79,325	301,881	2,922,882	3,304,087	88%
	Total	1,051,579	2,191,546	3,774,517	7,017,641	
	User`s Accuracy	**84%**	81%	77%		**80%**

BIAS CORRECTION

The confusion matrix of each final classification was used to remove the bias in the area estimation using satellite imagery (i.e. the satellite results are adjusted to the results obtained through ground truthing). The bias correction improves the area estimations by calculating the probability of each ground class with respect to the corresponding spectral class.

Example: Bias correction for Shortepa Imagery, Balkh province

Table 28: Confusion Matrix :

		Classification (based on satellite imagery)				
		Poppy	Wheat	Other	Total	**Producer`s Accuracy**
Ground Reference Data	Poppy	28,385	1,446	8,054	37,886	**75%**
	Wheat	1,568	72,918	25,847	100,335	73%
	Other	2,243	5,880	89,348	97,475	92%
	Total	32,197	80,244	123,249	235,696	
	User`s Accuracy	**88%**	91%	72%		81%

Table 29: Probability Matrix :

	Poppy	**Wheat**	**Other**
Poppy	0.882	0.018	0.065
Wheat	0.049	0.909	0.210
Other	0.070	0.073	0.725
Total	1	1	1

Total area classified as poppy = 244 ha

Total area classified as wheat = 943 ha

Total area classified as other = 998 ha

*Bias corrected area for poppy = 0.882*244+0.018*943+0.065*998 = 298 ha*

*Bias corrected area for wheat = 0.049*244+0.909*943+0.210*998 = 1078 ha*

Table 30: Comparison of results

	Classified area (ha)	Bias corrected area (ha)	Difference
Poppy	244	297	22%
Wheat	943	1,078	14%
Other	998	810	-19%
Total	2,185	2,185	0%

The total area classified as poppy within the imagery increased 22% after the bias correction in this particular imagery. This procedure was done for all the images where ground reference data was available. The bias corrected estimate for the area under opium poppy cultivation in the 15 provinces covered by satellite imagery is thus 87,419 ha.

Table 31: Comparison of results from bias corrected and non-bias corrected estimations

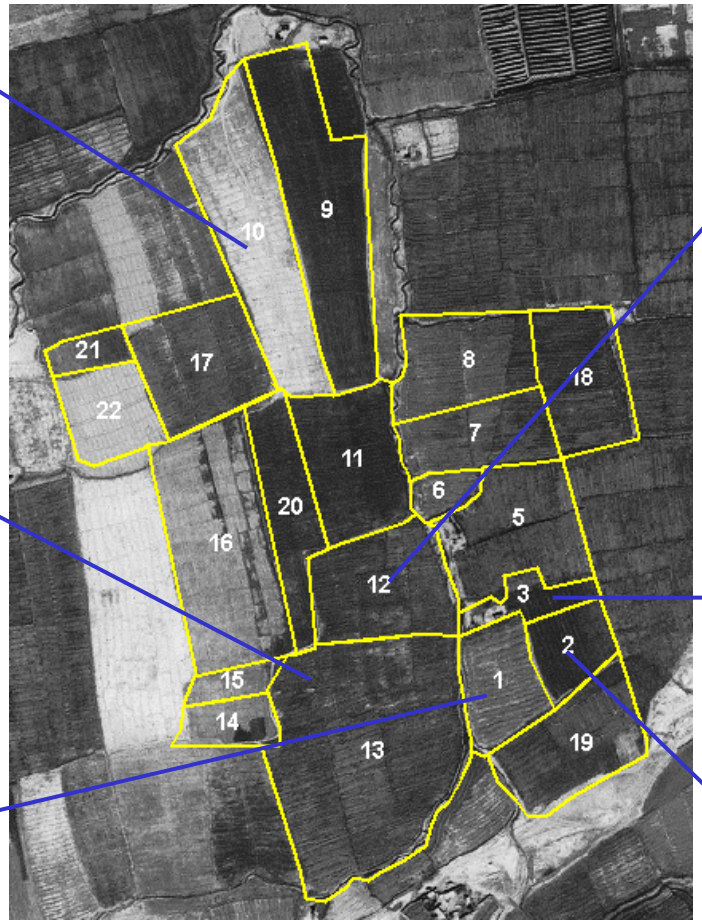
Province	Non-Bias Corrected (ha)	Bias Corrected (ha)	Difference (%)
Hilmand	23,934	26,500	11%
Kandahar	10,740	12,989	21%
Uruzgan	2,657	2,790	5%
Farah	8,738	10,240	17%
Balkh	9,094	10,837	19%
Badakshan	7,593	7,370	-3%
Ghor	2,704	2,689	-1%
Hirat	1,968	1,924	-2%
Baghlan	2,453	2,563	4%
Others	10,332	9,517	-8%
Total	**80,213**	**87,419**	9%

Segment Data Collection, Kandahar, 2005

Fallow land

Poppy

Poppy



IKONOS Panchromatic data (1 M resolution)
dated 26 March 05

Poppy

Wheat

Wheat

3.2 Mapping of agricultural land and opium poppy using SPOT images

In addition to the IKONOS images, 6 provinces (Hilmand, Fahar, Kandahar, Uruzgan, Nangarhar and Balkh) were covered with SPOT5 multi-spectral images. The objectives were two-fold, first to assess the usefulness of SPOT data for estimating total poppy area and second to update the mapping of agricultural areas.

Estimation of poppy by using SPOT data was attempted to determine if the loss in spatial resolution, from the 4 meter IKONOS to the 10 meter SPOT5 image, could be compensated by the full coverage of the province by the low-cost SPOT images. SPOT data was also used to prepare land use maps of 6 provinces to get updated information on agricultural areas in 2005. This was essential since the poppy area estimation methodology adopted by UNODC uses total agricultural area as one of the inputs for estimating total poppy area at the province level. The use of SPOT5 images fulfilled the second objective, but turned out to be less satisfactory with respect to the first objective.

Due to the poor (cloudy and rainy) weather conditions, SPOT images could not be collected for the ideal time period. This posed some difficulties in distinguishing poppy from other crops. The best period to discriminate poppy from other crops is when the poppy is either in cabbage or lancing stage. Only 15 out of 70 SPOT images were collected in February when poppy is in cabbage stage. Another 15 images collected in early March were still found useful for poppy identification. The rest of the images was acquired during the flowering stage of poppy, which was not ideal for discriminating poppy from other crops. Poppy could only be identified in 3 provinces *viz*. Hilmand, Kandahar and Farah, where the images were suitable for discriminating opium poppy from other crops.

Future work will involve applying regression estimators using SPOT image classifications and ground reference data in collaboration with Cranfield University (UK) to assess possible usage of SPOT for the next survey cycle.

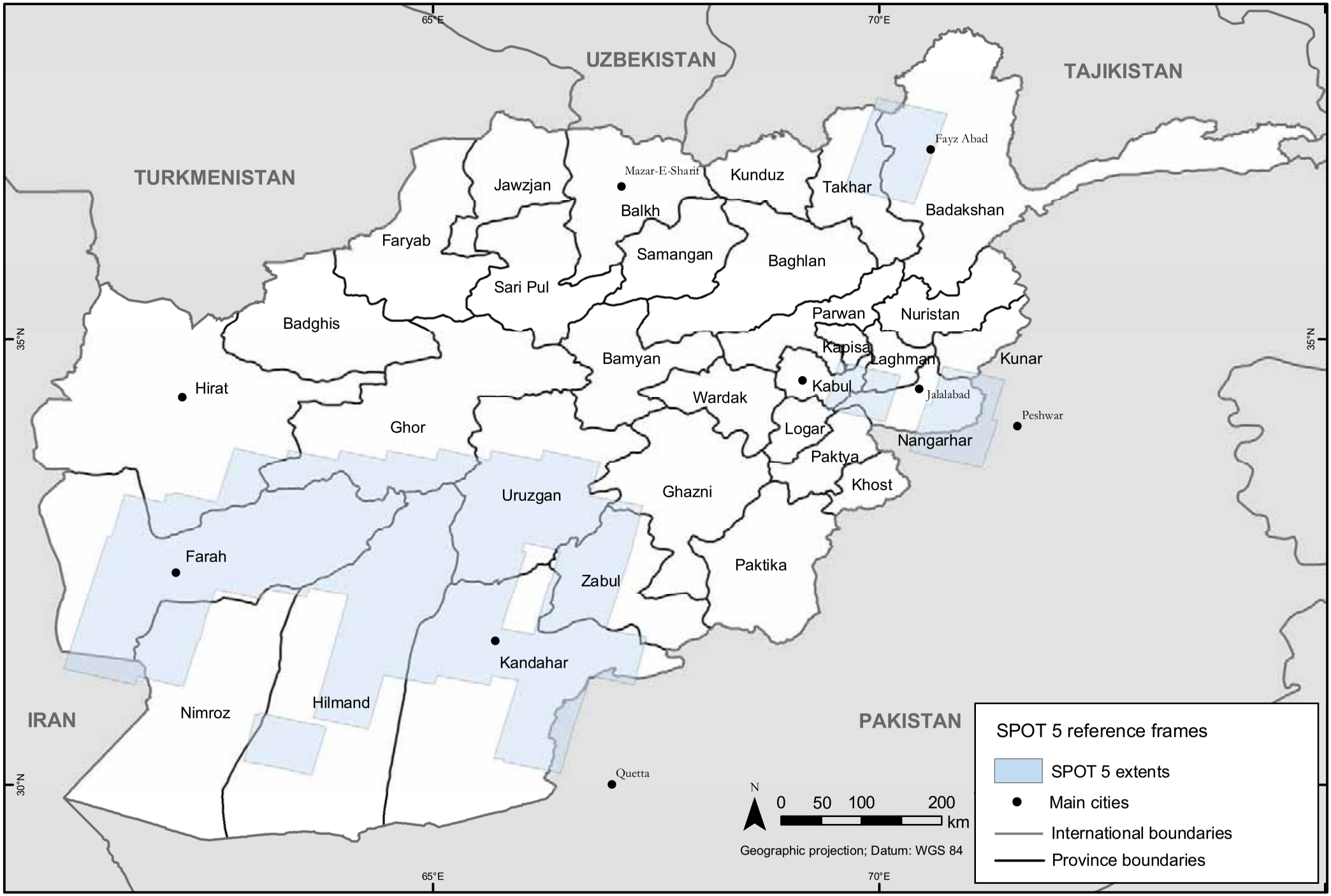
This year's experience of using SPOT5 data shows that it was not an appropriate solution for identifying poppy fields. Low revisiting capability of the SPOT satellite (10-15 days) does not take into account the variations in the poppy growth cycle within and between the provinces. This can be understood from the fact that there is a 15-20 days difference in harvest time between lower and upper Hilmand. Further, single date images do not provide enough confidence to depict poppy fields.

The poppy estimation attempt using SPOT helped nonetheless to gain some experience in the context of ongoing efforts towards improving the survey methods and producing reliable district level estimates.

SPOT images collected in 2005 were best used for updating the agricultural areas in the six provinces. This is the first attempt where land use mapping has been carried out in Afghanistan using 10m resolution images. The most recent land use/ land cover mapping was done by FAO in 1993 using Landsat TM (30m resolution) images. UNODC updated the 1993 FAO maps for Hilmand, Nangarhar, Kandahar and Badakshan provinces using Landsat TM images of the year 2002-03. It was noticed that there was a significant loss of agricultural areas during 1993 and 2002 due to serious droughts in Afghanistan. However, it was also observed that some of the unused agricultural areas have been converted to arable land over the last two years.

A total of 70 SPOT images were classified using standard classification methods (maximum likelihood). Results were improved using visual interpretation.

SPOT 5 reference frames in Afghanistan, 2005

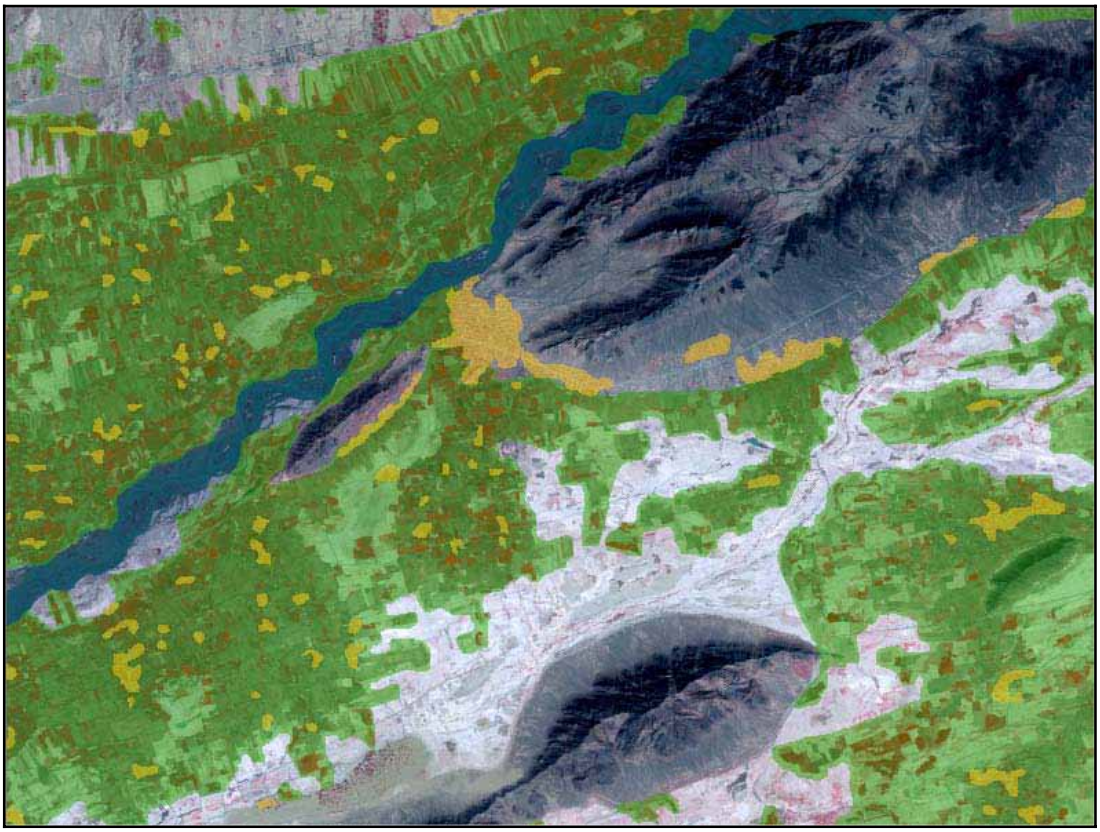


Source: MCN - UNODC Afghanistan Opium Survey 2005
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

METHODOLOGY

Manual Digitizing and Masking

Prior to classifying the SPOT images, several layers (masks) were created to restrict the classification to the area currently being intensively farmed and to mask the areas that give misleading results due to spectral overlaps, sub-pixel elements and presence of clouds or other aerosols, which obscure the conditions on the ground. These layers were digitized manually over the imagery.



