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United Nations Office on Drugs and Crime

Islamic Republic of Afghanistan
Ministry of Counter Narcotics

Afghanistan
Opium Survey 2015

Cultivation and Production

DECEMBER 2015

ABBREVIATIONS

AGE	Anti-Government elements
ANP	Afghan National Police
CNPA	Counter Narcotics Police of Afghanistan
GLE	Governor-led eradication
ICMP	Illicit Crop Monitoring Programme (UNODC)
ISAF	International Security Assistance Force
MCN	Ministry of Counter-Narcotics
UNODC	United Nations Office on Drugs and Crime

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Survey Coordinators: Sayed Eshaq Masumi (Central Region), Abdul Latif Ehsan (Western Region), Fida Mohammad (Northern Region), Mohammed Ishaq Anderabi (North-Eastern Region), Khalil Ahmad Noori (Southern Region), Abdullah Jan Daudkhail (Eastern Region)

United Nations Office on Drugs and Crime (Kabul)
Andrey Avetisyan (Regional Representative), Mark Colhoun (Deputy Representative), Devashish Dhar (International Project Coordinator), Abdul Manan Ahmadzai (Senior Survey Officer), Noor Mohammad Sadiq (Database Developer)

Remote Sensing Analysts: Ahmad Jawid Ghiasee and Sayed Mehdi Sadat. Ziaulhaq Sidiqi (GIS Associate), Asia Noory (Project Associate)

Survey Coordinators: Abdul Basir Basiret (Eastern Region), Sayd Ghawash Nayer (Western Region), Rahimullah Omar (Central Region).

Provincial Coordinators: Mohammad Alam Ghalib (Eastern Region), Altaf Hussain Joya (North-eastern Region), Lutfurhaman Lutfi (Northern Region).

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Key Findings

Area under opium poppy cultivation decreased by 19%

- The total area under opium poppy cultivation in Afghanistan was estimated at 183,000 hectares in 2015, a 19% decrease from the previous year. Area under opium poppy cultivation has decreased for the first time since 2009 but it is at its fourth highest level since the beginning of estimations in 1994; higher levels have been estimated in 2007, 2013 and 2014.
- The vast majority (97%) of opium poppy cultivation took place in the Southern, Eastern and Western regions of the country. Hilmand remained Afghanistan's major opium-poppy-cultivating province, followed by Farah, Kandahar, Badghis, Uruzgan and Nangarhar.
- All three main opium-poppy-cultivating regions experienced a decrease in poppy-cultivation levels in 2015, with the largest relative decrease being in the Eastern region (-40%; mainly driven by decreases in Nangarhar), followed by the Southern (-20%) and Western (-10%) regions.
- Opium poppy cultivation decreased in most of the main poppy-cultivating provinces, including Nangarhar (-45%), Nimroz (-40%), Kandahar (-38%), Farah (-23%) and Hilmand (-16%).
- In the Central (+38%) and Northern (+154%) regions a strong increase was observed, albeit starting from low levels, which coincides with a deterioration of the security situation. Badghis, at the border to In the Northeastern region (-5%) area under poppy cultivation remained relatively as stable.
- The number of poppy-free provinces decreased in 2015. In the Northern region, Balkh lost its poppy-free status, which it had regained in 2014.

Improvements of methodology

- Caution is needed when interpreting these results: between 2014 and 2015, the availability of improved technology led to a major improvement in the methodology used to estimate area under poppy cultivation. The changes affected all 12 provinces in which a sampling approach to select satellite imagery was employed, including all major opium poppy-growing provinces.

  The change in methodology may have had the effect of making the extent of changes appear greater than it actually was, but additional research undertaken by MCN/UNODC confirms the direction of the change (decrease/increase) at provincial, regional and national level. A detailed description of the changes and their possible impact can be found in the Methodology section.

Total eradication of opium poppy increased by 40%

- Total eradication of opium poppy increased by 40% in 2015, to 3,760 hectares, while less security incidences occurred than in 2014: in 2015, 5 lives were lost and 18 persons were injured. In 2014, 13 lives were lost and 26 persons were injured.

Potential opium yield and production decreased in 2015

- Potential opium production was estimated at 3,300 tons in 2015, a decrease of 48% from its 2014 level (6,400 tons). The low production is a result of a reduction in area under cultivation, but more importantly of a reduction in opium yield per hectare.
- Average opium yield amounted to 18.3 kilograms per hectare, which was 36% less than in 2014. Yields decreased in all main opium poppy cultivating regions. The strongest decrease occurred in the Southern region, where the average yield decreased by 45% from 29.5 kilograms per hectare in 2014 to 16.1 kilograms per hectare in 2015, followed by the Western region (-20%; from 20.4 in 2014 to 16.3 kilograms per hectare in 2015) and Eastern region (-8%; from 39.6 in 2014 to 36.5 kilograms per hectare 2015).

- Reports from the field (Nimroz province) pointed towards a lack of water, which may have affected field quality and thus yields. Low yields and poor quality of fields (low plant density) has been confirmed by satellite imagery and field photographs for all of the Western and Southern regions.
- Accounting for 58% of national production, the Southern region continued to produce the vast majority of opium in Afghanistan. With 22% of national production, the Western region was the country's second most important opium-producing region in 2015.
- In 2015, possibly caused by the decrease in supply, opium prices increased in all regions of Afghanistan. However, at US$ 0.57 billion, or the equivalent of roughly 4% of Afghanistan's estimated GDP, the farm-gate value of opium production decreased by 33% in 2014 to its lowest level since 2009 (not adjusted for inflation).

Discussion of possible reasons for the decrease

The reasons why Afghan farmers cultivate opium poppy are multiple. The '2014 Afghanistan opium survey report – Socioeconomic Analysis', discussed these reasons, presenting the views of the farmers and an in-depth analysis of different data which described the risk factors related to illicit cultivation of opium.

The lucrative nature of the crop has been the principal reason that the largest share of farmers have offered as an explanation for their decision to cultivate opium poppy but risk factors behind opium poppy cultivation vary from region to region, with environmental suitability, socio-economic vulnerability and security/rule of law issues (as insecurity continues to be highly correlated with opium poppy cultivation), and opium prices being the principal factors.

Economic reasoning might offer an explanation for the decreases in the Southern and Western regions. Opium poppy cultivation, as lucrative as it is, is costly. Harvest is labor intensive and requires paid lancers. In desert areas, poppies have to be irrigated, often by using irrigation pumps which need costly fuel to function. In times of high prices and good harvests, investments in making land arable and maintaining fields under unfavorable conditions were profitable. In the past years, however, yields have decreased in the Southern and Western regions, which, together with moderate prices, may have led to a situation where making new land arable and keeping high-maintenance fields have become not highly profitable anymore.

The climatic conditions, such as lack of water or soil degradation, that have affected yields in the South and West might have directly reduced land available for opium poppy cultivation. In Nimroz province, for example the land available for agriculture in general reduced by 19% between 2014 and 2015, which directly affected the area under cultivation of opium poppy, too.

Opium poppy cultivation thus may have reached a 'natural exploitation' peak in the main poppy cultivating provinces in 2014 or may have even exceeded it, providing a possible explanation for the poppy cultivation decrease in the Southern and Western regions. With this assumption, there is a risk of an inner Afghan shift of cultivation. If conditions in the main poppy cultivating provinces continue to deteriorate, cultivation might shift to other provinces, where agriculture conditions are more favourable. The increases in the Central and Northern regions, which coincided with a deterioration of the security situation, might foreshadow such a development which needs close monitoring and appropriate action to avoid cultivation from spreading.

There is also a question on whether the decrease observed in 2015 is a result of a market adjustment since two strong years of production in 2013 and 2014 may have led to an oversupply of opium. The 2015 price increase points to an unmet demand caused by the reduction of supply, but the increase observed is not comparable to the price shocks in years when the reduction on opium supply clearly triggered a large gap with demand. Weak data on global opiates use do not allow a holistic interpretation of the Afghan trend in 2015 in the context of global demand and supply of opium.

With the multitude of possible reasons for changes in area under cultivation and the complexity of the factors driving opium poppy cultivation, the present reduction of cultivation cannot be related to a single factor or policy measure. Further analyses of the underlying driving factors will be provided in the upcoming "Afghanistan opium survey 2015 – Socio-economic analysis".

Fact Sheet Afghanistan Opium Survey 2015[1]

	2014	Change from 2014	2015
Net opium poppy cultivation (after eradication)	224,000 ha (200,000 - 250,500)	-19%	183,000 ha (163,000 - 202,000)
Number of poppy-free provinces[2]	15	-1	14
Number of provinces affected by poppy cultivation[3]	19	+1	20
Eradication	2,692 ha	+40%	3,760 ha
Average opium yield (weighted by cultivation)	28.7 kg/ha	-36%	18.3 kg/ha
Potential production of opium[4]	6,400 mt (5,100 - 7,800)	-48%	3,300 mt (2,700 - 3,900)
Average farm-gate price (weighted by production) of fresh opium at harvest time	US$ 114/kg	+13%	US$ 129/kg
Average farm-gate price (weighted by production) of dry opium at harvest time	US$ 133/kg	+29%	US$ 171/kg
Total farm-gate value of opium production	US$ 0.85 billion	-33%	US$ 0.57 billion

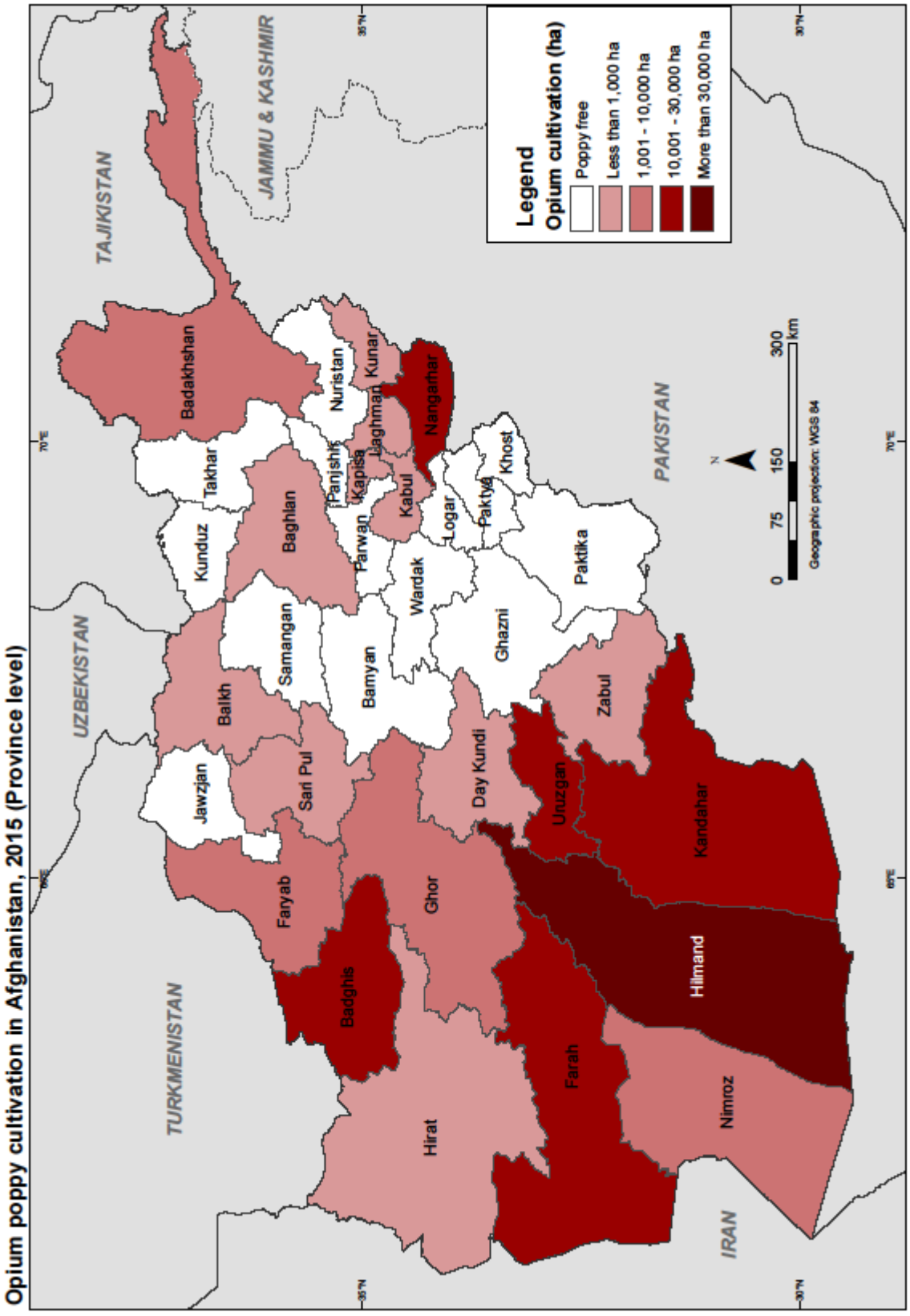
[1] Numbers in brackets indicate the upper and lower bounds of the estimation range.
[2] Poppy-free provinces are estimated to have less than 100 hectares of opium cultivation.
[3] Provinces estimated to contain more than 100 hectares of opium cultivation.
[4] Refers to oven-dry opium.

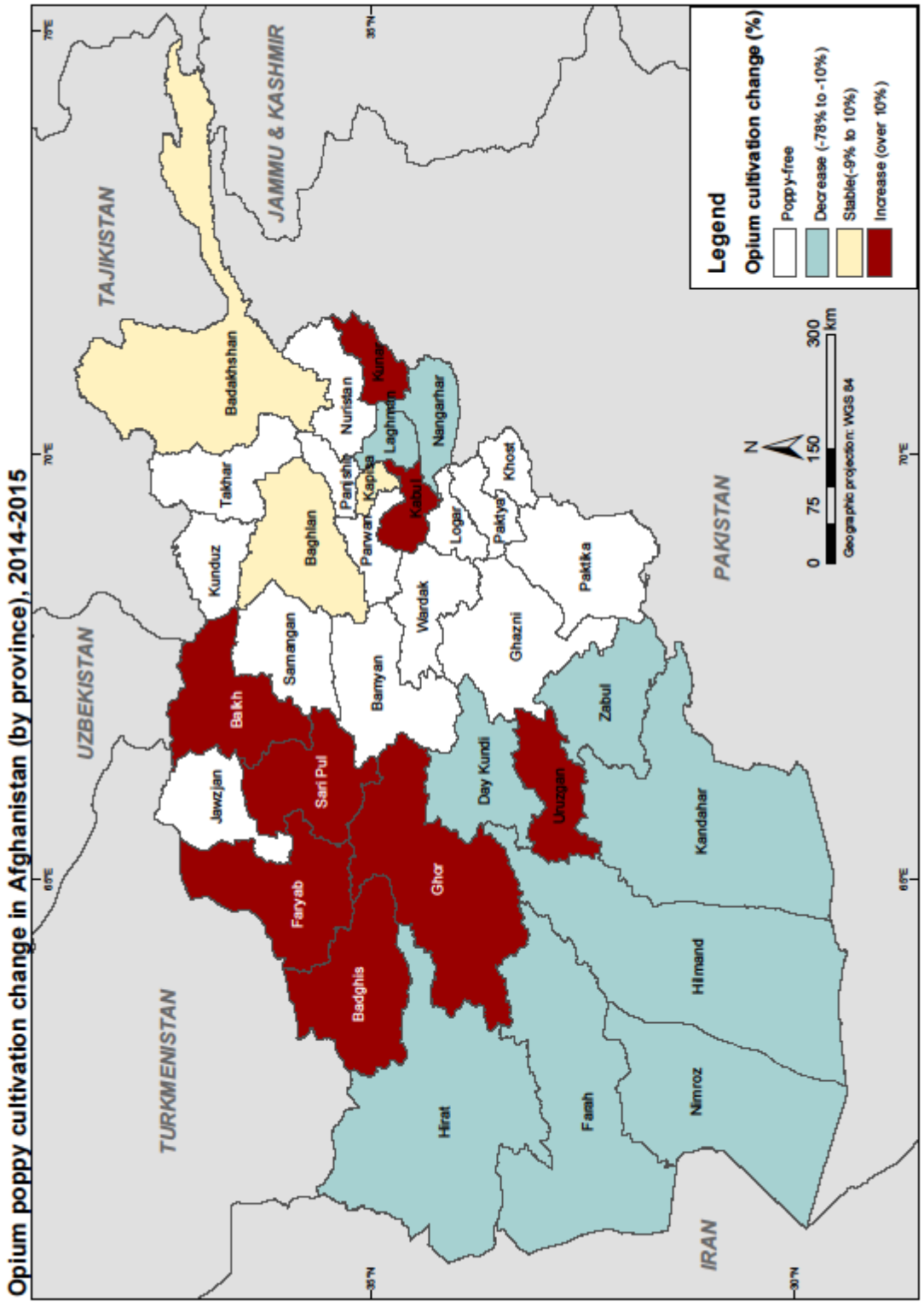
1 Introduction

The *Afghanistan Opium Survey* is implemented annually by the Ministry of Counter Narcotics (MCN) of Afghanistan in collaboration with the United Nations Office on Drugs and Crime (UNODC). The survey team collects and analyses information on the location and extent of opium poppy cultivation, potential opium production and the socio-economic situation in rural areas. Since 2005, MCN and UNODC have also been involved in the verification of opium eradication conducted by provincial governors and poppy-eradication forces. The results provide a detailed picture of the outcome of the current year's opium season and, together with data from previous years, enable the identification of medium- 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 that has serious implications for Afghanistan and the international community.

The opium survey is implemented within the technical framework of the UNODC 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 Plan of Action adopted by the United Nations (the 53rd session of the Commission on Narcotic Drugs in March 2009). Under ICMP, monitoring activities currently supported by UNODC also exist in other countries affected by illicit crop cultivation: in Asia, Myanmar and the Lao People's Democratic Republic; in Latin America, the Plurinational State of Bolivia, Colombia, Ecuador, Mexico and Peru; in Africa, Nigeria.

The *Afghanistan Opium Survey 2015* was implemented under project AFG/F98, "Monitoring of Opium Production in Afghanistan", with financial contributions from the Governments of Germany, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.


Opium poppy cultivation in Afghanistan, 2015 (Province level)
Legend
Opium cultivation (ha)
Poppy free
Less than 1,000 ha
1,001 - 10,000 ha
10,001 - 30,000 ha
More than 30,000 ha
TAJIKISTAN
JAMMU & KASHMIR
UZBEKISTAN
TURKMENISTAN
PAKISTAN
IRAN
Badakhshan
Takhar
Kunduz
Baghlan
Nuristan
Kunar
Laghman
Nangarhar
Panjshir
Kapisa
Kabul
Parwan
Logar
Paktya
Khost
Paktika
Samangan
Balkh
Jawzjan
Sari Pul
Bamyan
Wardak
Ghazni
Faryab
Ghor
Day Kundi
Uruzgan
Zabul
Kandahar
Badghis
Hirat
Farah
Hilmand
Nimroz
0
75
150
300
km
Geographic projection: WGS 84
Source: Government of Afghanistan - National monitoring system implemented by MCN/UNODC
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 (by province), 2014-2015
TAJIKISTAN
JAMMU & KASHMIR
UZBEKISTAN
PAKISTAN
TURKMENISTAN
IRAN
Badakhshan
Takhar
Kunduz
Baghlan
Nuristan
Kunar
Laghman
Nangarhar
Panjshir
Kapisa
Parwan
Kabul
Logar
Paktya
Khost
Paktika
Samangan
Bamyan
Wardak
Ghazni
Balkh
Jawzjan
Sari Pul
Faryab
Ghor
Badghis
Day Kundi
Uruzgan
Zabul
Kandahar
Helmand
Nimroz
Farah
Herat
Legend
Opium cultivation change (%)
Poppy-free
Decrease (-78% to -10%)
Stable(-9% to 10%)
Increase (over 10%)
N
0
75
150
300
km
Geographic projection: WGS 84
Source: Government of Afghanistan - National monitoring system implemented by UNODC
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 Opium Poppy Cultivation

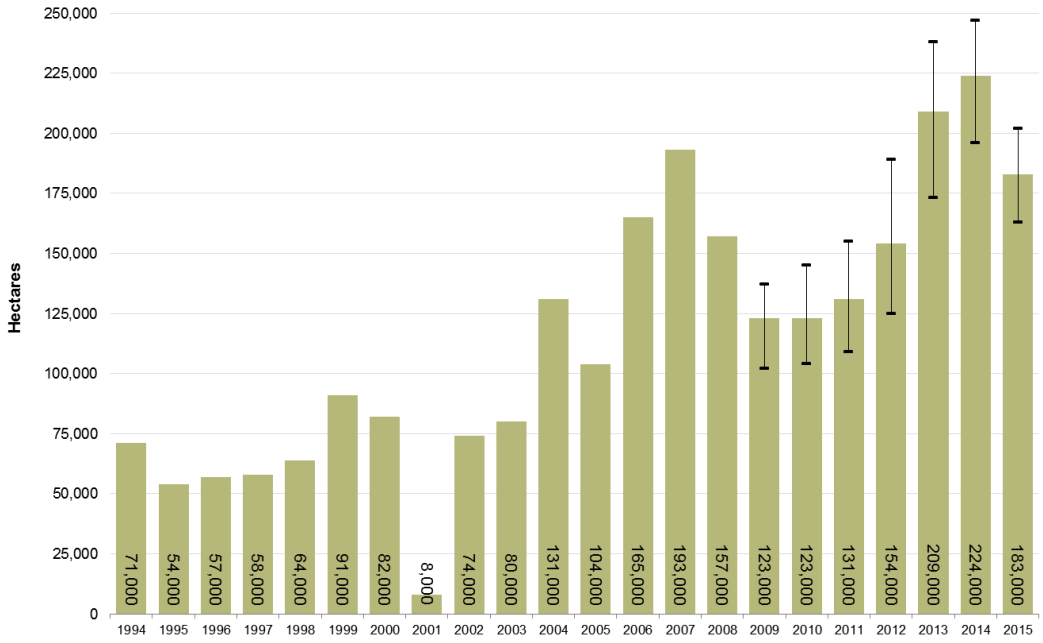
2.1 National and regional opium poppy cultivation trends

The total area under opium poppy cultivation in Afghanistan was estimated to be 183,000 hectares (163,000-202,000) in 2015, which represents a 19% decrease from 2014.

In 2015, 97% of total estimated opium poppy cultivation in Afghanistan took place in the Southern, Eastern and Western regions of the country, which include the country's most insecure provinces. The Southern region accounted for 66% of total estimated cultivation; the Western region for 24% and the Eastern region for 7%, where cultivation concentrated in Kapisa, Kunar, Laghman and Nangarhar provinces. These are the most insecure provinces, with a security risk classified as "high" or "extreme" by the United Nations Department of Safety and Security (UNDSS), and they are mostly inaccessible to the United Nations and NGOs. Day Kundi is the only province in the South where security is generally good, with the exception of Kejran district. The remaining regions (Northern, North-Eastern and Central) together accounted for 3%.

Hilmand remained the country's major opium-poppy-cultivating province (86,443 hectares), followed by Farah (21,106 hectares), Kandahar (21,020 hectares), Badghis (12,391 hectares), Uruzgan (11,277 hectares), Nangarhar (10,016 hectares), Nimroz (8,805 hectares), Badakhshan (4,056 hectares), Ghor (1,721 hectares), Faryab (1,160 hectares), Kunar (987 hectares), Laghman (779 hectares), Zabul (644 hectares), Kapisa (460 hectares), Day Kundi (381 hectares), Sari Pul (331 hectares), Kabul (321 hectares), Hirat (285 hectares) and Balkh (204 hectares).

Figure 1: Opium poppy cultivation in Afghanistan, 1994-2015 (Hectares)



Sources: UNODC and MCN/UNODC opium surveys 1994-2015. The high-low lines represent the upper and lower bounds of the 95% confidence interval.

All three main opium-poppy-cultivating regions experienced a decrease in poppy-cultivation levels in 2015, with the largest relative decrease being in the Eastern region (-40%; mainly driven by decreases in Nangarhar), followed by the Southern (-20%) and Western (-10%) regions. In the Central (+38%) and Northern (+154%) regions a strong increase was observed albeit starting from low levels. In the North-eastern region (-5%) area under poppy cultivation could be considered as stable.

The number of **poppy-free provinces** in Afghanistan decreased from 15 in 2014 to 14 in 2015, as Balkh (204 hectares) lost its poppy-free status, which it had regained in 2014.

Table 1: Regional distribution of opium poppy cultivation, 2014-2015 (Hectares)

Region	2014 (ha)	2015 (ha)	Change 2014-2015 (%)	2014 (ha) as % of total	2015 (ha) as % of total
Southern	149,711	119,765	-20%	67%	66%
Western	49,049	44,308	-10%	22%	24%
Eastern	20,353	12,242	-40%	9%	7%
North-eastern	4,253	4,056	-5%	2%	2%
Central	233	321	+38%	0.1%	0.2%
Northern	738	1,875	+154%	0.3%	1.0%
Rounded Total	**224,000**	**183,000**	**-19%**	**100%**	**100%**

In the **Eastern region**, the decrease of cultivation was mainly driven by the strong decrease in Nangarhar (-45%). Area under cultivation in Laghman provinces decreased by 14%, but increased in Kunar province by 31%. Cultivation in Kapisa with decrease of 3% can be considered as stable. Only 1% of the total poppy cultivation was eradicated (137 hectares) in Nangarhar province in 2015.

In the **North-Eastern region**, Badakhshan saw an insignificant decrease of 4% in opium poppy cultivation from 4,204 hectares to 4,056 hectares and can be considered as stable. Eradication in Badakhshan province was 1,246 hectares of opium poppy in 2015 (1,411 hectares in 2014).

Improvements in methodology

Caution is needed when interpreting the extent of change in area under cultivation: between 2014 and 2015, the availability of improved technology allowed MCN/UNODC to acquire satellite imagery at an increased number of locations compared to previous years. This has led to a much better geographical coverage by satellite imagery of provinces where a sample approach was used for area estimation. With the greater number of images and the better coverage, estimates are of higher accuracy.

The change in methodology may have had the effect of making the extent of changes appear greater than it actually was. This might have been the case in provinces, where previous samples, due to their small number, did not represent the overall distribution of opium poppy very well.

Additional research undertaken by MCN/UNODC confirms the direction of the change (decrease/increase) at provincial, regional and national level. A detailed description of the changes and their possible impact can be found in the Methodology section.

In the **Northern region**, strong increases were observed in Faryab province (+451%) and Sari Pul province (+70%); a moderate increase in Baghlan province (+7%). Balkh province lost its poppy-free status, which it had regained in 2014. However, the level of opium poppy cultivation remained very low in Baghlan, Balkh and Saripul provinces. This year no eradication was carried out in the Northern region with an exception of 33 hectares in Sari Pul province.

In the **Southern region**, poppy cultivation decreased by 78%, 38%, 35% and 16% in Zabul, Kandahar, Daykundi and Hilmand provinces respectively. Hilmand remained the country's principal opium-poppy-cultivating province in 2015, accounting for 47% of total opium poppy cultivation. Poppy cultivation in Uruzgan increased by 22% in 2015. Only 2% of the total poppy cultivation were eradicated (2,223 hectares) in Southern region.

In the **Western region**, the main poppy-cultivating provinces in 2015 were Farah, Badghis and Nimroz. The area under opium poppy cultivation in Farah province decreased from 27,513 hectares in 2014 to 21,106 hectares in 2015 (a decrease of 23%). With 12,391 hectares under cultivation, Badghis province remained the second largest opium-poppy-cultivating province in

the Western region in 2015 (an increase of 117%). Opium poppy cultivation in Nimroz province decreased by 40% from 14,584 hectares in 2014 to 8,805 hectares in 2015. This year a total of 92 hectares were eradicated in Western region.

