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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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Key Findings

Area under opium poppy cultivation increased by 10%

- The total area under opium poppy cultivation in Afghanistan was estimated at 201,000 hectares in 2016, a 10% increase from the previous year. Strong increases were observed in the Northern region and in Badghis province where the security situation has deteriorated since 2015.
- The vast majority (93%) of opium poppy cultivation took place in the Southern, Eastern and Western regions of the country. The Southern region accounted for 59% of total cultivation; the Western for 25% and the Eastern for 9%. The remaining regions (Northern, North-Eastern and Central) together accounted for 7% only.
- Hilmand remained the country's major opium poppy cultivating province, followed by Badghis, Kandahar, Uruzgan[1], Nangarhar, Farah, Badakhshan, and Nimroz.
- All regions except the Southern experienced increase in opium poppy-cultivation in 2016, with the largest relative increase being in the Northern region (+324), followed by the North-eastern (+55%), Eastern (+44%), Central (+24%) and Western (+15%; mainly driven by increases in Badghis) regions.
- The main opium poppy-growing provinces showed diverging trends. Opium poppy cultivation rose in Badghis (184%), Nangarhar (+43%) and Uruzgan (+37%) whereas decreases were seen in Farah (-57%), Nimroz (-40%), Hilmand (-7%) and Kandahar(-3%).
- In the Central (+24%) and Northern (+324%) regions a strong increase was observed, albeit starting from low levels, which coincides with a deterioration of the security situation.
- In 2016 the number of poppy-free provinces in Afghanistan decreased from 14 to 13. Opium poppy cultivation in Jawzjan, in the Northern region, was estimated at 409 hectares and this province lost its poppy-free status, which it had regained in 2008. The number of provinces affected by opium poppy cultivation has increased from 14 to 21 since 2009 and increase in the poppy affected provinces were mainly in Northern region.

Total eradication of opium poppy decreased by 91%

- Total eradication of opium poppy decreased by 91% in 2016, to 355 hectares, while more security accidents occurred than in 2015: in 2016, 8 lives were lost and 7 persons were injured. In 2015, 5 lives were lost and 18 persons were injured.
- Eradication did not take place in the high opium poppy cultivating provinces, due to the extremely poor security situation in those areas and logistical/financial challenges to organize the eradication teams on time.

Potential opium yield and production increased in 2016

- Potential opium production was estimated at 4,800 tons in 2016, an increase of 43% from its 2015 level (3,300 tons). The increase in production is a result of an increase in area under opium poppy cultivation, but more importantly of an increase in opium yield per hectare.
- Potential opium production in 2016 might be an underestimation, since a comparison of the quality of the crop made on satellite images indicated that opium yields in Badghis could have been higher than in the other Western provinces used to calculate the regional average applied to this province. In 2016, MCN and UNODC were not able to conduct field measurements in Bhadghis, but in 2017 research will be conducted to have better insight in provincial differences

[1] Including Gizab district, a district formally part of Day Kundi, but under the administration of the Governor of Uruzgan province.

- The average opium yield amounted to 23.8 kilograms per hectare, which was 30% higher than in 2015. Yield increased in all main opium poppy cultivating regions. Increases occurred in the Western region, where the average yield increased by 37% from 16.3 kilograms per hectare in 2015 to 22.3 kilograms per hectare in 2016 and the Southern region (+36%; from 16.1 in 2015 to 22.0 kilograms per hectare in 2016).
- Reports from the field indicates that favourable climate condition during harvesting time may have improved the yield. Good quality crop (high plant density) has been also confirmed by satellite imagery and field photographs in the Western and Southern regions.
- Accounting for 54% of national production, the Southern region continued to produce the vast majority of opium in Afghanistan. With 24% of national production, the Western region was the country's second most important opium-producing region in 2016, followed by the Eastern region (12%) and Northern region (6%).
- In 2016 opium prices increased in all regions of Afghanistan. At almost US$ 0.9 billion, or the equivalent of roughly 5% of Afghanistan's estimated GDP, the farm-gate value of opium production increased by 57% in 2016 with respect to past year (not adjusted for inflation).

Discussion of possible reasons for the increase

The reasons why Afghan farmers cultivate opium poppy are multiple. The forthcoming socio-economic survey will discuss these reasons in detail, 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 most farmers gave as an explanation for their decision to cultivate opium poppy in 2016. However, 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 key factors.

In 2016, the increase of opium poppy area, which occurred mainly in the Northern provinces and in Badghis, was mostly related to the deteriorating security situation which diverted the attention of the national authorities from combatting opium cultivation.

The huge decrease of eradication activities in 2016 is also a consequence of this situation. Eradication is risky and requires human and economic resources whose opportunity cost increases in times of country's instability and high insurgency rate. Eradication this year was limited to only 355 ha, 91% less than 2015. The 18,000 ha of increase in opium poppy area cannot be explained by the reduction in eradication, however the perception of lack of control could have spurred many farmers toward the illicit cultivation.

Economic reasoning might also offer an explanation. High farm gate prices of 2016 could have persuaded farmers to face the costly investments that opium poppy cultivation requires (e.g. irrigation pumps, specialized lancers, etc.)

A diverging trend has been observed in some provinces of Western and Southern regions, with important decrease in Farah, Nimroz and Hilmand. 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.

Usually a worsening security situation is linked to increases in opium poppy cultivation, as happened in the Northern region, however, in Hilmand the opposite may have occurred. Hilmand remains by far the major opium poppy-growing province in Afghanistan, therefore a large amount of specialized manpower is required to carry out the harvesting of the large fields (compared to the fields in the northern regions). In time of social disorders it is likely that human labor supply (many who come from other provinces of Afghanistan and also from neighbouring countries) is less available and therefore opium-poppy farmers restrict their investments to avoid the risk of suffering from unharvested fields.

With the multitude of possible reasons for changes in area under cultivation and the complexity of the factors driving opium poppy cultivation, the present increase 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 2016 – Socio-economic analysis”.

Fact Sheet Afghanistan Opium Survey 2016[2]

	2015	Change from 2015	2016
Net opium poppy cultivation (after eradication)	183,000 ha (163,000 - 202,000)	+10%	201,000 ha (182,000 - 221,000)
Number of poppy free provinces[2]	14	-1	13
Number of provinces affected by poppy cultivation	20	+1	21
Eradication	3,760 ha	-91%	355 ha
Average opium yield (weighted by cultivation)	18.3 kg/ha	+30%	23.8 kg/ha
Potential production of opium	3,300 mt (2,700 - 3,900)	+43%	4,800 mt (4,000 - 5,600)
Average farm-gate price (weighted by production) of fresh opium at harvest time	US$ 129/kg	+18%	152US$ /kg
Average farm-gate price (weighted by production) of dry opium at harvest time	US$ 171/kg	+10%	US$ 187/kg
Total farm gate value of opium production	US$ 0.57 billion	+57%	US$ 0.90 billion