Manual interpretation of the Agricultural Areas

(Manually derived agriculture (green) and urban (orange) masks overlaid on the SPOT 5 imagery)

The masks pertaining to following themes were created to improve the classification accuracy:

Agriculture – All areas showing current intensive agriculture were manually digitized based on SPOT 5 image and displayed at a 1:15,000 scale. These polygons were used to restrict the classification to agricultural land.

Urban – All areas showing buildings were manually digitized on the SPOT 5 image. This included clusters of houses, towns/cities, airports, factories, etc.

Water – Surface water masks were derived from the image classification or from NDVI thresholds. NDVI was useful in the cases where water classes were not separable such as tributaries, small reservoirs and small irrigation channels.

Drought areas – The areas showing soil degradation (saline lands) were delineated. The delineation was done using the image classification. However manual editing was required to improve the delineations. 'Saline soil' was retained as one of the classes in the final classification.

Image Classification

The hybrid classification approach was adopted combining supervised classification and visual image interpretation to get the best results. The supervised approach involves selecting training areas in each satellite image corresponding to the land cover class to be classified (as determined during knowledge base development). The statistics generated using training sites for each class were fed into a Maximum Likelihood Classification algorithm. This algorithm computes the probability value of an image pixel belonging to a particular land cover class. The output was filtered to remove noise and the classes were aggregated to a more general classification scheme. The class 'Potential Poppy' was part of this classification scheme for 3 provinces namely Hilmand, Kandahar and Farah. Classes derived manually (though visual interpretation) were merged with the supervised classification outputs to derive the final land use map.

Various crops and poppy fields in particular, exhibit a high degree of spectral variability in the SPOT 5 imagery. Different crop growth stages, densities, agro-climactic, and topographic conditions result in a wide range of spectral signatures/profiles. Such spectral profiles could be considered as individual land use classes in a given time for a given region. In light of this variability, large numbers of land cover classes were generated initially and later aggregated to fit the general classification scheme.

In order to identify poppy areas, initial agriculture classes were studied with respect to interpreter's knowledge about the poppy cultivation. Once a spatial, contextual, topographical, and spectral profile was determined for poppy areas, the agriculture classes matching these parameters were aggregated to a single 'poppy' class.

The classification scheme of SPOT images is given in the table below:

Table 32: Class names for classification of the SPOT images

Class Value	Class Name	Class Value	Class Name
1	Barren	**9**	Dense Crop
2	Water Bodies	**10**	Very Dense Crop
3	Fallow Field	**11**	Flooded Field (inundated crops)
4	Very Early Emergent Crop	**12**	Urban or built-up area
5	Poppy	**13**	Non-Agriculture Vegetation
6	Early Emergent Crop	**14**	Salt build-up/Degraded soil
7	Emergent Crop	**15**	Cloud
8	Established Crop		

Characteristics of the land use classes[29]:

Barren: Areas with little or no vegetation and no visible agriculture. Rangeland was included in this classification as it does not represent intensive agriculture practices and is outside the scope of this project.

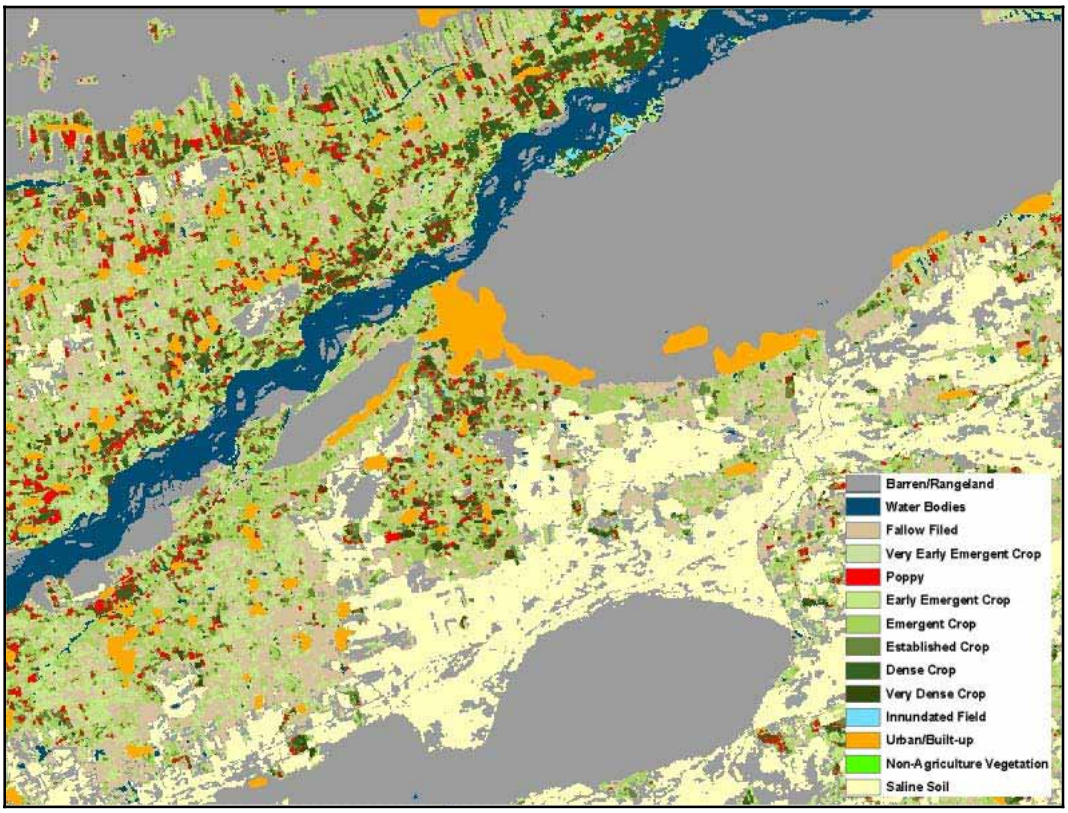
Water Bodies All water bodies, including lakes, rivers, ponds, and streams.

Fallow Field Agriculture fields not currently cultivated, or containing pre-emergent crops at the time of image capture.

Very Early Emergent Crop: This class exists only in February images and denotes agricultural fields with extremely faint vegetation signatures. This class was interpreted to represent early stage poppy at higher elevations.

[29] Note that not every class was present in every SPOT 5 scene

Poppy:	Fields that match the spectral and contextual profile typical for intensive monoculture poppy cultivation.
Early Emergent Crop:	Fields containing an uneven coverage of crop vegetation in the first stages of growth.
Emergent Crop:	Fields containing an even coverage of crop vegetation in an early growth stage.
Established Crop:	Fields containing established crops but not yet matured.
Dense Crop:	Fields containing a dense coverage of established crop vegetation.
Very Dense Crop:	Fields containing dense coverage of vegetation with a strong signature.
Flooded Field :	Fields containing water. Crop vegetation may be partially or completely inundated. Most common in river floodplains and seen in the February imagery.
Urban or built-up area:	Areas with a significant component of buildings, roads and other urban structures.
Non-Agriculture Vegetation:	Non-agricultural land containing significant vegetation signatures. These areas may include wetlands and scrub vegetation.
Degraded Soils	Salt affected soils.
Cloud	Areas obscured by cloud or other aerosols at the time of image capture.



Final classification results

*The final product, showing the results of initial classification, aggregation, and merging with digitized masks

Classification Results

It is difficult to compare the FAO 1993 land cover data with the UNODC 2005 figures because both classification schemes are not compatible with each other, as shown in the table below. Since opium poppy is mainly grown in irrigated areas -except in Badakshan- UNODC mainly includes irrigated and active agricultural areas in its maps.

	UNODC 2005	FAO 1993	
	Total Irrigated Area (ha)	Irrigated- Intensively cultivated (ha)	Irrigated- intermittently cultivated (ha)
Helmand	205,000	119,040	117,515
Kandahar	122,500	51,706	199,324
Farah	99,000	20,656	147,522
Balkh	160,000	101,480	173,760
Nangarhar	96,947	66,786	29,326
Uruzgan - excluding Day Kundi	81,659	52,174	51,975

The UNODC updated land use map of Hilmand province, using 2002 Landsat TM images, found 184,500 ha of irrigated agriculture. Acquisition dates for the Hilmand images were between 5 February – 4 April 2005 (pre-harvest). This year's results (205,000) show an increase of 11.5% in the agricultural area of Hilmand as compared to 2003.

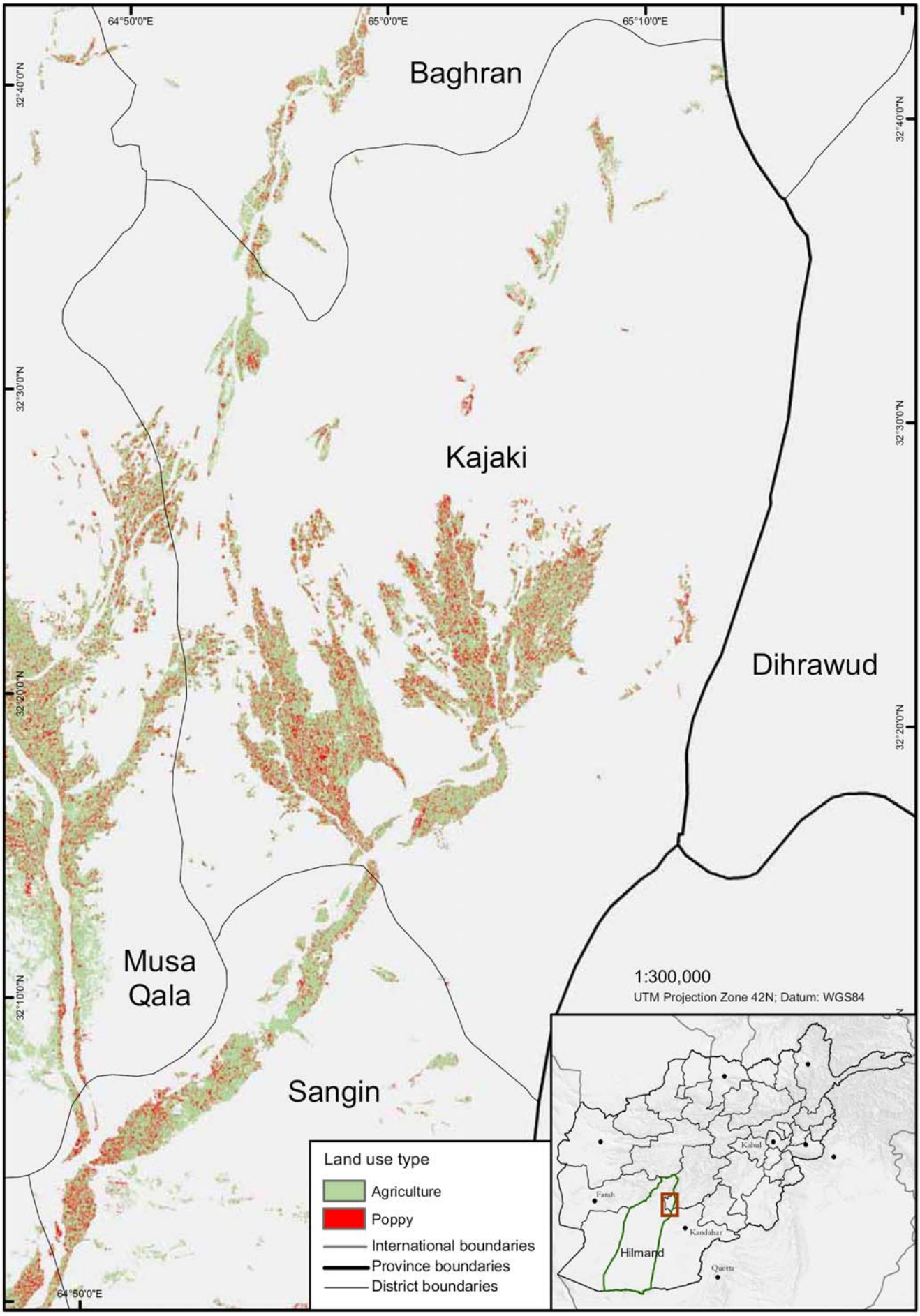
Images over Kandahar were acquired in April 2005. A total of 122,500 ha of irrigated agriculture land was mapped.