Figure 2: Number of provinces by opium poppy cultivation trends, 2006-2015[5]

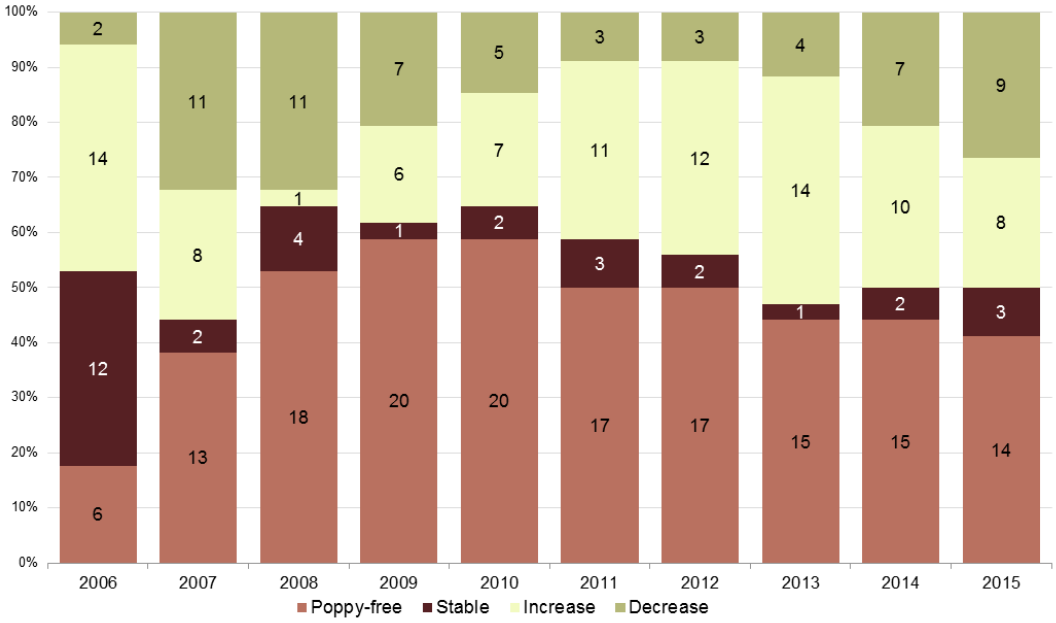


Table 2: Main opium-poppy-cultivating provinces in Afghanistan, 2009-2015 (Hectares)

Province	2009	2010	2011	2012	2013	2014	2015	Change 2014-2015	2015 (ha) as % of total
Hilmand	69,833	65,045	63,307	75,176	100,693	103,240	86,443	-16%	47%
Farah	12,405	14,552	17,499	27,733	24,492	27,513	21,106	-23%	12%
Kandahar	19,811	25,835	27,213	24,341	28,335	33,713	21,020	-38%	12%
Badghis	5,411	2,958	1,990	2,363	3,596	5,721	12,391	+117%	7%
Uruzgan	9,224	7,337	10,620	10,508	9,880	9,277	11,277	+22%	6%
Nangarhar	294	719	2,700	3,151	15,719	18,227	10,016	-45%	5%
Nimroz	428	2,039	2,493	3,808	16,252	14,584	8,805	-40%	5%
Badakhshan	557	1,100	1,705	1,927	2,374	4,204	4,056	-4%	2%
Day Kundi	3,002	1,547	1,003	1,058	1,536	587	381	-35%	0.2%
Rest of the country	2,131	1,383	2,535	4,417	6,585	7,271	7,072	-3%	4%
Rounded Total	**123,000**	**123,000**	**131,000**	**154,000**	**209,000**	**224,000**	**183,000**	**-19%**	**100%**

[5] For the purpose of this table, change of area under cultivation from one year to the next is considered stable when the change is smaller than 10 per cent. Data since 2006 has been updated in 2015 to fit this criterion.

Table 3: Opium poppy cultivation (2012-2015) and eradication (2014-2015) in Afghanistan
(Hectares)

PROVINCE	Cultivation 2012 (ha)	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Estimation method 2014	Eradication in 2014 (ha)	Eradication in 2015 (ha)	Change 2014-2015 (%)
Kabul	120	298	233	321	+38%	T	0	0	NA
Khost	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Logar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Paktya	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Panjshir	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Parwan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Wardak	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Ghazni	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Paktika	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Central Region	**120**	**298**	**233**	**321**	**+38%**		**0**	**0**	**NA**
Kapisa	290	583	472	460	-3%	T	26	0	-100%
Kunar	1,279	1,127	754	987	+31%	S	75	9	-88%
Laghman	877	1,236	901	779	-14%	T	1	7	+600%
Nangarhar	3,151	15,719	18,227	10,016	-45%	S	34	137	+303%
Nuristan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	0	0	NA
Eastern Region	**5,596**	**18,665**	**20,353**	**12,242**	**-40%**		**136**	**153**	**+13%**
Badakhshan	1,927	2,374	4,204	4,056	-4%	S	1,411	1,246	-12%
Takhar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	1	12	+1100%
Kunduz	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	9	0	NA
North-eastern Region	**1,927**	**2,374**	**4,204**	**4,056**	**-4%**		**1,421**	**1,258**	**-11%**
Baghlan	177	141	168	180	+7%	T	3	0	-100%
Balkh	Poppy-free	410	Poppy-free	204	NA	T	35	0	-100%
Bamyan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Faryab	Poppy-free	158	211	1,160	+451%	T	10	0	-100%
Jawzjan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	0	0	NA
Samangan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Sari Pul	Poppy-free	Poppy-free	195	331	+70%	T	43	33	-23%
Northern Region	**177**	**710**	**574**	**1,875**	**+227%**		**91**	**33**	**-64%**
Day Kundi	1,058	1,536	587	381	-35%	S	6	5	-17%
Hilmand	75,176	100,693	103,240	86,443	-16%	S	787	1,747	+122%
Kandahar	24,341	28,335	33,713	21,020	-38%	S	68	396	+482%
Uruzgan	10,508	9,880	9,277	11,277	+22%	S	163	75	-54%
Zabul	424	1,335	2,894	644	-78%	S	12	0	-100%
Southern Region	**111,507**	**141,779**	**149,711**	**119,765**	**-20%**		**1,036**	**2,223**	**+115%**
Badghis	2,363	3,596	5,721	12,391	+117%	S	0	0	NA
Farah	27,733	24,492	27,513	21,106	-23%	S	0	52	NA
Ghor	125	264	493	1,721	+249%	S	8	0	-100%
Hirat	1,080	952	738	285	-61%	T	0	0	NA
Nimroz	3,808	16,252	14,584	8,805	-40%	S	0	40	NA
Western Region	**35,109**	**45,557**	**49,049**	**44,308**	**-10%**		**8**	**92**	**+1055%**
Total (rounded)	**154,000**	**209,000**	**22,400**	**183,000**	**-19%**		**2,692**	**3,759**	**+40%**

Area estimation method: S=remote sensing sample survey, T=remote sensing target survey, V=village sample survey and field observation. See Methodology section for detailed description of methods used. A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation.

2.2 Regional Breakdown

2.2.1 Central region

(Ghazni, Kabul, Khost, Logar, Paktika, Paktya, Panjshir, Parwan, Wardak)

Opium poppy cultivation in the Central region increased by 38% in 2015, with the total area cultivated increasing to 321 hectares in 2015 from 233 hectares in 2014. Opium poppy cultivation was limited to the Uzbeen valley of Surobi district in Kabul province, where security is extremely poor. There was no eradication in Kabul province since 2013. With the exception of **Kabul**, all provinces in the Central region have been poppy-free since 2008 and remained so in 2015.

Table 4: Opium poppy cultivation and eradication in the Central region, 2013-2015
(Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Eradication in 2014 (ha)	Eradication in 2015 (ha)
Kabul	298	233	321	+38%	0	0
Khost	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Logar	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Paktya	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Panjshir	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Parwan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Wardak	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Ghazni	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Paktika	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Central Region	**298**	**233**	**321**	**+38%**	**0**	**0**

A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation.

2.2.2 Eastern region

(Kapisa, Kunar, Laghman, Nangarhar, Nuristan)

The Eastern region experienced a 40% decrease in opium poppy cultivation in 2015. A total of 12,242 hectares of opium was cultivated in the Eastern region, whereas only 153 hectares were eradicated.

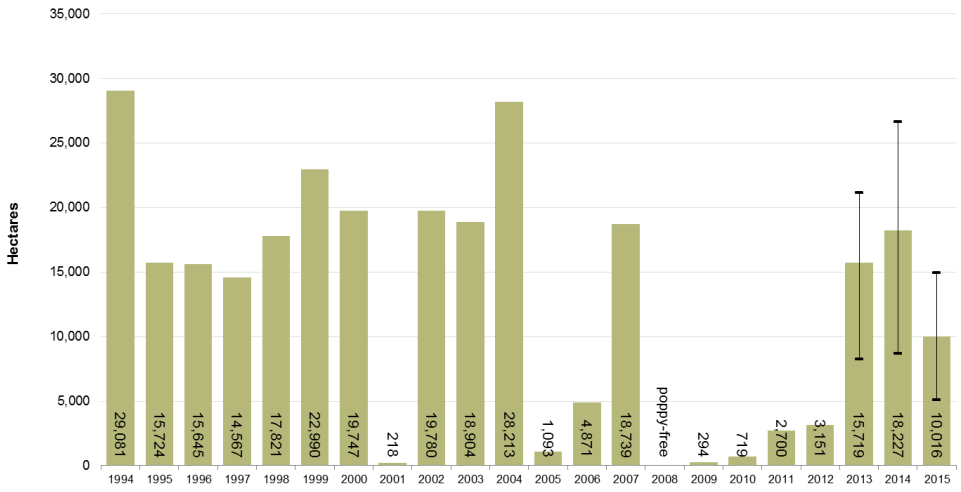
Table 5: Opium poppy cultivation and eradication in the Eastern region, 2013-2015
(Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Eradication in 2014 (ha)	Eradication in 2015 (ha)
Kapisa	583	472	460	-3%	26	0
Kunar	1,127	754	987	+31%	75	9
Laghman	1,236	901	779	-14%	1	7
Nangarhar	15,719	18,227	10,016	-45%	34	137
Nuristan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Eastern Region	**18,665**	**20,354**	**12,242**	**-40%**	**136**	**153**

A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation.

Nangarhar experienced a decrease in opium poppy cultivation of 45% in 2015, to 10,016 hectares from 18,227 hectares in 2014. Khugyani, Chaprahar, Achin, Pachir wagam and Sherzad are the main opium poppy cultivated districts in Nangarhar province. In 2015, only 1% of the total poppy cultivation was eradicated (137 hectares) in Nangarhar province.

Figure 3: Opium poppy cultivation in Nangarhar province, 1994-2015 (Hectares)



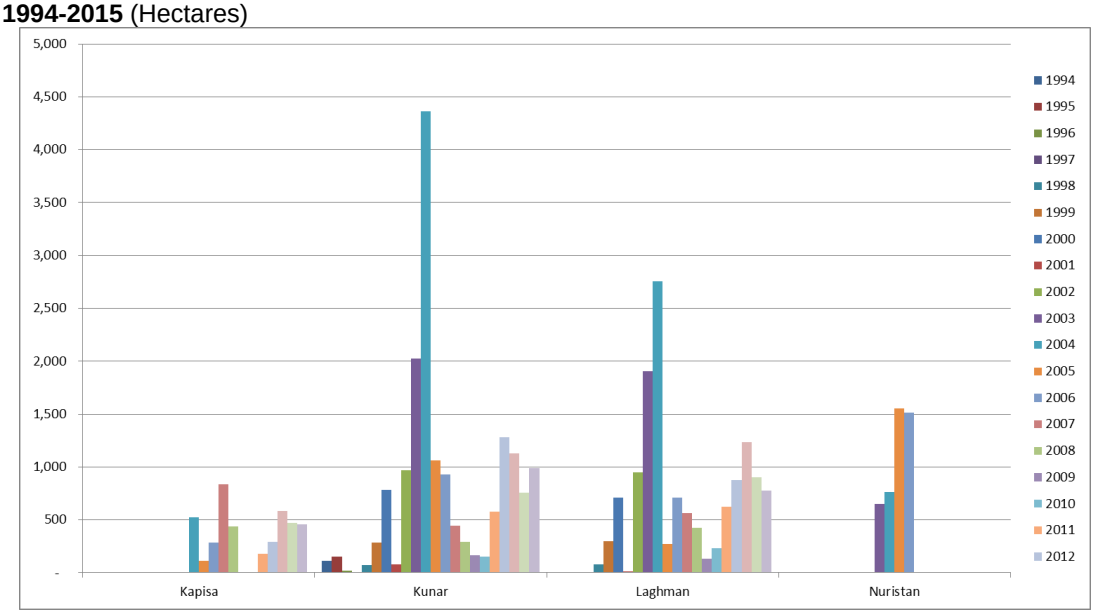
The high-low lines represent the upper and lower bounds of the 95% confidence interval.

In **Laghman** province, opium poppy cultivation decreased by 14%, from 901 hectares in 2014 to 779 hectares in 2015. At the district level, a significant decrease were observed in Alingar (-42%). In Dawlatshah district cultivation increased from 5 hectares in 2014 to 90 hectares in 2015.

In **Kunar** province, opium poppy cultivation increased by 31% in 2015 (from 754 hectares in 2014 to 987 hectares in 2015), with the main opium poppy cultivating districts being Sarkani, Watapoor, Khas Kunar.

Opium poppy cultivation in **Kapisa** province decreased by 3% in 2015, from 472 hectares to 460 hectares, with Tagab being the main opium-poppy-cultivating district. **Nuristan** maintained the poppy-free status it achieved in 2007.

Figure 4: Opium poppy cultivation in Laghman, Kunar, Nuristan and Kapisa provinces, 1994-2015 (Hectares)



2.2.3 North-eastern region

(Badakhshan, Kunduz and Takhar)

Opium poppy cultivation in the North-eastern region remained almost stable at 4,056 hectares in 2015.

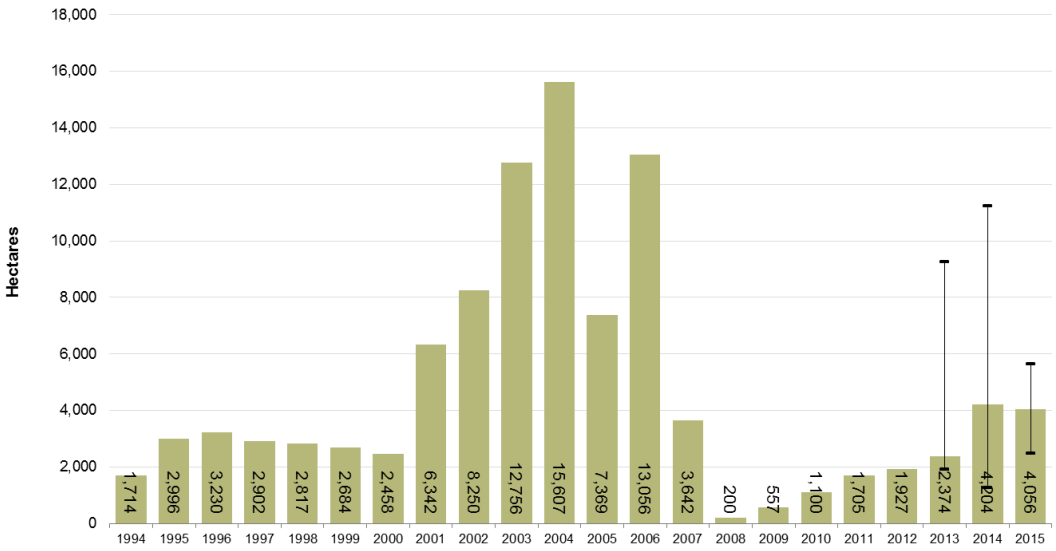
The only opium poppy cultivating province in the region is **Badakhshan** province as the two other provinces, Kunduz and Takhar, have been poppy-free since 2007 and 2008, respectively. Opium poppy cultivation in Badakhshan was mostly confined to rain-fed areas cultivated in spring, mainly in Argo and Darayim districts. A total of 1,246 hectares of opium poppy cultivation was eradicated in Badakhshan province in 2015.

Table 6: Opium poppy cultivation and eradication in the North-eastern region, 2013-2015 (Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Eradication in 2014 (ha)	Eradication in 2015 (ha)
Badakhshan	2,374	4,204	4,056	-4%	1,411	1,246
Kunduz	Poppy-free	Poppy-free	Poppy-free	NA	1	0
Takhar	Poppy-free	Poppy-free	Poppy-free	NA	9	12
North-eastern Region	**2,374**	**4,204**	**4,056**	**-4%**	**1,421**	**1,258**

A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation.

Figure 5: Opium poppy cultivation in Badakhshan province, 1994-2015 (Hectares)



The high-low lines represent the upper and lower bounds of the 95% confidence interval.

Kunduz province has been poppy-free since 2007 and is well known for growing a wide range of licit crops, from fruit and vegetables to cotton. An insignificant amount of cultivation has been observed in this province in recent years, and it remained under 100 hectares in 2015, the threshold for obtaining poppy-free status.

Also poppy-free since 2008, **Takhar** province maintained its poppy-free status in 2015. Only 12 hectare was eradicated there in 2015.

2.2.4 Northern region

(Baghlan, Balkh, Bamyan, Faryab, Jawzjan, Samangan, Sari Pul)

Opium poppy cultivation increased by 7% in **Baghlan** province in 2015, though the level of opium poppy cultivation remained still low at 180 hectares. The main opium-poppy-cultivating districts were Pul-i-Hisar and Deh Salah, with 104 and 68 hectares, respectively.

Balkh province lost its poppy-free status, which it had regained in 2014. The province was poppy-free from 2007 to 2012. Opium is mainly cultivated in Chimtal district.

Faryab province was poppy-free in 2009, 2010 and 2012, but lost its poppy-free status in 2013. In 2014, opium poppy cultivation increased by 33%, to 211 hectares. In 2015, opium poppy cultivation further increased by 451% to 1,160 hectares. Opium poppy cultivation mainly took place in Qaysar (982 hectares), Gurziwan (108 hectares) and Kohistan (69 hectares) districts.

Samangan and **Bamyan** have been poppy-free since 2007 and remained so in 2015.

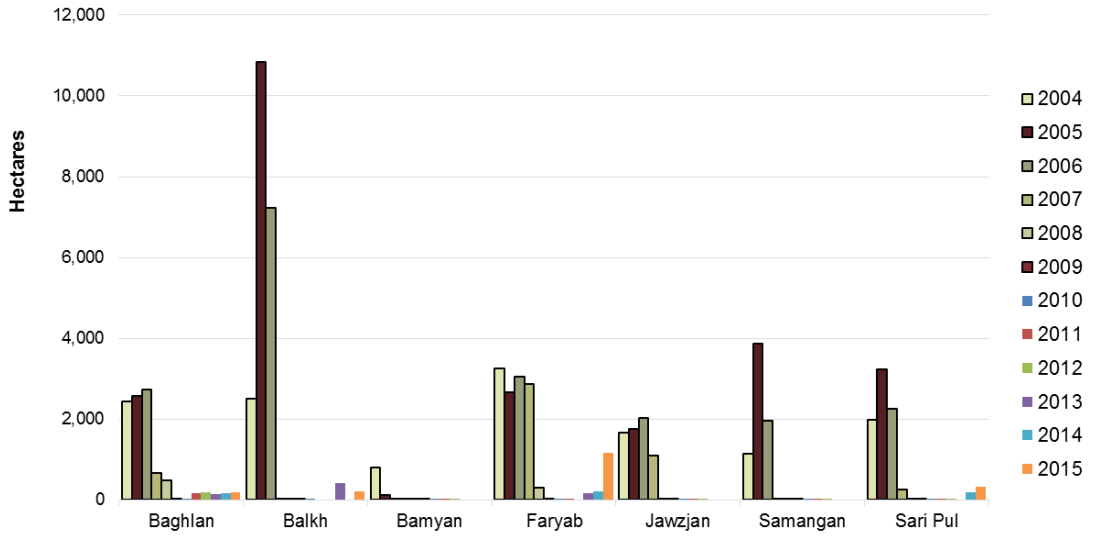
Saripul province was poppy-free from 2008 to 2013. The province lost its poppy-free status in 2014 with 195 hectares of opium poppy cultivation. In 2015, opium poppy cultivation further increased by 70% to 331 hectares. **Jawzjan** province has been poppy-free since 2008 and maintained its poppy-free status in 2015.

Table 7: Opium poppy cultivation and eradication in the Northern region, 2013-2015 (Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Eradication in 2014 (ha)	Eradication in 2015 (ha)
Baghlan	141	168	180	+7%	3	0
Balkh	410	Poppy-free	204	NA	35	0
Bamyan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Faryab	158	211	1,160	+451%	10	0
Jawzjan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Samangan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Sari Pul	Poppy-free	195	331	+70%	43	33
Northern Region	**710**	**574**	**1,875**	**+227%**	**91**	**33**

A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation.

Figure 6: Opium poppy cultivation in the Northern region, 2004-2015 (Hectares)



A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation. The high-low lines represent the upper and lower bounds of the 95% confidence interval.

2.2.5 Southern region

(Day Kundi, Hilmand, Kandahar, Uruzgan, Zabul)

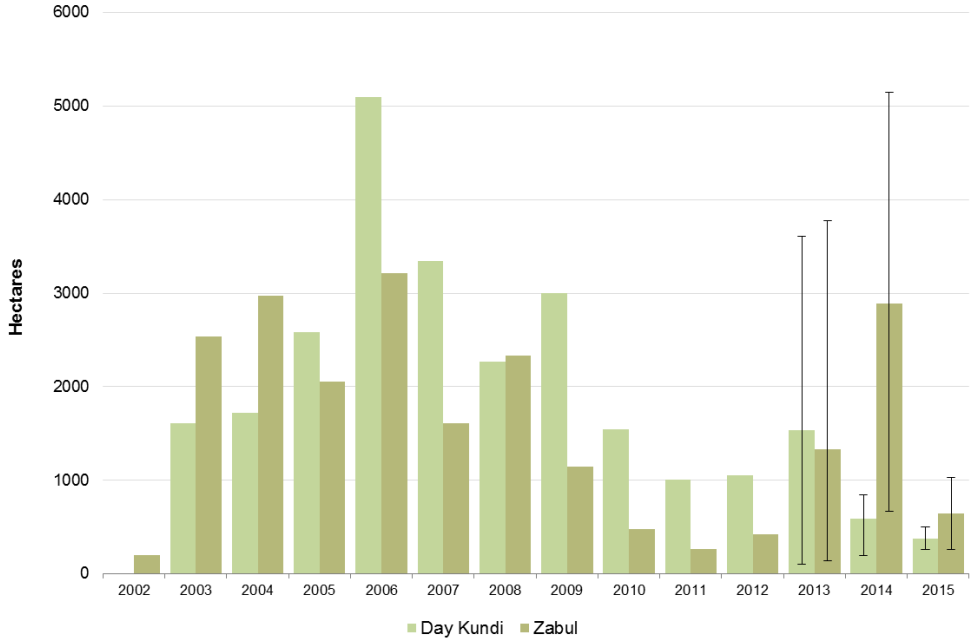
Accounting for 66% of total opium poppy cultivation in Afghanistan, 119,765 hectares of opium poppy were cultivated in the Southern region in 2015, a decrease of 20% from 2014.

Table 8: Opium poppy cultivation and eradication in the Southern region, 2013-2015 (Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Eradication in 2014 (ha)	Eradication in 2015 (ha)
Day Kundi	809	587	381	-35%	6	5
Hilmand	100,693	103,240	86,443	-16%	787	1,747
Kandahar	28,335	33,713	21,020	-38%	68	396
Uruzgan	10,607	9,277	11,277	+22%	163	75
Zabul	1,335	2,894	644	-78%	12	0
Southern Region	**141,779**	**149,711**	**119,765**	**-20%**	**1,036**	**2,223**

A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation.

Figure 7: **Opium poppy cultivation in Day Kundi and Zabul provinces, 2002-2015**



A province is defined as poppy-free when it is estimated to have less than 100 hectares of opium poppy cultivation. The high-low lines represent the upper and lower bounds of the 95% confidence interval.

Hilmand remained Afghanistan's single largest opium-poppy-cultivating province in 2015, although cultivation decreased by 16,797 hectares (-16%). Hilmand accounts for 47% of the total area under opium poppy cultivation in Afghanistan. A total of 1,747 hectares of Governor-led opium poppy eradication was carried out in 2015, which corresponds to only 2% of estimated opium poppy cultivation.

At the district level, opium poppy cultivation levels in 2015 were highest in Nad Ali, Naher-i-Saraj, Kajaki, Garmser, Regi-i-Khan Nishin, Musa Qala, Nawzad, Sangin Qala, Dishu,Nawa-e-Barakzaiy and Baghran districts. The decrease in opium poppy cultivation was mainly observed in north of Hilmand province (see district details in the Annex I).

The "Food Zone" alternative livelihood programme in Hilmand province came to an end in 2012, but significant differences could still be observed between the areas inside and outside the Food zone in 2015. Opium poppy cultivation inside the former Food Zone decreased by 32% in 2015 (from 41,089 hectares in 2014 to 31,216 hectares) and to a lesser extent outside of the former Food Zone by 13% (from 62,151 in 2014 to 55,227 hectares).

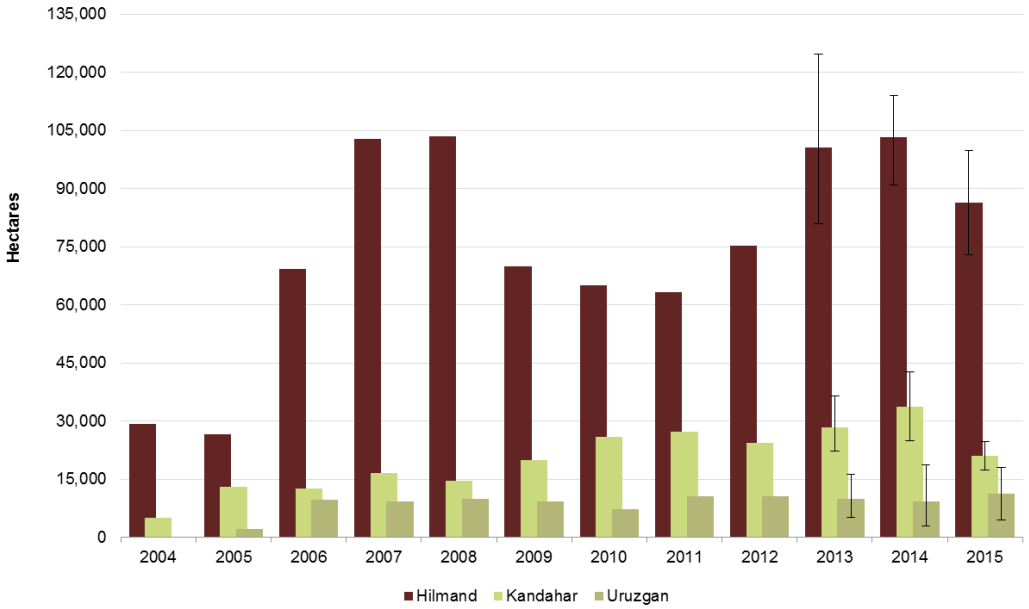
Table 9: Poppy cultivation inside and outside the former Hilmand "Food Zone" (after eradication)**, 2012-2014**

	2013 poppy cultivation	2014 poppy cultivation	2015 poppy cultivation	Change 2014-2015 (%)
Inside the food zone	36,244	41,089	31,216	-32%
Outside the food zone	64,449	62,151	55,227	-13%
Total province	**100,693**	**103,240**	**86,443**	**-16%**

The Food Zone estimates refer to an area in ten districts of Hilmand (the "Food Zone" as of 2011, where farmers were provided with fertilizers, certified wheat seeds and high-value horticulture seeds in the poppy planting seasons for the 2009-2012 harvests. See Afghanistan Opium Survey 2009 and Methodology section.