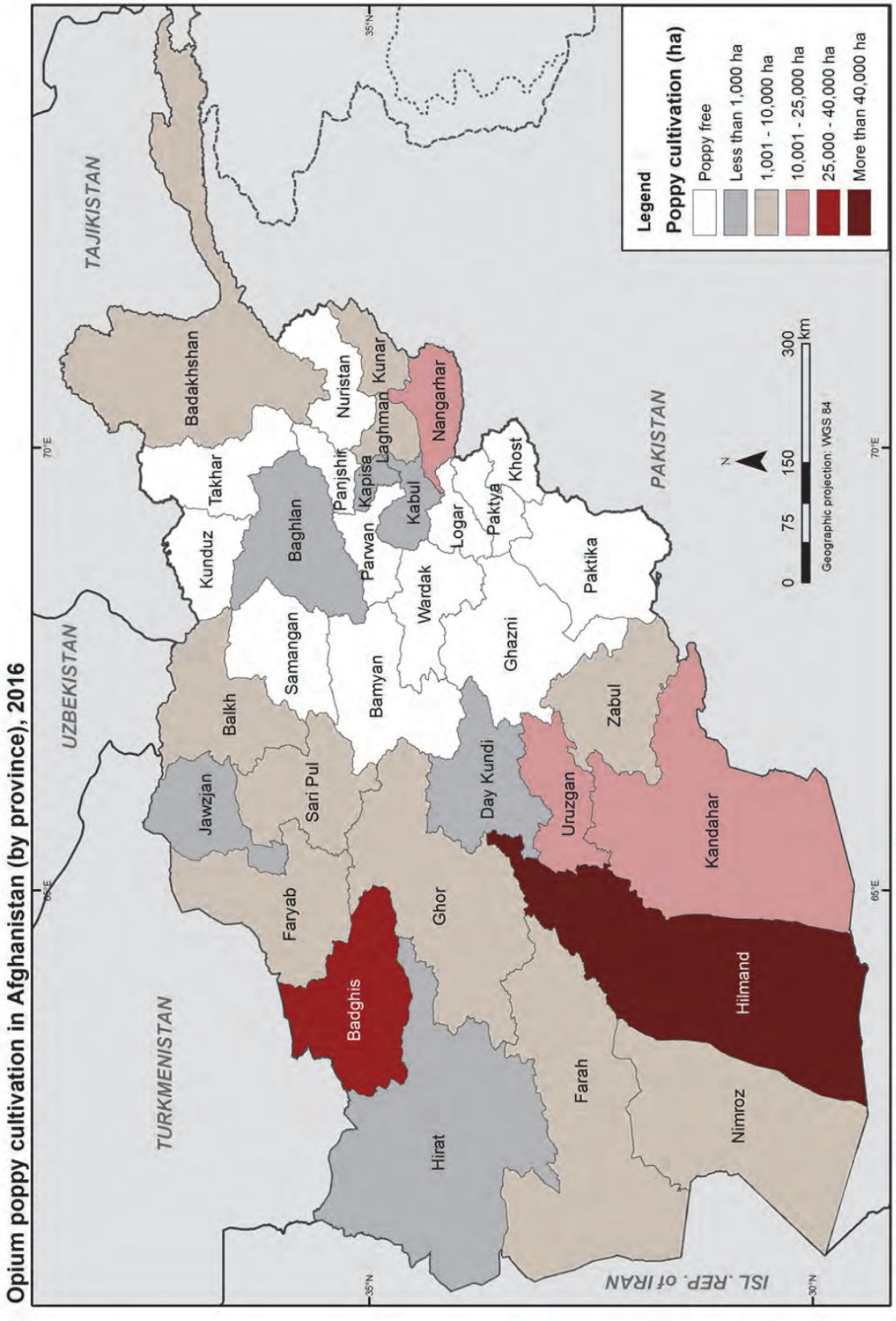
[2] Numbers in brackets indicate the upper and lower bounds of the estimation range.

1 Introduction

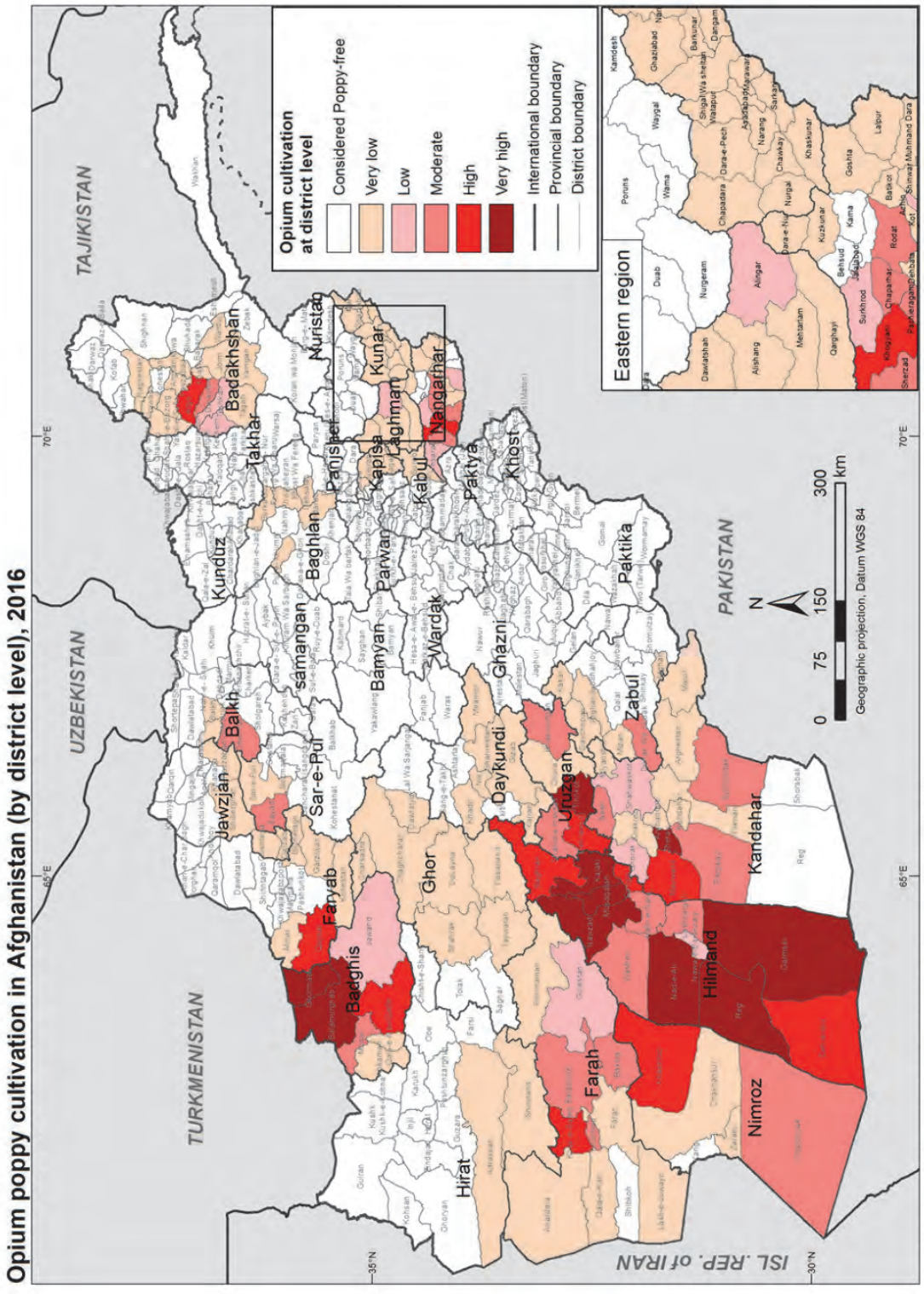
The *Afghanistan Opium Survey* is implemented annually by the Ministry of Counter Narcotics (MCN) of Afghanistan in collaboration with the United Nations Office on Drugs and Crime (UNODC). The survey team collects and analyses information on the location and extent of opium poppy cultivation, potential 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; in Latin America, the Plurinational State of Bolivia, Colombia, Ecuador, Mexico and Peru; in Africa, Nigeria.

The *Afghanistan Opium Survey 2016* was implemented under project AFG/F98, "Monitoring of Opium Production in Afghanistan", with financial contributions from the Governments of Japan and the United States of America.



Source: Government of Afghanistan - National monitoring system implemented by UNODC/MCN
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The dotted line represents approximately the line of control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.