Images for Farah were acquired in April 2005. The map shows a total of 99,000 ha of irrigated agriculture. The effect of soil salinity in this province was very serious.

Balkh province was covered by a total of 7 SPOT images collected in May, 2005. A total of 160,000 ha of irrigated agriculture land was mapped.

Due to poor weather conditions in Uruzgan, images could be collected only in April and May 2005. A total of 81,659 ha of irrigated agriculture land was mapped.

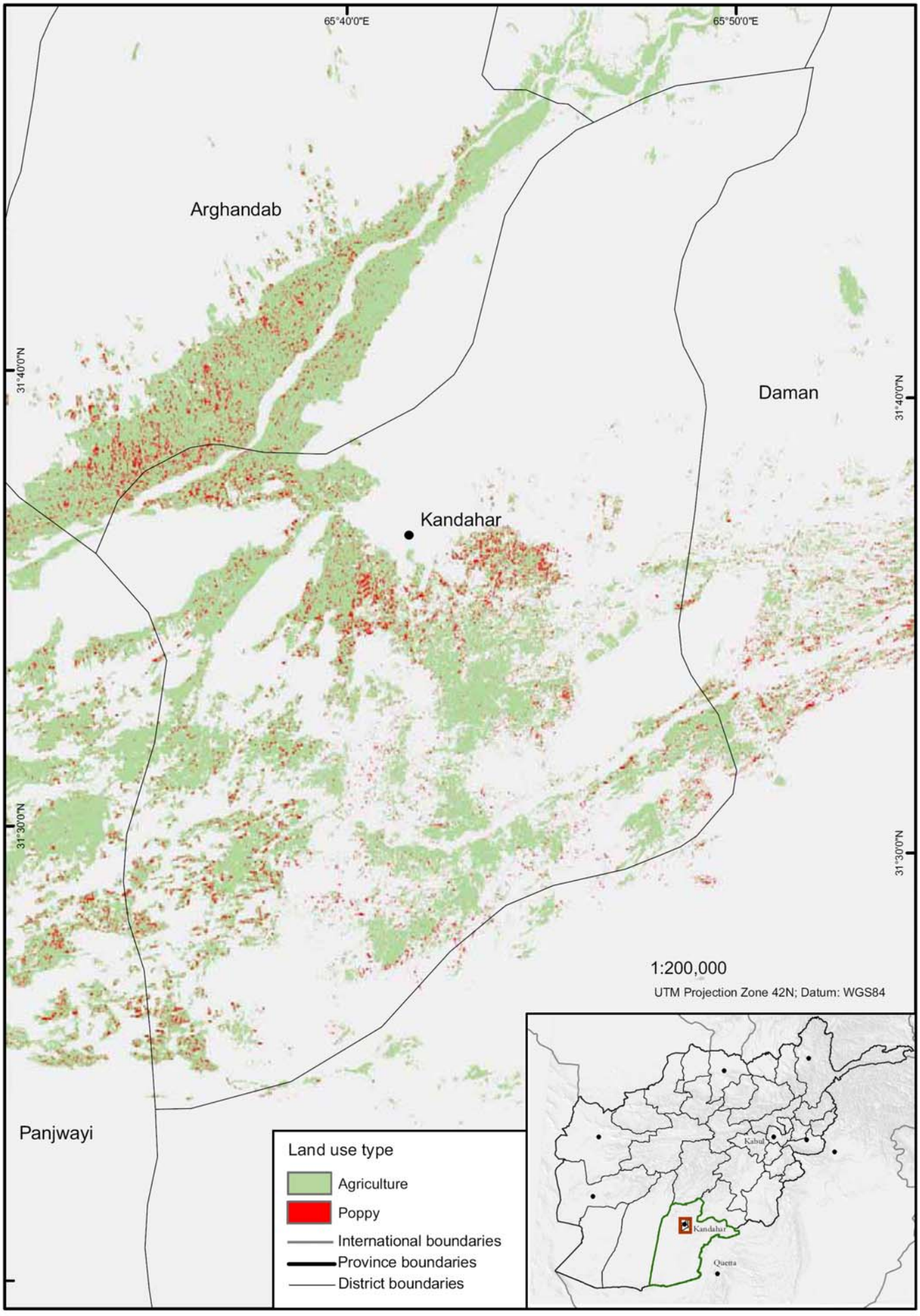
Land use map of Kajaki district, Hilmand Province in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

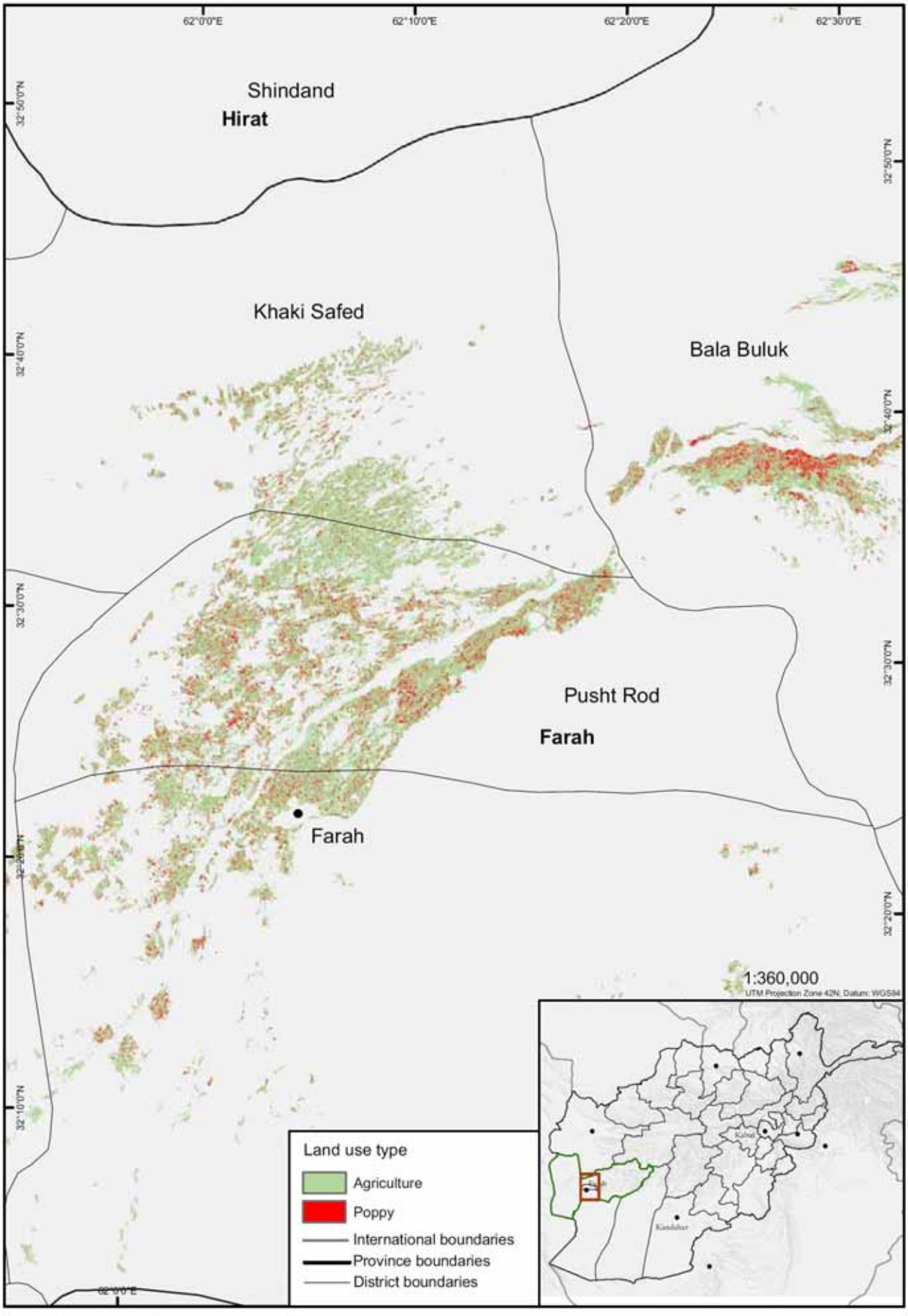
Land use map of Kandahar district, Kandahar province in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

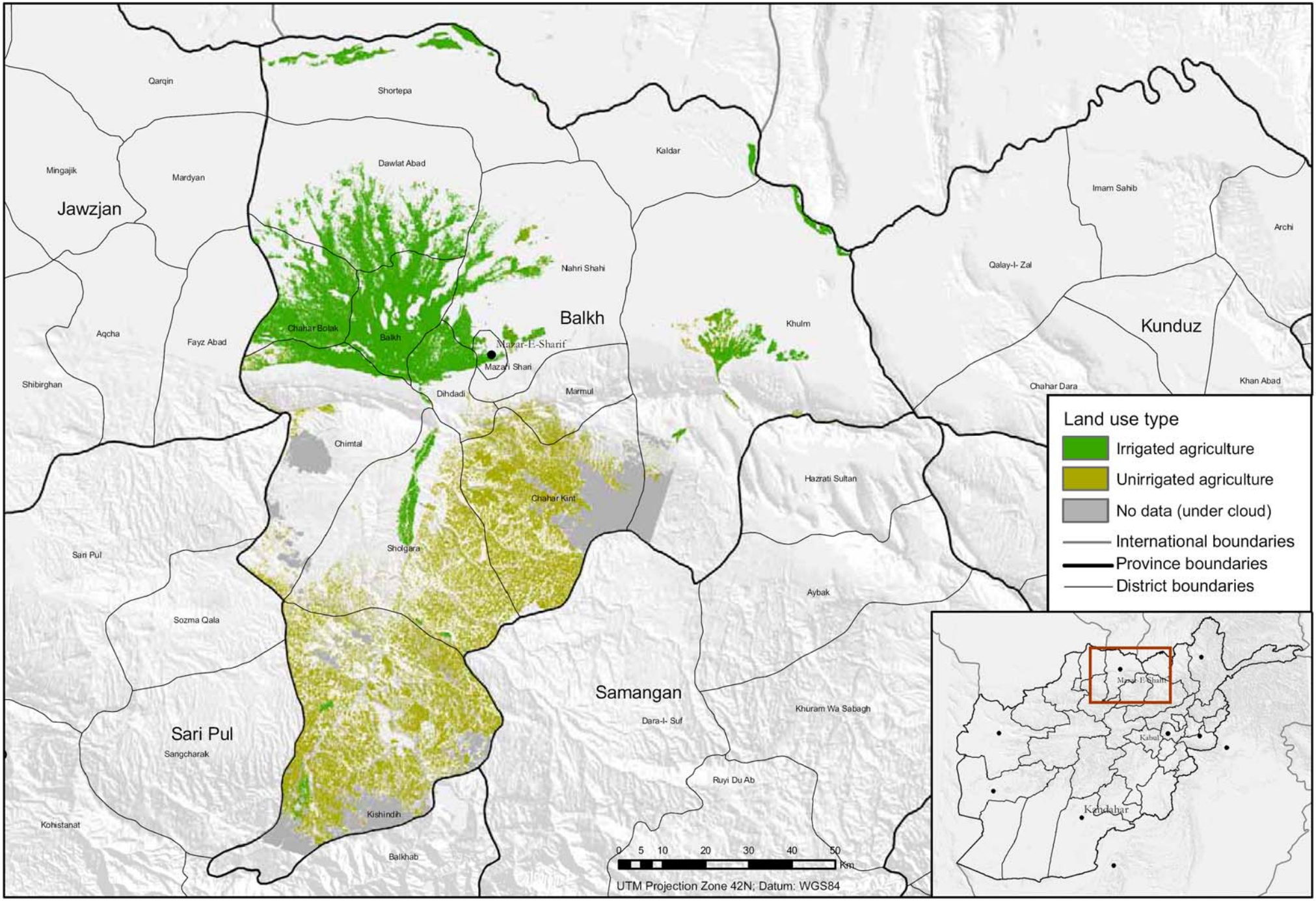
Land use map of Pusht Rod district, Farah province in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