In **Kandahar** province, opium poppy cultivation decreased from 33,713 hectares in 2014 to 21,020 hectares in 2015. The main opium poppy cultivation districts were Maiwand, Zhire and Panjway.

Figure 8: Opium poppy cultivation in Hilmand, Kandahar and Uruzgan provinces, 2005-2015 (Hectares)



The high-low lines represent the upper and lower bounds of the 95% confidence interval.

Opium poppy cultivation in **Uruzgan** province increased by 22% from 9,277 hectares in 2014 to 11,277 hectares in 2015, with the province accounting for 6% of total Afghan opium poppy cultivation.

Tirin, Kot, Shahidi, Hassas and Dihrawud were the main opium poppy-cultivating districts in Uruzgan province.

Opium poppy cultivation in **Zabul** province saw a significant decrease of 78% in 2015. The main opium-poppy-cultivating districts in Zabul were Tarank Wa Jaldak, Kakar and Mizan, where security was poor.

2.2.6 Western region

(Badghis, Farah, Ghor, Hirat, Nimroz)

In the Western region, opium poppy cultivation decreased by 10% from 49,049 hectares in 2014 to 44,308 hectares. The decease mainly took place in Farah and Nimroz provinces. Badghis and

Ghor provinces experienced strong increases (117% and 249%, respectively). Eradication was barely carried out in the Western region, a total of 92 hectares of eradication was carried out in Farah and Nimroz provinces.

The Western region consistently shows very high levels of opium poppy cultivation. Insecurity continues to be a major problem as it compromises the rule of law and limits counter-narcotics interventions.

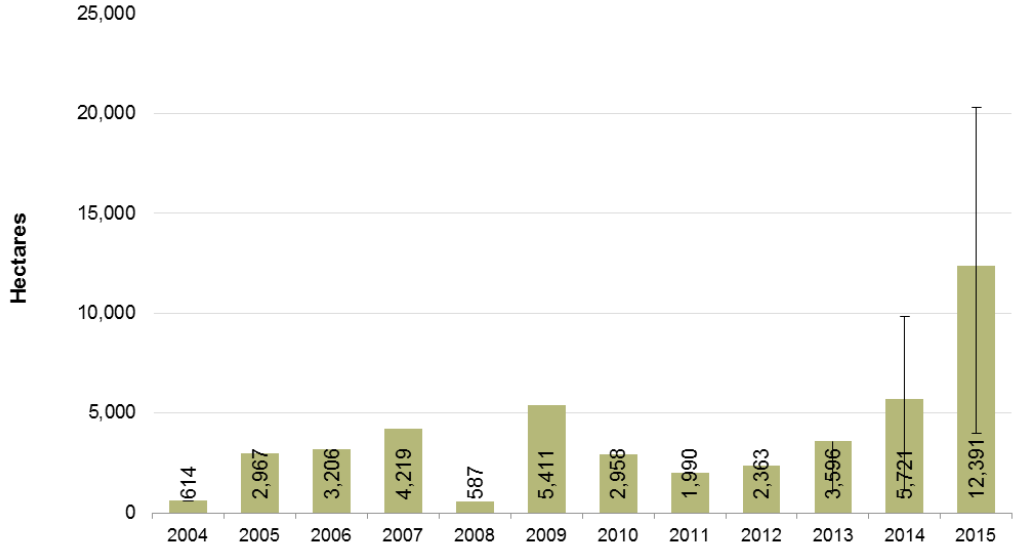
Table 10: Opium poppy cultivation and eradication in the Western region, 2013-2015
(Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Change 2014-2015 (%)	Eradication in 2014 (ha)	Eradication in 2015 (ha)
Badghis	3,596	5,721	12,391	+117%	0	0
Farah	24,492	27,513	21,106	+-23%	0	52
Ghor	264	493	1,721	+249%	8	0
Hirat	952	738	285	-61%	0	0
Nimroz	16,252	14,584	8,805	-40%	0	40
Western Region	**45,557**	**49,049**	**44,308**	**-10%**	**8**	**92**

Note: In 2013, the Dilaram area, previously a district of Farah province, was reintegrated into Nimroz province.

Badghis' main opium-growing districts are Ghormach, Balamurghab, Ab Kamari and Qadis.

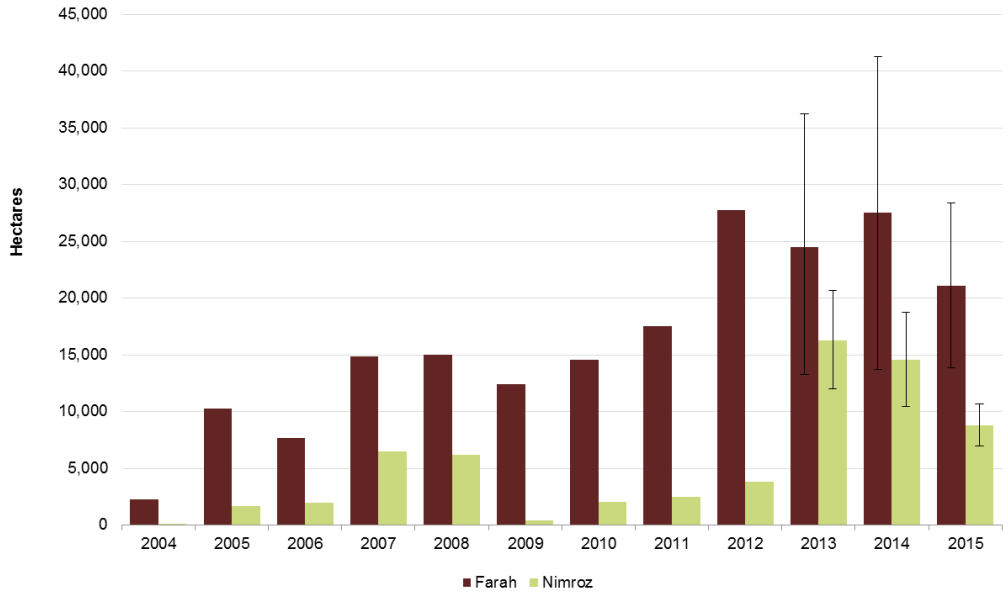
Figure 9: Opium poppy cultivation in Badghis province, 2004-2015 (Hectares)



The high-low lines represent the upper and lower bounds of the 95% confidence interval.

In 2015, opium poppy cultivation in **Farah** province decreased from 27,513 hectares in 2014 to 21,106 hectares in 2015. The main opium-poppy-cultivating districts in Farah, where security is very poor, were Bala Buluk, Bakwah, Khak-i-Safed, Pusht-Rod and Gulistan in 2015.

Figure 10: Opium poppy cultivation in Farah and Nimroz provinces, 2004-2015 (Hectares)



The high-low lines represent the upper and lower bounds of the 95% confidence interval.

Poppy cultivation in **Ghor** increased by 249% in 2015, from 493 hectares to 1,721 hectares (Ghor was poppy-free in 2011). The increase can be partly attributed to the change in the estimation method from census approach last year to a sampling approach this year. While a census approach has highest levels of accuracy, it can only reflect a minimum level of cultivation. No eradication took place in Ghor province in 2015.

In **Hirat** province, the level of opium poppy cultivation decreased by 61%, from 738 hectares in 2014 to 285 hectares in 2015. The only district in Hirat province where opium poppy cultivation took place was Shindand, where security is very poor.

In 2015, the level of opium poppy cultivation in **Nimroz** province decreased by 40% to 8,805 hectares. The main poppy cultivating district was Khash-Rod. The decrease of opium poppy cultivation in Nimroz province is supported by an overall decrease of 19% in the land available for agriculture. The information from the field suggests lack of water for irrigation as the main reason for this decrease.

3 Eradication

3.1 Poppy eradication increased by 40% in 2015

A total of 3,760 hectares of verified poppy eradication was carried out by the provincial Governors in 2015, representing an increase of 40% from 2014 when 2,692 hectares of Governor-led eradication (GLE) was verified by MCN/UNODC.

In 2015, MCN/UNODC field surveyors verified the eradication of 11,694 fields in 619 villages in 12 provinces, whereas in 2014 MCN/UNODC verifiers visited 480 villages (10,221 poppy fields) in 17 provinces where eradication had been carried out by Governor-led eradication teams.

Quality control of eradication verification was carried out using satellite data in Badakhshan, Hilmand, Kandahar, Nangarhar, Sari Pul, Nimroz and Uruzgan provinces. Final figures for eradication in these provinces are confirmed after checking with high-resolution satellite imagery supported by GPS tracking files, and photographs from the ground. For the provinces of Day Kundi, Farah, Kunar, Faryab, Laghman and Takhar, the quality checks for eradication verification were based on survey forms, checking area measurement calculations and on field photographs.

Major observations on eradication campaigns in 2014 and 2015 are given below (see tables also):

- Governor-led poppy eradication campaigns eradicated more area in Hilmand province in 2015 than in 2014.
- A total of 3,760 hectares of Governor-led poppy eradication was carried out in 2015, which corresponds to an increase of 40% from 2014, when 2,692 hectares were eradicated.
- Eradication took place in 12 provinces in 2015 (17 provinces in 2014): Badakhshan, Day Kundi, Farah, Hilmand, Kandahar, Kunar, Laghman, Nangarhar, Nimroz, Sari Pul, Takhar and Uruzgan. No eradication took place in Faryab, Ghor, Kunduz, Kapisa, Balkh, Baghlan and Zabul provinces.
- The Governor-led poppy eradication campaign commenced on 25 February 2015 in Kandahar province and 27 February in Hilmand province, while the 2014 eradication activities began on 3 March in Hilmand province and 16 April in Kandahar province.
- The largest amount of poppy eradication took place in Hilmand province (1,747 hectares; 122% more than in 2014), followed by Badakhshan province (1,246 hectares; 12% less than in 2014), and Kandahar, where 396 hectares were eradicated (482% more than in 2014).
- In 2015, less security incidences occurred than in 2014. In 2015, 5 lives were lost (1 Police officer, 3 Afghan Local Police officers, and 1 member of the Afghan National Army) and 18 persons were injured (2 Police officers, 3 Afghan Local Police officers, 7 members of the Afghan National Army and 6 farmers). In 2014, 13 lives were lost and 26 persons were injured. Farmers' resistance against poppy eradication operations manifested itself in different ways such as direct attacks on eradication teams, mine explosions or flooding of fields.
- The increased security during eradication has been attributed to a better coordination between the Ministry of Counternarcotics, the Ministries of Defense and Interior and the Independent Directorate of Local Governance. Eradication was carried out in the vicinity of military operations in Hilmand and Kandahar provinces, which reportedly increased security.
- GLE teams mainly used tractors and ATVs (All Terrain Vehicles) and manual eradication (sticks, blades, hands and uprooting) in 2015, with 62% of GLE being carried out by tractor/ATV and 38% by manual methods.

Table 11: Governor-led eradication, by province, 2015

Province	Verified eradication (ha)	Reported no. of eradicated fields	No. of villages eradication reported
Badakhshan*	1,246	7,424	214
Daykundi	5	38	2
Farah	52	108	5
Hilmand*	1,747	2,358	208
Kandahar *	396	592	73
Kunar	9	41	7
Laghman	7	43	3
Nangarhar*	137	496	42
Nimroz*	40	58	11
Saripul	33	55	8
Takhar	12	32	2
Uruzgan*	75	449	44
Grand Total	**3,760**	**11,694**	**619**

** Eradication verified by using satellite imagery.*

Table 12: Governor-led eradication, 2014-2015 (Hectares and percentage change)

Province	Verified eradication (ha) 2014	Verified eradication (ha) 2015	% Change
Badakhshan	1,411	1,246	-12%
Daykundi	6	5	-7%
Faryab	10	0	-100%
Farah	0	52	NA
Ghor	8	0	-100%
Hilmand	787	1,747	+122%
Kandahar	68	396	+482%
Kunduz	9	0	-100%
Kunar	75	9	-88%
Laghman	1	7	+424%
Nangarhar	34	137	+302%
Nimroz	0	40	NA
Uruzgan	163	75	-54%
Kapisa	26	0	-100%
Balkh	35	0	-100%
Baghlan	3	0	-100%
Saripul	43	33	-23%
Takhar	1	12	+1,100 %
Zabul	12	0	-100%
Grand Total	**2,692**	**3,760**	**+40%**

Figure 11: Percentage of total opium poppy eradication, by province, 2014-2015

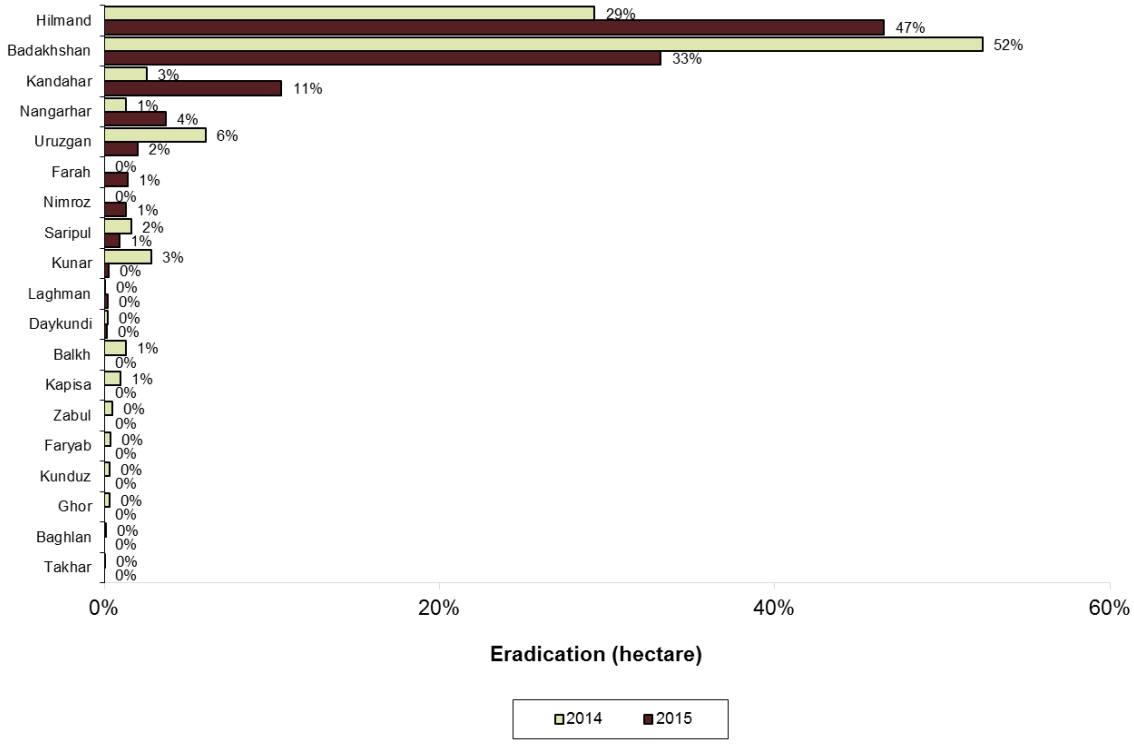


Table 13: Opium poppy eradication and cultivation in Afghanistan, 2010-2015 (Hectares)

Year	2010	2011	2012	2013	2014	2015
Number of provinces eradication carried out	11	18	18	18	17	12
Governor-led Eradication (GLE), (ha)	2,316	3,810	9,672	7,348	2,692	3,760
Cultivation (ha) *	123,000	131,000	154,000	209,000	224,000	183,000
Eradication as percentage of cultivation	1.9%	2.9%	6.3%	3.5%	1.2%	2.1%

** Net opium poppy cultivation after eradication.*

Figure 12: Area of opium poppy eradication, by different methods, 2014-2015 (Percentage of total)

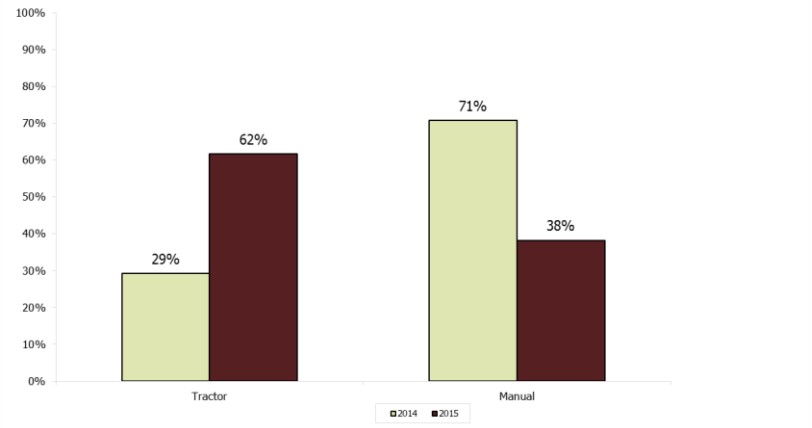


Figure 13: Area of opium poppy eradication, per month, 2014-2015 (Percentage of total)

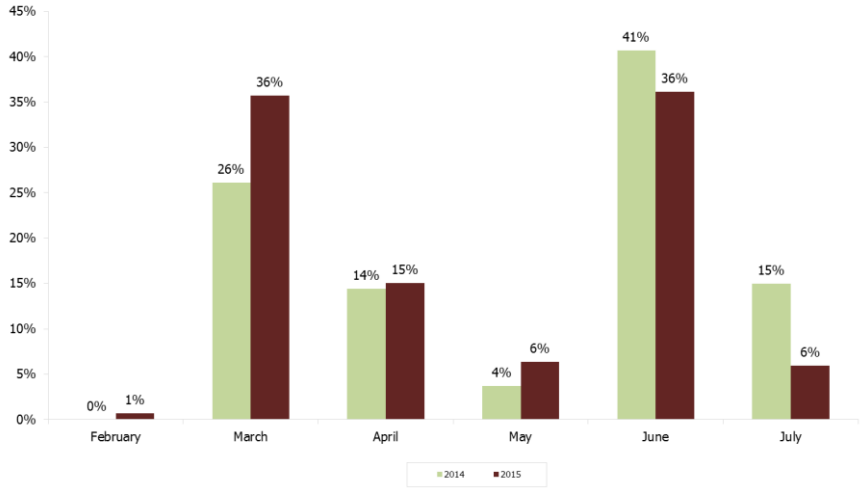


Table 14: Start and end dates of Governor-led eradication (GLE), 2015

Region	Province	Eradication Start Date	Eradication End Date	Verified Eradication (ha)
East	Kunar	6-Apr-2015	21-Apr-2015	9
	Laghman	31-Mar-2015	9-Apr-2015	7
	Nangarhar	2-Apr-2015	14-May-2015	137
North	Sari pul	9-May-2015	11-May-2015	33
North-eastern	Takhar	9-Jun-2015	11-Jun-2015	12
	Badakhshan	16-May-2015	13-Jul-2015	1,246
South	Day Kundi	22-May-2015	24-May-2015	5
	Hilmand	27-Feb-2015	19-Apr-2015	1,747
	Kandahar	25-Feb-2015	19-Apr-2015	396
	Uruzgan	9-Apr-2015	16-Apr-2015	75
West	Farah	25-Mar-2015	10-Apr-2015	52
	Nimroz	16-Mar-2015	20-Mar-2015	40

3.2 Quality control of reported eradication with satellite images

As in previous years, in 2015, MCN/UNODC procured high-resolution satellite images based on the field coordinates recorded by verifiers in eradicated poppy fields to validate the authenticity of reports and generate more accurate area figures by on-screen digitization of the eradicated fields.

The Governor-led eradication of opium poppy in Badakhshan, Hilmand, Kandahar, Nangarhar, Nimroz and Uruzgan provinces was checked with satellite images. Satellite images were supported with ground pictures and GPS tracking collected during eradication campaign.

Since 2013, surveyors have generated a GPS track around eradicated fields that provides both the location and shape of the fields. These tracks have helped verification of eradicated fields with satellite imagery.

In 2015, satellite images of eradicated fields were interpreted and compared with the figures available on the ground and, in general, over-reporting was observed in most of the provinces.

In **Badakhshan** province, 1,590 hectares of eradication was reported and the province's final eradication figure was corrected to 1,246 hectares. The quality of eradication was very poor in Badakhshan province: The average of percentage eradication in the total poppy fields (7,424) was less than 55%.

In **Kandahar** province, over-reporting to the extent of 244 hectares was observed, which led to a corrected eradication figure of 396 hectares.

Eradication reported by verifiers in **Hilmand** province was checked with satellite imagery and over-reporting to the extent of 332 hectares was confirmed. The final eradication figure in Hilmand province was thus corrected to 1,747 hectares. The quality of eradication seen on both satellite images and ground pictures was generally very good and effective in most places in Hilmand province.

In **Nangarhar** province, eradication reported by verifiers was checked with satellite images and over-reporting to the extent of 20 hectares was confirmed. The final eradication figure in Nangarhar province was corrected to 137 hectares.

Eradication reported by verifiers in **Uruzgan** province was checked with satellite images. The final eradication figures were 75 hectares. Eradication was mainly carried out with sticks and, based on field measurement with satellite imagery and the quality of eradication reported by verifiers, the final eradication area was calculated. Most of the fields were only partially eradicated.

In **Nimroz** province, eradication reported by verifiers was checked with satellite images and over-reporting to the extent of 7 hectares was confirmed. The final eradication figures in Nimroz province was thus corrected to 40 hectares.

4 Potential opium yield and production

4.1 Potential opium yield and production decreased in 2015[6]

In 2015, estimated potential opium production in Afghanistan amounted to 3,300 tons (2,700-3,900 tons), a decrease of 48% from its 2014 level (6,400 tons). Average opium yield amounted to 18.3 kilograms per hectare in 2015, which was 36% less than in 2014 (28.7 kilograms per hectare).

The decrease in production was mainly the result of a decrease in opium poppy cultivation by 19% and yield by 36%. The 45% decrease in the Southern and 20% decrease Western region, in particular, caused a decrease in overall production. However, as in the previous year, adverse weather conditions in parts of the Western and Southern regions affected poppy plants, thereby reducing the yield in comparison to the relatively unaffected 2011 yield (44.5 kilograms per hectare).

In 2015, a total of 188 poppy fields were surveyed for the purpose of estimating opium yield. As in 2012, the yield survey was limited to low-risk areas where the security situation allowed access and enough time to carry out all measurements. Together with close supervision of field work, this ensured a very high degree of compliance with the yield survey protocol.[7] All yield data obtained in 2015, except for the data collected in Nimroz and Faryab provinces, met the strict quality criteria introduced in 2011.

The Southern region continued to produce the vast majority of opium in Afghanistan in 2015, representing 58% of national production. The Western region was the country's second most important opium-producing region (22%). The Eastern region was the country's third most important opium-producing region (14%). The rest of the country contributed 6% of total opium production.

Table 15: Opium yield, by region, 2014-2015[8] (Kilograms per hectare)

REGION	2014 average yield (kg/ha)	2015 average yield (kg/ha)	% Change
Central	48.5	41.5	-14%
Eastern	39.6	36.5	-8%
North-eastern	38.2	39.6	+4%
Northern	34.5	38.3	+11%
Southern	29.5	16.1	-45%
Western	20.4	16.3	-20%
Weighted national average	**28.7**	**18.3**	**-36%**

[6] "Potential production" is a hypothetical concept and not an estimate of actual opium or morphine/heroin production. For more information, see UNODC *World Drug Report 2011*, p. 265.
[7] Published in UNODC *Guidelines for yield assessment of opium gum and coca leaf from brief field visits*, UN New York, 2001, ST/NAR/33.
[8] Yield estimates in this report are based on the concept of potential yield, i.e., the amount opium farmers can potentially extract from poppy capsules. Depending on local conditions and practices, this may differ from the amount actually harvested.