Opium poppy cultivation in Afghanistan (by district level), 2016
Opium cultivation at district level
Considered Poppy-free
Very low
Low
Moderate
High
Very high
International boundary
Provincial boundary
District boundary
Eastern region
TAJIKISTAN
UZBEKISTAN
TURKMENISTAN
PAKISTAN
ISL. REP. of IRAN
Badakhshan
Nuristan
Takhar
Kunar
Panjsher
Kapisa
Laghman
Nangarhar
Kabul
Paktya
Khost
Kunduz
Baghlan
Samangan
Balkh
Jawzjan
Sar-e-Pul
Bamyan
Parwan
Wardak
Ghazni
Paktika
Faryab
Badghis
Ghor
Daykundi
Uruzgan
Zabul
Kandahar
Hilmand
Farah
Nimroz
Hirat
0 75 150 300 km
Geographic projection, Datum WGS 84
Source: Government of Afghanistan - National monitoring system implemented by UNODC/MCN
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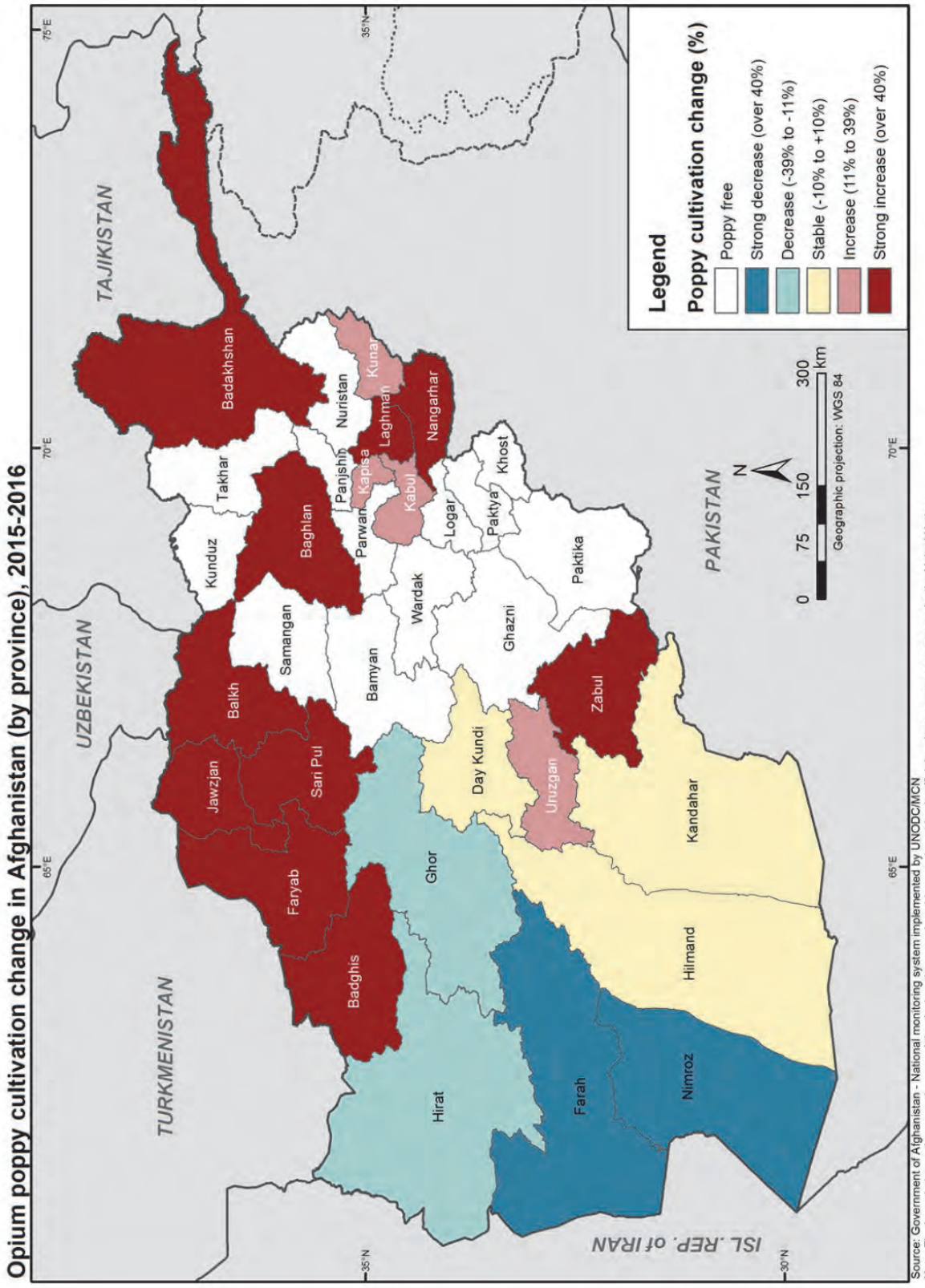

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2 Opium Poppy Cultivation

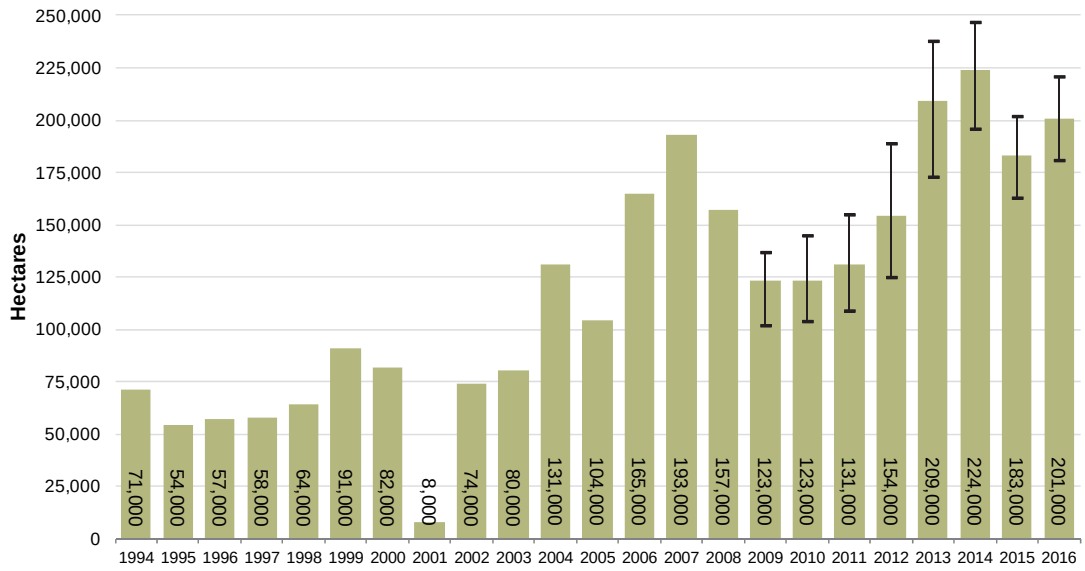
2.1 National and regional opium poppy cultivation trends

The total area under opium poppy cultivation in Afghanistan was estimated to be 201,000 hectares (182,000-221,000) in 2016, which represents a 10% increase from 2015.

In 2016, 93% of total estimated opium poppy cultivation in Afghanistan took place in the Southern, Eastern and Western regions of the country. The Southern region accounted for 59% of total estimated cultivation; the Western region for 25% and the Eastern region for 9%. The remaining regions (Northern, North-Eastern and Central) together accounted for 7%. The geographical locations of opium poppy cultivated area are in 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.

Hilmand remained the country's major opium-poppy-cultivating province (80,273 hectares), followed by Badghis (35,234 hectares), Kandahar (20,475 hectares), Uruzgan[3] (15,503 hectares), Nangarhar (14,344 hectares), Farah (9,101 hectares), Badakhshan (6,298 hectares), Nimroz (5,303 hectares), Faryab (2,923 hectares), Balkh (2,085 hectares), Saripul (1,686 hectares), Laghman (1,380 hectares), Zabul (1363 hectares), Kunar (1,276 hectares), Ghor (1,222 hectares), Baghlan (849 hectares), Kapisa (608 hectares), Jawzjan (409 hectares), Kabul (398 hectares), Day Kundi (374 hectares) and Hirat (208 hectares)

Figure 1: Opium poppy cultivation in Afghanistan, 1994-2016 (Hectares)



Sources: MCN/UNODC opium surveys 1994-2016. The vertical lines represent the upper and lower bounds of the 95% confidence interval.

All regions, except the Southern, experienced increases in opium poppy-cultivation in 2016, with the largest relative increase being in the Northern region (+324%; mainly driven by increases in Balkh, Faryab, Baghlan, Saripul and Jawzjan), followed by the North-eastern (+55%), Eastern (+44%), Central (+24%) and Western (+15%) regions. Opium poppy cultivation remained stable (-1%) in Southern region.

[3] Including Gizab district, a district formally part of Day Kundi, but under the administration of the Governor of Uruzgan province.

In 2016, the number of poppy-free provinces in Afghanistan decreased from 14 to 13. Opium poppy cultivation in Jawzjan, in the Northern region, was estimated at 409 hectares and this province lost its poppy-free status, which it had regained in 2008.

Table 1: Regional distribution of opium poppy cultivation, 2015-2016 (Hectares)

Region	2015 (ha)	2016 (ha)	Change 2015-2016 (%)	2015 (ha) as % of total	2016 (ha) as % of total
Southern	119,765	117,987	-1%	66%	59%
Western	44,308	51,067	+15%	24%	25%
Eastern	12,242	17,608	+44%	7%	9%
North-eastern	4,056	6,298	+55%	2%	3%
Central	321	398	+24%	0.2%	0.2%
Northern	1,875	7,951	+324%	1.0%	3.9%
Rounded Total	**183,000**	**201,000**	**+10%**	**100%**	**100%**

In the **Eastern region**, the increase of opium poppy cultivation was mainly driven by the strong increase in Nangarhar (+43%). An increase was also observed in low level of opium poppy cultivating provinces namely Laghman (+77), Kapisa (+32%) and Kunar (+29%). An imperceptible amount of eradication (4 hectares) was carried out in Laghman and Nangarhar provinces in 2016.