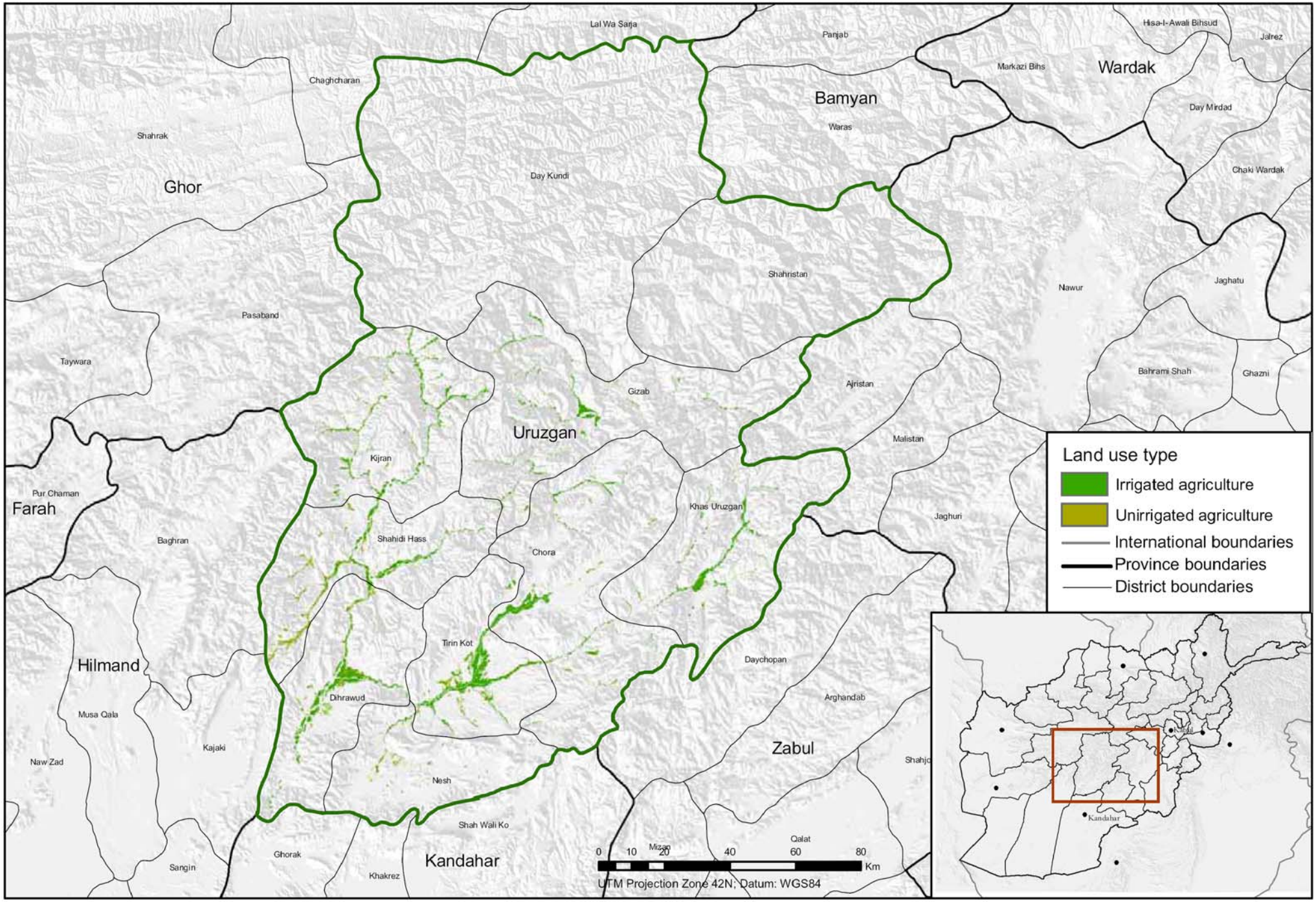
Land use map of Balkh province in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Land use map of Uruzgan province (excluding the district of Day Kundi) in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

3.3 Village survey methodology

Experienced surveyors were selected from the UNODC surveyor pool, based on their previous performance. Security was generally problematic for the surveyors, but selection of the surveyors from the corresponding region helped to reduce the security risks.

The surveyor training began in March 2005 and was conducted by the national staff of UNODC. The Ministry of Counter Narcotics also participated in most of the training sessions. The training included practical (use of GPS, area calculation, etc) and theoretical aspects (questioning and dialogue with the village headmen and farmers).

The sample village survey was implemented to collect socio-economic and poppy cultivation data throughout the country. In the 17 provinces for which no satellite images were acquired, the sample ground survey was also used to estimate opium poppy cultivation. Opium poppy cultivation estimated through the sample village survey eventually accounted for 16% (19% in 2004) of the total area under opium poppy cultivation in 2005.

For all villages surveyed, the following data were collected (from 32 provinces)

- Total number of families & inhabitants living in the village
- Total number of families growing opium poppy
- Poppy planting & harvest dates
- Farmer estimates of wheat & opium yield
- Prices for wheat & opium
- Number of opium addicts
- Economical status of farmers
- Reasons for cultivation/non-cultivation of poppy
- Extent of opium poppy and wheat cultivation

Surveyor Training in Nangarhar, March 2005.

Establishment of the sampling frame for the village survey

In 2005, the sampling frame for the village survey data was the complete list of all villages in Afghanistan. The village database used to establish the sampling frame was obtained from UNDP's Afghanistan Information Management System (AIMS), which consisted of 30,706 villages.

Sampling ratio

The overall village sampling ratio was 6%, and the villages were selected through simple random sampling. The villages were first stratified based on their location on a cover map, and then randomly selected within each strata:

strata 1: villages located over irrigated land (or within the proximity of irrigated land, with a maximum buffer of 1 km) – 6% sampling rate

strata 2: villages located over rain-fed area (or within the proximity of rain-fed area, with a maximum buffer of 1 km) – 6% sampling rate

strata 3: villages located further than 1 km of any irrigated or rain-fed area – 6% sampling rate.

At the country level, a total of 1,900 villages were surveyed and 5,700 farmers and headmen interviewed for the village survey, employing 110 surveyors. Due to security constraints 58 of the assigned villages could not be visited.

Area estimation formula from village survey

Stratified random sampling formulae have been used to calculate opium poppy cultivation from the village survey for the 21 provinces where no satellite images were acquired.

$\bar{x}_s$ = Provincial average of the surveyor's estimation of opium poppy cultivation per village in strata's

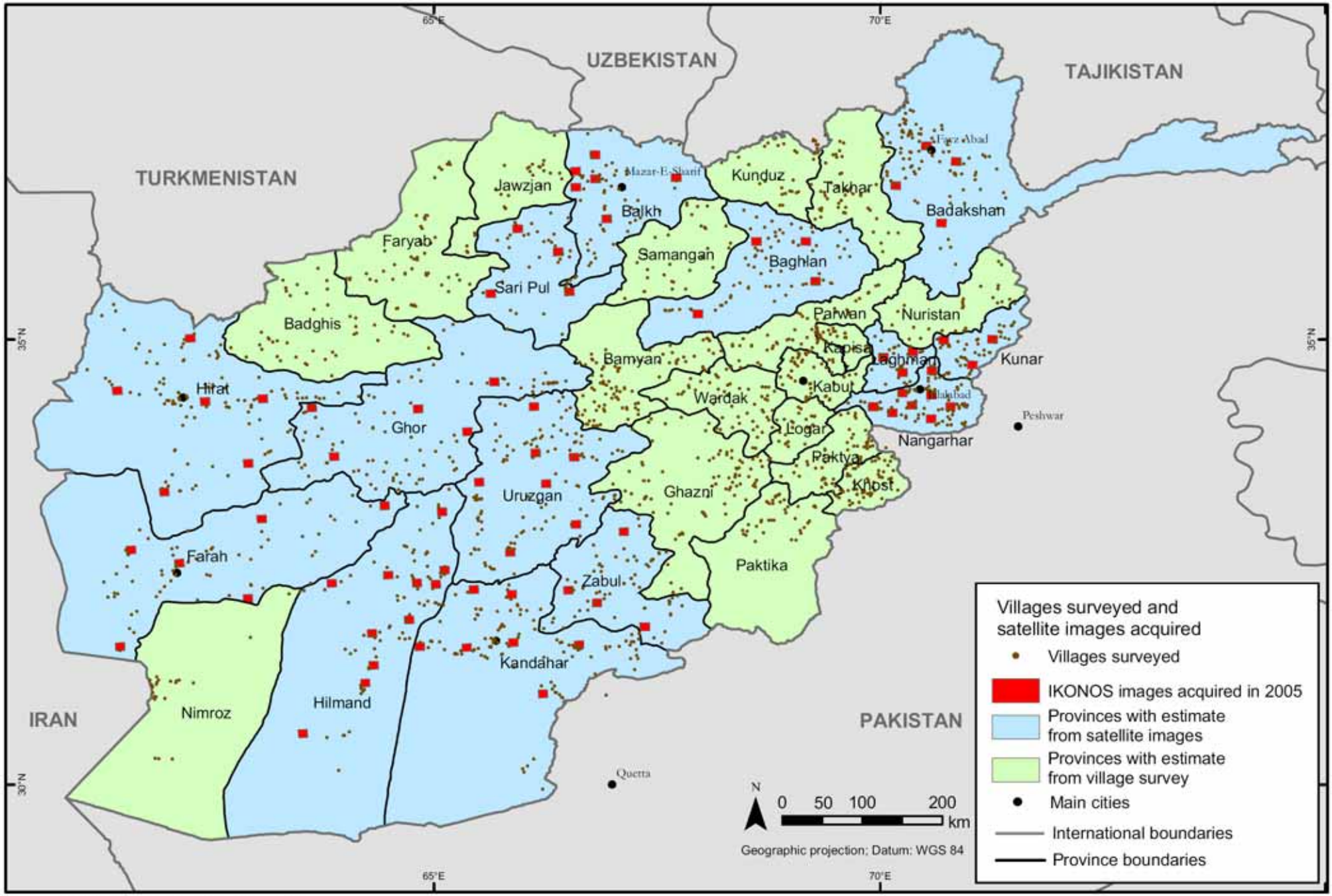
N_s = Total number of villages per province of strata's

$X = \sum_s N_s * \bar{x}_s$ = Total opium poppy cultivation area

As the agricultural land varies from one village to another, these results were also refined by bootstrapping the provincial samples (with 10,000 iterations). The bootstrap method also provided for the standard error of the estimates. There was a 90% probability that the area under opium poppy cultivation was between 13,647 ha and 19,725 ha, with a mean estimate of 16,581 ha (the upper and lower estimates do not lie symmetrically around the mean estimate because of the bootstrap method used). The mean estimate for the 17 provinces, covered by the village survey, represented 16% of the total area under opium poppy cultivation in 2005.

Overall, the area estimation from satellite and village survey ranged between 95,000 ha and 113,000 ha, with a mean estimate of 104,000 ha.

Villages surveyed and satellite images acquired in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

3.4 Opium Yield and Production

In the past, calculation of opium yield in Afghanistan relied on farmers' interviews, mostly done prior to the harvest. The data thus reflected primarily the farmers 'expected' opium yield rather than the actual opium yield which was still unknown at the time of the survey. Data were also subject to the farmers' own bias.

Since 2000, UNODC has been developing an alternative objective yield assessment approach, based on the measured volume of opium capsules and cultivation density[30]. The relationship between capsule volume per square metre and the yield of dry opium was originally developed from data collected in Pakistan and Thailand. It takes the form of a non-rectangular hyperbola:

Non-rectangular hyperbola formula for predicting opium yield

$$Y = [(VC + 1495) - ((VC + 1495)^2 - 395.259\ VC)^{0.5}] / 1.795$$

where,

Y = Dry opium gum yield (kilograms / hectare)

VC = Mature capsule volume (cm^3/m^2)

Data Collection

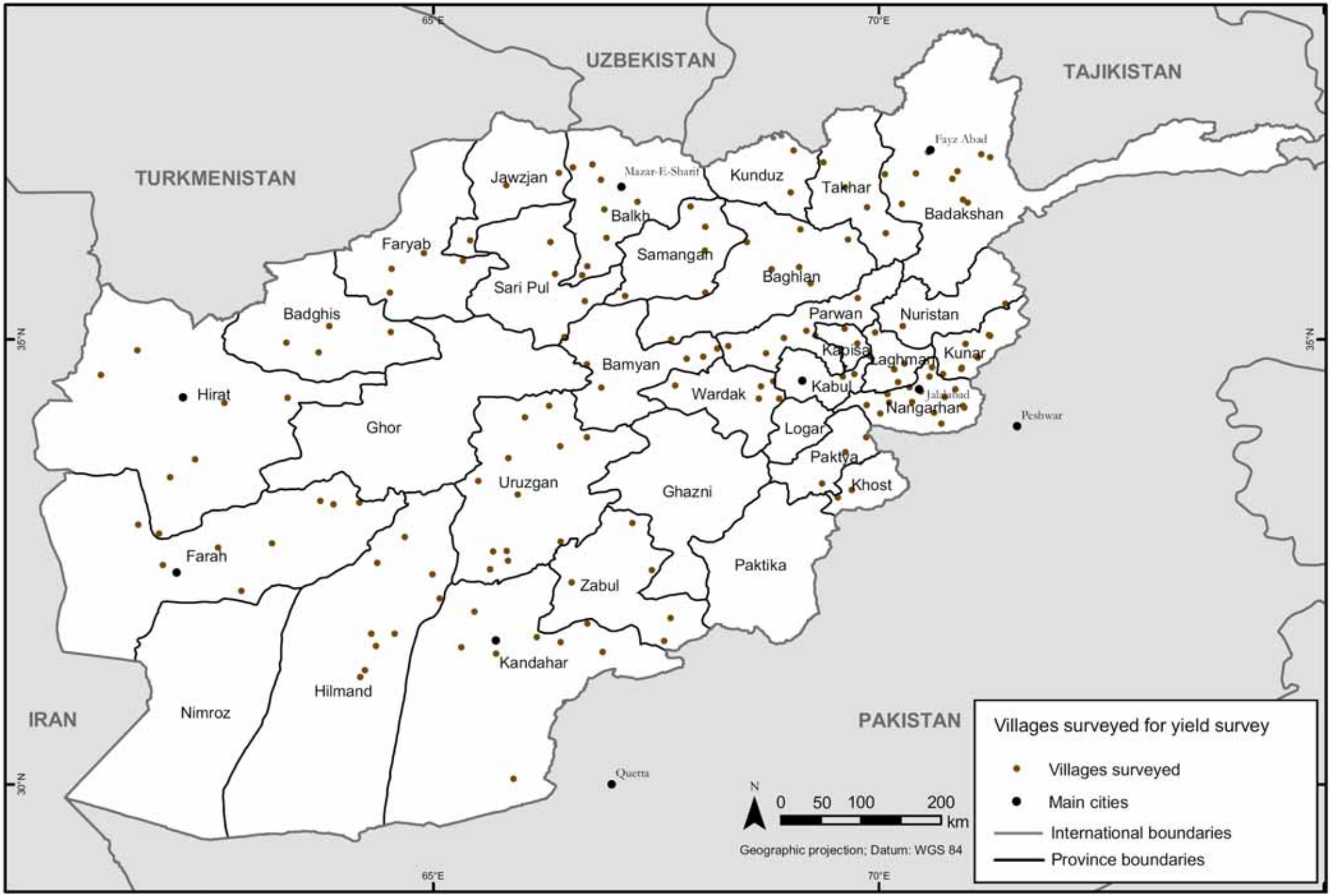
In 2005, capsule measurements were collected from 160 fields in 160 villages randomly selected throughout the country. A total of 4121 capsules were measured from 348 plots. In the central and eastern regions, it was difficult to find any poppy fields this year.