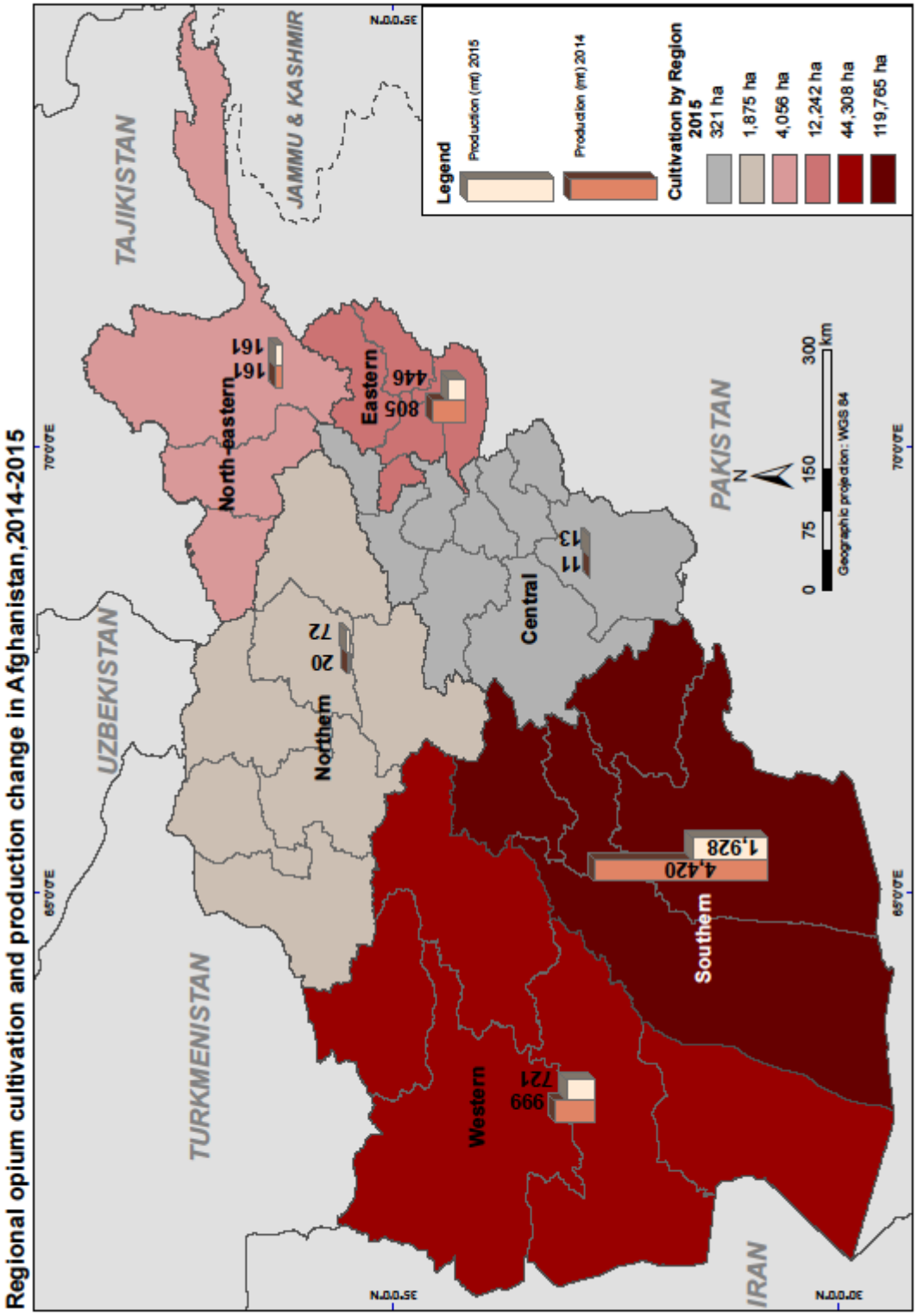
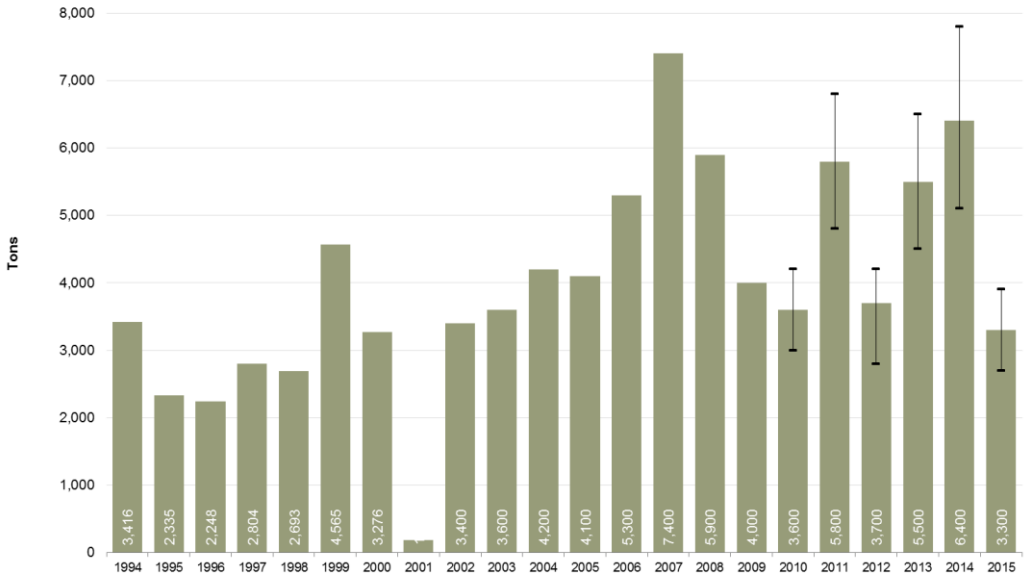

Regional opium cultivation and production change in Afghanistan,2014-2015
TAJIKISTAN
JAMMU & KASHMIR
UZBEKISTAN
TURKMENISTAN
PAKISTAN
IRAN
Legend
Production (mt) 2015
Production (mt) 2014
Cultivation by Region 2015
321 ha
1,875 ha
4,056 ha
12,242 ha
44,308 ha
119,765 ha
North-eastern
161
161
Eastern
805
446
Central
13
11
Northern
72
20
Southern
4,420
1,928
Western
999
721
0
75
150
300
km
N
Geographic projection : WGS 84
Source: Government of Afghanistan - National monitoring system implemented by UNODC
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Table 16: Opium production in Afghanistan 2009-2015, by province (Tons)

Province	Production 2012 (mt)	Production 2013 (mt)	Production 2014 (mt)	Production 2015 (mt)	Change 2014-2015 (mt)	Change 2014-2015 (%)
Ghazni	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Kabul	4	14	11	13	+2	+18%
Khost	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Logar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Paktika	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Paktya	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Panjshir	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Parwan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Wardak	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Central Region	**4**	**14**	**11**	**13**	**+2**	**+18%**
Kapisa	11	26	19	17	-2	-10%
Kunar	49	51	30	36	+6	+21%
Laghman	34	56	36	28	-7	-20%
Nangarhar	122	709	721	365	-355	-49%
Nuristan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Eastern Region	**216**	**842**	**805**	**446**	**-358**	**-45%**
Badakhshan	86	102	161	161	0	0%
Kunduz	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Takhar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	+49	NA
North-eastern Region	**86**	**102**	**161**	**161**	**0**	**0%**
Baghlan	7	5	6	7	+1	+19%
Balkh	Poppy-free	14	Poppy-free	8	+100	+100%
Bamyan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Faryab	Poppy-free	6	7	44	+37	+511%
Jawzjan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Samangan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Sari Pul	Poppy-free	Poppy-free	7	13	+6	NA
Northern Region	**7**	**25**	**20**	**72**	**+52**	**264%**
Day Kundi*	24	36	17	6	-11	-65%
Hilmand	1,699	2,339	3,048	1,392	-1,656	-54%
Kandahar	550	658	995	338	-657	-66%
Uruzgan*	237	229	274	182	-92	-34%
Zabul	10	31	85	10	-75	-88%
Southern Region	**2,520**	**3,293**	**4,420**	**1,928**	**-2,492**	**-56%**
Badghis	55	97	117	202	+85	72%
Farah	651	658	561	343	-218	-39%
Ghor	3	7	10	28	+18	180%
Hirat	25	26	15	5	-10	-69%
Nimroz	89	437	297	143	-154	-52%
Western Region	**824**	**1,224**	**999**	**721**	**-277**	**-28%**

Figure 14: Potential opium production in Afghanistan, 1997-2015 (Tons)



Sources: UNODC and MCN/UNODC opium surveys, 1994-2015. The high-low lines represent the upper and lower bounds of the confidence interval of the estimates. Figures refer to oven-dry opium. Production figures for 2006 to 2009 have been revised; see MCN/UNODC Afghanistan opium survey 2012.

Table 17: Potential opium production, by region, 2014-2015 (Tons)

Region	Production 2014	Production 2015	Change 2014-2015 (%)
Central	11	13	+15%
Eastern	805	446	-45%
North-eastern	161	161	0%
Northern	20	72	+264%
Southern	4,420	1,928	-56%
Western	999	721	-28%
Total (rounded)	**6,400**	**3,300**	**-48%**

Table 18: Potential opium production, by region, with ranges, 2015 (Tons)

REGION	Best estimate	Lower bound	Upper bound
Central	13	12	15
Eastern	446	244	649
North-eastern	161	96	225
Northern	72	60	84
Southern	1,928	1,421	2,435
Western	721	482	960
National	**3,341**	**2,742**	**3,940**
National (rounded)	**3,300**	**2,700**	**3,900**

4.2 Potential heroin production in Afghanistan

All the opium produced in Afghanistan each year is either exported as raw opium or heroin/morphine, consumed domestically in various forms, seized, stored for later use or lost (for example, due to mold, disposal to avoid seizures, etc.).

Hence, the critical components needed for estimating the potential heroin of certain purity yielded from one year's opium production are:

- the share of raw opium produced that is converted to heroin (for the domestic market or for export)
- the amount of heroin/morphine yielded from the amount of raw opium converted
- the purity of the heroin considered
- the shares of opium in the form of raw opium or heroin that are seized or lost, and the remainder (if any), which does not enter the market in the year of interest.

There is a clear understanding of the approximate amount of opium produced. However, the shares converted to morphine and heroin, as well as the purities of these substances are much less clear as only secondary data can be used as a proxy. In the case of seizures, for example, the purity of the heroin seized is often not known. Likewise, the purity of heroin consumed domestically may differ substantially from the purity of heroin destined for export. Furthermore, little is known about when and where the conversion of morphine to heroin takes place.

In 2014, one component, the amount of raw opium needed to produce a kilogram of heroin/morphine, was updated by MCN/UNODC: recent results on the morphine content of Afghan opium gave reason to do so[9]. However, apart from morphine content, none of the factors in the opium-to-heroin conversion chain are well researched. Therefore the updated heroin conversion ratio can only provide an indication of the actual average amount of opium needed to produce one kilogram of heroin.

Given these uncertainties, potential morphine and heroin production should be taken as a rough estimate.

Based on information from 2012-2014 on the distribution of opium, morphine and heroin seizures in Afghanistan and neighbouring countries, and assuming a 59% purity of heroin of export quality, it can be estimated that out of every 100 kilograms of opium, 59 kilograms are converted into

[9] The morphine content of opium harvested in Afghanistan has decreased since 2005, which was the reason for updating the conversion ratio of opium to heroin. Until 2014, a conversion ratio of 7:1 (7 kilograms of opium are needed for producing one kilogramm of heroin of unknown purity) was used. Since 2014, a ratio of 18.5:1 is used for converting opium to pure heroin base. In addition, a conversion ratio for the amount of opium needed to produce on kilogram of heroin of export quality is estimated since 2014.

heroin of export quality and 41 kilograms are left unprocessed.[10] Potentially, all opium produced in Afghanistan could be converted into morphine and heroin. In reality, however, a sizable proportion of opium is trafficked and consumed in the region in its raw form.

As in 2014, estimated purity of heroin of export quality is based on the latest data available on purity of wholesale heroin reported by Turkey[11], an important transit country for opiates trafficked from Afghanistan to Europe. Reported purity of heroin varies substantially. Tajikistan reported purities from 0.4% to 79% (2013[12]); the United Kingdom, a destination country for heroin which receives considerable amounts of Afghan heroin directly from Pakistan, reported purities of brown heroin of typically 45% (from 20% to 70%) in 2012 (latest available data). Similar levels of purity as Turkey have been found by the Combined Maritime Forces[13]. The Combined Maritime Forces reported purities of seizures of a total of 3.9 tons of heroin over the time period 2012 to 2014, which had an average purity (weighted) of 62% (minimum 34%, maximum 82.5%).

The following table shows potential production of pure heroin and of heroin of export quality (59 per cent purity) if 59% of potential opium production is converted to heroin and if all opium is converted to heroin. More details on the estimation of heroin production in Afghanistan can be found in the methodology section.

Table 19: Potential heroin production from Afghan opium, 2015

	If 59% of potential opium production converted (tons)	If total potential opium production converted (tons)
Pure heroin base	110 (80-130)	180 (140-230)
Heroin of export quality (59% purity)	180 (160-200)	300 (260-340)
Unprocessed opium	1,360 (1,110-1,600)	-

A ratio of 18.5:1 (17.5:1 – 19.6:1) is used for converting opium to pure heroin base. For converting opium to 59% pure heroin, 11 kilograms (10.4 to 11.6 kilograms) of opium are assumed to be needed. For a detailed discussion of the heroin conversion ratio see the methodology section and Afghanistan opium survey report 2014 – cultivation and production.

[10] At the time of writing updated data was available for Pakistan, Tajikistan and Uzbekistan. For Afghanistan, Iran (Islamic Republic of) and Turkmenistan 2013 data was used as a proxy for 2014.
[11] Annual Report Questionnaires 2015, data used in 2015 is from 2013.
[12] Paris Pact Initiative
[13] Combined Maritime Forces (CMF), http://combinedmaritimeforces.com/

5 Opium prices and farm-gate value of opium

5.1 Opium prices

Opium prices generally increased in all regions of Afghanistan in 2015, although prices did not reach their peak level of 2011.

Table 20: Regional farm-gate prices of dry opium at harvest time, reported by farmers through the price-monitoring system, 2014-2015 (US dollars per kilogram)

Region	Average Dry Opium Price (US$/kg) 2014	Average Dry Opium Price (US$/kg) 2015	Change 2014-2015(%)
Central	142	NA	NA
Eastern	113	184	+63%
North-eastern	60	81	+36%
Northern	112	113	+1%
Southern	129	153	+18%
Western	178	237	+33%
National average weighted by production*	**133**	**173**	**+30%**

MCN/UNODC has been monitoring opium prices in selected provinces of Afghanistan on a monthly basis since 1994 (18 provinces as of September 2011) and has been calculating an average farm-gate price annually based on prices at harvest time weighted by regional production. The average farm-gate price follows the laws of demand and supply: during years of high production (e.g. 2006 to 2008) the average price decreased, whereas following a supply shortage (for example the Taliban opium ban in 2001) the average price increased strongly.

Between 2014 and 2015, prices increased as a consequence of the low harvest in 2015 (from 133 to 173 US$ per kilogram), however, to a smaller degree when compared to 2010-2011 when prices increased from 150 to 241$ per kilogram . This highlights that first, due to the change in methodology in the area estimates, change in production may be greater than it actually was and second, that the two years of very high levels of production in 2013 and 2014 may have led to an oversupply of opiates which may have mitigated the effects of the low 2015 harvest on the market.

Figure 15 Farm-gate prices of dry opium at harvest time weighted by production and annual opium production, 1999-2015 (tons; US dollars per kilogram)

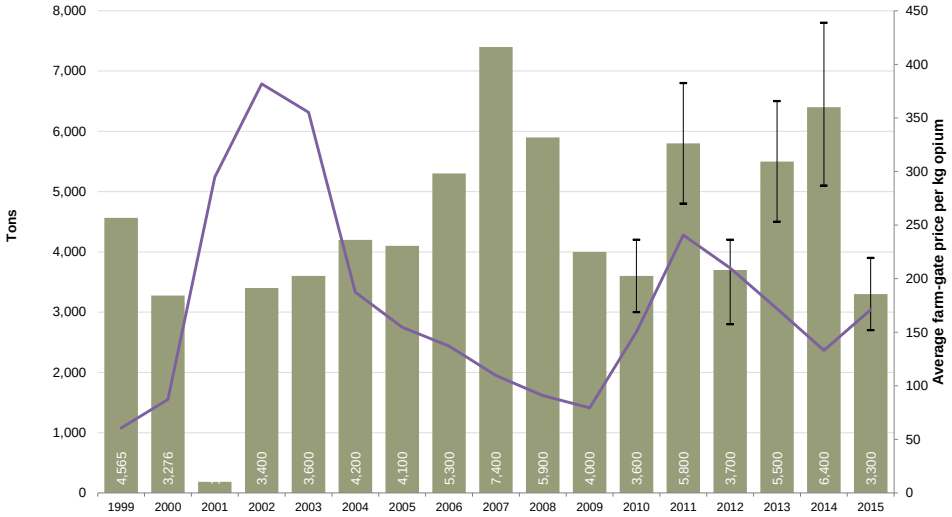
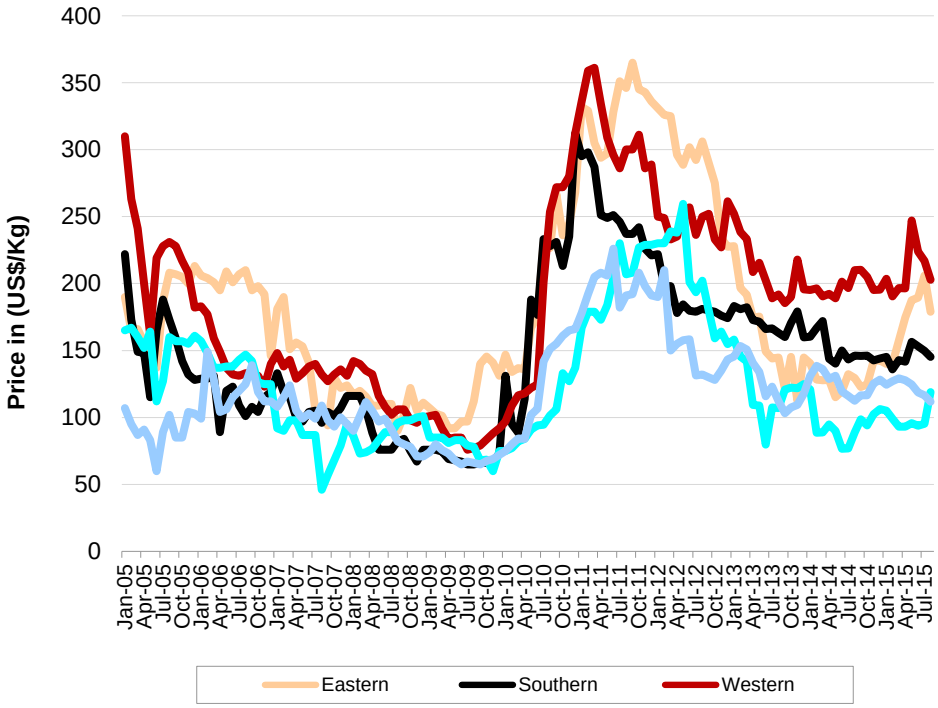


Figure 16: Regional average price of dry opium reported by opium traders, January 2005 to August 2015 (US dollars per kilogram)

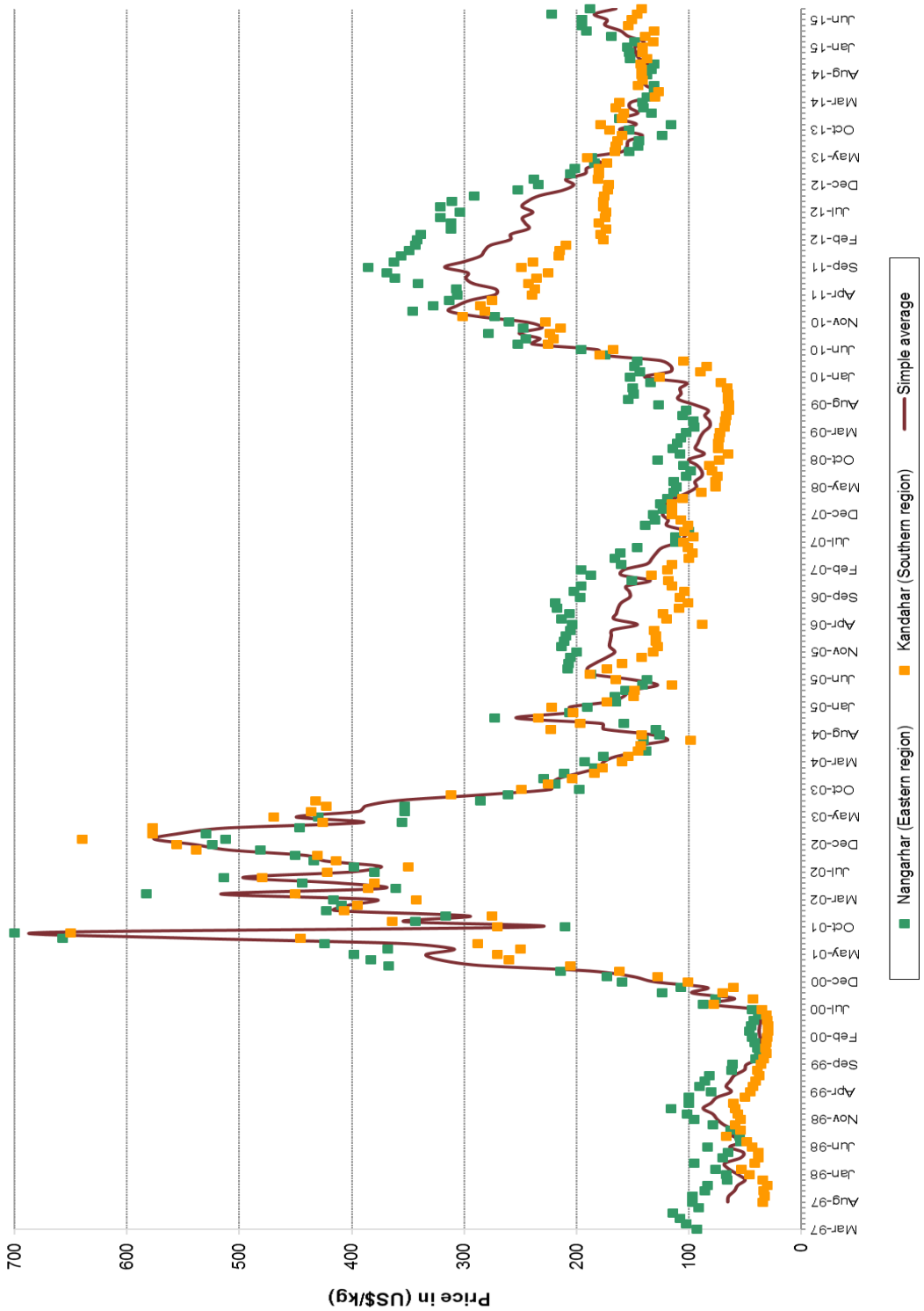


Source: MCN/UNODC Monthly Price Monitoring System.

Table 21: Dry opium prices reported by opium traders, by region, August 2014-August 2015
(US dollars per kilogram)

Region	Regional average price (US$/kg) August-2014	Regional average price (US$/kg) August-2015	Change 2014-2015 (%)
	Trader	Trader	
Eastern region (Kunar, Laghman, Nangarhar)	129	179	+39%
Southern region (Hilmand, Kandahar, Uruzgan, Zabul)	146	145	-0.5%
Western region (Badghis, Farah, Ghor, Hirat, Nimroz)	210	203	-3%
North-eastern region (Badakhshan, Kunduz, Takhar)	89	119	+34%
Northern region (Baghlan, Balkh, Faryab)	112	112	0%
Average	**137**	**159**	**+16%**

Figure 17: Monthly prices of dry opium in Kandahar and Nangarhar province, as collected from March 1997 to August 2015 (US dollars per kilogram)



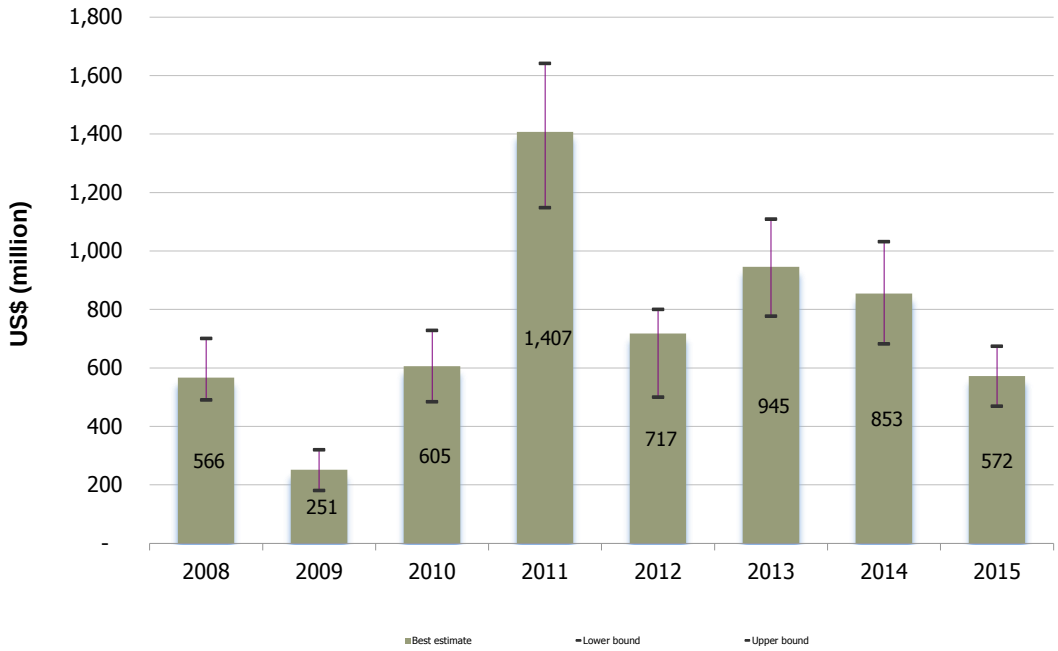
Source: MCN/UNODC Monthly Price Monitoring System.

5.2 Farm-gate value of opium production

Amounting to US$ 572 million (US$ 470-670 million), the estimated farm-gate value of opium production in 2015 decreased by 33% from its 2014 level. The decrease in farm-gate value was mainly due to the 48% decrease in opium production this year.

Farmers in Hilmand, the country's largest opium-producing province, earned some estimated US$ 240 million, which was equivalent to 41% of the total farm-gate value of opium production in Afghanistan in 2015; a decrease of 39% from 2014 (US$ 394 million).

Figure 18: Farm-gate value of opium production in Afghanistan, 2008-2015 (Million US dollars)



Figures for 2008 and 2009 were recalculated from the revised opium production estimates; see MCN/UNODC Afghanistan Opium Survey 2012.

6 Methodology

This chapter covers various methodological aspects regarding survey design and estimation procedure.

6.1 Estimation of area under opium poppy cultivation

Remote sensing methodologies have been used by UNODC since 2002 to monitor the extent of opium poppy cultivation in Afghanistan. Changes in the location of opium poppy cultivation and the increased security difficulties involved in accessing the area under scrutiny require continuous improvements of the survey designs applied.

A sampling approach is used to cover those provinces where most of the poppy is found, whereas a targeted approach is used in provinces with a low level of opium poppy cultivation. "Targeted approach" means that a certain area of a province is fully covered by satellite imagery. Provinces without indication for opium poppy cultivation are covered by the village survey only.

In 2015, new and better satellite technology allowed for a major change in the study design: the size of the grid cells used for acquiring satellite imagery has been reduced from 10 x 10 km images to 5 x 5 km images. This change affected only provinces where a sampling approach was used; all other provinces were not affected by this change.

In 2015, out of 34 provinces in Afghanistan, 12 were sampled and 12 were targeted. The remaining 10 provinces were considered to be poppy-free[14] based on information from the field. These provinces were not covered by the remote sensing survey, but were covered by the village survey.

Table 22: Area estimation method, by province, 2015

Region	Targeted approach	Sampling approach	Village survey only
Central	Kabul		Ghazni, Khost, Logar, Paktya, Panjshir, Parwan, Wardak, Paktika
Eastern	Kapisa, Laghman, Nuristan	Kunar, Nangarhar	
Northern	Baghlan, Balkh, Faryab, Jawzjan, Sari-Pul		Bamyan, Samangan
North-eastern	Takhar, Kunduz	Badakhshan	
Southern		Day Kundi, Hilmand, Kandahar, Uruzgan, Zabul	
Western	Hirat	Badghis, Farah, Nimroz, Ghor	

6.1.1 Change of study design

6.1.1.1 Sampling frame

The area available for agriculture was updated based on Landsat 8 ETM images and DMC images. The total estimated agricultural area in Afghanistan in 2015 amounted to 82,546 km^2. The sampling frame was established by extracting the area of land potentially available for opium poppy cultivation in 12 provinces. This area was divided into regular 5 km by 5 km grids, which constituted the sampling frame. The final sampling frame, from which the satellite images were randomly selected, consisted of 5,895 cells in 12 provinces. In the case of images that cut across provincial boundaries, only the part falling into a particular province was considered to be in that province.

The area available for agriculture in the sampling frame covers irrigated and rain-fed land. The total area in the 12 provinces was 24,951 km^2, which is equivalent to 30% of all potential

[14] Note that more than these 12 provinces turned out to be poppy-free in the satellite survey, because less than 100 hectares of opium cultivation was detected.

agricultural land in Afghanistan. Potential land refers to all land available for cultivation and also includes land that is currently fallow.

Cells containing less than 0.25 km^2 of potential agricultural land were excluded from the sampling frame in order to reduce the likelihood of choosing cells with very little arable land. In total, the exclusions represented less than 1% of the total potential agricultural land.

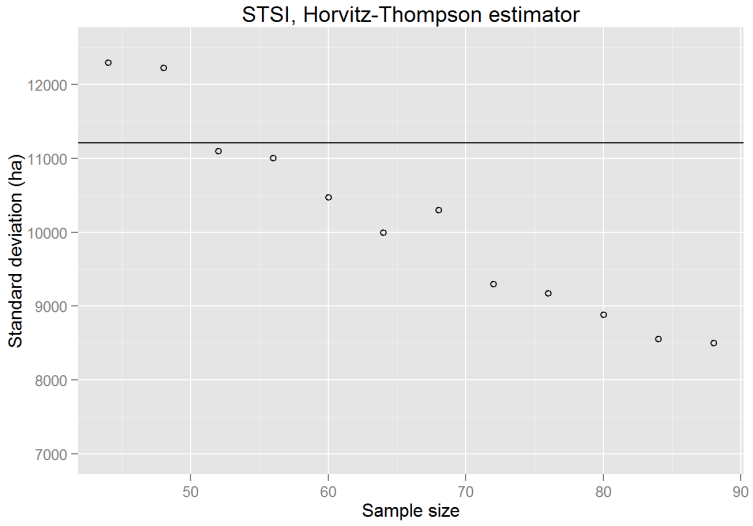
6.1.1.2 Sample size determination

The total number of images to be selected in the sampled provinces was determined with the goal to increase accuracy of the estimates and to save cost when compared to previous years.