In the **North-Eastern region**, Badakhshan saw a significant increase of 55% in opium poppy cultivation from 4,056 hectares to 6,298 hectares. Eeradication in Badakhshan province was 270 hectares in 2016 (1,246 hectares in 2015).

In the **Northern region**, strong increases were observed in Balkh province (+921%), Sari Pul province (+409%), Baghlan province (+373%) and Faryab province (+152%). Jawzjan province (409 hectares) lost its poppy-free status, which it had regained in 2008. The number of provinces affected by opium poppy cultivation has increased from 14 to 21 since 2009 and additional affected provinces were mainly in the Northern region. The increase in opium poppy cultivation in recent years are due to deteriorated security situation in Northern provinces. Since last two years no eradication was carried out in the Northern region with an exception of 33 hectares in 2015 and 55 hectares in 2016 in Sari Pul province.

In the **Southern region**, poppy cultivation decreased by 7%, 3% and 2% in Hilmand, Kandahar and Daykundi provinces respectively. Hilmand remained the country's principal opium-poppy-cultivating province in 2016, accounting for 40% of total opium poppy cultivation. Poppy cultivation in Zabul and Uruzgan provinces increased by 112% and 37% respectively in 2016. An imperceptible amount of eradication (4 hectares) was carried out in Kandahar province in 2016.

In the **Western region**, Badghis province became the second highest opium poppy cultivating province in the country with 184% increase in 2016; however, the other two main poppy-cultivating provinces namely Farah and Nimroz saw a significant decrease by 57% and 40% respectively. This year no eradication was carried out in Western region with exception of 1 hectare in Nimroz province.

Figure 2: Number of provinces by opium poppy cultivation trends, 2006-2016[4]

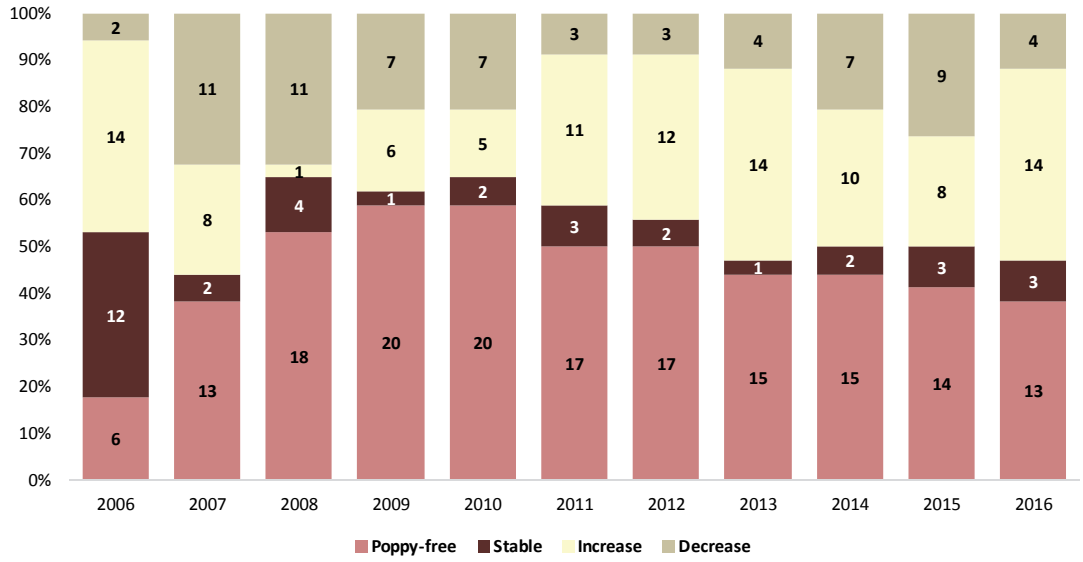


Table 2: Main opium-poppy-cultivating provinces in Afghanistan, 2010-2016 (Hectares)

Province	2010	2011	2012	2013	2014	2015	2016	Change 2015-2016	2016(ha) as[5] % of total
Hilmand	65,045	63,307	75,176	100,693	103,240	86,443	80,273	-7%	40%
Badghis	2,958	1,990	2,363	3,596	5,721	12,391	35,234	+184%	18%
Kandahar	25,835	27,213	24,341	28,335	33,713	21,020	20,475	-3%	10%
Uruzgan	7,337	10,620	10,508	9,880	9,277	11,277	15,503	+37%	8%
Nangarhar	719	2,700	3,151	15,719	18,227	10,016	14,344	+43%	7%
Farah	14,552	17,499	27,733	24,492	27,513	21,106	9,101	-57%	5%
Badakhshan	1,100	1,705	1,927	2,374	4,204	4,056	6,298	+55%	3%
Nimroz	2,039	2,493	3,808	16,252	14,584	8,805	5,303	-40%	3%
Rest of the country	2,930	3,538	5,475	8,121	7,858	7,453	14,779	+98%	7%
Rounded Total	**123,000**	**131,000**	**154,000**	**209,000**	**224,000**	**183,000**	**201,000**	**+10%**	**100%**

[4] 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.

[5] Percentages are rounded.

Table 3: Opium poppy cultivation (2013-2016) and eradication (2015-2016) in Afghanistan
(Hectares)

PROVINCE	Cultivation 2013 (ha)	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Estimation method 2016	Eradication in 2015 (ha)	Eradication in 2016 (ha)	Change 2015-2016 (%)
Kabul	298	233	321	398	+24%	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	**298**	**233**	**321**	**398**	**+24%**		**0**	**0**	**NA**
Kapisa	583	472	460	608	+32%	T	0	0	NA
Kunar	1,127	754	987	1,276	+29%	S	9	0	-100%
Laghman	1,236	901	779	1,380	+77%	T	7	3	-57%
Nangarhar	15,719	18,227	10,016	14,344	+43%	S	137	1	-99%
Nuristan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	0	0	NA
Eastern Region	**18,665**	**20,353**	**12,242**	**17,608**	**+44%**		**153**	**4**	**-97%**
Badakhshan	2,374	4,204	4,056	6,298	+55%	S	1,246	270	-78%
Takhar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	12	21	+75%
Kunduz	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	T	0	0	NA
North-eastern Region	**2,374**	**4,204**	**4,056**	**6,298**	**+55%**		**1,258**	**291**	**-77%**
Baghlan	141	168	180	849	+373%	T	0	0	NA
Balkh	410	Poppy-free	204	2,085	+921%	T	0	0	NA
Bamyan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Faryab	158	211	1,160	2,923	+152%	T	0	0	NA
Jawzjan	Poppy-free	Poppy-free	Poppy-free	409	+100%	T	0	0	NA
Samangan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	V	0	0	NA
Sari Pul	Poppy-free	195	331	1,686	+409%	T	33	55	+67%
Northern Region	**710**	**574**	**1,875**	**7,951**	**+324%**		**33**	**55**	**+67%**
Hilmand	100,693	103,240	86,443	80,273	-7%	S	1,747	0	-100%
Kandahar	28,335	33,713	21,020	20,475	-3%	S	396	4	-99%
Uruzgan	9,880	9,277	11,277	15,503	+37%	S	75	0	-100%
Zabul	1,335	2,894	644	1,363	+112%	S	0	0	NA
Day Kundi	1,536	587	381	374	-2%	S	5	0	-100%
Southern Region	**141,779**	**149,711**	**119,765**	**117,987**	**-1%**		**2,223**	**4**	**-100%**
Badghis	3,596	5,721	12,391	35,234	+184%	S	0	0	NA
Farah	24,492	27,513	21,106	9,101	-57%	S	52	0	-100%
Ghor	264	493	1,721	1,222	-29%	T	0	0	NA
Hirat	952	738	285	208	-27%	T	0	0	NA
Nimroz	16,252	14,584	8,805	5,303	-40%	S	40	1	-98%
Western Region	**45,557**	**49,049**	**44,308**	**51,067**	**+15%**		**92**	**1**	**-99%**
Total (rounded)	**209,000**	**224,000**	**183,000**	**201,000**	**+10%**		**3,760**	**355**	**-91%**

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 24% in 2016, with the total area cultivated increasing to 398 hectares in 2016 from 321 hectares in 2015. 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 2016.