For the yield survey, the procedure as described in the UNODC Guidelines for Yield Assessment was followed. An imaginary transect was drawn, along which three one-meter square plots were selected. From each plot, the number of flower buds, flowers, immature capsules and mature capsules that were expected to yield opium were counted, and the diameter and height of 10 to 15 opium yielding capsules were measured with a calliper. With these data the capsule volume per square meter was calculated and input into a non-rectangular formula for the yield calculation. Each plot thus provided one yield observation. The simple average of the observations gave the regional yield estimate.

Yield Survey Training, 2005

[30] *UNODC Guidelines for yield assessment of opium gum and coca leaf from brief field visits, UN New York, 2001, ST/NAR/33*

Sample fields for yield survey in Afghanistan, 2005



Source: MCN - UNODC Afghanistan Opium Survey 2005

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

3.5 Opium Price

Between April and August 2005, data were collected on the price of fresh and dry opium. In the 2005 village survey some 3,300 farmers in 1,113 villages were interviewed to provide data on fresh opium prices and about 3,700 farmers from 1,233 villages were interviewed to provide information on dry opium prices. The average regional values for price of dry opium were used to estimate the total value of opium produced in Afghanistan in 2005.

Since November 2002, UNODC conducts a regular opium price monitoring system, collecting prices of fresh and dry opium from farmers and traders on monthly basis in Nangarhar, Hilmand and Kandahar, and since May 2005 in Hirat, Balkh and Badakhshan provinces. About 90 farmers and 80 local traders are interviewed each month to provide this information.

3.6 Opium Growing Families

To estimate the number of families involved in opium poppy cultivation in Afghanistan, data were collected during the village survey on the number of families growing opium poppy in the sampled villages.

Stratified simple random sampling formulae were used to derive the number of opium growing families in Afghanistan as follow:

$\bar{x}_s$ = average number of opium poppy growing farmers per village in the sample in strata s

N_s = Total number of villages in the sampling frame in strata s

$X = \sum N_s * \bar{x}_s$ = Total number of families growing opium

As the sampled villages did not have a similar population size, the results were refined with a bootstrap of 10,000 iterations, providing an estimate for the mean and for the standard error. A total of 309,000 poppy (range 278,000 – 340,000) growing households were estimated in Afghanistan.

3.7 Value of Opium Production at Farmgate level

Based on the area under cultivation (A) (104,000 ha), the yield (Y) (39 kg per ha of dry opium) and the opium prices (P) (US$138; weighted by production) the farm-gate value of the opium harvest has been estimated (A x P x Y) at around $560 million. This figure is equivalent to the potential gross income of farmers from opium production. It does not take into account the costs of farmers related to hiring labour, using fertilizers, accepting a lower income as a result of selling the harvest in advance (salaam arrangements), paying taxes to local commanders or bribing officials for not eradicating the opium poppy harvest.

Table 33: Farm-gate value of opium production in 2005

Region	Production of dry opium in kg	Price of dry opium per kg in US$	Farm-gate value in million US$
Southern	1,749	141	246.515
Northern	1,098	112	123.105
Western	685	164	112.286
North-Eastern	365	128	46.603
Eastern	180	179	32.364
Central	4	235	0.897
Total	**4,082**	**138**	**561.770**
Total rounded	**4,100**		**560**
90% confidence interval	3,560 – 4,610	+/- 14	470 - 655

In order to estimate the confidence interval of the farm-gate value, the confidence intervals of all parameters (area under cultivation, yield, prices) were calculated separately.

The combination of the 'uncertainties' (u) of the different variables, was based on the following formula[31]:

$$u(y(x_1,x_2\ldots)) = \sqrt{\sum_{i=1,n} c_i^2 u(x_i)^2}$$

where $y(x_1,x_2,..)$ is a function of several parameters $x_1,x_2,..$ (here: area, yield, price), and c_i is a sensitivity coefficient evaluated as $c_i = \partial y / \partial x_i$, the partial differential of y with respect to x_i. For simple products (y = p x q x r …) and an independence of the variables used (i.e. the yield per ha is not a function of the area under cultivation or the price paid to farmers), the formula could be simplified as follows:

$$u_c(y) = y \cdot \sqrt{\left(\frac{u(p)}{\bar{p}}\right)^2 + \left(\frac{u(q)}{\bar{q}}\right)^2 + \ldots}$$

where $(u(p)/\bar{p})$ etc. are the uncertainties in the parameters, expressed as relative standard deviations. In order to arrive at the combined confidence interval of the farm-gate value, the calculated standard deviations are then multiplied with the appropriate z-value.

Given the fact that the confidence intervals for the individual parameters have already been calculated, a further simplification is possible. Instead of using the 'standard deviation' as a percentage of the mean of the respective parameters as inputs for the calculation of the formula shown above, before multiplying the final results with the respective z-values, the 'differences between the mean value and the upper and lower limits of the confidence interval', expressed as a proportion of the mean value of the parameter, can be used as input for the calculation of the overall confidence interval.

Following these considerations, the calculation was done as follows:

a) Calculation of individual minimum and maximum values:

The results, based on 90% confidence intervals, showed the following results:

	Average	Minimum	Maximum
A Area under cultivation (ha):	104,000	95,326	112,674
Y Yield (kg/ha)	39.3	35.4	43.2
P Dry opium farm-gate price (US$/kg)	138	124	152

b) Calculation of the distance between the minimum (maximum) limit and the mean of the confidence interval, expressed as a proportion of the mean value of the respective parameter

	Minimum	Maximum
	$\frac{\text{Min(X)} - \text{Avg(X)}}{\text{Avg(X)}}$	$\frac{\text{Max(X)} - \text{Avg(X)}}{\text{Avg(X)}}$
A = Area under cultivation (ha):	-8.35%	+8.35%
Y = Yield (kg/ha)	-9.8%	+9.8%
P = Dry opium farm-gate price (US$/kg)	10.2%	10.2%

[31] EURACHEM/CITAC, Guide CG4, *Quantifying Uncertainty in Analytical Measurements*' 2nd Edition, 2000, UK/Switzerland; http://www.measurementuncertainty.org/mu/guide/index.html?content_frame=/mu/guide/stepcalculating.html

c) Calculation of the lower (upper) limit of the overall confidence interval:

$$\sqrt{\sum_{X=A,Y,P}\left(\frac{\text{Min}(X) - \text{Avg}(X)}{\text{Avg}(X)}\right)^2}$$

$$\sqrt{\sum_{X=A,Y,P}\left(\frac{\text{Max}(X) - \text{Avg}(X)}{\text{Avg}(X)}\right)^2}$$

$$= (8.35\%^2 + 9.8\%^2 + 10.2\%^2)^{(1/2)} = +/- 16.4\%$$

The 90% confidence interval for the farm-gate value of the 2005 harvest in Afghanistan is thus:

US$561.77 mio x (1-16.4%) - US$561.77 x (1+16.4%) =

= US$469.6 million – US$653.9 million

or rounded: **US$470 million – US$655 million**

3.8 Value of Afghan Opiates in Neighbouring Countries

Opiates are usually trafficked by Afghan traders to neighbouring countries. In general, Afghan traffickers are involved in shipping the opiates across the borders. From there onwards, traffickers from neighbouring countries take over the consignments. The value of the opium production (partly transformed into morphine/heroin) in neighbouring countries close to the borders with Afghanistan is thus considered to be a good proxy for the overall gross income made by Afghan citizens from the opium sector. [32] The approach taken to calculate such an income has remained largely unchanged as compared to previous years in order to guarantee direct comparability of the results.

The calculation has followed the following steps:

- establishment of an appropriate conversion ratio of opium into heroin;
- establishment of a distribution pattern of opium production between (i) opium destined for exports and (ii) opium destined for transformation into heroin & morphine;
- establishment of a distribution pattern of (i) opium exports and of (ii) heroin & morphine exports;
- analysis of opium prices as well as of heroin & morphine prices in neighbouring countries in border regions with Afghanistan;
- using prices in neighbouring countries in the border regions with Afghanistan and the distribution pattern to calculate an average weighted export opium price and an average weighted heroin/morphine price;
- multiplying opium export volumes with export prices of opium to arrive at the value of opium exports and (ii) multiplying heroin & morphine export volumes with heroin and morphine export prices to arrive at the value of heroin and morphine exports.

[32] *There are, of course, also traders from neighbouring countries (notably from Pakistan, Iran and Tajikistan) purchasing opiates in Afghanistan and smuggling them across the border. Similarly, some Afghan traffickers are involved in shipping the opiates from Afghanistan to the main transhipment markets, located further inland in neighbouring countries. These effects are considered to offset each other.*

Conversion of opium into heroin

The first question relates to the amounts of opium needed to produce 1 kg of heroin. Traditionally a 10:1 rule of thumb ratio has been used (10 kg of opium for 1 kg of heroin). Previous research showed that such a transformation ratio is correct for many opium producing countries, notably in countries of South-East Asia which until the early 1990s used to dominate global heroin production.

Afghanistan, however, is different. Dating back to the late 1950s, the analysis of an opium sample showed already a morphine content of almost 17%. Authorities in the Kyrgyz Republic reported that the morphine content of opium trafficked through their country (in general, originating in Afghanistan) ranged from 14% to 22%, with a typical morphine content of 18% (ARQ, 2001).[33] Over the 2000-2003 period, UNODC collected opium samples across Afghanistan, dried them and analyzed the morphine content of these samples. Overall 39 opium samples from 29 test fields across Afghanistan were collected. The morphine content of dry opium in these samples ranged from 8% to 24%. The highest morphine yields over the 2000-2003 period were found in Badakshan (on average slightly more than 16%[34]). The average morphine content of fields in Nangarhar was above 15%. The average morphine content in Hilmand was above 12%. The average morphine content from the 39 samples in Afghanistan was 15% (confidence interval: 13.7%-16.3%).[35] This suggested that in Afghanistan, on average, only 6 to 7 kg of dry opium were needed to produce 1 kg of heroin.[36]

Table 34: Average morphine content of opium in Afghanistan (2000-2003)*

Province	Average morphine content
Badakhshan	16.2%
Nangarhar	15.3%
Hilmand	12.4%
Others (Kandahar, Balkh)	11.2%
Unweighted average	*15.0%*
Confidence interval (α=0.05)	*13.7%–16.3%*

* Information based on the analysis of 39 opium samples from 28 fields.

Source: UNODC, Limited Opium Yield Assessment Surveys, Technical report: Observations and findings, December 2003.

Such a ratio was also in line with 'recipes' for morphine/heroin manufacture, made available to UNODC in recent years, which suggested that the typical inputs needed for the production of 1 kg of morphine / brown heroin were typically between 6 and 7 kg of opium, in addition to a number of chemicals.[37] The question remained, however, how 'representative' had been such 'recipes', quoted in the literature.[38]

[33] *UNODC, Limited Opium Yield Assessment Surveys, Technical report: Observations and findings, December 2003.*

[34] There was, however, a clear downward trend in the morphine content of opium in Badakshan; while the average morphine content was 18% in 2000 and 17% in 2001 it fell to 11% in 2003. This went hand in hand with a marked increase in the use of irrigated land for poppy cultivation (instead of rain-fed land), a strong increase in yields per hectare and a strong decline of opium prices, far below the national average.

[35] *UNODC, Limited Opium Yield Assessment Surveys, Technical report: Observations and findings, December 2003.*

[36] This refers to heroin at 100% purity. In practice, laboratory efficiencies of typically 60%-70% would, of course, require the input of more opium to produce pure heroin. Heroin produced in Afghanistan, however, is not 100% pure; purity levels usually range from 40%-85%, typically slightly above 60%. This results again in a 6:1 or 7:1 conversion ratio of dry opium to heroin. *(UNODC, The Opium Economy in Afghanistan, An International Problem, New York 2003, p. 133).*

[37] *UNODC, the Opium Economy in Afghanistan – An International Problem, New York 2003, p. 135.*

[38] This is a difficult question as only few such recipes are available and have been described in detail. One recipe, dating back to 2001/02, suggested that a typical ratio was 7 kg of opium for 1 kg of morphine base in Afghanistan. According to this recipe, 28 kg of opium, 6 kg of calcium carbonate and 3 kg of ammonium chloride are needed to produce 4 kg of morphine base. (In another conversion process, calcium oxide (lime) is used instead of calcium carbonate.) In order to produce white morphine base, needed for

Against this background, surveyors in the 2005 survey were explicitly asked to find out from their contacts and informants the amounts of dry opium typically needed to produce 1 kilogram of morphine / brown heroin. Given the highly sensitive nature of heroin production in Afghanistan, and the ongoing dismantling of such laboratories, no formal questionnaire was developed in order not to raise unnecessary suspicions and endanger the security of the surveyors. A majority of the surveyors were not in a position to gather such information, possibly indicating an ongoing lack of heroin production know-how in several parts of the country, as well as the sensitive nature of such a question. Most of the surveyors operating in the main heroin producing areas, however, succeeded to obtain such information and quoted typical transformation ratios around **7 kg of dry opium for the manufacture of 1 kg of morphine / brown heroin** in the debriefing sessions. Thus previously obtained information from recipes and through the analysis of opium samples could be confirmed. This conversion rate was subsequently also adopted as UNODC's general transformation ratio for dry opium to morphine/heroin in Afghanistan.