The accuracy of area estimates depends on the proportion of land covered by satellite imagery and even more so on the number of images than can be acquired. With opium poppy cultivation being concentrated in hot spots and thus unevenly distributed across the agricultural land, information from a large, contiguous piece of land has less value than geographically evenly distributed, smaller pieces information. Costs associated with satellite imagery depends mainly on the total area covered (and not on the number of images). By using 5 x 5 km instead of 10 x 10 km images, at same costs four times the number of images can be acquired.

The following figure shows the results of a simulation exercise undertaken by UNODC[15]. The higher the standard deviation (vertical axis), the less accurate is the estimate. The vertical line represents the base line case, which is the sampling standard deviation of the 2014 sample (22 10 x 10 km images) of Kandahar; the dots represent sampling standard deviation of samples of various sizes of 5 x 5 km images. The underlying data is a simulated map of Kandahar.

Figure 19 Square root of predicted sampling variance for simple random sampling of 27 units of 10x10 km (horizontal line) **together with sampling**



At 52 5x5 km samples, when roughly 60% of the area of the 2014 sample is covered, standard deviation is about the same size as in the base line case. This means that the the same accuracy could be achieved while reducing the area observed by up to 40%. More samples led to an increasing accuracy of the estimate.

All sample sizes smaller than 108 (four times 27) reduce costs, since overall less area needs to be covered by imagery. These results are expected to carry over to the actual survey. Based on various such simulations (including based on data of Hilmand province), it was decided to aim at reducing the total surveyed area by about 25%, yielding roughly a total of 500 images of 5 x 5 km to be distributed across the sampled provinces (the actual number of images needed was higher, because Ghor was added as sample province).

[15] UNODC thanks Professor Dick Brus for his input and guidance.

6.1.1.3 Sample size allocation

The available number *n* of images has been distributed to provinces *h* according to a so-called power allocation, which uses agricultural area as size measure. For provincial sample size n_h,

$$n_h = n\frac{X_h^q CV_h}{\sum_{h=1}^{H} X_h^q CV_h}$$

where CV_h is the coefficient of variation of area under poppy cultivation in province *h* and X_h land available for agriculture in province *h.* This approach ensures that sample size depends on both the variability of poppy and the size of the province measured by agricultural land. After an empirical assessment, the smoothing parameter q, $0 \leq q \leq 1$, was set to 0.2. In addition, a mininum of 20 samples per provinces was set, which took effect in Day Kundi and Kunar. This yielded the following sample size allocation

In 2015, high-resolution satellite images were acquired for 582 sampled locations 5 km by 5 km in size covering a total of 12 provinces. The difference to the 500

Table 23 Sample size and agricultural land and sampling ratio, by province, 2015

Province	Total arable land (km^2)	Frame	Estimated sample size	Effective sample size	Arable land in selected cells	Sample size (% of arable land in selected cells)
		# cells	# cells	# cells	(km^2)	
Badakhshan	3,490	396	52	53	456	13%
Badghis	6,956	618	59	57	711	11%
Day Kundi	544	406	12	20	25	5%
Farah	2,076	604	47	46	361	17%
Ghor	1,508	1,144	83	83	108	7%
Hilmand	4,013	696	98	98	965	24%
Kandahar	2,837	695	66	80	702	25%
Kunar	246	124	14	24	42	17%
Nangarhar	919	181	25	26	162	18%
Nimroz	985	213	37	36	284	29%
Uruzgan	787	277	29	30	83	11%
Zabul	1,071	541	31	29	124	12%
Total	**25,432**	**5,895**	**553**	**582**	**4,023**	**16%**

6.1.1.4 Sample design

MCN/UNODC undertook an extensive simulation study which compared various sampling designs and estimation methods in order to determine the best (most accurate with a given number of samples) design for a certain situation.

Case studies were undertaken for Hilmand and Kandahar province. The sampling desings considered have been used in the past by MCN/UNODC:

- simple random sampling,
- probability proportional to size sampling (PPS), using agricultural area as a size measure,
- stratified random sampling using compact geostrata of equal size as strata,
- systematic random sampling.

To estimation methods have been compared: a ratio estimator using agricultural area as auxillary variable and the Horvitz-Thompson estimator.

The study concluded that for the two cases considered

- PPS performed best, and
- The ratio estimator is to be preferred for simple random sampling, systematic random sampling, and stratified random sampling. For PPS, it does not yield any improvements in accuracy.

The PPS builds on the correlation between the size measure and the variable of interest. In provinces where poppy and agricultural land are highly correlated, PPS is expected to perform best. In provinces, however, where poppy and agricultural land are only weakly correlated, PPS does not bring any advantages and might reduce accuracy.

Therefore, in Farah, Hilmand, Kandahar, Nimroz and Zabul PPS was applied. In the remaining provinces, systematic random sampling was used, a sampling design that ensures an even geographical distribution of samples. In Nangarhar systematic random sampling was applied in spite of a high correlation, since correlation was driven by a few samples and not representative for the province (in fact in 2015, based on 26 samples, the correlation coefficient was only 0.15).

Table 24 Coefficient of variation, variance, standard deviation and correlation between agricultural land and poppy in the 2014 samples

Province	Coefficient of variation poppy	Variance poppy	Standard deviation poppy	Correlation agricultural land and poppy
Hilmand Outside	2.7	1,339,898	3,660.4	0.97
Nimroz	1.71	46,689	216.08	0.93
Zabul	1.37	502	22.4	0.91
Farah	1.86	68,296	261.34	0.87
Nangarhar	1.19	123,185	350.98	0.84
Kandahar	2.41	185,286	430.45	0.74
Hilmand Food Zone	0.86	569,568	754.6	0.73
Badaskhan	1.85	10,010	100.05	0.34
Kunar	0.86	305	17.48	0.28
Uruzgan	1.38	20,567	143.41	0.21
Day Kundi	0.63	11	3.30	0.15
Badghis	1.82	8,912	94.40	-0.13

In more detail in a PPS design without replacement a unit has a probability to be selected in the first draw of

$$pi = \frac{x_i}{\sum_{i=1}^{N} x_i}$$

where x is the size variable (agricultural land) in unit i, and N is the number of units that can be selected. The subsequent units have slightly modified inclusion probabilities. For drawing the samples and for calculating the inclusion probabilities the statistical software *R* (package *sampling*) was used.

Since agricultural area tends to be concentrated in one or more clusters in a province, PPS sampling without further stratification would lead to a concentration of samples in a few spots and possibly do not cover every district. Therefore, in all PPS provinces, the sample was stratified by district.

In the remaining 7 provinces, a one-stage systematic random sampling approach was employed in which a sampling rule was applied that ensured good geographic coverage. Starting from a randomly chosen cell, every *k*th element from then onwards was chosen, where *k* is determined by the number of cells in the frame and the desired sample size (the actual sample size might differ slightly).

In **Nangarhar** province, the districts Dara-e-Nur, Kuzkunar, Kama, Behsud, Jalalabad and partially Surkhrod were excluded from the frame.

6.1.2 Area estimation in sampled provinces

The estimation of the extent of opium poppy cultivation is a ratio estimate[16] for each of the provinces, using potential agricultural land as an auxiliary variable. The national estimate was obtained by adding up the provincial estimates in what is known as a separate ratio estimate.

In provinces where systematic random sampling was applied, the area of opium poppy cultivation, Y_k, within province *k*, is estimated as:

$$Y_k = X \frac{\sum_{i=1}^{n_k} y_i}{\sum_{i=1}^{n_k} x_i}$$

where n_k is the number of satellite image locations within the province; y_i is the area of poppy cultivation in image *i;* x_i is the area of land potentially available for poppy cultivation in image *I*, and *X* is the total potential land available for poppy cultivation in province *k*.

In PPS provinces, where units are selected with unequal inclusion probability, a slightly different ratio estimate was used that incorporates the inclusion probability (Horvitz-Thompson estimator).

6.1.2.1 Uncertainty

In the PPS provinces the confidence intervals were calculated following statistical practice.[17]

In all remaining provinces no unbiased estimator for the variance was available; confidence intervals were approximated by assuming simple random sampling. The confidence intervals therefore slightly overestimate the uncertainty of the estimates.

Table 25: Area estimates of sample provinces with 95% confidence interval, 2015 (Hectares)

Province	Point estimate (Hectares)	Lower bound (Hectares)	Upper bound (Hectares)
Badakhshan	4,056	2,477	5,635
Badghis	12,391	4,011	20,770
Day Kundi	381	264	498
Farah	21,106	13,875	28,384
Ghor	1,721	800	2,643
Hilmand	86,443	72,885	99,914
Kandahar	21,020	17,379	24,661
Kunar	987	266	1,708
Nangarhar	10,016	5,085	14,948
Nimroz	8,805	6,946	10,664
Uruzgan	11,277	4,510	18,044
Zabul	644	262	1,026
Target provinces	**3,720**	**NA**	**NA**
National	**182,567**	**162,638**	**202,454**
National rounded	**183,000**	**163,000**	**202,000**

To express the uncertainty associated with the national area estimation, which includes the provinces covered by the targeted approach and the sample provinces, but excludes provinces with an estimate of less than 100 hectares (which are considered "poppy-free" and not counted), a

[16] The ratio estimator did not outperform the Horvitz Thompson estimator in the PPS provinces. The ratio estimator was applied in all provinces for reasons of consistency and to account for possible updates of the agricultural area in future years.

[17] See, e.g. Cochran, W. G., Sampling techniques, John Wiley & Sons (2007).

range was calculated by adding the poppy area figures of the target provinces to the upper and lower limits of the 95% confidence interval at the national level.

6.1.3 Area estimation in target provinces

The consensus view of those working in Afghanistan was that the MCN/UNODC surveillance system developed in the provinces can identify sites where poppy was grown, with further inputs being obtained from the survey of village headmen. Fieldworkers visited potential poppy-growing sites to confirm the situation and provided GPS references for the sites. If geographical clusters of sites were identified, targeted satellite images were obtained to measure the areas involved. The total poppy area of a target province is equal to the poppy area measured on the imagery without any further calculation. For a list of provinces for which the target approach was used see Table 4.

In provinces where satellite images were targeted, the estimated area under opium poppy cultivation is not affected by sampling errors, although they may be affected by the omission of areas with very little cultivation. Area estimates of target provinces should therefore be considered as a minimum estimate.

6.1.4 District level estimation

District level results are indicative only. For district level estimation all cells are used which have the majority of agricultural area in that district. That means that in certain cases, agricultural area and poppy cultivation is accounted for in a neighbouring district and not within the district where cultivation occurred. This is, however, in most cases set off by those cells, where the contrary is the case.

6.1.5 Accuracy assessment

Due to the difficult security situation in many parts of Afghanistan, which prevented surveyors from carrying GPS and mapping equipment, an insufficient number of ground segments could be visited in order to conduct a systematic accuracy assessment.

6.1.6 Estimation of the net cultivation area

The area figure presented is the net harvestable opium poppy cultivation area. The effect of poppy eradication activities was taken into account based on data from the eradication verification survey, which provides exact GPS coordinates of all eradicated fields supplemented with additional information. The gross cultivation areas would be the net cultivation plus eradication.

In provinces where the poppy area is estimated with a sampling approach, the first step is to calculate the gross poppy cultivation area. The total area eradicated in those provinces is then deducted from the mid-point estimate of the provincial cultivation estimate to obtain the net cultivation area. If eradication activities were carried out after the date of the image acquisition, no adjustment is necessary as the poppy present in the image reflects the gross poppy area. If eradication activities were carried out in a sample block before the date of the image acquisition, the area interpreted as poppy would not reflect the gross area. Therefore, the eradicated fields are added to the interpreted fields. The adjusted poppy area figure for the block is then used for the provincial estimate.

In provinces where the poppy areas is estimated with a targeted approach (census), eradication activities that happened before the date of the image acquisition are already reflected, as these fields no longer appear as poppy in the image. Fields that were eradicated after the date of the images acquisition are simply deleted.

6.2 Possible impact of the change of study design

Caution is needed when interpreting the extent of change in area under cultivation: Between 2014 and 2015, the availability of improved technology allowed MCN/UNODC to acquire satellite imagery at much more locations than in the years before. This has led to a much better geographical coverage by satellite imagery of provinces where a sample approach is used for area estimation. With the greater number of images and the better coverage, estimates are of higher accuracy.

The change in methodology may have had the effect of making the extent of changes appear greater than it actually was. When by chance a previous sample did not cover areas with low (or high) density of opium poppy cultivation well, the new sample may have covered areas with low (or high) densities of cultivation much better and therefore can overstate the extent of change.

6.2.1 Kandahar province

In 2014, In the province of Kandahar 22 10 x 10 images have been used for the area estimation. In 2015, 80 images of size 5 x 5 km were used. The following figure shows the distribution of the samples in the province. The clusters of samples in 2015 are due to probability-proportional-to-size sampling.

The map shows that in 2015, geographical coverage was much better than in the year before: In 2014, low density areas such as in the districts of Spinboldak, Arghestan and Naesh (see density map), were not covered well by the random sample in 2014. This means that in 2015, the overall distribution of poppy cultivation was better represented in the sample than in 2014. An analysis of overlapping images did confirm the reduction in overall cultivation but did not allow a confirmation of -38% reduction. Poppy cultivation certainly reduced in Kandahar but probably not by 38% as the estimations suggest.

Figure 20 Samples of 2014 (blue) and 2015 (red) together with potential agricultural land in Kandahar province

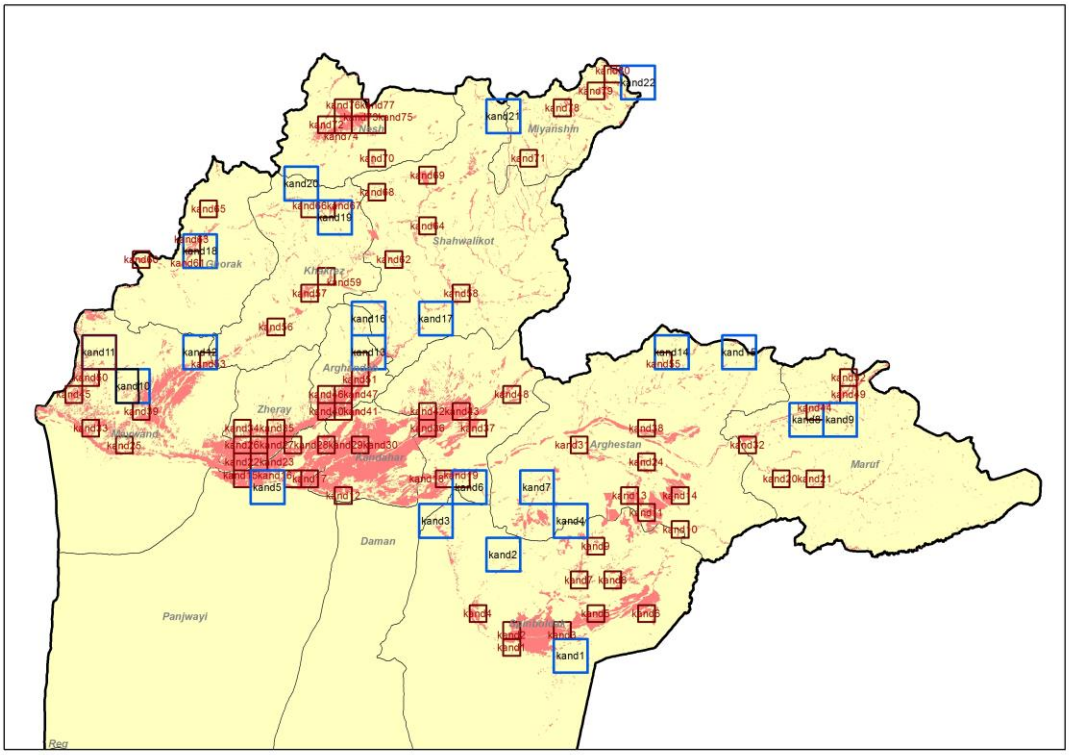
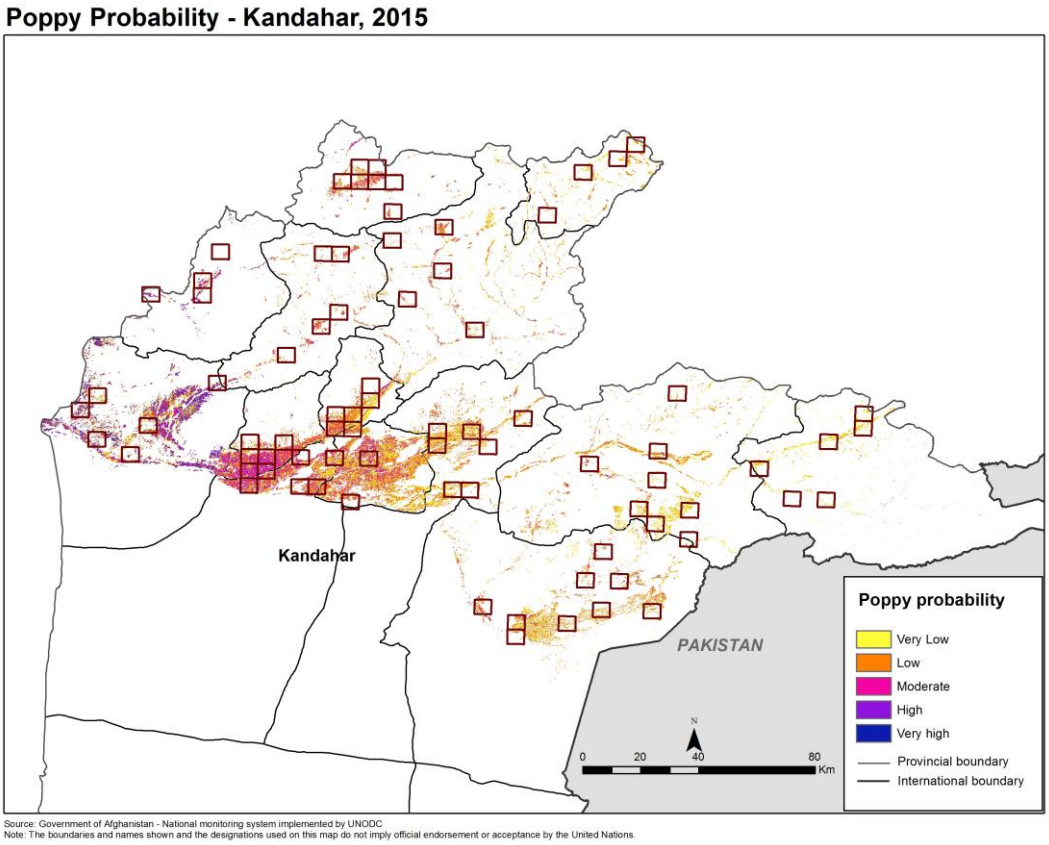


Figure 21 Poppy probability (geotools) in Kandahar province, 2015



6.2.1 Farah and Nimroz provinces

In Nimroz province the 2014 sample did not cover agricultural land in the districts Chakhansur and Kang, two districts of low poppy density (the main poppy cultivating district is Khashrod district).

An analysis of overlapping images confirmed a strong decrease of poppy cultivation in the province. Figure 22 shows an example of this analysis: in a single image a reduction of 43% could be observed.

A similar picture presented itself in Farah: here a strong reduction could be as well confirmed by the analysis of overlapping images. Figure 24 shows the samples in 2014 and 2015 on a map.

Figure 22 Poppy fields in 2014 (yellow; 1,332 hectares) and 2015 (blue; 755 hectares) of a single image in Nimroz province

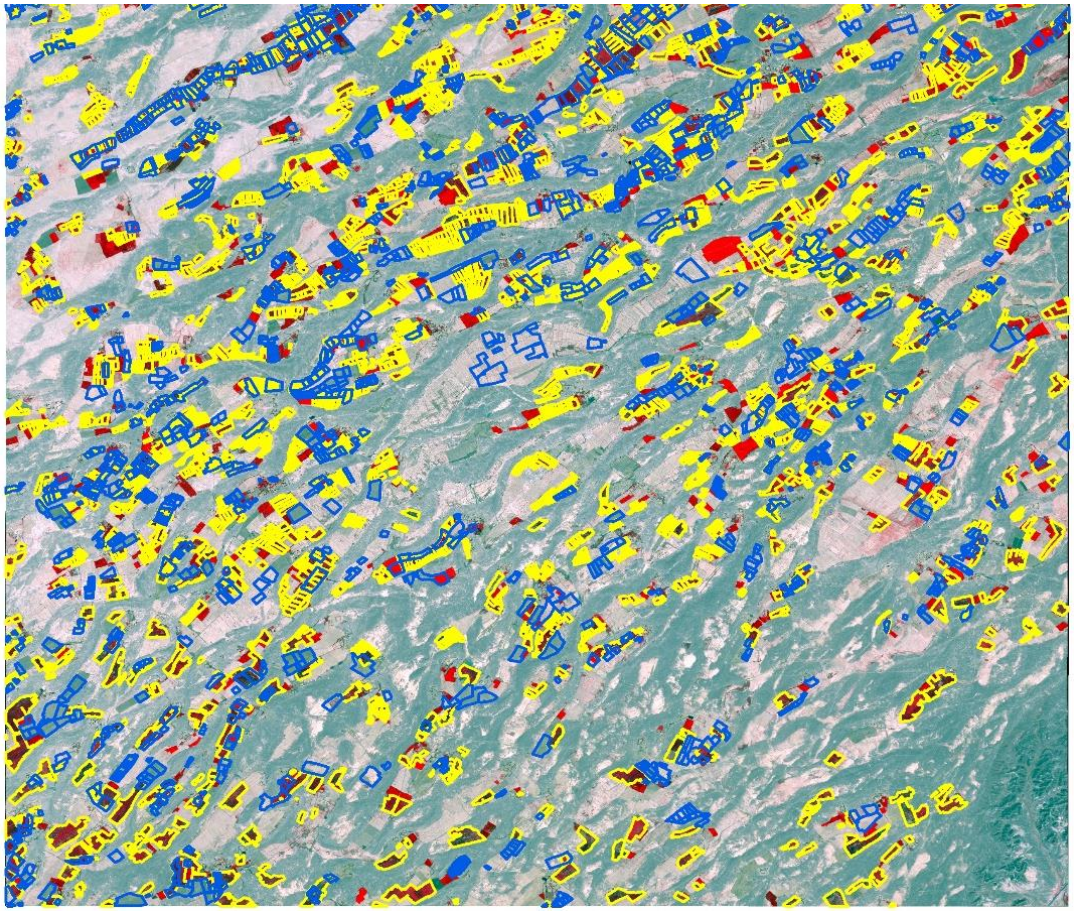


Figure 23 Samples of 2014 (blue) and 2015 (red) together with potential agricultural land in Nimroz province

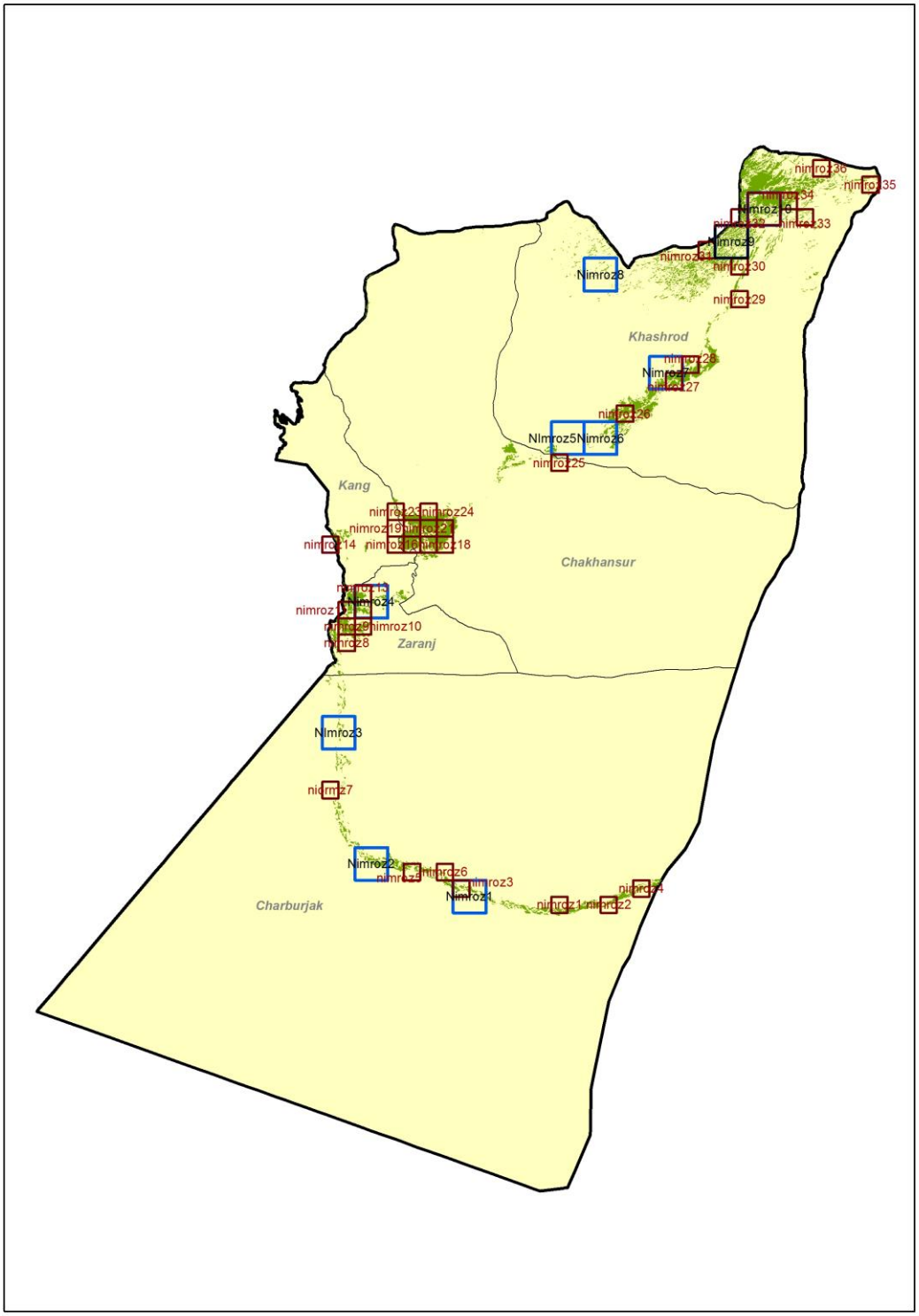
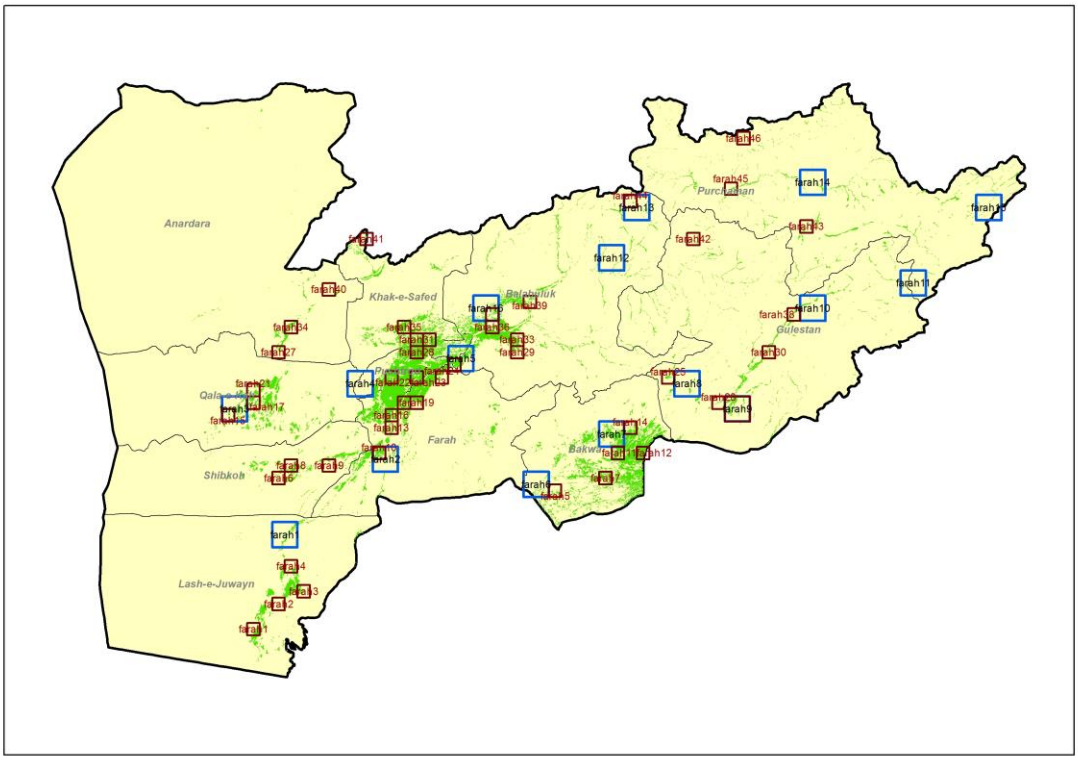


Figure 24 Samples of 2014 (blue) and 2015 (red) together with potential agricultural land in Farah province



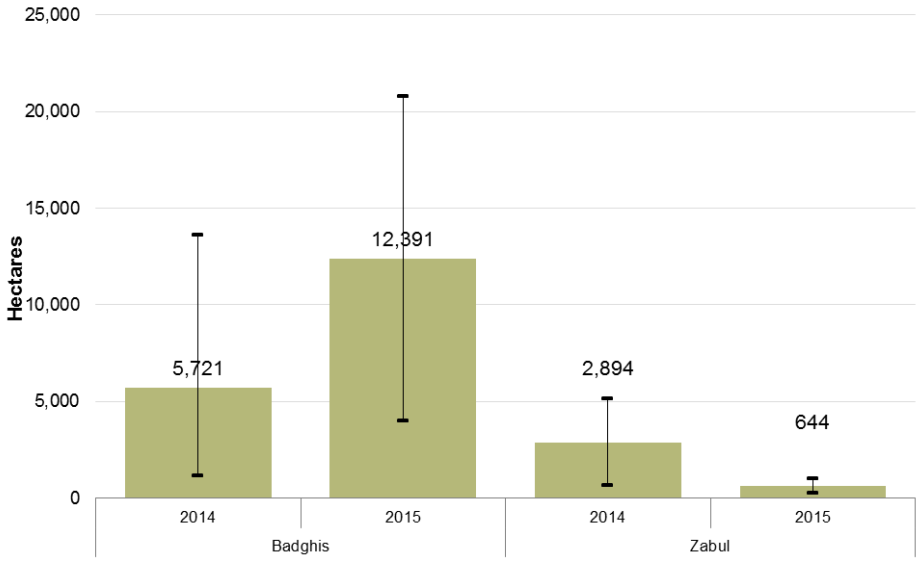
6.2.2 Badghis, Nangarhar and Zabul

In the provinces of Badhgis, Nangarhar and Zabul the extent of change should be considered with particular caution. In Nangarhar a similar situation was observed as in Kandahar: the samples in 2014 did not cover low density areas well, which might have led to an overestimation of the extent of change.