Table 4: Opium poppy cultivation and eradication in the Central region, 2014-2016
(Hectares)

PROVINCE	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Eradication in 2015 (ha)	Eradication in 2016(ha)
Kabul	233	321	398	+24%	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	**233**	**321**	**398**	**+24%**	**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 44% increase in opium poppy cultivation in 2016. A total of 17,608 hectares of opium poppy was cultivated in the Eastern region, whereas only 4 hectares were eradicated in 2016.

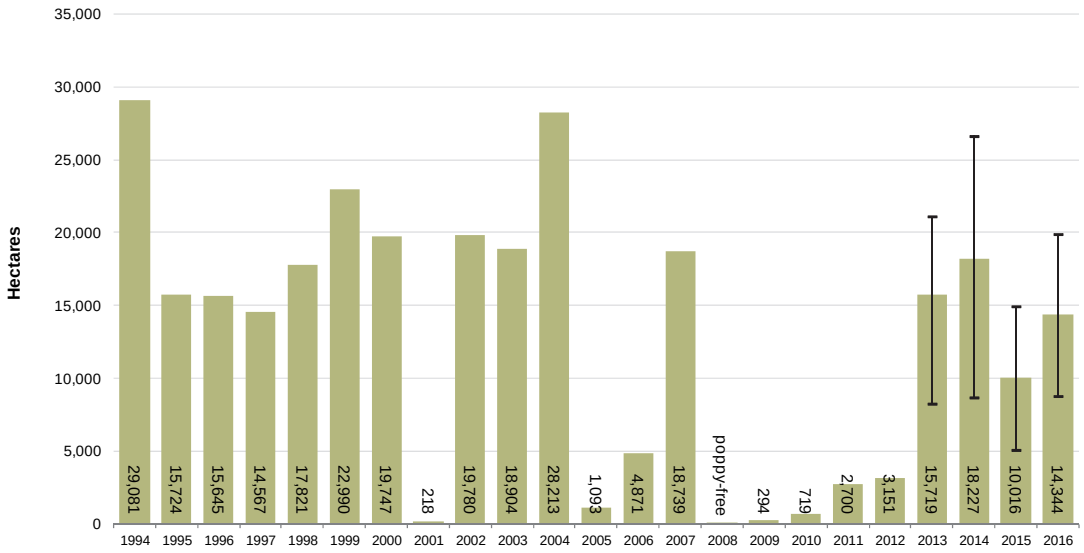
Table 5: Opium poppy cultivation and eradication in the Eastern region, 2014-2016
(Hectares)

PROVINCE	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Eradication in 2015 (ha)	Eradication in 2016 (ha)
Kapisa	472	460	608	+32%	0	0
Kunar	754	987	1,276	+29%	9	0
Laghman	901	779	1,380	+77%	7	3
Nangarhar	18,227	10,016	14,344	+43%	137	1
Nuristan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Eastern Region	**20,353**	**12,242**	**17,608**	**+44%**	**153**	**4**

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

In 2016 **Nangarhar** experienced an increase in opium poppy cultivation by 43% to 14,344 hectares from 10,016 hectares in 2015. Opium poppy cultivation increased in Khugyani, Chaprahar, Batikot, Darah-i- Noor, Hesark, Lalpoor, Mohmand Dara, Rodat, Surkh Rud, Shinwari and Sherzad districts in Nangarhar province.

Figure 3: Opium poppy cultivation in Nangarhar province, 1994-2016 (Hectares)



The vertical lines represent the upper and lower bounds of the 95% confidence interval.

In contrast to the increase in opium poppy cultivation in most of the districts in this province, an large decrease was observed in Achin, Kot and Dehbala districts particularly in the rural areas. These three districts are reportedly controlled by the Islamic State of Iraq and Syria (ISIS) group where they have forbidden the opium poppy cultivation.

Figure 4: Opium poppy cultivation change by district in Nangarhar, 2016

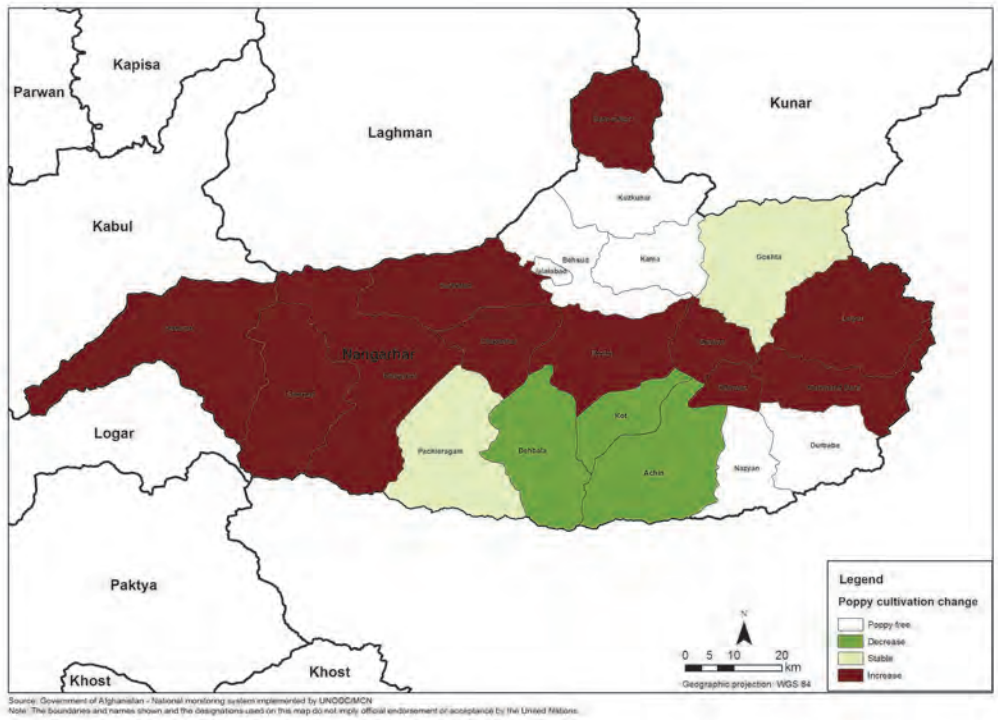
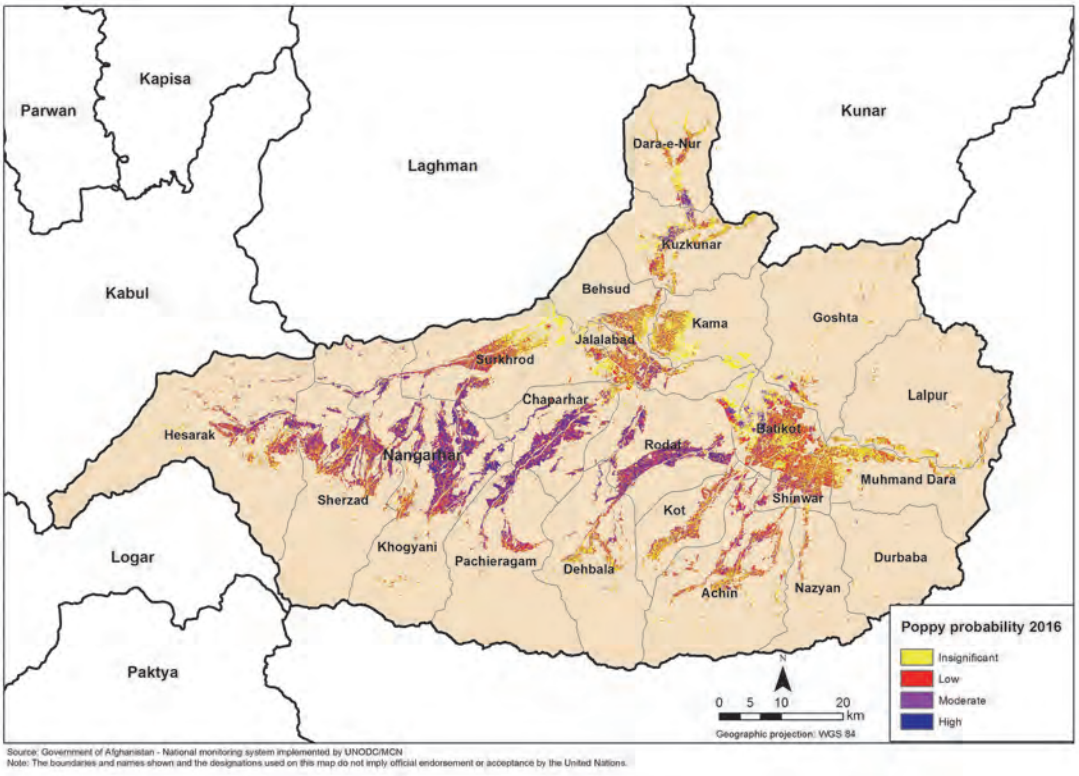


Figure 5: Opium poppy cultivation probability in Nangarhar, 2016



The poppy probability map shows the extent of opium poppy cultivation in Nangarhar province clearly indicating the low and insignificant probability in the southern part of Kot, Dehbala and Achin districts where opium poppy cultivation decreased by 91%, 80% and 36% respectively.