Establishment of a distribution pattern of opium and heroin & morphine exports

Opium production in Afghanistan is primarily destined for export to foreign markets, either in the form of opium or in the form of morphine/heroin. Against the background of large-scale opium production, domestic use and seizures within Afghanistan are of only minor importance. They have not been explicitly taken into account in the subsequent calculations. Recalculating the results based on these additional factors would change the final results only marginally.[39]

A far more important question concerns the extent to which opium is transformed into morphine and heroin within Afghanistan. This is an important issue as there is clear evidence of significant morphine and heroin production taking place within Afghanistan:

In 2003 Afghan authorities dismantled 120 'fixed laboratories' and 30 'movable laboratories', mainly in Hilmand, Nangarhar (notably in Shanwar district) and in Badakshan,[40] accounting for more than 40% of all opiate laboratories dismantled worldwide in that year.[41] In 2004, 125 clandestine morphine/heroin laboratories were dismantled in Afghanistan, located in various regions of the country: South (Hilmand, Nimroz, Kandahar: 30 laboratories), East (Nangarhar: 25 laboratories), North-East (Badakshan: 25 laboratories) and North (Jawzjan & Sari Pul: 18 laboratories; Kunduz 12). Most laboratories continued to be located in the border areas, though a number of laboratories have been found in other locations as well. Afghanistan is also faced with significant illegal imports of chemical precursors required to produce morphine and heroin. They are often smuggled into the country via Pakistan as well as other neighbouring countries. The precursor chemicals found in the heroin laboratories in 2004 were reported by the Afghan authorities to have been mainly from China, India, Russia and Hungary while in the morphine producing laboratories precursor chemicals from Germany and Korea were

---

the production of white heroin HCL, some further processing has to take place. For the production of 2.2 kg of white morphine base, 4 kg of dry (brown) morphine base were found to be required, in addition to 3 ½ litres of methanol, 5 litres of sulphuric acid, 0.5 litres of ammonium hydroxide and 3 cups of charcoal. (*DEA, Heroin Laboratories in Afghanistan, April 2002, p. 40*).

In a more recent attempt to establish a better understanding of the heroin manufacturing process, the German authorities, in cooperation with the Counter Narcotics Police of Afghanistan, hired two cooks to produce white heroin for the authorities in 2004. Out of 70 kg of raw opium, the two cooks produced 7.8 kg of morphine base (purity 68%) and, out of this, 3.9 kg of white heroin HCL (purity of 74%). Other substances used in the process included 8 kg of acetic anhydride, 20 kg of ammonium-chloride (NH_4Cl), 20 kg of natrium-carbonate (Na_2CO_3 x 10 H_2O), 1.5 l of concentrated hydrochloride acid, 1 litre of concentrated ammonia solution, 0.15 l of acetone (C_3H_6O), and 6 kg of charcoal (*Bundeskriminalamt, Dokumentation einer authentischen Heroinherstellung in Afghanistan*, 2004, pp. 28-30). The morphine content of the raw opium used (previously seized by the authorities, and defined by the cooks of being of 'poor quality') had a morphine content of, on average, 8.5% (range: 6.1% – 11.1%), less than the average morphine content found in UNODC opium samples across the country (average of 15%). Readjusting the production to a hypothetical sample of 15% morphine content it can be assumed that only 40 kg of opium (of 15% morphine content) would have been needed to produce the 7.8 kg of morphine base (equivalent to a 5:1 ratio) or 3.9 kg of white heroin HCL (equivalent to a 10:1 ratio). Given the dominance of 'brown heroin' instead of 'white heroin' in Afghanistan's heroin production, it can be assumed that the overall transformation ratio of opium to heroin should fall within a 5:1 to 10:1 range, probably closer to the lower limit (i.e. 6:1 or 7:1). However, this would be still the result of just one singular exercise, based on a hypothetical opium sample.

[39] Taking these additional factors into account, total opium production available for export would decline from 4100 tons to some 4000 tons; the calculated gross receipts of Afghan traffickers would fall marginally, from US$2.7 to between US$2.5 and US$2.6 billion. As such a calculation would, however, be different from the way the results were calculated last year, it was decided to continue with last year's methodology in order to guarantee direct comparability of results.

[40] Islamic Republic of Afghanistan, *Annual Reports Questionnaire Data for the year 2003.*

[41] UNODC, ARQ/DELTA.

reported.[42] The analysis of available precursors in Afghanistan by a team of experts of the German Bundeskriminalamt in 2004 found, however, that many of the alleged German precursor chemicals were actually forged products, with wrong labels put on them, in order to indicate a high 'quality product' to the clandestine laboratory owners. Some of the labels even had spelling mistakes in German.

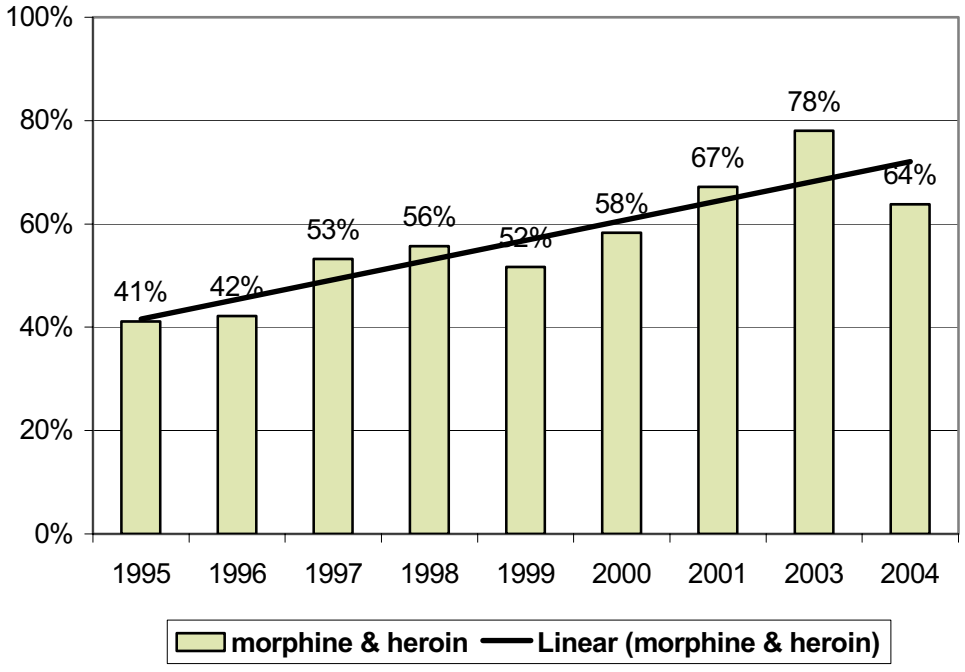
Even though the existence of widespread morphine and heroin production within Afghanistan is well established, the question as to the extent of such production is more difficult to answer.

One approach to provide an estimate of the extent of domestic morphine/heroin production is to analyse seizure data in Afghanistan and its neighbours (Pakistan, Iran, countries of Central Asia). As long as there is no substance specific targeting of drug shipments by law enforcement, seizures of opiates – expressed in heroin equivalents – should provide a reasonable estimate of the extent opiates are transformed into intermediary products (morphine) or end products (heroin) within the region.

One problem here is that aggregated seizure data for 2005 are not, as yet available. Thus a different approach has to be taken: it was decided to calculate average annual seizures of opium and of heroin & morphine over the last three years (2002-2004). The results are then used as a proxy for the – so-far - unknown proportion for the year 2005.

The analysis revealed that – expressed in heroin equivalents - 71.5% of seizures in the countries neighbouring Afghanistan were in the form of either morphine or heroin over the 2002-2004 period and only 28.5% were in the form of opium. As law enforcement agencies in countries neighbouring Afghanistan claim that no heroin production takes place on their territories (and UNODC has no information that would contradict these claims) the following calculation assumes that 71.5% of the opium produced in Afghanistan is transformed into morphine & heroin within Afghanistan.

Figure 47: Proportion* of heroin & morphine seizures in all opiate seizures in Afghanistan and countries neighbouring Afghanistan



* Note: a 7:1 conversion ratio was used to convert opium into morphine/heroin

Source: UNODC, Annual Reports Questionnaire Data.

[42] Islamic Republic of Afghanistan (Ministry of Counter Narcotics), *Annual Reports Questionnaire Data for the year 2004.*

Table 35: Estimated opium and heroin & morphine exports of Afghanistan in 2005

	Opium production (metric tons)	Opium exports (metric tons)	Heroin & morphine exports (metric tons)
Opium production	4,100		
Distribution		28.5%	71.5%
Opium used for purposes		1,168	2,932
Conversion rate dry opium to heroin			7 : 1 ratio
End products – exports		**1,168**	**419**
End products (rounded)		**1,200**	**420**

Distribution pattern of opiate shipments out of Afghanistan

Giving differences in opium and heroin prices in neighbouring countries, the next important question relates to the quantities

Distribution of opium exports

As discussed above, the calculations suggest that some 1,200 tons (28.5% of 4,100 tons = 1,168 tons) are exported in the form of opium. Based on a three-year average of seizures in neighbouring countries the following patterns emerges:

Table 36: Distribution of opium exports

	Seizures (average 2002-2004)	Opium exported
Iran	93.7%	1,094
Pakistan	3.4%	40
Central Asia	2.9%	34
Total	100%	1,168

Given the strong enforcement efforts by the Iranian authorities, there could be a potential bias towards seizures made in Iran, and thus a potential over-reporting of opium exports to Iran. On the other hand, Iran is also the only country in the region where widespread 'opium addiction' is reported. (In the other countries of the region, use of other opiates is more widespread). At the same time, none of the neighbouring countries has significant levels of morphine/heroin production, suggesting that the bulk of the opium exports of Afghanistan are indeed for opium consumption, and not for any further processing in morphine or heroin. Thus, there is a strong likelihood that the bulk of the exported opium is indeed destined for the Iranian market. This does not exclude the possibility that some of the 1,095 tons of opium leave Afghanistan via Pakistan for final destinations in Iran. In such cases, the involvement of Afghan traffickers (often Baluch traffickers) does not necessarily stop across the border in Pakistan but may well continue until the borders of Iran are crossed. In other words, the total gross income for Afghan traffickers does not change much whether Iran is targeted directly, or indirectly via Pakistan.

Distribution of morphine & heroin exports

Applying the same approach to morphine & heroin exports is likely to lead to a significant under-reporting of opiate shipments via Central Asia and to an over-reporting of exports via Pakistan. (There was a significant decline of opium production in areas close to Pakistan in 2005, which would not be adequately reflected in seizures data of the 2002-2004 period).

Table 37: Distribution of heroin and morphine exports

	Distribution based on seizures (average 2002-2004)	Distribution based on production in Afghanistan (see below)
Iran	35.7%	49.0%
Pakistan	50.0%	25.9%
Central Asia	14.3%	25.1%
Total	100%	100%

Against this background, a different approach was taken. The bulk of production in Afghanistan is – in general - exported to the closest external border in order to avoid expensive payments to local commanders who have check-points across the country. There are indications that

- most of the opium produced and transformed into morphine/heroin in central and eastern Afghanistan leaves the country via Pakistan,
- most of the opium produced and transformed into morphine/heroin in north-eastern Afghanistan leaves the country via Tajikistan,
- most of the opium produced and transformed into morphine/heroin in western Afghanistan leaves the country via Iran,
- about half of the opium produced and transformed into morphine/heroin in southern Afghanistan leaves the country via Pakistan, and the rest via Iran.

The situation is more complicated for the rapidly expanding opium production in northern Afghanistan. The debriefing of the surveyors revealed that large parts of the opium produced in northern Afghanistan (around 70%) were – in 2005 - routed towards major opium markets in Hilmand province or Western Afghanistan, where prices are high, for export to Iran, and only a smaller proportion (some 30%) was destined for export to Central Asia. However, many of these exports from northern Afghanistan are already included in the overall opium exports of Afghanistan going to Iran. Such exports have to be deducted. For the remaining opium produced in northern Afghanistan and transformed into heroin & morphine, calculations suggest that around 60% went to Central Asia and 40% to Iran.

Table 38: Opium production in Afghanistan – regional breakdown in 2005 (in metric tons)

	Metric tons	in %
South	1,749	43%
North	1,098	27%
West	685	17%
North-East	365	9%
East	180	4%
Central	4	0%
Total	4,081	100%

Table 39: Distribution of heroin and morphine based on production estimates

	Distribution	Assumptions	Distribution of morphine/heroin exports based on production estimates
Iran	49.0%	50% South, 100% West, 40% North	206
Pakistan	25.9%	East, Central, 50% south	109
Central Asia	25.1%	North-East, 60% North	105
Total	100.0%		420

Prices of opiates in neighbouring countries

The next parameters investigated were the opium and morphine/heroin prices in countries neighbouring countries, notably in the border regions with Afghanistan. Such prices were collected by the UNODC field offices, located in Pakistan, Iran and in Central Asia. Prices in border areas of Tajikistan were used as a proxy for prices in border areas of Central Asian countries.