In Badghis province the contrary might be the case. Up until 2014, a historically grown, non-random sample was used. The change to a random probability sample and a strong increase in sample size (57 in 2015 instead of 16 in 2014) may have had a strong impact on Badghis and may in particular limit the comparability of the results.

In 2014, Zabul province had a very small number of 10 x 10 km samples (8), out of which one sample contained a very high poppy density. The small sample size caused each sample to have a large relative weight on the estimate and a high uncertainty around the estimate (large confidence interval). With the much higher sample size in 2015 (29), the estimate gained strongly in accuracy.

Figure 25 Area estimates of selected sample provinces with 95% confidence interval, 2014 and 2015 (Hectares)



6.3 Satellite image interpretation

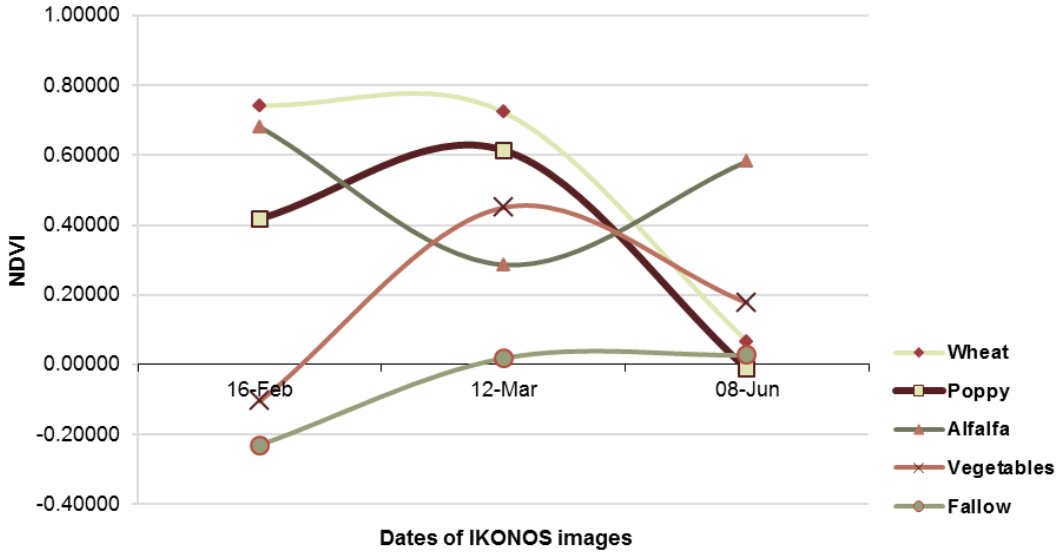
6.3.1 Acquisition of satellite images

The acquisition of satellite images at the appropriate growth stage of the opium poppy is key to the successful identification of opium poppy fields on satellite images. Satellite data is collected at two stages: the pre-harvest (flowering) stage and the post-harvest (post-lancing) stage. In recent years, detailed information on the crop growth cycle of each district has been collected in the form of a phenological chart, which is useful for deciding on appropriate dates for satellite data acquisition. First-dated images of the Southern, Eastern and Western regions are collected during March and April due to the early cultivation and maturity of crops in those regions. The crop growth cycle begins later as one goes northward. Images of the North and North-eastern region are acquired during May, June and July. Second-dated satellite images are collected approximately two months after the first images are collected.

The normal time window for satellite data acquisition is one month, depending on the scheduled passing of satellite and weather conditions. The time window for first-dated image acquisition begins at the full flowering stage and continues through the capsule stage. Second-dated image acquisition begins towards the end of the lancing stage and continues until the opium poppy fields are ploughed. Images acquired in the middle of the prescribed time window facilitate optimum discrimination between opium poppy and other crops.

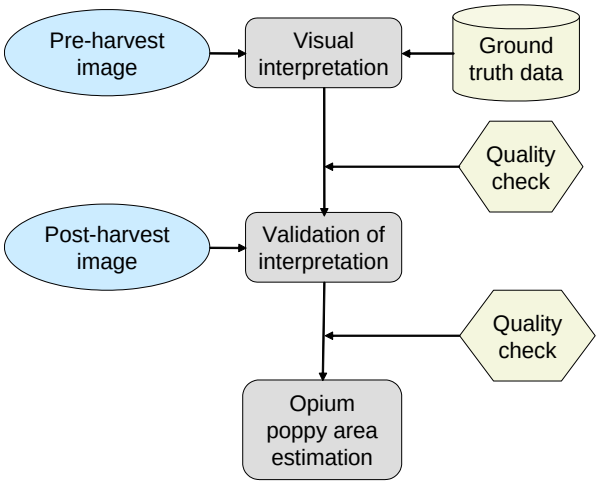
The figure below illustrates the spectral characteristics (Normalized Difference Vegetation Index; NDVI) of opium poppy and other crops between February and June. Wheat and opium poppy have the same growth cycle between March and June, as illustrated. The spectral differences between those two crops are more pronounced in February, which marks the beginning of the capsule stage of the crop in this example. Poppy fields are ploughed immediately after the harvest, whereas wheat fields are not. That is why two-dated images (pre-harvest and post-harvest) are collected for the same location.

Figure 26: Spectral reflectance of opium poppy and other crops



The figure above illustrates the growth cycles of opium poppy, wheat and clover from February to June, with the help of ground photographs. Note that maximum visual discrimination between opium poppy and other crops is possible during the flowering/capsule stage and after capsule lancing. The different phenological stages described above are shown in the figure on the previous page (field photographs of opium poppy, wheat and clover on different dates).

Figure 27: Image classification methodology for estimating opium poppy cultivation area



6.3.2 Interpretation of opium poppy cultivation from satellite images

First-dated images were acquired during the flowering or capsule stage and second-dated images were acquired after the opium harvest. For example, wheat appears mostly in bright red on the first date image in false colour composite (full coverage with vegetation appears in red; bare soil in grey/green), while opium poppy fields are shown in tones of pink. Although there can be some confusion between opium poppy and wheat in the first-dated images, the acquisition of second-dated images makes it possible to distinguish opium poppy from other crops, because the opium poppy crop has been harvested and the fields appear in grey/green.

Visual interpretation was used to delineate opium poppy fields by interpreting PLEIADES images covering a 5 km by 5 km area. Ortho-rectified PLEIADES images of 0.5 m resolution (PAN-sharpened) were used for this purpose. Opium poppy was initially identified using first-dated high resolution images. Ground truth information collected in the form of segment maps and GPS points was also useful in identifying opium poppy fields. The interpretation based on first-dated images was improved using patterns of observation in second-dated images. Ground photos of the poppy fields were used in the provinces of in Kabul, Kapisa, Kunar, Laghman, Nangarhar Faryab, Baghlan, Badakhshan, Jawzjan and Saripul provinces. These photographs were tagged by latitude and longitude and facilitated to locate the poppy areas on satellite images, and were very helpful in confirming the poppy areas in the satellite images. Poppy field boundaries were delineated by an on-screen digitization method.

6.3.2.1 Band combination for opium poppy identification

Two kinds of band combination were used to detect opium poppy. True-colour combination (blue, green, red) was used in areas where land use is dominated by opium (for example, Hilmand and Kandahar) and in cases where images were obtained during the flowering and lancing stages of opium poppy. False-colour combination (infra-red, red, green) was used in almost all cases. Analysts used both combinations simultaneously to optimize discrimination between opium poppy and other crops.

Some of the images could not be acquired at the appropriate time due to weather conditions and/or the time at which the satellite passed. The delayed acquisition of images makes it difficult to detect opium poppy, since fields may be at the senescence stage due to the lancing of capsules and can therefore be confused with fallow fields. In such cases, second-dated images are often useful in confirming opium poppy fields, since harvest patterns are different for wheat and opium poppy.

6.3.2.2 Ground reference information

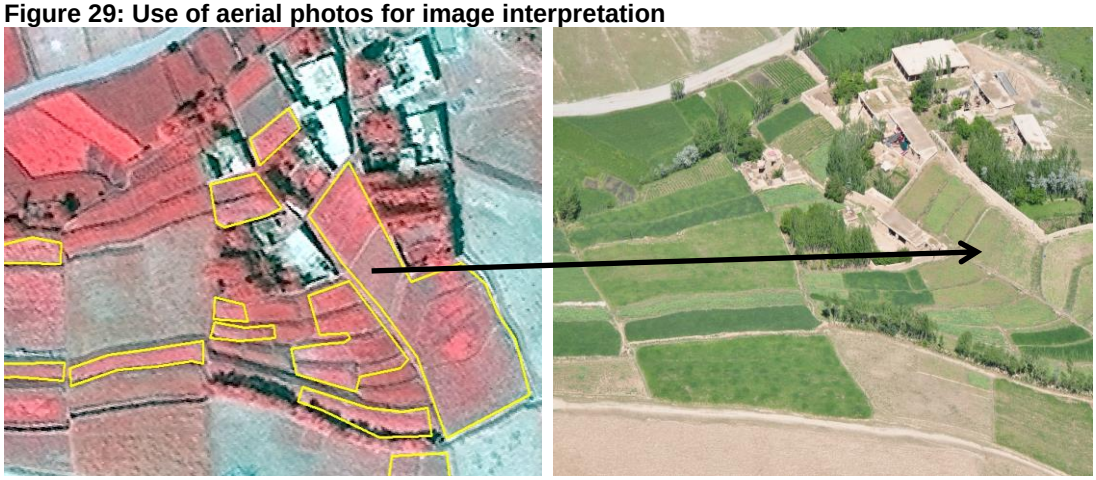
Ground reference data were collected in the form of GPS points, field photographs and aerial photographs. Some 1,854 GPS points of poppy fields, supported with pictures, were collected from the provinces of Takhar, Sari Pul, Baghlan, Balkh, Faryab, Kapisa.

GPS point data were superimposed over the ortho-rectified satellite images to facilitate identification of poppy fields during visual interpretation.

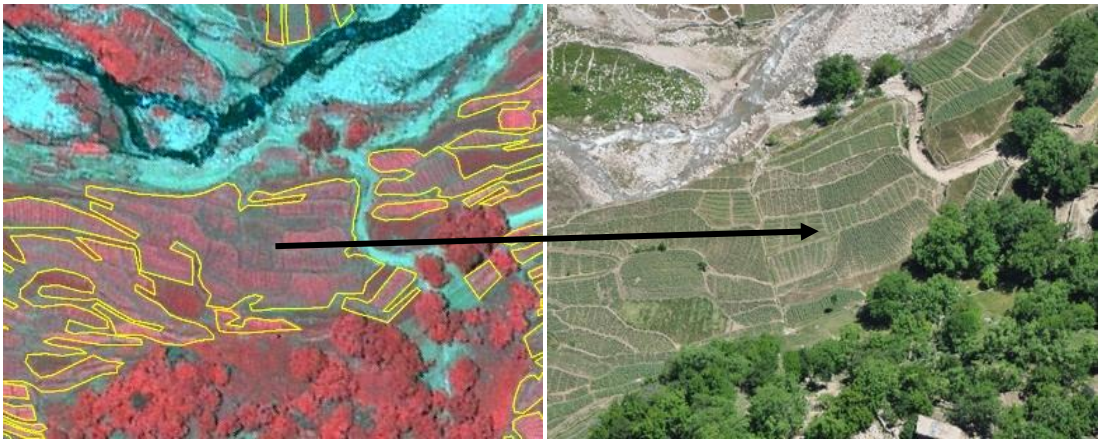
Figure 28: Use of geo-referenced ground photos for image interpretation

Natural colour aerial photographs acquired from helicopters were co-related with the satellite images to identify poppy from other crops, as shown below.

Figure 29: Use of aerial photos for image interpretation



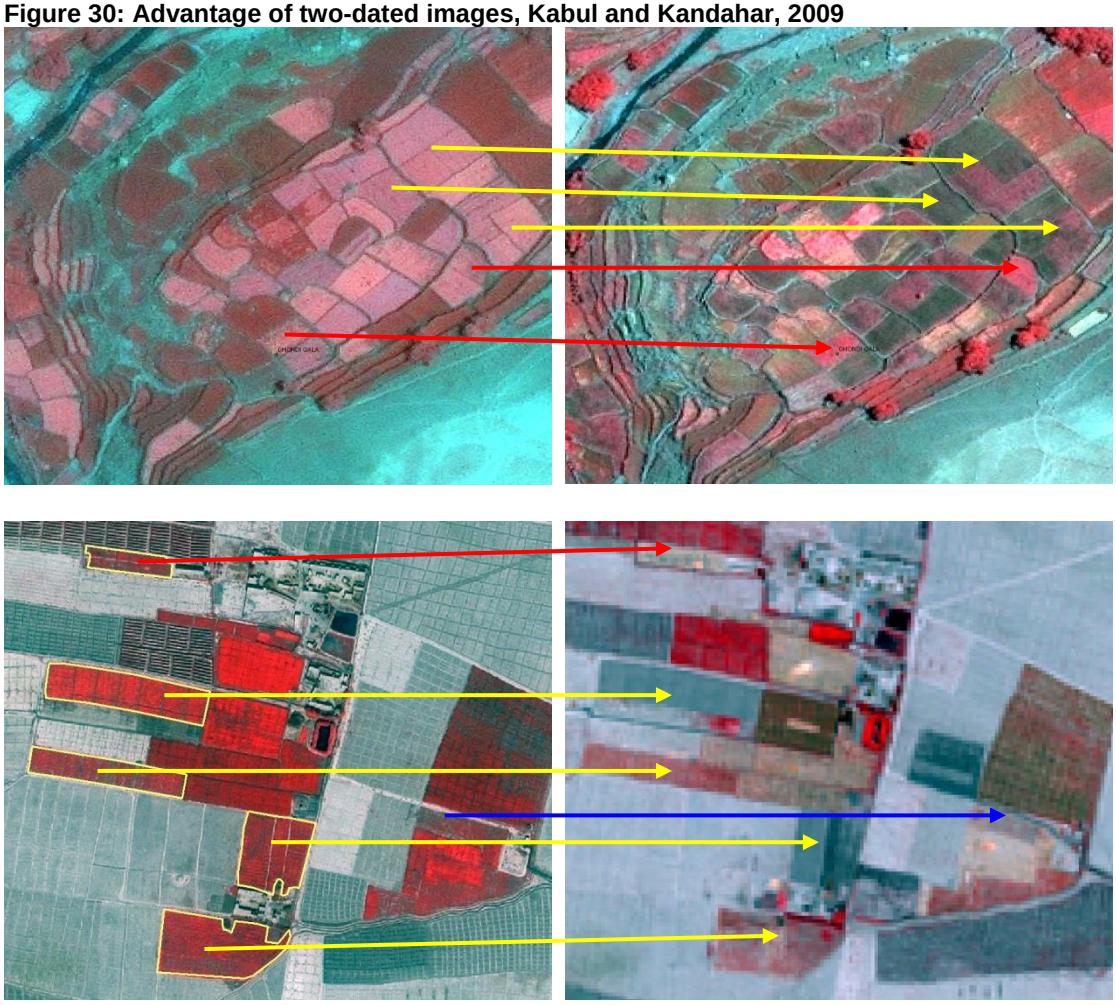
Satellite image (infra-red) *Aerial photograph (natural colour)*



6.3.2.3 Advantage of two-dated images

Visual interpretation of single-dated very high-resolution images was a relatively easy task in Hilmand, Kandahar, Uruzgan, Farah and Nimroz provinces. This was due to larger field sizes and timely acquisition of the images. Interpretation in target provinces Nangarhar, Laghman, Kunar, Kabul, Kapisa, Hirat, Ghor, Baghlan, Faryab and Badakhshan was easy with the help of GPS points and aerial photographs. Interpretation of images in Badghis and Zabul was more difficult since the spectral signatures of opium poppy were not as clear as in Hilmand, Kandahar, Uruzgan and Nangarhar. The second-dated images were useful to distinguish poppy from barley, wheat and grapes in certain provinces, namely Kabul, Kandahar and Nangarhar, particularly where the first-dated images were acquired late during the senescence stage. The second-dated (post-harvest) images were therefore useful in confirming whether the opium poppy on the first-dated images had been correctly identified. Image acquisition at two different times (pre- and post-harvest) is thus proven to be essential in such cases.

Figure 30: Advantage of two-dated images, Kabul and Kandahar, 2009



6.3.2.4 Quality control

A quality control mechanism was applied to the image interpretation process, with each analyst's work being checked by two other experts. Both first-dated and second-dated images were cross-checked.

All fields determined as likely to be under opium poppy cultivation (potential opium poppy fields) were delineated on the basis of the interpretation of first-dated satellite imagery. In some cases a second-dated image was acquired for the purpose of confirmation. The corrections involved a few commissions and omissions.

6.4 Verification of Governor-led eradication (GLE)

MCN/UNODC has improved field-based verification activities since 2010 by enhancing the control mechanism. The areas verified by eradication verifiers were randomly checked by the team leader and UNODC/MCN survey coordinators for validation of the reported figures. A total of 124 eradication verifiers were trained in eradication verification techniques and deployed in a phased manner to provinces where eradication activities were envisaged. The eradication verifiers were part of the eradication teams led by the respective provincial governor. Verifiers reported to the office of Provincial Governors in the last week of February 2013.

Verification methodology for GLE:

- Eradication verifiers were part of the Governor-led eradication teams.
- The verifiers took measurements of each eradicated field by their pace length, converted them into metres and calculated the area in jerib (1 jerib=2000 m^2), collected field coordinates using new GPS cameras and took photographs.
- The verifiers drew sketch maps of each field as a reference for area calculations.
- The verification-reporting officers in Kabul obtained the provisional data from the verifiers by telephone (mobile/satellite phones) and updated the database on a daily basis.
- The verifiers filled in hardcopy survey forms and submitted them to UNODC regional offices. The forms were then sent to the Kabul office for data entry. Quality control was undertaken by MCN/UNODC survey coordinators at the regional level. Eradicated fields were revisited randomly by team leaders and MCN/UNODC survey coordinators to check the accuracy of the reports. Further validation of the results was done using data obtained through helicopter flights, as well as from satellite imagery, to calculate the final area of eradicated poppy fields wherever possible.
- In Hilmand province, the area calculations of the eradicated poppy fields was facilitated by calculating the area of fields automatically using a standard template in Excel file, thus avoiding manual calculation errors at the field level.
- MCN/UNODC published periodical reports on a weekly basis to inform stakeholders of eradication activities. The eradication figures provided in these reports were considered provisional until they were finalized based on field checks and/or checks based on the satellite image interpretation.

6.5 Opium yield and production

6.5.1 Estimating opium yield

The relationship between poppy capsule volume per square metre and dry opium yield is used to estimate opium production.[18] It takes the form of a non-rectangular hyperbola.

Non-rectangular hyperbola formula for opium yield as function of capsule volume:

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

where

Y = Dry opium gum yield (kg/ha), and

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

In the yield survey, data on the number of yield capsules per plot and capsule volume are collected. The survey follows the procedure established in the UNODC *Guidelines for Yield Assessment*.

An imaginary transect was drawn on each surveyed field, along which three one-metre square plots were selected. In 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. The capsule volume per square metre was calculated with these data and entered into the formula for the yield calculation. Each plot thus provided one yield observation. The simple average of the three plots in a field is the field yield. The simple average of all fields in a region is the regional yield. A range was calculated to express the uncertainty of the yield estimate due to sampling with the 95% confidence interval.

[18] UNODC Guidelines for yield assessment of opium gum and coca leaf from brief field visits, UN New York, 2001, ST/NAR/33. See also UNODC (2003): Limited opium yield assessment surveys. Technical report: Observations and findings. Guidance for future activities. In: Scientific and Technical Notes, SCITEC/19, December 2003.

Table 26: Regional opium yield values with 95% confidence intervals, 2015 (Kilograms per hectare)

REGION	Best estimate	Lower bound	Upper bound
Central	41.50	36.20	46.80
Eastern	36.46	29.21	43.71
North-eastern	39.61	35.83	43.39
Northern	38.27	31.75	44.80
Southern	16.10	12.42	19.78
Western	16.27	12.81	19.73
National weighted by opium poppy cultivation	**28.7**	**16.9**	**19.5**

6.5.2 Size of the yield survey and data quality

Since 2012, the yield survey has been significantly reduced in comparison to previous years. Due to the increasingly difficult security situation, only fields where it was possible to complete the survey without time pressure were visited. Furthermore, training was improved and surveyors worked in pairs rather than alone. The survey is therefore no longer statistically representative.

To further enhance data quality, data quality checks developed with external experts were applied. The statistical tests developed in 2011[19] were applied to the capsule measurements, i.e. to the values reported regarding height and diameter, and thus the resulting capsule volumes. Regarding the number of capsules contributing to yield per plot, no systematic tests are available.

The results showed that data continued to be of a high quality. In 2015, data collected in Faryab had to be excluded, because data collection happened too late: almost all fields had been already harvested.

Table 27: Yield survey villages and fields surveyed (all data)**, 2009-2015**

	2009	2010	2011	2012	2013	2014	2015
Number of villages	248	240	232	41	48	45	59
Number of fields (max. 3 per village)	699	685	685	114	142	134	172
Number of plots (3 per field)	2,415	2,040	2,055	342	426	401	506
Number of capsules measured	26,901	20,474	20,769	3,211	4,009	3,474	4,280

6.5.3 Estimating opium production

Opium production was calculated by the estimated regional area under opium poppy cultivation being multiplied by the corresponding regional opium yield. All opium estimates in this report are expressed in oven-dry opium equivalent, i.e. the opium is assumed to contain 0% moisture. The same figure expressed in air-dry opium, i.e. opium under "normal" conditions as traded, would be higher as such air-dry opium contains some moisture.

The point estimates and uncertainties of the opium production estimate due to sampling of the area under poppy cultivation and yield can be expressed as $a_p \pm \Delta a$ and $y_p \pm \Delta y$, respectively, where the uncertainty is determined from the 95% confidence intervals.

[19] See MCN/UNODC *Afghanistan Opium Survey 201, December 2011*, page 95.

These uncertainties will impact on the estimate of production ($p_p \pm \Delta p$, or equivalently expressed as the range ($p_p - \Delta p$, $p_p + \Delta p$)), where the best estimate $p_p = a_p y_p$, such that

$$\frac{\Delta p}{p_p} = \left[\left(\frac{\Delta a}{a_p} \right)^2 + \left(\frac{\Delta y}{y_p} \right)^2 \right]^{\frac{1}{2}}$$

expresses the error in production, Δp , resulting from uncertainty in the estimates for cultivation area and yield.

For targeted regions there is no sampling error in the area under cultivation. In such cases, the error in production relates only to the uncertainty in the yield and is given by $\Delta p = p_p \Delta y / y_p$.

6.6 Heroin production

6.6.1 Share of raw opium converted to heroin

When estimating the amount of opium converted to heroin, seizures in Afghanistan and in neighbouring countries, such as the Islamic Republic of Iran, Pakistan and Central Asia (e.g. Tajikistan, Turkmenistan, Uzbekistan), are considered in the model. There are indications of direct drug exports to China and India as well as to other countries by air or land, but the amounts trafficked through those routes are thought to be comparatively small and are not considered in the model. All seizure data from Afghanistan and neighbouring countries is used for the estimation (retrieved from the latest World Drug Report), which implicitly assumes that the shares converted in and exported from Afghanistan are proportional to all seizures made in those countries.

A three-year average of all reported amounts was taken. In order to estimate the share of opium converted to heroin, all heroin and morphine seizures are converted into opium equivalents by applying the opium to heroin conversion ratio for heroin of export quality.

As seizures are often driven by pure chance and seizure data have some inherent uncertainties, changes should be interpreted with caution. Information from the CNPA laboratory indicates that not all assumed seizures of heroin turn out to actually contain heroin, or they contain heroin in combination with various other substances.[20] This is rather typical for seizures and not specific only to Afghanistan.

Table 28: Proportions of opiate seizures in Afghanistan and neighbouring countries
(Percentage)

Distribution	2012	2013	2014	Average 2012-2014 weighted by amounts seized
Opium	63%	54%	64%	59%
Heroin and morphine combined	37%	46%	36%	41%

6.6.2 Conversion ratio from opium to heroin

The amount of raw opium needed for producing pure heroin base depends on two main factors:[21]

- the average morphine content of opium
- the efficiency of the heroin laboratory in extracting morphine from opium and in converting the yielded morphine to pure heroin base (laboratory efficiency).