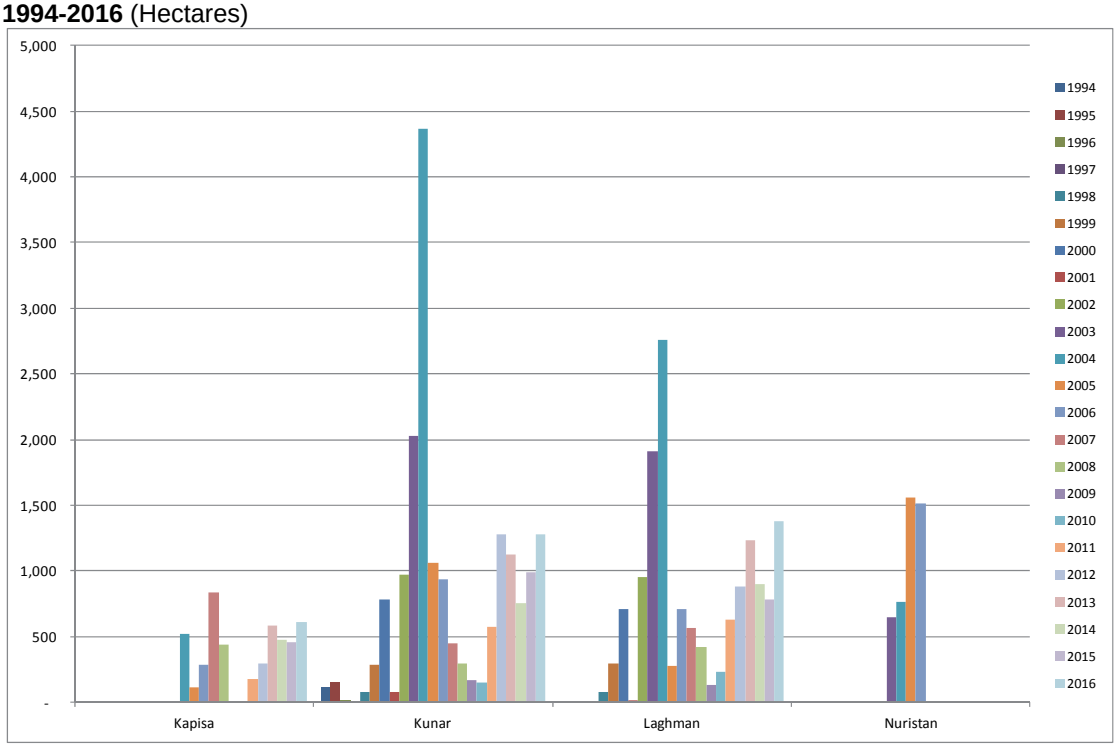
In **Laghman** province, opium poppy cultivation increased by 77%, from 779 hectares in 2015 to 1,380 hectares in 2016. At the district level, a significant increase were observed in all poppy cultivated districts (Alingar, Alishang, Dowlat Shah, Mehterlam and Garghayee).

In **Kunar** province, opium poppy cultivation increased by 29% in 2016 (from 987 hectares in 2015 to 1,276 hectares in 2016), with the main opium poppy cultivating districts being Sarkani, Noor Gal, Shigal Wa Sheltan, Watapoor and Dangam.

Opium poppy cultivation in **Kapisa** province increased by 32% in 2016, from 460 hectares to 608 hectares, with Tagab being the main opium-poppy-cultivating district.

Nuristan maintained the poppy-free status it achieved in 2007. An insignificant amount of cultivation has been observed in this province in recent years, and it remained under 100 hectares in 2016, the threshold for obtaining poppy-free status.

Figure 6: Opium poppy cultivation in Laghman, Kunar, Nuristan and Kapisa provinces, 1994-2016 (Hectares)



2.2.3 North-eastern region

(Badakhshan, Kunduz and Takhar)

Opium poppy cultivation in the North-eastern region increased by 55% from 4,056 in 2015 to 6,298 hectares in 2016.

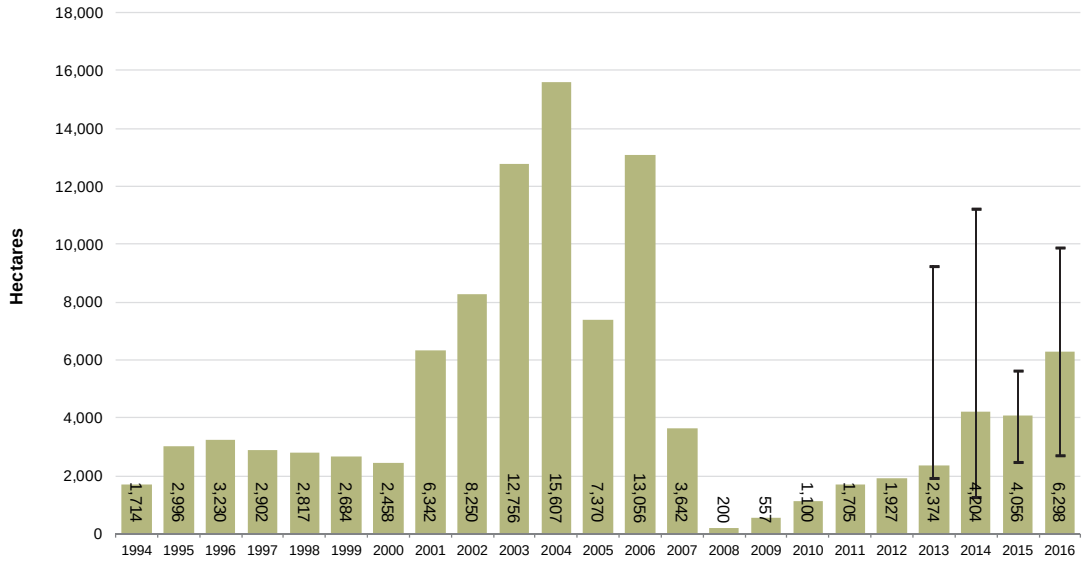
The only opium poppy cultivating province in the region is **Badakhshan** province as the two other provinces, Kunduz and Takhar, have been poppy-free since 2007 and 2008, respectively. Opium poppy cultivation in Badakhshan was mostly confined to rain-fed areas cultivated in spring, mainly in Argo and Darayim districts. A total of 270 hectares of opium poppy was eradicated in Badakhshan province in 2016. The increase in opium poppy cultivation was mainly in Argo and Kishim district.

Table 6: Opium poppy cultivation and eradication in the North-eastern region, 2014-2016 (Hectares)

PROVINCE	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Eradication in 2015 (ha)	Eradication in 2016 (ha)
Badakhshan	4,204	4,056	6,298	+55%	1,246	270
Kunduz	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Takhar	Poppy-free	Poppy-free	Poppy-free	NA	12	21
North-eastern Region	**4,204**	**4,056**	**6,298**	**+55%**	**1,258**	**291**

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 Badakhshan province, 1994-2016 (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 2016, the threshold for obtaining the poppy-free status.

Also poppy-free since 2008, **Takhar** province maintained its poppy-free status in 2016. A total of 21 hectare was eradicated there in 2016.

2.2.4 Northern region

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

Opium poppy cultivation increased by 324% in Northern region. The increase in opium poppy cultivation for the last two years is due to the deteriorated security situation.

In **Baghlan** province the opium poppy cultivation increased from 180 hectares in 2015 to 849 hectares in 2016. The main opium-poppy-cultivating districts were Deh Salah, Pul-i-Hisar, Andrab and Khwajah Hijran(Jalgah) with 351, 319, 92 and 84 hectares, respectively.

Balkh province was poppy-free in 2007- 2012 and 2014. The province lost its poppy free status in 2015 with 204 hectare of opium poppy cultivation. The significant increase of 921% to 2,085 hectares was observed in 2016. This year opium poppy was mainly cultivated in Chimtal and Chahar Bolak districts.