- *Opium prices (per kilogram)*

Iran (Feb. 2005):

Sistan Baluchistan (region bordering Afghanistan):

average: US$930;

Tehran

= US$3400; (retail: US$4,400)

Pakistan (March 2005):

best quality opium: Rs15,000-20,000 in Peshawar (close to Afghanistan);

best quality opium: Rs 20,000 in Quetta (close to Afghanistan)

average: US$314

best quality opium: Rs 20,000–34,000 in Karachi

Tajikistan (March/July 2005)

Gorno Badakhshan Autonomous Province (Pamir)

US$ 200-350 (March 2005); 100-250 (July 2003)

Khatlon province (Pyanj-Moskovskiy-Shuroobod areas)

US$ 400-750 (March 2005); 400-700 (July 2003)

average: US$363 (July 2003)

Dushanbe: US$400-US$1000 (March 2005)

Sogd province (northern exit points bordering Kyrgyzstan and Uzbekistan): *US$400-US$1000*

- *Heroin/morphine prices (per kilogram)*

Iran (Feb. 2005):

Sistan Baluchistan (region bordering Afghanistan):

average: US$3,800 (morphine); (poor quality heroin: US$2,300)

Tehran

Morphine: US$4,700;

Heroin: from US$4,400 (max. 30% purity) to US$7,700 (50%+ purity)

Pakistan (March 2005):

best quality heroin: Rs 181,000-225,000 in Peshawar (close to Afghanistan)

best quality heroin: Rs 130,000-290,000 in Quetta (close to Afghanistan)

average: US$3,459

best quality heroin: Rs 280,000–290,000 in Karachi

Tajikistan (March/July 2005)

Gorno Badakhshan Autonomous Province (Pamir) – bordering Afghanistan

best quality heroin: US$4000-US$ 5000 (March 2005); US$2500-US$3500 (July 2003)

Khatlon province (Pyanj-Moskovskiy-Shuroobod areas) – bordering Afghanistan

Best quality heroin: US$500-US$6500 (March 2005); US$5000-US$6500 (July 2003)

average: US$,4375 (July 2003)

Dushanbe: US$6000-US$7500 (March 2005)

Sogd province (northern exit points bordering Kyrgyzstan and Uzbekistan): US$6,000-US$8,000

Results

Combining all the elements discussed above, the calculations result in a likely overall gross income (= in his case 'value added') of around US$2.7 billion for Afghanistan (farmers and traffickers) from the opium sector for 2005. This would be equivalent to about 52% of legal GDP (US$5.2 bn in 2004/05) or 34% of overall GDP in Afghanistan.

Table 40: Estimate of potential total Afghan gross income from the opium sector in 2005

	Opium exports	Opium prices per kg	Opium distribution based on seizures	Heroin and morphine exports	Heroin/morphine price per kg	Heroin/morphine distribution based on opium production	Total
Total exports in tons	1,169 mt			420 mt			
Iran		US$930	93.7%		US$3,800		
Pakistan		US$314	3.4%		US$3,459		
Central Asia		US$363	2.9%		US$4,375		
Average export price weighted by distribution		US$ 893	100.0%		US$ 3,856		
Value in billion US$ (exports × export price)	US$ 1.04 billion			US$ 1.62 billion			**US$ 2.7 billion**

The calculations suggest an average export price of opium of US$893 per kilogram and of morphine/heroin of US$3,856 per kilogram The average opium price was thus slightly higher than a year earlier (US$725 in 2004) while the average morphine/heroin price was slightly lower (US$4,171 in 2004), possibly reflecting the built-up of stocks in the region in 2003/04.

Deducting the farmers' income of US$0.56 billion, the overall gross income for traffickers amounts to some US$2.14 billion. The estimate does not take into account additional gains made by traffickers by diluting heroin,

i.e. adding other substances in order to increase the weight of the heroin. It also does not take into account the fact that some Afghan traffickers do not only ship the opium or heroin to the borders of neighbouring countries, but also onwards to major transhipment places where prices are usually far higher. On the other hand, not all of the opiates are smuggled by Afghan traffickers across the borders. Some of the opium and heroin is also being trafficked by traders from neighbouring countries, notably from Pakistan, Iran and Tajikistan, to markets outside Afghanistan. The estimate above assumes that all these additional factors, which could influence total income, more or less offset each other.

Confidence interval

The best available mid-point estimate has been given above. Nonetheless, it must be clear that there could be significant variations, if actual values of the key parameters used were to fall towards the lower of the higher end of the respective ranges. In the following sub-chapter, the 90% confidence interval of the various indicators will be calculated and discussed.

- *Production (90% confidence interval)*

The calculation of the range of opium production was already discussed in the methodology sub-chapter on the value of opium production. Based on the confidence interval of production estimates, Afghan opium exports could range from 1000 to 1300 tons, and morphine/heroin exports from some 360 to 470 tons.

.

Opium production:

range: 3,560 – 4,610 metric tons (mean: 4,100 tons)

Opium exports (28.5% of production)

range: 1,015-1,314 metric tons; +/- 13% of mean (1,169 tons)

Heroin exports (71.5% of production; 7:1 ratio)

range: 364-471 metric tons; +/- 13% of mean (419 tons)

The calculation of a 90% confidence interval of prices has been slightly more difficult.

In the case of Iran, no price ranges of opium or morphine prices in Sistan Baluchistan were reported. However, time series data of drug price fluctuations exist. Based on these price fluctuations over the last year, a 90% confidence interval of the mean price could be established.

In the case of both Pakistan and Tajikistan minimum and maximum prices were available. It was assumed that the reported range included 99% of all reported prices (and that there were no important outliers). Assuming a normal distribution, this is equivalent to a value of 2.576 x standard error. As the calculations are aiming at a 90% confidence interval, the range could be reduced by dividing it by the z-value for 99% (2.576) and multiplying it with the z-value for a 90% (1.645) confidence interval (assuming a normal distribution).

- *Prices (90% confidence interval)*

Opium prices in Iran (Sistan Baluchistan):	US$890-U$970; +/- 4% of mean (US$930)
Opium prices in Pakistan (Quetta/Peshawar):	US$301-US$327; +/- 4% of mean (US314)
Opium prices in Tajikistan (border region):	US$259-US$467; +/- 29% of mean (US$363)
Heroin prices in Iran (Sistan Baluchistan):	US$3,613-US$3,987; +/- 5% of mean (US$3800)

Heroin prices in Pakistan (Quetta/Peshawar): US$2,913-US$4,005; +/- 16% of mean (US$3459)

Heroin prices in Tajkistan (border region): US$3,497-US$5,253; +/- 20% of mean (US$4375)

Based on these ranges the following confidence intervals (90%) could be calculated:

a) Keeping production levels constant and multiplying them with minimum and maximum prices results in a range of US$2.4 to US$2.9 billion;

b) Keeping prices constant and calculating the confidence intervals based on minimum and maximum production levels, results in a range of US$2.3 to US$3 billion;

c) Calculating the average minimum export prices (US$852 for opium and 3,403 for morphine & heroin), the average maximum export prices (US$934 for opium and 4,309 for morphine & heroin), and applying the formula discussed in the methodology sub-chapter on the value of opium production, results in an overall 90% confidence interval of **US$2.2 to US$3.1 billion.**

$$= \mathrm{Avg}(j_1)^{x}\ \mathrm{Avg}(j_2)^{x}\left(1-\sqrt{\sum_{j=1}^{2}\left(\frac{\mathrm{Min}(j)-\mathrm{Avg}(j)}{\mathrm{Avg}(j)}\right)^2}\right) \qquad \text{(minimum)}$$

$$\mathrm{Avg}(j_1)^{x}\ \mathrm{Avg}(j_2)^{x}\left(1+\sqrt{\sum_{j=1}^{2}\left(\frac{\mathrm{Max}(j)-\mathrm{Avg}(j)}{\mathrm{Avg}(j)}\right)^2}\right) \qquad \text{(maximum)}$$

where j=1 for prices and j=2 for production

= for opium: US$1.043 bn * (1- (4.583%^{2} + 13.17%^{2})$^{(1/2)}$) = US$0.897 bn (min)
US$1.043 bn * (1+ (4.583%^{2} + 12.40%^{2})$^{(1/2)}$) = US$1.19 bn (max)

= for heroin/morphine: US$1.619 bn * (1- (11.756%^{2} + 13.33%^{2})$^{(1/2)}$) = US$1.33 bn (min)
US$1.619 bn * (1+(11.756%^{2} + 11.90%^{2})$^{(1/2)}$) = US$1.89 bn (max)

= **for opiates:** **US$2.2 bn (minimum)**
US$3.1 bn (maximum)

4 ANNEXES

Annex 1: Opium cultivation in Afghanistan per province, 2002-2005 (hectares)

PROVINCE	2002	2003	2004	2005	Change 2004-2005 (ha)	Change 2004-2005 (%)
Badakhshan	8,250	12,756	15,607	7,370	-8,237	-53%
Badghis	26	170	614	2,967	2,353	383%
Baghlan	152	597	2,444	2,563	119	5%
Balkh	217	1,108	2,495	10,837	8,342	334%
Bamyan	-	610	803	126	-677	-84%
Farah	500	1,700	2,288	10,240	7,952	348%
Faryab	28	766	3,249	2,665	-584	-18%
Ghazni	-	-	62	-	-62	-100%
Ghor	2,200	3,782	4,983	2,689	-2,294	-46%
Hilmand	29,950	15,371	29,353	26,500	-2,853	-10%
Hirat	50	134	2,531	1,924	-607	-24%
Jawzjan	137	888	1,673	1,748	75	4%
Kabul	58	237	282	-	-282	-100%
Kandahar	3,970	3,055	4,959	12,989	8,030	162%
Kapisa	207	326	522	115	-407	-78%
Khost	-	375	838	-	-838	-100%
Kunar	972	2,025	4,366	1,059	-3,307	-76%
Kunduz	16	49	224	275	51	23%
Laghman	950	1,907	2,756	274	-2,482	-90%
Logar	-	-	24	-	-24	-100%
Nangarhar	19,780	18,904	28,213	1,093	-27,120	-96%
Nimroz	300	26	115	1,690	1,575	1,370%
Nuristan	-	648	764	1,554	790	103%
Paktika	-	-	-	-	0	0%
Paktya	38	721	1,200	-	-1,200	-100%
Parwan	-	-	1,310	-	-1,310	-100%
Samangan	100	101	1,151	3,874	2,723	237%
Sari Pul	57	1,428	1,974	3,227	1,253	63%
Takhar	788	380	762	1,364	602	79%
Uruzgan	5,100	7,143	11,080	4,605	-6,475	-58%
Wardak	-	2,735	1,017	106	-911	-90%
Zabul	200	2,541	2,977	2,053	-924	-31%
Total (rounded)	**74,000**	**80,000**	**131,000**	**104,000**	**-27,000**	**-21%**

Annex 2: Indicative district level estimations of opium poppy cultivation,1994-2005 (hectares)[43]

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Badakhshan	Baharak	111	64	116	9	202	23	86	345	180			1,635
	Fayz Abad	77	2,344	1,592	1,634	1,282	906	1,073	868	2,370	3,109		3,111
	Ishkashim			3									
	Jurm	433	555	1,326	1,051	1,198	1,249	773	2,897	2,690	4,502		1,460
	Khwahan												
	Kishim	1,093	3	177	62	62	385	507	2,191	2,840	4,530		1,076
	Kuran Wa Munjan												48
	Ragh			8	31	2	8						
	Shahri Buzurg					71	113	19	41	170	615		39
	Zebak		4	8	115								
Badakhshan Total		**1,714**	**2,966**	**3,230**	**2,902**	**2,817**	**2,684**	**2,458**	**6,342**	**8,250**	**12,756**	**15,607**	**7,369**
Badghis	Ghormach							20		4	101		944
	Jawand												134
	Murghab							21		22	69		1,889
Badghis Total		**0**	**0**	**0**	**0**	**0**	**0**	**41**	**0**	**26**	**170**	**614**	**2,967**
Baghlan	Andarab								81	31	301		548
	Baghlan							152		120	16		374
	Baghlani Jadid												248
	Burka												242
	Dahana-I-Ghori				328	929	967	27			37		24
	Dushi												116
	Kahmard												263
	Khinjan										9		92
	Khost Wa Firing										21		295
	Nahrin								1		63		35
	Puli Khumri						38	20		1	37		224
	Tala Wa Barfak										113		102
Baghlan Total		**0**	**0**	**0**	**328**	**929**	**1,005**	**199**	**82**	**152**	**597**	**2,444**	**2,563**
Balkh	Balkh				13	29	29	82	1	22	332		2,786
	Chahar Bolak				165	530	2,600	53			68		2,701
	Chahar Kint												25
	Chimtal			1,065	532	485	1,428	2,451		153	617		1,878
	Dawlat Abad								3	-			202
	Dihdadi							22		8	35		990
	Kaldar												395
	Khulm												367

[43] District estimates may not be statistically significant as the sample size at the district level is not appropriate to produce estimates at such level.