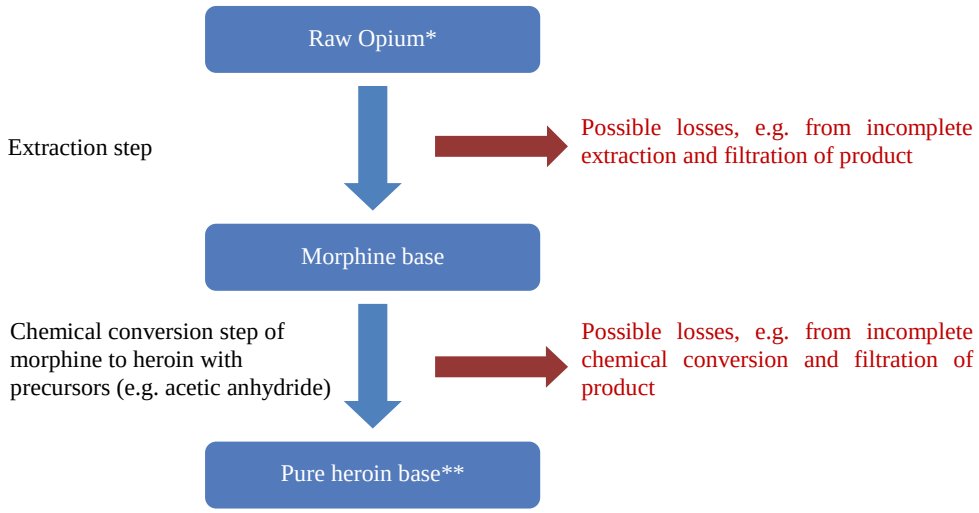
Raw opium is converted into heroin base in two main steps: In the first step (the extraction step), morphine (and other alkaloids) are extracted from raw opium by adding hot water and chemicals

[20] Counter Narcotics Police of Afghanistan, Forensic Laboratory/UNODC (2008): Laboratory Information Bulletin 12/2008 (LIB IV/2008). http://www.unodc.org/pdf/scientific/LIB%20IV-2008_Kabul-.pdf.

[21] For more details on the heroin production process in Afghanistan, please see *Bulletin on Narcotics, vol. LVII, Nos. 1 and 2, 2005, pp. 11-31*.

such as calcium oxide and ammonium chloride. Theoretically, 100 kilograms of opium with an average morphine content of 12.3% can yield 12.3 kilograms of pure morphine (12.3% of 100). However, in reality, traffickers are not well trained chemists and do not work under optimal conditions, thus it is unlikely that the full potential of raw opium is used, and a certain percentage of potential morphine production is lost at this stage.

Figure 31: Simplified flow chart of the main stages of processing pure heroin base from opium.



*Note: *oven-dried values are used in estimation; **For the purpose of comparability, 100% pure heroin base is considered.*

In the second step, morphine base is converted to heroin base by adding precursor substances such as acetic anhydride. During this step, when it becomes pure heroin base, the morphine molecule gains two additional "acetyl groups" from the acetic anhydride. These additional molecules add weight to the morphine base: in an optimal scenario, when morphine is completely converted into pure heroin base, the heroin output is 1.29[22] times heavier than the morphine used as input. Thus, 1 kilogram of pure morphine can theoretically yield 1.29 kilograms of pure heroin, if the reaction goes to completion. But this reflects only a potential weight gain as losses also occur at this stage.

The combined losses in both steps are reflected in "laboratory efficiency", which is a measure of the ability of traffickers and clandestine chemists to extract morphine from opium and to convert it into heroin. Laboratory efficiency is expressed as the percentage of actual amount of pure heroin base produced over the theoretically possible, maximum output (potential amount). Laboratory efficiency can vary substantially, depending on factors such as the skills and efforts of the chemists producing the heroin, the availability and quality of precursor substances, and the equipment used.

The number of kilograms of raw opium needed to produce a kilogram of pure heroin base is thus given by the inverse of the product of

average morphine content (%) x chemical conversion ratio (1.29) x laboratory efficiency (%).

Data on morphine content is available from the annual investigations undertaken from 2000 to 2005, and 2010 to 2012.[23] These data show that the morphine content of opium harvested in Afghanistan has decreased since 2005, which was the reason for updating the conversion ratio of opium to heroin in 2014.

[22] The factor of 1.29 is the ratio of the molecular weight of heroin to that of morphine (molecular weight of heroin and morphine are 369.42 and 285.34, respectively).
[23] In 2013 and 2014, UNODC/MCN also collected samples. These samples have been dried and stored to be analysed in the CNPA forensic laboratory when it becomes operational.

Between 2000 and 2003, 39 opium samples from different regions of Afghanistan, which contained an average of 15.0% morphine content (95% confidence interval ±1.32),[24] were analysed. In 2004 and 2005, a total of 56 opium samples was collected and analysed, which had an average morphine content of 13.6% (95% confidence interval ±1.2).[25] From 2010 to 2012, 57 opium samples from all regions of Afghanistan were collected and analysed, which presented a statistically significant[26] lower average morphine content of 12.3% (95% confidence interval ±0.7)[27] than the average from 2000 to 2005. A trend analysis of all yearly data reveals a statistically significant[28] declining trend of average morphine content.

Based on recent trends, the simple[29] average of the morphine content of all samples collected between 2010 and 2012 was used (12.3%) for the calculations of the conversion ratio. When more data becomes available, the morphine content will be updated.

While there is updated information on morphine content available, little is known about the laboratory efficiency of heroin laboratories in Afghanistan.

When the opium/heroin conversion ratio was revised in 2005, the underlying assumption was a laboratory efficiency of 60-70% together with a heroin purity range of 45-85%. These percentages were based on interviews with key informants and seizure data for purity.

In the same year, a study[30] conducted by the Federal Criminal Police Office, Wiesbaden, Germany was published, in which white heroin hydrochloride was produced by using locally seized substances and equipment. In this experiment, a laboratory efficiency[31] of 34% was achieved in the conversion of raw opium of low quality (8.5% morphine content) to pure heroin base. This is the only study available to date that has investigated laboratory efficiency in Afghanistan[32] under local conditions. The study has a number of limitations, including a limited number of experiments performed by only two "heroin cooks".

The main uncertainty surrounding the conversion ratio of opium to pure heroin base is thus due to a lack of information on the average efficiency of heroin laboratories in Afghanistan: the processing of illicit heroin from opium is normally carried out with readily available equipment such as buckets, barrels, pots and cloth.[33] Precursors and chemicals used, such as acetic anhydride, ammonium chloride, acids, bases and solvents, are of unknown purities. Furthermore, laboratory operators may be experienced but seldom have any background in chemistry. All these factors considered, laboratory efficiency can vary anywhere from 30% to 70% efficiency and an assumption of either percentage could be either a gross under- or over-estimation.

When estimating the quantity of pure heroin base yielded from annual Afghan opium production, UNODC/MCN uses a laboratory efficiency of 34% for the estimation of the conversion ratio of opium to pure heroin base. If 70% laboratory efficiency could be achieved the conversio ratio from opium to pure heroin base would change from 18.5:1 to 9:1. The estimated heroin production would thus almost double. If more data on laboratory efficiency becomes available, the ratio will be updated.

[24] UNODC, SCITEC/19, Limited Opium Yield Assessment Surveys, December 2003.
[25] Analysis of the raw data used in B. Remberg, A.F. Sterrantino, R. Artner, C. Janitsch, L. Krenn, Science in drug control: the alkaloid content of Afghan opium, Chemistry and Biodiversity, 5 (2008), pp. 1770–1779.
[26] $p<0.05$.
[27] Recent data collected by UNODC/MCN.
[28] $p<0.001$.
[29] Analysis revealed that there are no statistically significant differences between regions in the data collected between 2010 and 2012. Therefore, the data has not been weighted according to production.

[30] Bulletin on Narcotics, vol. LVII, Nos. 1 and 2, 2005, pp. 11-31.
[31] In the study, 70 kilograms of raw opium with 8.5% morphine content were converted to 2.9 kilograms of pure heroin hydrochloride, which is equivalent to 2.64 kilograms of pure heroin base – assuming no further losses at this stage.
[32] A DEA study on heroin laboratory efficiency in Colombia estimated an overall laboratory efficiency of 67.2% under local conditions from opium (latex) to heroin HCl. This study is not applicable to Afghanistan, because in Colombia processors use a unique method known as the "ammonia method" (key chemicals are ammonia and ethyl acetate) to extract morphine base from opium latex.
[33] Bulletin on Narcotics, vol. LVII, Nos. 1 and 2, 2005.

6.6.1 Heroin of export quality – purity

The amount of pure heroin produced can only be a theoretical measure of the heroin output of Afghanistan opium production: heroin is rarely traded in its pure form and comes as brown heroin base or white heroin (heroin hydrochloride). It is also cut with diluents such as caffeine, chloroquine, phenolphthalein and paracetamol. When aiming to reflect local markets and estimate heroin availability for consumption, an estimate of the amount of heroin of export quality (quality of heroin traded by traffickers at the wholesale level) produced in a given year is a more informative measure.

Scarce data is available for the purity of heroin exported from Afghanistan. In 2014 and in 2015, the typical purity of heroin of wholesale quality reported by Turkey has been used for estimating purity of export quality. Turkey is an important transit country for opiates trafficked from Afghanistan to Europe and reports purities on a regular basis. However, the percentage is only a single data point and can therefore only give a rough indication for the actual average purity of heroin trafficked out of Afghanistan.

6.7 Average farm-gate price and farm-gate value of opium production

Since 2009, farm-gate prices at harvest time have been derived from the opium price monitoring system and refer to the month when opium harvesting actually took place in the different regions of the country, which is thought to reflect opium prices at harvest time better. To calculate the national average price, regional price averages were weighted by regional opium production. The opium price in the Central region was calculated from the annual village survey, as there is no monthly opium price monitoring in that region.

The farm-gate value of opium production is the product of potential opium production at the national level multiplied by the weighted average farm-gate price of dry opium at harvest time. The upper and lower limits of the range of the farm-gate value were determined by using the upper and lower opium production estimate.

Annex I: Indicative district level estimates of opium poppy cultivation, 2001-2015 (Hectares)[34]

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Badakhshan	Arghanj Khwah	-	-	-	-	-	-	54	-	-	-	-	-	-	-	10
Badakhshan	Argo	-	-	-	-	-	-	210	60	203	327	617	610	565	2,046	1,273
Badakhshan	Baharak	345	180		5,544	1,635	710	-	14	2	-	-	43	322	41	271
Badakhshan	Darayim	-	-	-	-	-	-	682	43	145	289	662	898	684	1,282	1,530
Badakhshan	Darwaz-i Payin (mamay)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Badakhshan	Darwaz-i- Bala (nesay)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Badakhshan	Faiz abad (Provincial Center)	868	2,370	3,109	2,362	3,111	7,154	83	64	11	10	64	7	48	65	4
Badakhshan	Eshkashim	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Badakhshan	Jurm	2,897	2,690	4,502	4,818	1,460	2,027	170	6	6	2	43	98	196	85	50
Badakhshan	Khash	-	-	-	-	-	-	999	7	6	4	46	-	-	-	152
Badakhshan	Khwahan	-	-	-	-	-	-	-	-	-	-	-	-	5	21	7
Badakhshan	Kishim	2,191	2,840	4,530	2,883	1,076	3,165	-	2	68	204	73	45	141	117	35
Badakhshan	Kohistan	-	-	-	-	-	-	-	-	-	-	-	2	0	11	8
Badakhshan	Kuf Ab	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-
Badakhshan	Kiran wa Munjan	-	-	-	-	48	-	10	-	-	-	-	-	0	0	-
Badakhshan	Raghistan	-	-	-	-	-	-	400	-	-	-	-	19	9	26	-
Badakhshan	Shahri Buzurg	41	170	615		39	-	313	-	2	3	3	36	148	59	37
Badakhshan	Shighnan	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-
Badakhshan	Shiki	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-
Badakhshan	Shuhada	-	-	-	-	-	-	-	-	-	-	-	12	86	236	-
Badakhshan	Tagab	-	-	-	-	-	-	93	-	-	-	-	22	36	101	57
Badakhshan	Tashkan	-	-	-	-	-	-	136	-	57	163	145	73	107	92	595
Badakhshan	Wakhan	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-
Badakhshan	Wardooj	-	-	-	-	-	-	9	3	14	1	1	-	0	0	-
Badakhshan	Yaftal-i-Sufla	-	-	-	-	-	-	305	-	43	97	50	32	18	12	25
Badakhshan	Yamgan	-	-	-	-	-	-	10	-	-	-	-	1	-	5	10	-
Badakhshan	Yawan	-	-	-	-	-	-	166	-	-	-	-	30	-	-	2
Badakhshan	Zaybak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Badakhshan Total		**6,342**	**8,250**	**12,756**	**15,607**	**7,369**	**13,056**	**3,642**	**200**	**557**	**1,100**	**1,705**	**1,927**	**2,374**	**4,204**	**4,056**
Badghis	Ab Kamari	-	-	-		-	127	-	11	161	16	5	14	24	-	1,996
Badghis	Ghormach	-	4	101	-	944	624	250	328	299	486	1,485	1,005	2,395	1,009	6,855
Badghis	Jawand	-	-	-	226	134	431	66	13	1,090	130	106	187	850	797	683
Badghis	Muqur	-	-	-	-	-	220	149	7	102	81	9	61	26	47	86
Badghis	Bala Murghab	-	22	69	345	1,889	1,034	3,557	81	2,754	2,055	284	870	-	3,762	1,417
Badghis	Qadis	-	-	-	-	-	391	198	146	906	135	92	152	264	57	1,331
Badghis	Qala-i-Now (Provincial Center	-	-	-	43	-	378	-	-	99	55	9	75	37	49	23
Badghis Total		**0**	**26**	**170**	**614**	**2,967**	**3,205**	**4,219**	**587**	**5,411**	**2,958**	**1,990**	**2,363**	**3,596**	**5,721**	**12,391**
Baghlan	Andarab	81	31	301	564	548	947	130	475	-	-	18	5	3	4	8
Baghlan	Baghlan *	-	120	16	154	374	72	-	-	-	-	-	-	-	-	-
Baghlan	Baghlan-i-Jadeed	-	-	-	81	248	371	287	-	-	-	-	-	-	-	-
Baghlan	Burka	-	-	-	198	242	39	31	-	-	-	-	-	4	1	0
Baghlan	Dahana-i- Ghuri	-	-	37	200	24	35	-	-	-	-	-	-	-	-	-
Baghlan	Deh Salah	-	-	-	-	-	-	14	-	-	-	113	33	37	60	68
Baghlan	Dushi	-	-	-	89	116	174	68	-	-	-	-	-	-	-	-
Baghlan	Firing Wa Gharu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baghlan	Gozargah-i-Noor	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-
Baghlan	Kahmard *	-	-	-	527	263	255	-	-	-	-	-	-	-	-	-
Baghlan	Khinjan	-	-	9	21	92	137	23	-	-	-	-	-	-	-	-
Baghlan	Khost Wa Firing	-	-	21	-	295	442	56	-	-	-	-	-	-	-	-
Baghlan	Khwajah Hijran (Jalgah)	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
Baghlan	Nahreen	1	-	63	276	35	36	-	-	-	-	-	-	-	-	-
Baghlan	Pul-i-Hisar	-	-	-	-	-	-	-	-	-	-	30	139	97	103	104
Baghlan	Pul-i-Khumri (Provincial Cente	-	1	37	173	224	81	21	-	-	-	-	-	-	-	-
Baghlan	Talah wa Barfak	-	-	113	161	102	153	-	-	-	-	-	-	-	-	-
Baghlan Total		**82**	**152**	**597**	**2,444**	**2,563**	**2,742**	**671**	**475**	**p-f**	**p-f**	**161**	**177**	**141**	**168**	**180**
Balkh	Balkh	1	22	332	411	2,786	1,975	-	-	-	-	-	-	-	-	-
Balkh	Chahar Bolak	-	-	68	877	2,701	799	-	-	-	-	-	-	10	-	9
Balkh	Chahar Kent	-	-	-	23	25	16	-	-	-	-	-	-	-	-	-
Balkh	Chimtal	-	153	617	258	1,878	2,074	-	-	-	-	-	-	400	-	195
Balkh	Dowlat abad	3	-	-	141	202	181	-	-	-	-	-	-	-	-	-
Balkh	Dehdadi	-	8	35	16	990	307	-	-	-	-	-	-	-	-	-
Balkh	Kaldar (Shahrak-i-Hairatan)	-	-	-	152	395	123	-	-	-	-	-	-	-	-	-
Balkh	Khulm	-	-	-	50	367	-	-	-	-	-	-	-	-	-	-
Balkh	Kishindeh	-	-	-	111	290	189	-	-	-	-	-	-	-	-	-
Balkh	Marmul	-	-	-	3	18	12	-	-	-	-	-	-	-	-	-
Balkh	Mazar-i-Sharif	-	-	-	50	119	78	-	-	-	-	-	-	-	-	-
Balkh	Nahr-i-Shahi	-	14	30	139	425	833	-	-	-	-	-	-	-	-	-
Balkh	Sholgarah	-	19	28	256	543	245	-	-	-	-	-	-	-	-	-
Balkh	Shortepa	-	-	-	8	98	401	-	-	-	-	-	-	-	-	-
Balkh	Sharak-e-Hayratan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balkh	Zari	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balkh Total		**4**	**217**	**1,108**	**2,495**	**10,837**	**7,233**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**410**	**P-f**	**204**

[34] *The survey is designed to produce province level estimates. District estimates are derived by a combination of different approaches. They are indicative only, and suggest a possible distribution of the estimated provincial poppy area among the districts of a province.*