Faryab province was poppy-free in 2009, 2010 and 2012, but lost its poppy-free status in 2013. The province has been experiencing a continuance increase trend in the level of opium poppy cultivation from 2014. In 2014, opium poppy cultivation increased by 33%, to 211 hectares, in 2015 by 451% to 1,160 hectares and in 2016 by 152% to 2,923 hectares. Opium poppy cultivation mainly took place in Qaysar (2742 hectares) district.

Samangan and **Bamyan** have been poppy-free since 2007 and remained so in 2016.

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 increased by 70% to 331 hectares and in 2016 a large increase (409%) to 1,686 hectares was observed.

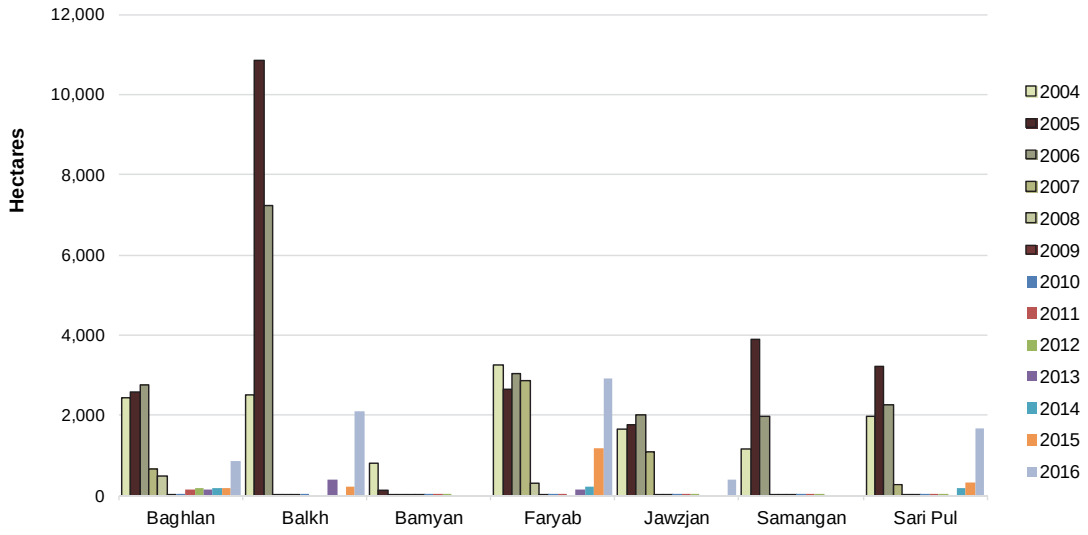
Jawzjan province was poppy-free from 2008 to 2015 but the province lost its poppy-free status with 409 hectares of opium poppy cultivation in Qush Tepeh and Darzab districts.

Table 7: Opium poppy cultivation and eradication in the Northern region, 2014-2016 (Hectares)

PROVINCE	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Eradication in 2015 (ha)	Eradication in 2016 (ha)
Baghlan	168	180	849	+373%	0	0
Balkh	Poppy-free	204	2,085	+921%	0	0
Bamyan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Faryab	211	1,160	2,923	+152%	0	0
Jawzjan	Poppy-free	Poppy-free	409	NA	0	0
Samangan	Poppy-free	Poppy-free	Poppy-free	NA	0	0
Sari Pul	195	331	1,686	+409%	33	55
Northern Region	**574**	**1,875**	**7,951**	**+324%**	**33**	**55**

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

Figure 8: Opium poppy cultivation in the Northern region, 2004-2016 (Hectares)



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

2.2.5 Southern region

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

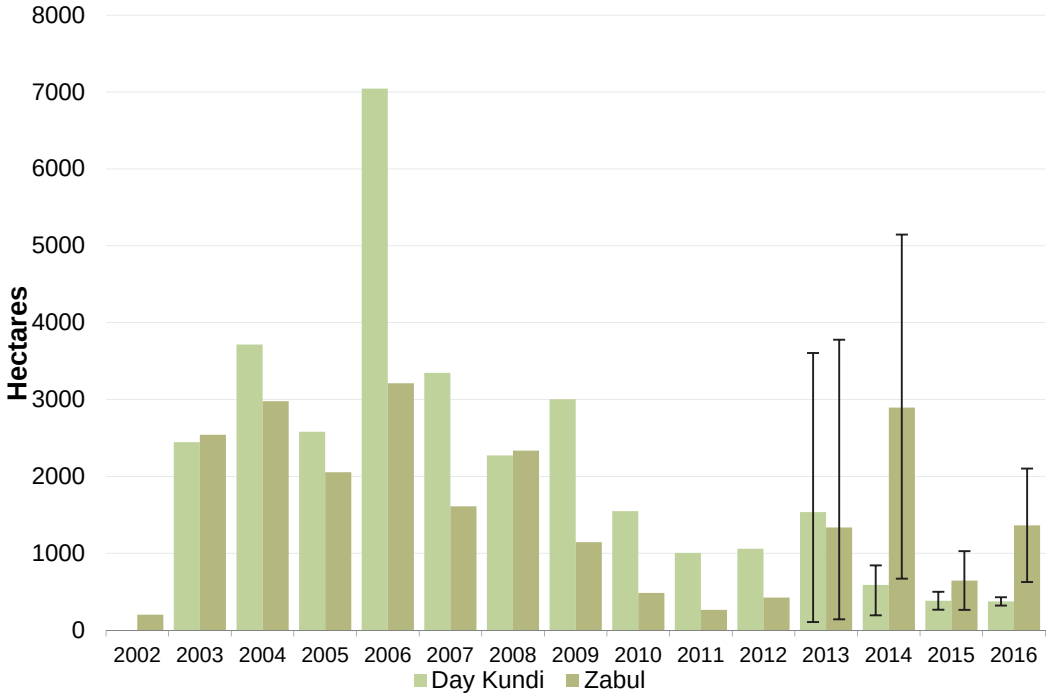
Accounting for 59% of total opium poppy cultivation in Afghanistan, 117,987 hectares of opium poppy were cultivated in the Southern region in 2016 where opium poppy cultivation remained stable.

Table 8: Opium poppy cultivation and eradication in the Southern region, 2014-2016 (Hectares)

PROVINCE	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Eradication in 2015 (ha)	Eradication in 2016 (ha)
Hilmand	103,240	86,443	80,273	-7%	1,747	0
Kandahar	33,713	21,020	20,475	-3%	396	4
Uruzgan	9,277	11,277	15,503	+37%	75	0
Zabul	2,894	644	1,363	+112%	0	0
Day Kundi	587	381	374	-2%	5	0
Southern Region	**149,711**	**119,765**	**117,987**	**-1%**	**2,223**	**4**

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

Figure 9: **Opium poppy cultivation in Day Kundi and Zabul provinces, 2002-2016**



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

Hilmand remained Afghanistan's single largest opium-poppy-cultivating province in 2016, although cultivation decreased by 6,170 hectares (-7%). Hilmand accounted for 40% of the total area under opium poppy cultivation in Afghanistan. In 2016 no Governor-led opium poppy eradication was carried out.

At the district level, opium poppy cultivation levels in 2016 were highest in Nad Ali, Naher-i-Saraj, Garmser, Kajaki, Regi-i-Khan Nishin, Nawzad, Musa Qala, Baghran, Dishu,Nawa-e-Barakzaiy and Sangin Qala, districts. The strongest decrease in opium poppy cultivation was observed north of Boghra canal (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 2016. Opium poppy cultivation inside the former Food Zone increased by 11% in 2016 (from 31,216 hectares in 2015 to 34,760 hectares) and decreased outside of the former Food Zone by 18% (from 55,227 hectares in 2015 to 45,513 hectares). The decrease outside the former Food Zone was mainly north of the Boghra canal.