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Kishindih												290
	Marmul												18
	Mazari Shari												119
	Nahri Shahi							33		14	30		425
	Sholgara							28		19	28		543
	Shortepa												98
Balkh Total		**0**	**0**	**1,065**	**710**	**1,044**	**4,057**	**2,669**	**4**	**217**	**1,108**	**2,495**	**10,837**
Bamyan	Bamyan										20		19
	Panjab										250		
	Shibar										36		107
	Waras										191		
	Yakawlang										112		
Bamyan Total											**610**	**803**	**126**
Farah	Anar Dara												1,828
	Bakwa		1	13	129	31	129	259					390
	Bala Buluk		8	19	169	36	186	183			513		1,665
	Farah			18	18	10	44	73					729
	Gulistan			581	252	94	428	849			1,187		163
	Khaki Safed												432
	Lash Wa Juwa												1,568
	Pur Chaman												293
	Pusht Rod												2,482
	Qalay-I-Kah												407
	Shib Koh												283
Farah Total		**0**	**9**	**631**	**568**	**171**	**787**	**1,364**	**0**	**500**	**1,700**	**2,288**	**10,240**
Faryab	Almar												57
	Andkhoy												13
	Bilchiragh							6		26	232		
	Dawlat Abad												133
	Khani Chahar												6
	Khwaja Sabz												451
	Kohistan												50
	Maymana							1					
	Pashtun Kot							11		1	281		97
	Qaramqol												138
	Qaysar							16			150		579
	Shirin Tagab							3			103		1,141
Faryab Total		**0**	**0**	**0**	**0**	**0**	**0**	**36**	**0**	**28**	**766**	**3,249**	**2,665**
Ghazni	Ajristan	313								-			
	Bahrami Shah												9
Ghazni Total		**313**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**62**	**9**
Ghor	Chaghcharan									700	1,189		1,149
	Lal Wa Sarja												718

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Pasaband									700	805		48
	Saghar									300	256		120
	Shahrak										640		18
	Taywara									500	808		240
	Tulak										84		396
Ghor Total										**2,200**	**3,782**	**4,983**	**2,689**
Hilmand	Baghran		2,519	1,267	2,754	2,910	2,794	2,653		1,800	2,309		2,507
	Dishu									-			911
	Garmser	786	725	942	1,993	1,205	2,643	2,765		2,020	462		1,912
	Kajaki	979	4,087	2,814	3,904	3,959	5,746	4,625		2,640	1,392		1,639
	Lashkar Gah	2,256	885	1,054	1,325	1,869	2,528	3,145		1,140	605		1,332
	Musa Qala	1,154	5,137	3,924	4,360	5,574	7,013	5,686		3,690	2,455		1,664
	Nad Ali	12,529	5,983	4,035	5,102	5,156	8,667	8,323		5,880	870		2,356
	Nahri Sarraj	590	4,716	4,309	4,807	2,426	4,041	4,378		1,850	1,575		3,548
	Naw Zad	2,345	2,799	3,596	1,585	3,605	4,424	5,085		2,650	3,096		3,737
	Naway i Barakzayi	6,074	1,254	505	722	1,150	2,581	3,246		2,730	1,240		2,552
	Reg							222		1,940			2,772
	Sangin	2,866	973	1,909	1,971	1,734	2,646	1,711		2,810	777		1,184
	Washer		676	555	877	1,084	1,469	1,014		800	590		386
Hilmand Total		**29,579**	**29,754**	**24,910**	**29,400**	**30,672**	**44,552**	**42,853**	**0**	**29,950**	**15,371**	**29,353**	**26,500**
Hirat	Adraskan												9
	Chishti Shar												42
	Farsi										134		110
	Ghoryan												238
	Gulran												33
	Guzara												231
	Hirat												16
	Injil												394
	Karukh												124
	Kohsan												72
	Kushk												64
	Kushki Kuhna												15
	Obe												144
	Pashtun Zarghun				38			38					249
	Shindand							146					54
	Zinda Jan												128
Hirat Total		**0**	**0**	**0**	**38**	**0**	**0**	**184**	**0**	**50**	**134**	**2,531**	**1,924**
Jawzjan	Aqcha						532	208		47	171		631
	Darzab												272
	Fayz Abad						43	105		24	280		112
	Khamyab							6		30	51		68
	Khwaja Du Ko												15

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Mardyan						43	111		4	228		21
	Mingajik						1,789	141		7	64		77
	Qarqin						186	10		24	58		43
	Shibirghan							19		1	36		508
Jawzjan Total		**0**	**0**	**0**	**0**	**0**	**2,593**	**600**	**0**	**137**	**888**	**1,673**	**1,748**
Kabul	Surobi						132	340	29	58	237		
Kabul Total		**0**	**0**	**0**	**0**	**0**	**132**	**340**	**29**	**58**	**237**	**282**	**0**
Kandahar	Arghandab	211	87	331	561	399	750	459		330	139		287
	Arghistan						38	13		80	14		2,449
	Daman						110	50		190	357		775
	Ghorak	347	803	692	1,503	1,126	1,109	574		380	166		233
	Kandahar	320	53	234	21	73	227	156		640	293		0
	Khakrez	362	274	627	286	518	632	320		560	312		185
	Maruf	30	16	1		3	5	17		-	63		150
	Maywand	256	333	618	1,278	2,497	2,022	995		1,090	353		1,281
	Panjwayi	250	357	266	255	134	132	184		150	482		4,687
	Reg												327
	Shah Wali Ko	678	97	94	127	162	236	238		260	489		2,379
	Shorabak										111		19
	Spin Boldak	1,170	107	194	91	317	261	26		290	277		218
Kandahar Total		**3,624**	**2,127**	**3,057**	**4,122**	**5,229**	**5,522**	**3,034**	**0**	**3,970**	**3,055**	**4,959**	**12,990**
Kapisa	Alasay												82
	Koh Band												33
	Tagab						5	104	0	207	326		
Kapisa Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**522**	**115**
Khost	Jaji Maydan												
	Spera										118		
	Tani								6		257		2
Khost Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**375**	**838**	**2**
Kunar	Asad Abad						73	239	1	140	396		270
	Bar Kunar						47	72	31	40	163		14
	Chapa Dara												147
	Chawkay	13	11			8	9	50	8	140	83		284
	Dangam								4	49			22
	Khas Kunar	75	82	10		12	50	173		70			41
	Marawara										345		22
	Narang		15	1		13	27	84	10	100	173		55
	Nari								1	-	60		19
	Nurgal	27	19	5		8	28	98	9	70	353		58
	Pech								11	263	310		76
	Sirkanay		25	2		34	54	71	8	100	141		50
Kunar Total		**115**	**152**	**18**	**0**	**75**	**288**	**786**	**82**	**972**	**2,025**	**4,366**	**1,059**
Kunduz	Ali Abad						5	51		3	5		

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Chahar Dara						8	30		6	15		
	Imam Sahib						3						
	Khan Abad						2	36			11		
	Kunduz						9	51		3	9		
	Qalay-I- Zal						11	321		5	8		275
Kunduz Total		**0**	**0**	**0**	**0**	**0**	**38**	**489**	**0**	**16**	**49**	**224**	**275**
Laghman	Alingar					2	71	131	3	146	354		107
	Alishing					3	26	88	0	104	148		69
	Dawlat Shah								12	-	571		44
	Mihtarlam					14	72	190		240	366		25
	Qarghayi					58	128	298	0	460	468		30
Laghman Total		**0**	**0**	**0**	**0**	**77**	**297**	**707**	**15**	**950**	**1,907**	**2,756**	**274**
Logar Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Nangarhar	Achin	5,354	2,187	2,315	1,640	1,693	2,209	1,317	1	940	2,131		198
	Bati Kot	3,797	529	392	1,013	2,034	603	535		2,390	1,994		166
	Chaparhar	1,089	1,377	1,750	1,234	1,365	977	832	2	990	1,169		20
	Dara-I-Nur	1,302	392	199	73	199	734	421		380	24		2
	Dih Bala	307	646	354	569	511	468	439	11	650	927		17
	Dur Baba	29	78	38	39	56	50	33		40	31		5
	Goshta	1,249	467	116	77	122	240	238	99	150	13		10
	Hisarak	202	453	253	370	436	741	541	2	620	1,016		64
	Jalal Abad	458	31	51	123	397	979	1,021		90	4		77
	Kama		18			198	389	589		1,120	558		82
	Khogyani	4,347	2,577	2,628	3,385	3,808	5,338	4,913	3	2,640	2,986		117
	Kuz Kunar	293	233	115	15	105	236	399		500	102		37
	Lal Pur	302	267	79	66	137	270	248	95	250	1		17
	Muhmand Dara	1,630		156	83	125	290	255		720	19		54
	Nazyan	343	138	251	111	252	184	177		150	98		8
	Pachir Wa Agam	768	571	681	400	488	731	630	3	420	1,142		35
	Rodat	1,026	2,038	1,959	1,583	2,147	3,649	2,302		2,760	3,313		50
	Sherzad	1,954	2,351	1,646	1,689	1,302	1,741	1,719	2	1,470	1,641		57
	Shinwar	3,884	1,265	2,075	1,478	1,374	1,559	1,300		2,060	1,616		79
	Surkh Rod	747	106	587	619	1,072	1,602	1,840	0	1,440	118		0
Nangarhar Total		**29,081**	**15,724**	**15,645**	**14,567**	**17,821**	**22,990**	**19,747**	**218**	**19,780**	**18,904**	**28,213**	**1,093**
Nimroz	Chahar Burjak												526
	Kang	10	2	1	107	5	2						
	Khash Rod	672	117	135	535	6	201	219			26		1164
Nimroz Total		**682**	**119**	**136**	**642**	**11**	**203**	**219**	**0**	**300**	**26**	**115**	**1,690**
Nuristan	Bargi Matal												535
	Kamdesh										210		269
	Mandol												731
	Nuristan										438		19

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Nuristan Total											**648**	**764**	**1,554**
Paktika													
Paktika Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Paktya	Azra					4	29	46	1	38	419		
	Chamkani								0	-	76		
	Jaji								0	-	185		
	Lija Mangal								0	-			
	Sayid Karam								0	-	41		
Paktya Total		**0**	**0**	**0**	**0**	**4**	**29**	**46**	**1**	**38**	**721**	**1,200**	**0**
Parwan													
Parwan Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,310**	**0**
Samangan	Aybak										14		0
	Dara-I- Suf								614		34		1,454
	Hazrati Sultan										29		280
	Khuram Wa Sarbagh							54	0		24		307
	Ruyi Du Ab												1,833
Samangan Total		**0**	**0**	**0**	**0**	**0**	**0**	**54**	**614**	**100**	**101**	**1,151**	**3,874**
Sari Pul	Balkhab										453		95
	Kohistanat												1,424
	Sangcharak										453		441
	Sari Pul										595		959
	Sayyad												52
	Sozma Qala	0	0	0	0	0	0	146	0	57	380		256
Sari Pul Total								**146**	**0**	**57**	**1,881**	**1,974**	**3,227**
Takhar	Bangi							8	0		20		
	Chah Ab						17	45	19		4		
	Chal						8	17	20				
	Farkhar						6	6	26		43		43
	Ishkamish							10	19		77		
	Kalafgan						101	93	27		77		
	Khwaja Ghar						9	57	32		26		
	Rustaq						10	151	24		34		1,321
	Taluqan						16	97	16		14		
	Warsaj						12	9	10		14		
	Yangi Qala						22	154	20		71		
Takhar Total		**0**	**0**	**0**	**0**	**0**	**201**	**647**	**211**	**788**	**380**	**762**	**1,364**
Uruzgan	Chora	694	424	1,574	233	652	932	1,179	0	1,330	975		259
	Day Kundi								0	-	836		1,353

Province		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Dihrawud	909	938	2,923	1,870	1,033	1,243	726	0	1,340	1,282		209
	Gizab	1,476	16	8	0	0	0	0	0	-	776		268
	Khas Uruzgan	0	4	0	0	0	0	130	0	-	580		338
	Kijran								0	-	418		735
	Nesh	410	334	104	399	373	510	394	0	490	59		352
	Shahidi Hass	1,337	12	0	0	1,158	1,110	802	0	1,190	1,333		646
	Shahristan								1	-	415		225
	Tirin Kot	1,428	1,180	3,271	2,484	1,445	1,194	1,494	0	750	469		221
Uruzgan Total		**6,254**	**2,908**	**7,880**	**4,986**	**4,661**	**4,989**	**4,725**	**1**	**5,100**	**7,143**	**11,080**	**4,605**
Wardak	Chaki Wardak										211		
	Day Mirdad										0		106
	Hisa-i-Awali Bihsud										22		
	Jalrez										531		
	Markazi Bihs										472		
	Maydan Shahr										527		
	Nirkh										780		
	Sayd Abad										192		
Wardak Total											**2,735**	**1,017**	**106**
Zabul	Arghandab	0	0	0	0	0	74	139	0		302		205
	Atghar										188		86
	Daychopan	0	0	0	0	0	41	114	0		646		1,016
	Mizan	54	0	255	154	160	373	383	0		309		56
	Qalat	0	0	0	0	1	46	40	0		689		188
	Shahjoy								0		178		240
	Shamulzayi										65		16
	Shinkay										164		102
	Tarnak wa Ja	0	0	0	0	0	77	48	1				145
Zabul Total		**54**	**0**	**255**	**154**	**161**	**537**	**585**	**1**	**200**	**2,541**	**2,977**	**2,053**
TOTAL		71,416	53,759	56,827	58,417	63,672	90,904	81,928	7,606	73,838	80,609	**130,612**	**103,918**
Rounded Total		**71,000**	**54,000**	**57,000**	**58,000**	**64,000**	**91,000**	**82,000**	**8,000**	**74,000**	**81,000**	**131,000**	**104,000**