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bamyan	Bamyan (Provincial Center)	-	-	20	93	19	17	-	-	-	-	-	-	-	-	-
Bamyan	Kahmard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bamyan	Panjab	-	-	250	31	-	-	-	-	-	-	-	-	-	-	-
Bamyan	Saighan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bamyan	Shebar	-	-	36	492	107	-	-	-	-	-	-	-	-	-	-
Bamyan	Waras	-	-	191	64	-	-	-	-	-	-	-	-	-	-	-
Bamyan	Yakawlang	-	-	112	123	-	-	-	-	-	-	-	-	-	-	-
Bamyan Total				**610**	**803**	**126**	**17**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Day Kundi	Gizab	-	-	1,305	2,109	-	2,243	1,054	665	810	722	621	684	727	Part of Uruzgan	Part of Uruzgan
Day Kundi	Ishtarlay	-	-	-	-	-	-	535	214	239	9	9	9	6	8	16
Day Kundi	Kajran	-	-	725	789	-	2,581	366	357	704	622	153	288	700	320	124
Day Kundi	Khedir	-	-	-	-	-	-	531	289	160	5	8	9	4	6	24
Day Kundi	Kiti	-	-	-	-	-	-	282	168	284	134	151	14	-	-	13
Day Kundi	Mir Amor	-	-	-	-	-	-	512	281	703	19	22	5	12	16	72
Day Kundi	Nili (Provincial Center)	-	-	-	-	-	-	-	214	5	5	9	16	3	-	-
Day Kundi	Sang-i-Takht	-	-	-	-	-	-	2	1	68	10	15	8	30	150	43
Day Kundi	Shahristan	1	-	415	817	-	2,220	64	85	29	21	13	25	53	87	89
Day Kundi Total		**1**	**0**	**2,445**	**3,715**	**2,581**	**7,044**	**3,346**	**2,273**	**3,002**	**1,547**	**1,003**	**1,058**	**1,536**	**587**	**381**
Farah	Anar Darah	-	-	-	91	1,828	143	16	239	79	1	9	3	314	104	-
Farah	Bakwah	-	-	-	39	390	1,093	3,458	3,090	3,570	1,936	800	5,822	8,844	12,651	5,567
Farah	Bala Buluk	-	-	513	336	1,665	1,669	5,312	1,509	2,705	2,586	3,157	3,951	1,947	2,730	7,033
Farah	Delaram	-	-	-	-	-	-	-	-	3,011	4,404	4,263	8,899	part of Nimroz	part of Nimroz	part of Nimroz
Farah	Farah (Provincial Center)	-	-	-	87	729	905	1,328	1,013	1,142	51	-	129	4,451	4,760	128
Farah	Gulistan	-	-	1,187	447	163	202	1,132	4,756	1,355	2,661	4,565	3,920	3,759	2,000	1,065
Farah	Khaki-Safed	-	-	-	84	432	537	99	609	232	645	1,103	2,220	1,186	1,726	4,562
Farah	Lash-i-Juwayn	-	-	-	41	1,568	215	233	109	45	3	6	2	179	27	7
Farah	Pur Chaman	-	-	-	409	293	363	1,549	1,046	96	2,175	3,512	2,164	230	930	365
Farah	PushtRod	-	-	-	554	2,482	1,709	1,314	1,588	46	61	46	505	2,521	2,214	2,192
Farah	Qala-i-Kah	-	-	-	189	407	506	337	888	47	11	39	117	914	354	186
Farah	Shib Koh	-	-	-	12	283	352	87	163	77	18	-	-	149	17	1
Farah Total		**0**	**500**	**1,700**	**2,289**	**10,240**	**7,694**	**14,865**	**15,010**	**12,405**	**14,552**	**17,499**	**27,733**	**24,492**	**27,513**	**21,106**
Faryab	Almar	-	-	-	239	57	338	213	-	-	-	-	-	-	-	-
Faryab	Andkhoy	-	-	-	15	13	31	-	-	-	-	-	-	-	-	-
Faryab	Bil Chiragh	-	26	232	24	-	322	620	102	-	-	-	-	-	-	-
Faryab	Dowlat abad	-	-	-	78	133	27	-	-	-	-	-	-	-	-	-
Faryab	Gurziwan	-	-	-	-	-	-	101	-	-	-	75	-	46	40	108
Faryab	Khani ChaharBagh	-	-	-	205	6	490	-	-	-	-	-	-	-	-	-
Faryab	Khwajah Sabz Poshi Wali	-	-	-	129	451	375	238	-	-	-	-	-	-	-	-
Faryab	Kohistan	-	-	-	640	50	84	152	10	-	-	49	-	65	69	69
Faryab	Maimanah	-	-	-	248	-	218	66	10	-	-	-	-	-	-	-
Faryab	Pashtun Kot	-	1	281	429	97	60	249	-	-	-	9	-	1	-	-
Faryab	Qaram Qul	-	-	-	55	138	43	-	-	-	-	-	-	-	-	-
Faryab	Qaisar	-	-	150	1,050	579	880	303	168	-	-	13	-	46	102	983
Faryab	Qurghan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Faryab	Shirin Tagab	-	-	103	137	1,141	172	924	-	-	-	-	-	-	-	-
Faryab Total		**0**	**28**	**766**	**3,249**	**2,665**	**3,040**	**2,866**	**291**	**p-f**	**p-f**	**146**	**p-f**	**158**	**211**	**1,160**
Ghazni	Ab Band	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Ajristan	-	-	-	62	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Andar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Bahram-e Shahid (Jaghatu)	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-
Ghazni	Deh Yak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Gelan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Ghazni (Provincial Center)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Giro	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Jaghatu *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Jaghuri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Khwajah Omari	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Malistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Muqur	-	-	-	-	-	-	-	-	-	v	-	-	-	-	-
Ghazni	Nawa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Nawur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Qara Bagh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Rashidan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Waghaz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Wali Muhammad Shadid Khu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni	Zanakhan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghazni Total		**0**	**0**	**0**	**62**	**9**	**0**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Ghor	Chaghcharan (Provincial Cent	-	700	1,189	872	1,149	1,233	910	-	-	-	-	71	72	222	397
Ghor	Chahar Sadah	-	-	-	-	-	-	41	-	-	-	-	-	64	95	-
Ghor	Dowlatyar	-	-	-	-	-	-	132	-	-	-	-	5	82	117	154
Ghor	Do Lainah	-	-	-	-	-	-	131	-	-	-	-	16	9	9	17
Ghor	Lal Wa Sarjangal	-	-	-	1,055	718	771	200	-	-	-	-	-	-	9	280
Ghor	Pasaband	-	700	805	175	48	241	17	-	-	-	-	-	-	-	633
Ghor	Saghar	-	300	256	340	120	283	18	-	-	-	-	-	-	-	8
Ghor	Shahrak	-	-	640	902	18	1,398	-	-	-	-	-	33	37	41	62
Ghor	Taywara	-	500	808	649	240	608	39	-	-	-	-	-	-	-	126
Ghor	Tulak	-	-	84	990	396	145	16	-	-	-	-	-	-	-	44
Ghor Total		**0**	**2,200**	**3,782**	**4,983**	**2,689**	**4,679**	**1,503**	**p-f**	**p-f**	**p-f**	**p-f**	**125**	**264**	**493**	**1,721**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Hilmand	Baghran	-	1,800	2,309	2,232	2,507	2,890	4,287	4,279	3,343	4,049	6,739	2,788	4,037	4,553	2,190
Hilmand	Dishu	-	-	-	369	911	851	1,160	688	475	119	481	1,601	4,161	3,338	3,528
Hilmand	Garm Ser	-	2,020	462	1,922	1,912	6,168	6,523	8,000	5,789	6,333	4,342	1,246	4,527	8,394	10,406
Hilmand	Kajaki	-	2,640	1,392	1,676	1,639	6,760	5,807	6,240	3,696	3,299	6,435	9,065	10,611	10,836	11,564
Hilmand	Lashkargah (Provincial Cente	-	1,140	605	1,380	1,332	4,008	6,320	7,857	4,379	2,014	649	1,469	1,828	2,562	2,089
Hilmand	Musa Qala	-	3,690	2,455	2,404	1,664	6,371	8,854	12,687	8,603	8,415	**10,340**	7,235	10,586	8,320	6,974
Hilmand	Nad Ali	-	5,880	870	4,177	2,356	11,652	20,045	20,824	17,063	18,646	5,413	8,038	19,136	22,256	17,022
Hilmand	Marja	-	-	-	-	-	-	-	-	-	-	2,629	2,046	part of Nad Ali	part of Nad Ali	part of Nad Ali
Hilmand	Naher-i-Saraj	-	1,850	1,575	6,486	3,548	10,386	22,769	13,270	9,598	11,517	12,638	22,468	18,701	16,984	11,759
Hilmand	Nowzad	-	2,650	3,096	1,051	3,737	2,707	6,192	3,863	6,473	2,845	4,694	10,822	11,944	9,839	5,576
Hilmand	Nawa-i-Barukzai	-	2,730	1,240	3,506	2,552	10,168	6,314	13,978	4,416	1,328	1,610	41	97	319	2,176
Hilmand	Reg-i-Khan Nishin	-	1,940	-	1,893	2,772	3,765	8,484	4,720	2,056	2,292	2,120	2,718	5,912	6,781	7,352
Hilmand	Sangin Qala	-	2,810	777	1,365	1,184	2,862	5,150	5,532	2,754	2,631	2,941	2,882	3,709	5,349	3,731
Hilmand	Washer	-	800	590	892	386	735	865	1,653	1,188	1,555	2,275	2,757	5,445	3,710	2,076
Hilmand Total		**0**	**29,950**	**15,371**	**29,353**	**26,500**	**69,323**	**102,770**	**103,590**	**69,833**	**65,045**	**63,307**	**75,176**	**100,693**	**103,240**	**86,443**
Hirat	Adraskan	-	-	-	133	9	99	196	22	1	-	-	-	3	10	5
Hirat	Chiisht-i-Sharif	-	-	-	166	42	42	-	-	-	-	-	-	-	-	-
Hirat	Fersi	-	-	134	28	110	111	-	-	-	-	-	-	-	-	-
Hirat	Ghoryan	-	-	-	60	238	204	302	-	-	-	-	-	-	-	-
Hirat	Gulran	-	-	-	240	33	32	-	-	-	-	-	-	-	-	-
Hirat	Guzara	-	-	-	88	231	233	-	-	-	-	-	-	-	-	-
Hirat	Hirat	-	-	-	-	16	16	-	-	-	-	-	-	-	-	-
Hirat	Enjil	-	-	-	41	394	382	-	-	-	-	-	-	-	-	-
Hirat	Karrukh	-	-	-	265	124	121	-	-	-	-	-	-	-	-	-
Hirat	Kohsan	-	-	-	4	72	73	146	-	-	-	-	-	-	-	-
Hirat	Kushk (Rabat-i-Sangi)	-	-	-	73	64	50	367	43	-	-	-	-	-	-	-
Hirat	Kusk-i-Kohnah	-	-	-	3	15	15	-	-	-	-	-	-	-	-	-
Hirat	Obe	-	-	-	842	144	131	-	-	-	-	-	-	-	-	-
Hirat	Pashtun Zarghun	-	-	-	154	249	242	-	-	-	-	-	-	-	-	-
Hirat	Shindand	-	-	-	427	54	408	516	201	555	360	366	1,080	949	729	280
Hirat	Zendah Jan	-	-	-	7	128	129	-	-	-	-	-	-	-	-	-
Hirat Total		**0**	**50**	**134**	**2,531**	**1,924**	**2,288**	**1,526**	**266**	**556**	**360**	**366**	**1,080**	**952**	**738**	**285**
Jawzjan	Aqchah	-	47	171	247	631	30	-	-	-	-	-	-	-	-	-
Jawzjan	Darzab	-	-	-	625	272	16	803	-	-	-	-	-	-	-	-
Jawzjan	Faizabad	-	24	280	218	112	473	21	-	-	-	-	-	-	-	-
Jawzjan	Khamyab	-	30	51	40	68	2	-	-	-	-	-	-	-	-	-
Jawzjan	Khanaqa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jawzjan	Khwajah DuKoh	-	-	-	19	15	271	-	-	-	-	-	-	-	-	-
Jawzjan	Mardyan	-	4	228	174	21	348	62	-	-	-	-	-	-	-	-
Jawzjan	Mingajik	-	7	64	101	77	38	-	-	-	-	-	-	-	-	-
Jawzjan	Qarqin	-	24	58	151	43	17	-	-	-	-	-	-	-	-	-
Jawzjan	Qush Tepah	-	-	-	-	-	-	43	-	-	-	-	-	-	-	-
Jawzjan	Sheberghan (Provincial Cente	-	1	36	98	508	828	156	-	-	-	-	-	-	-	-
Jawzjan Total		**0**	**137**	**888**	**1,673**	**1,748**	**2,023**	**1,086**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Kabul	Bagrami	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Chahar Asyab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	DehSabz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Farzah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Gulara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Estalef	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Kabul	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Kalakan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Khak-i-Jabar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Mir Bacha Kot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Musahi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Paghman	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Qara Bagh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Shakar Dara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabul	Surubi	29	58	237	282	-	80	500	310	132	152	220	120	298	233	321
Kabul Total		**29**	**58**	**237**	**282**	**0**	**80**	**500**	**310**	**132**	**152**	**220**	**120**	**298**	**233**	**321**
Kandahar	Arghandab	-	330	139	261	287	735	1,016	57	158	22	84	114	18	512	247
Kandahar	Arghistan	-	80	14	651	2,449	784	310	28	43	7	42	90	155	1,515	178
Kandahar	Daman	-	190	357	895	775	183	375	19	119	-	-	-	-	1,227	37
Kandahar	Ghorak	-	380	166	241	233	336	1,445	232	628	1,466	1,165	952	676	269	691
Kandahar	Kandahar (Provinclal Center)	-	640	293	-	-	1,367	1,220	590	425	108	262	11	46	-	56
Kandahar	Khakrez	-	560	312	145	185	217	132	1,224	1,474	1,215	1,190	794	1,006	867	433
Kandahar	Maruf	-	-	63	117	150	464	914	182	36	33	31	28	49	275	8
Kandahar	Maiwand	-	1,090	353	514	1,281	1,362	2,878	3,375	6,524	9,966	10,114	12,690	16,382	16,228	9,112
Kandahar	Miya Neshin	-	-	-	-	-	-	322	1,603	158	44	45	30	162	632	4
Kandahar	Nesh	-	-	-	-	-	-	432	3,284	1,717	2,842	2,096	620	1,057	405	1,065
Kandahar	Panjwayee	-	150	482	864	4,687	4,714	-	-	1,564	2,982	4,914	4,780	984	3,315	1,735
Kandahar	Reg	-	-	-	-	327	-	4	-	-	-	-	-	-	-	-
Kandahar	Shah Wali Kot	-	260	489	923	2,379	1,593	1,258	560	911	813	615	242	474	1,471	541
Kandahar	Shorabak	-	-	111	45	19	409	308	4	-	-	-	-	102	-	-
Kandahar	Spin Boldak	-	290	277	303	218	454	768	541	650	1,359	1,368	121	207	1,889	2,027
Kandahar	Zhire	-	-	-	-	-	-	5,232	2,923	5,405	4,978	5,288	3,867	7,017	5,108	4,886
Kandahar Total		**0**	**3,970**	**3,055**	**4,959**	**12,990**	**12,618**	**16,615**	**14,623**	**19,811**	**25,835**	**27,213**	**24,341**	**28,335**	**33,713**	**21,020**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Kapisa	AlaSai	-	-	-	77	82	-	367	-	-	-	3	34	33	125	71
Kapisa	Hisah-i-Awal Kohistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kapisa	Hisah-i-Duwumi Kohistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kapisa	Koh Band	-	-	-	111	33	-	-	-	-	-	9	16	20	46	10
Kapisa	Kohistan	-	-	-	116	-	-	-	-	-	-	-	-	-	-	-
Kapisa	Mahmood-i-Raqi (Provincial C	-	-	-	10	-	-	-	-	-	-	-	-	1	-	-
Kapisa	Nijrab	-	-	-	92	-	-	-	-	-	-	14	21	20	30	21
Kapisa	Tagab	0	207	326	116	-	282	468	436	-	-	155	219	508	270	358
Kapisa Total		**0**	**207**	**326**	**522**	**115**	**282**	**835**	**436**	**p-f**	**p-f**	**181**	**290**	**582**	**472**	**460**
Khost	Bak	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-
Khost	Gurbuz	-	-	-	47	-	10	-	-	-	-	-	-	-	-	-
Khost	Jaji Maidan	-	-	-	8	-	16	-	-	-	-	-	-	-	-	-
Khost	Khost Matun (Provincial Cent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Khost	Manduzay (Ismyel Khel)	-	-	-	125	-	-	-	-	-	-	-	-	-	-	-
Khost	Musa Khel (Mangal)	-	-	-	86	-	-	-	-	-	-	-	-	-	-	-
Khost	NadirShah Kot	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-
Khost	Qalandar	-	-	-	39	-	-	-	-	-	-	-	-	-	-	-
Khost	Sabari (Yaqubi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Khost	Shamul (Dzadran)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Khost	Spera	-	-	118	-	-	5	-	-	-	-	-	-	-	-	-
Khost	Tanay	6	-	257	458	2	88	-	-	-	-	-	-	-	-	-
Khost	Terayzai (Ali Sher)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Khost Total		**6**	**0**	**375**	**838**	**2**	**133**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Kunar	Asad Abad (Provincial center	1	140	396	841	270	356	42	252	4	-	-	61	342	209	1
Kunar	Bar Kunar (Asmar)	31	40	163	52	14	10	111	7	9	7	18	62	83	57	58
Kunar	Chapa Dara	-	-	-	535	147	23	-	-	-	12	42	-	-	-	-
Kunar	Dangam	4	49	-	44	22	9	90	-	9	-	43	30	46	46	28
Kunar	Dara-i-Pech	11	263	310	585	76	183	-	0	1	5	170	298	254	82	30
Kunar	Ghazi Abad	-	-	-	-	-	-	5	-	0	4	13	-	-	-	5
Kunar	Khas Kunar	-	70	-	298	41	18	8	1	-	-	-	57	79	21	116
Kunar	Mara warah	-	-	345	170	22	33	6	-	84	-	2	4	1	-	28
Kunar	Narang wa Badil	10	100	173	425	55	25	57	-	4	1	1	41	22	4	5
Kunar	Nari	1	-	60	-	19	-	80	15	1	-	-	21	18	7	20
Kunar	Noor Gal	9	70	353	460	58	88	7	-	4	20	20	101	-	79	9
Kunar	Sar Kani	8	100	141	385	50	75	11	6	1	-	-	14	25	-	476
Kunar	Shigal wa Sheltan	-	-	-	-	-	-	5	-	36	73	102	459	212	155	71
Kunar	Sawkai	8	140	83	571	284	111	19	9	4	33	30	124	-	50	8
Kunar	Watapoor	-	-	-	-	-	-	3	-	6	-	137	7	46	45	132
Kunar Total		**74**	**972**	**2,025**	**4,366**	**1,059**	**931**	**446**	**290**	**164**	**155**	**578**	**1,279**	**1,127**	**754**	**987**
Kunduz	Ali Abad	-	3	5	41	-	-	-	-	-	-	-	-	-	-	-
Kunduz	Dashti-i-Archi	-	-	-	9	-	102	-	-	-	-	-	-	-	-	-
Kunduz	Chahar Darah	-	6	15	37	-	-	-	-	-	-	-	-	-	-	-
Kunduz	Hazrati Imam Sahib	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-
Kunduz	Khanabad	-	-	11	70	-	-	-	-	-	-	-	-	-	-	-
Kunduz	Kunduz (Provincial Center)	-	3	9	32	-	-	-	-	-	-	-	-	-	-	-
Kunduz	Qala-i-Zal	-	5	8	7	275	-	-	-	-	-	-	-	-	-	-
Kunduz Total		**0**	**16**	**49**	**224**	**275**	**102**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Laghman	Alingar	3	146	354	593	107	259	23	13	1	48	343	303	503	477	277
Laghman	Alisheng	0	104	148	597	69	192	237	370	1	65	124	335	472	278	285
Laghman	Dowlat Shah	12	-	571	233	44	118	124	3	0	31	52	158	142	5	90
Laghman	Mehterlam (Provincial Center	-	240	366	580	25	-	-	16	43	90	104	69	119	137	123
Laghman	Qarghayee	0	460	468	753	30	140	177	23	90	-	-	12	-	5	4
Laghman Total		**15**	**950**	**1,907**	**2,756**	**274**	**709**	**561**	**425**	**135**	**234**	**624**	**877**	**1,236**	**901**	**779**
Logar	Azra	1	38	419	603	-	-	-	-	-	-	-	-	-	-	-
Logar	Baraki Barak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Logar	Charkh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Logar	Kharwar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Logar	Khoshi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Logar	Muhammad Aghah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Logar	Pul-i-Alam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Logar Total		**1**	**38**	**419**	**603**	**0**	**0**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Nangarhar	Achin	1	940	2,131	1,907	198	1,274	1,797	-	14	10	254	580	2,224	3,004	1,090
Nangarhar	Bati Kot	-	2,390	1,994	4,683	166	550	1,774	-	-	-	-	-	-	-	4
Nangarhar	Behsud	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nangarhar	Chaparhar	2	990	1,169	1,818	20	209	878	-	-	-	12	19	1,452	1,866	1,504
Nangarhar	Darah-i- Noor	-	380	24	472	2	-	322	-	-	-	-	-	-	162	11
Nangarhar	Deh Bala	11	650	927	358	17	68	1,075	-	-	-	-	14	-	-	275
Nangarhar	Dur Baba	-	40	31	99	5	19	36	-	-	-	-	-	-	-	-
Nangarhar	Goshta	99	150	13	217	10	41	109	-	-	-	-	-	19	95	6
Nangarhar	Hesarak	2	620	1,016	1,392	64	283	295	-	18	5	178	89	-	775	424
Nangarhar	Jalalabad	-	90	4	1,658	77	-	-	-	-	-	-	-	-	-	-
Nangarhar	Kama	-	1,120	558	1,898	82	-	-	-	-	-	-	-	-	14	-
Nangarhar	Khugyani	3	2,640	2,986	2,269	117	750	3,253	-	108	131	557	1,481	5,746	4,755	2,996
Nangarhar	Kot	-	-	-	-	-	-	-	-	-	-	-	-	993	2,040	872
Nangarhar	Kuzkunar	-	500	102	801	37	151	153	-	-	-	-	-	-	-	-
Nangarhar	Lalpoor	95	250	1	362	17	68	356	-	5	59	185	-	798	712	218
Nangarhar	Mohmand Dara	-	720	19	1,170	54	221	995	-	-	1	1	-	155	175	19
Nangarhar	Nazyan	-	150	98	168	8	160	266	-	1	-	-	-	-	-	-
Nangarhar	Pachir wagam	3	420	1,142	1,091	35	143	594	-	-	-	3	418	1,672	1,588	1,066
Nangarhar	Rodat	-	2,760	3,313	3,633	50	-	3,755	-	-	-	-	-	11	946	389
Nangarhar	Sherzad	2	1,470	1,641	1,229	57	430	864	-	148	513	1,510	550	2,650	1,876	884
Nangarhar	Shinwar	-	2,060	1,616	1,759	79	504	2,218	-	-	-	-	-	-	-	70
Nangarhar	Surkh Rud	0	1,440	118	1,229	-	-	-	-	-	-	-	-	-	219	188
Nangarhar Total		**218**	**19,780**	**18,904**	**28,213**	**1,093**	**4,871**	**18,739**	**0**	**294**	**719**	**2,700**	**3,151**	**15,719**	**18,227**	**10,016**
Nimroz	Asl-i-Chakhansur	-	-	-	-	-	-	-	1	-	183	855	98	9	-	57
Nimroz	Chahar Burjak	-	-	-	65	526	1,119	87	4	84	144	181	696	511	250	698
Nimroz	Kang	-	-	-	-	-	40	-	-	-	10	31	36	-	-	-
Nimroz	Khash Rod	-	-	26	50	1,164	661	6,421	6,197	326	1,621	1,323	2,536	15,731	14,334	8,046
Nimroz	Zaranj (Provincial Center)	-	-	-	-	-	135	-	-	17	81	102	442	1	-	4
Nimroz Total		**0**	**300**	**26**	**115**	**1,690**	**1,955**	**6,507**	**6,202**	**428**	**1,856**	**2,493**	**3,808**	**16,252**	**14,584**	**8,805**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Nuristan	Barg-i-Matal	-	-	-	2	535	522	-	-	-	-	-	-	-	-	-
Nuristan	Du Ab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuristan	Kamdesh	-	-	210	307	269	262	-	-	-	-	-	-	-	-	-
Nuristan	Mandol	-	-	-	-	731	713	-	-	-	-	-	-	-	-	-
Nuristan	Noor Gram	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuristan	Nuristan Paroon (Provincial C	-	-	438	185	19	19	-	-	-	-	-	-	-	-	-
Nuristan	Wama	-	-	-	66	-	-	-	-	-	-	-	-	-	-	-
Nuristan	Waygal	-	-	-	205	-	-	-	-	-	-	-	-	-	-	-
Nuristan Total				**648**	**765**	**1,554**	**1,516**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Paktika	Barmal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Dilah wa Khwoshamand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Giyan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Gomal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Jani Khel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Mata Khan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Nika	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Omna	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Sar Rowza	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Sharan (Provincial Center)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Sarubi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Turwo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Urgun	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Wazahkhwah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Wor Mamay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Yahya Khel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Yosuf Khel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Zarghun Shahr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika	Ziruk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktika Total		**0**	**0**	**0**	**0**	**0**	**0**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Paktya	Ahmadabad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Ali Khail															
Paktya	Samkani	-	-	76	275	-	-	-	-	-	-	-	-	-	-	-
Paktya	Dand Patan	-	-	-	175	-	-	-	-	-	-	-	-	-	-	-
Paktya	Gardez (Provincial Center)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Woza Jadran	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Jaji	-	-	185	11	-	-	-	-	-	-	-	-	-	-	-
Paktya	Jani Khel	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-
Paktya	Laja Ahmad Khel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Lija Mangal	-	-	-	118	-	-	-	-	-	-	-	-	-	-	-
Paktya	Sayyid Karam	-	-	41	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Shamul *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Shwak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya	Zurmat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paktya Total		**0**	**0**	**302**	**597**	**0**	**0**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Panjshir	Bazarak (Provincial Center)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Darah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Hissa-i-Awal(Khinj)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Hisa-i-Duwumi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Panjshir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Paryan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Rukhah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Shutul	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjshir	Unaba	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panjsher Total					**0**		**0**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Parwan	Bagram	-	-	-	274	-	-	-	-	-	-	-	-	-	-	-
Parwan	Charikar (Provincial Center)	-	-	-	181	-	-	-	-	-	-	-	-	-	-	-
Parwan	Syahgird (Ghorband)	-	-	-	141	-	-	-	-	-	-	-	-	-	-	-
Parwan	Jabalussaraj	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-
Parwan	Koh-i-Safi	-	-	-	41	-	124	-	-	-	-	-	-	-	-	-
Parwan	Salang	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parwan	Sayyid Khel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parwan	Shaykh Ali	-	-	-	263	-	-	-	-	-	-	-	-	-	-	-
Parwan	Shinwari	-	-	-	389	-	-	-	-	-	-	-	-	-	-	-
Parwan	Surkh-i-Parsa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parwan Total		**0**	**0**	**0**	**1,310**	**0**	**124**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Samangan	Aybak (Provincial Center)	-	-	14	27	-	-	-	-	-	-	-	-	-	-	-
Samangan	Darah-i-Soof-i-Bala	614	-	34	196	1,454	1,182	-	-	-	-	-	-	-	-	-
Samangan	Darah-i-Suf-i-Payin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samangan	Fayroz Nakhcheer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samangan	Hazrat-i-Sultan	-	-	29	85	280	90	-	-	-	-	-	-	-	-	-
Samangan	Khuram wa Sar Bagh	-	-	24	238	307	99	-	-	-	-	-	-	-	-	-
Samangan	Roi-Do-Ab	-	-	-	605	1,833	589	-	-	-	-	-	-	-	-	-
Samangan Total		**614**	**100**	**101**	**1,151**	**3,874**	**1,960**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Sari Pul	Balkhab	-	-	453	204	95	188	-	-	-	-	-	-	-	-	-
Sari Pul	Gosfandi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sari Pul	Kohistanat	-	-	-	471	1,424	377	-	-	-	-	-	-	-	-	-
Sari Pul	Sangcharak	-	-	-	687	441	1,122	16	-	-	-	-	-	-	-	-
Sari Pul	Sari Pul (Provincial Center)	-	-	595	476	959	415	203	-	-	-	-	-	-	-	-
Sari Pul	Sayyad	-	-	-	23	52	25	41	-	-	-	-	-	-	195	331
Sari Pul	Sozma Qala	-	57	380	113	256	124	-	-	-	-	-	-	-	-	-
Sari Pul Total		**0**	**57**	**1,428**	**1,974**	**3,227**	**2,251**	**260**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**195**	**331**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Takhar	Baharak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Takhar	Bangi	-	-	20	13	-	-	79	-	-	-	-	-	-	-	-
Takhar	Chahab	19	-	4	27	-	70	-	-	-	-	-	-	-	-	-
Takhar	Chal	20	-	-	30	-	15	9	-	-	-	-	-	-	-	-
Takhar	Darqad	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-
Takhar	DashtiQala	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Takhar	Farkhar	26	-	43	27	43	118	32	-	-	-	-	-	22	-	-
Takhar	Hazar Sumuch	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-
Takhar	Eshkamish	19	-	77	40	-	2	47	-	-	-	-	-	-	-	-
Takhar	Kalafgan	27	-	77	69	-	609	318	-	-	-	-	-	21	-	-
Takhar	Khwaja Bahawuddin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Takhar	Khwaja Ghar	32	-	26	35	-	109	-	-	-	-	-	-	-	-	-
Takhar	Namak Ab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Takhar	Rustaq	24	-	34	194	1,321	816	118	-	-	-	-	-	25	-	-
Takhar	Taloqan (Provincial Center)	16	-	14	115	-	77	577	-	-	-	-	-	2	-	-
Takhar	Warsaj	10	-	14	66	-	46	-	-	-	-	-	-	-	-	-
Takhar	Yangi Qala	20	-	71	131	-	317	-	-	-	-	-	-	-	-	-
Takhar Total		**211**	**788**	**380**	**762**	**1,364**	**2,179**	**1,211**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Uruzgan	Chorah	-	1,330	975	1,402	259	2,024	71	316	306	221	301	349	611	502	275
Uruzgan	Dihrawud	-	1,340	1,282	2,523	209	1,704	3,538	2,849	2,038	145	3,438	4,375	3,321	2,214	3,382
Uruzgan	Khas Uruzgan	-	-	580	358	338	886	173	304	407	230	384	38	123	1,074	172
Uruzgan	Nesh *	-	490	59	426	352	614	-	-	-	-	-	-	-	-	-
Uruzgan	Shahidi Hasas	-	1,190	1,333	782	646	1,127	3,109	4,403	2,445	3,635	3,601	3,617	3,888	2,296	3,489
Uruzgan	Tirin Kot (Provincial Center)	-	750	469	1,874	221	3,348	2,312	2,067	4,028	3,106	2,895	2,129	1,936	3,042	3,852
Uruzgan	Gizab*	-	-	-	-	-	-	-	-	-	-	-	-	-	148	107
Uruzgan Total		**0**	**5,100**	**4,698**	**7,365**	**2,025**	**9,703**	**9,203**	**9,939**	**9,224**	**7,337**	**10,620**	**10,508**	**9,880**	**9,277**	**11,277**
Wardak	Chak-i-Wardak	-	-	211	284	-	-	-	-	-	-	-	-	-	-	-
Wardak	Daimirdad	-	-	-	90	106	-	-	-	-	-	-	-	-	-	-
Wardak	Hisah-i-Awal Behsud	-	-	22	-	-	-	-	-	-	-	-	-	-	-	-
Wardak	Jaghatu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wardak	Jalrez	-	-	531	78	-	-	-	-	-	-	-	-	-	-	-
Wardak	Markaz-i- Behsud	-	-	472	-	-	-	-	-	-	-	-	-	-	-	-
Wardak	Maidan Shahr (Provincial Cen	-	-	527	102	-	-	-	-	-	-	-	-	-	-	-
Wardak	Nerkh	-	-	780	215	-	-	-	-	-	-	-	-	-	-	-
Wardak	Sayyidabad	-	-	192	248	-	-	-	-	-	-	-	-	-	-	-
Wardak Total		**0**	**0**	**2,735**	**1,017**	**106**	**0**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**	**p-f**
Zabul	Arghandab	-	-	302	526	205	346	79	55	103	91	47	79	32	256	24
Zabul	Atghar	-	-	188	32	86	36	16	3	2	16	1	5	12	12	-
Zabul	Daychopan	-	-	646	431	1,016	742	389	422	147	122	26	25	259	178	25
Zabul	Kakar Kak-e Afghan	-	-	-	-	-	-	104	110	219	44	40	38	50	403	122
Zabul	Mizan	-	-	309	251	56	123	129	289	309	140	74	155	858	544	171
Zabul	Naw Bahar	-	-	-	-	-	-	63	44	33	4	2	12	-	-	-
Zabul	Qalat (Provincial Center)	-	-	689	317	188	657	78	310	19	20	56	10	28	146	37
Zabul	Shah Joi	-	-	178	679	240	538	320	237	175	20	11	69	96	146	-
Zabul	Shemel Zayi	-	-	65	44	16	35	159	153	46	15	1	5	-	41	-
Zabul	Shinkai	-	-	164	287	102	228	139	105	87	-	-	-	-	-	-
Zabul	Tarnak wa Jaldak	1	-	-	410	145	506	136	608	5	10	5	26	-	1,168	265
Zabul Total		**1**	**200**	**2,541**	**2,977**	**2,053**	**3,211**	**1,611**	**2,335**	**1,144**	**482**	**262**	**424**	**1,335**	**2,894**	**644**
TOTAL		**7,598**	**74,045**	**80,482**	**126,899**	**103,919**	**164,969**	**192,981**	**157,252**	**123,095**	**122,332**	**131,065**	**154,436**	**209,450**	**224,337**	**182,566**
Rounded Total		**8,000**	**74,000**	**80,000**	**131,000**	**104,000**	**165,000**	**193,000**	**157,000**	**123,000**	**122,000**	**131,000**	**154,000**	**209,000**	**224,000**	**183,000**

p-f: poppy-free according to the definition of the respective year. This concept was introduced in 2007. In 2007, provinces with no poppy were considered poppy-free; since 2008, provinces with less than 100 hectares of poppy have been considered poppy-free.

Annex II: Eradication figures, by District (2015)

Province	DISTRICT	Eradication verified (ha)	No. of fields eradication reported	No. of villages eradication reported
Daykundi	Kajran	6	65	4
Daykundi Total		**6**	**65**	**4**
Hilmand	Garmser	211	182	17
	Khanashin	48	84	12
	Lashkargah	193	441	19
	Marjah	75	134	14
	Musaqalah	60	127	9
	Nad-e-Ali	99	311	18
	Nahr-e-Saraj	57	89	10
	Nawa-e-Barakzaiy	13	24	2
	Nawzad	7	21	2
	Sangin	25	38	6
Hilmand Total		**787**	**1,451**	**109**
Kandahar	Maywand	68	58	8
Kandahar Total		**68**	**58**	**8**
Kapisa	Tagab	26	311	13
Kapisa Total		**26**	**311**	**13**
Kunar	Chawkay	1	4	1
	Ghaziabad	2	15	1
	Narang	6	21	2
	Nurgal	7	49	6
	Sarkani	18	34	2
	Shigal Wa sheltan	24	52	2
	Watapur	17	34	3
Kunar Total		**75**	**209**	**17**
Laghman	Dawlatshah	1	25	1
Laghman Total		**1**	**25**	**1**
Nangarhar	Achin	23	145	11
	Nazyan	11	39	4
	Shinwar	0	7	2
Nangarhar Total		**34**	**191**	**17**
uruzgan	Chora	5	25	2
	Tirinkot	158	552	22
Uruzgan Total		**163**	**577**	**24**
Zabul	Mizan	9	11	3
	Shar-e-safa	3	9	3
Zabul Toal		**12**	**20**	**6**
Badakhshan	Argo	680	3116	112
	Darayem	171	819	48
	Jorm	9	128	10
	Keshem	126	549	22
	Khash	64	774	12
	Teshkan	350	1344	33
	yaftal	11	11	1
Badakhshan Total		**1,411**	**6,741**	**238**
Baghlan	Burka	3	20	1
	Pul-e-Hesar	1	4	3
Baghlan Total		**3**	**24**	**4**
Balkh	Chemtal	35	176	5
Balkh Total		**35**	**176**	**5**
Faryab	Garziwan	10	123	12
Faryab Total		**10**	**123**	**12**
Ghor	Chaghcharan	7	57	10
	Dawlatyar	1	6	1
Ghor Total		**8**	**63**	**11**
Kunuz	Kunduz	1	12	2
	Qala-e-Zal	7	35	2
Kunduz Total		**9**	**47**	**4**
Sar-e-Pul	Sayad	43	135	6
Sar-e-Pul Total		**43**	**135**	**6**
Takhar	Rostaq	1	5	1
Takhar Total		**1**	**5**	**1**
Grand Total		**2,692**	**10,221**	**480**