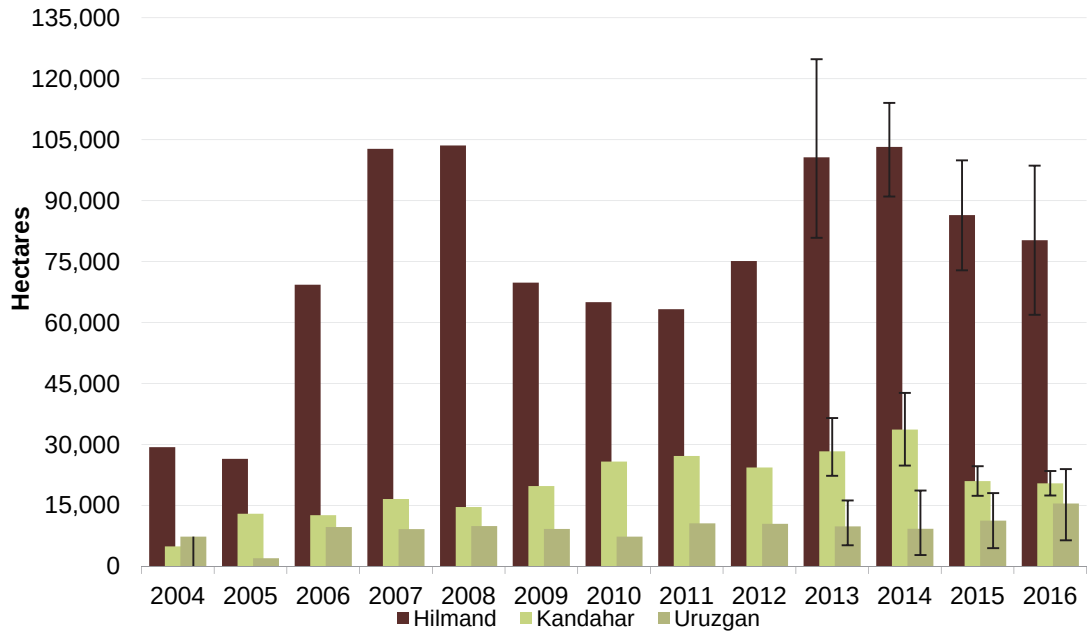
Table 9: Poppy cultivation inside and outside the former Hilmand "Food Zone" (after eradication)**, 2013-2016**

	2013 poppy cultivation	2014 poppy cultivation	2015 poppy cultivation	2016 poppy cultivation	change 2015-2016 (%)
Inside the food zone	36,244	41,089	31,216	34,760	+11%
Outside the food zone	64,449	62,151	55,227	45,513	-18%
Total province	**100,693**	**103,240**	**86,443**	**80,273**	**-7%**

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 21,020 hectares in 2015 to 20,475 hectares in 2016. The main opium poppy cultivation districts are Maiwand, Zhire, Nesh, Spin Boldak and Panjwayee.

Figure 10: Opium poppy cultivation in Hilmand, Kandahar and Uruzgan provinces, 2004-2016 (Hectares)



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

In 2016,opium poppy cultivation in **Uruzgan** province increased by 37% from 11,277 hectares in 2015 to 15,503 hectares in 2016, with the province accounting for 8% of total Afghan opium poppy cultivation. Tirin, Kot, Dihrawud and Shahidi, Hassas were the main opium poppy-cultivating districts in Uruzgan province.

Opium poppy cultivation in **Zabul** province saw a significant increase of 112% in 2016. The main opium-poppy-cultivating districts in Zabul were Tarank Wa Jaldak and Mizan, where security is poor.

2.2.6 Western region

(Badghis, Farah, Ghor, Hirat, Nimroz)

In the Western region, opium poppy cultivation increased by 15% from 44,308 hectares in 2015 to 51,067 hectares in 2016. Both an increasing and decreasing trend was observed in Western region. Badghis province experienced the strongest increase of 184% from 12,391 hectares in 2015 to 35, 234 hectares in 2016. All other provinces in the region experienced decreases. The strongest decrease was observed in Farah and Nimroz provinces by 57% and 40% respectively. Eradication was not carried out in the western region with the exception of one hectare in Nimroz province.

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.

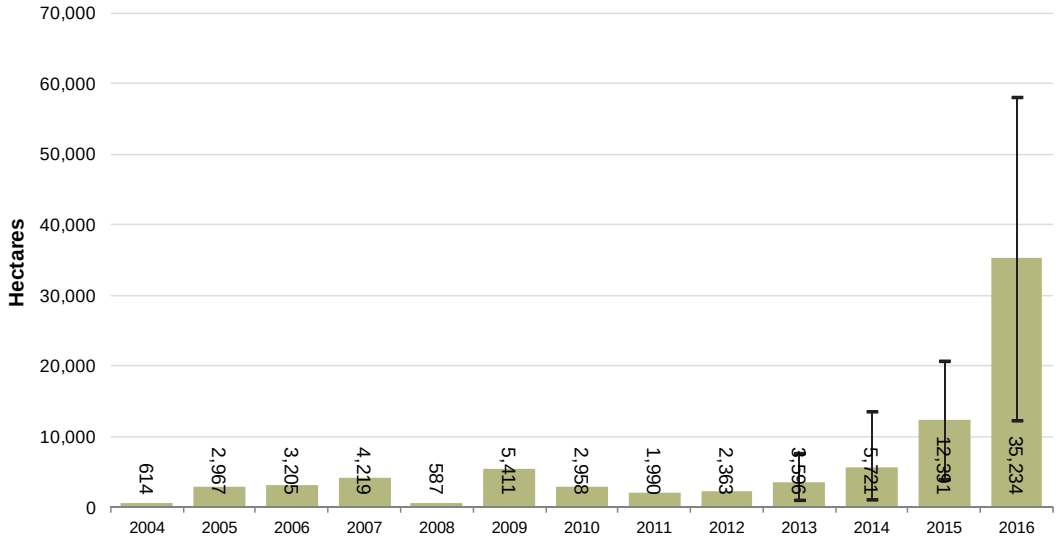
Table 10: Opium poppy cultivation and eradication in the Western region, 2014-2016 (Hectares)

PROVINCE	Cultivation 2014 (ha)	Cultivation 2015 (ha)	Cultivation 2016 (ha)	Change 2015-2016 (%)	Eradication in 2015(ha)	Eradication in 2016 (ha)
Badghis	5,721	12,391	35,234	+184%	0	0
Farah	27,513	21,106	9,101	-57%	52	0
Ghor	493	1,721	1,222	-29%	0	0
Hirat	738	285	208	-27%	0	0
Nimroz	14,584	8,805	5,303	-40%	40	1
Western Region	**49,049**	**44,308**	**51,067**	**+15%**	**92**	**1**

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

Badghis province became the second highest opium poppy cultivating province in the country with an increase of 184%. The main opium-growing districts are Ghormach, Balamurghab and Qadis.

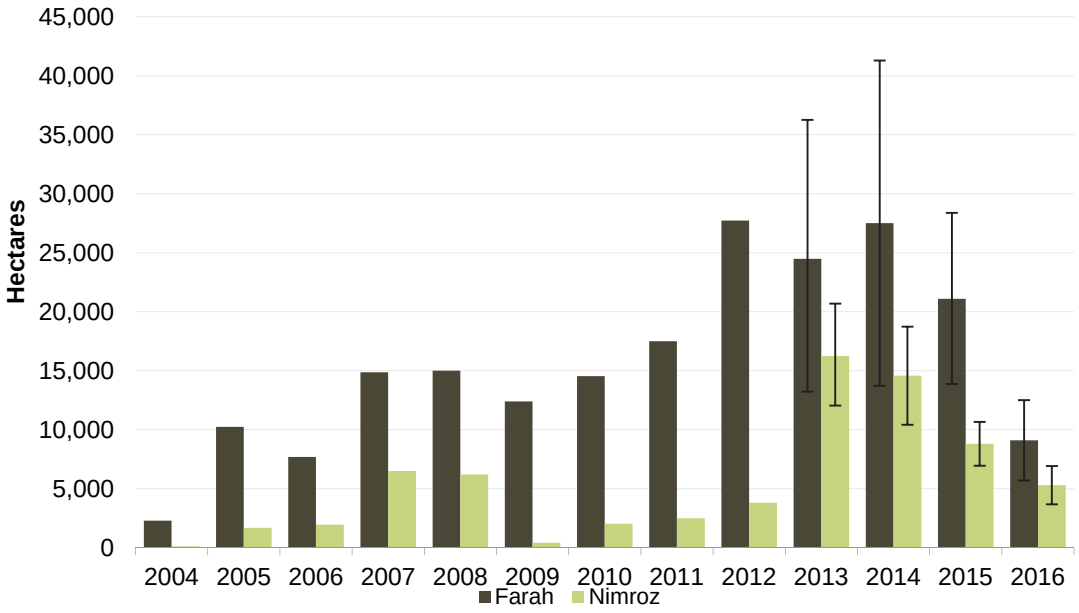
Figure 11: Opium poppy cultivation in Badghis province, 2004-2016 (Hectares)



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

In 2016, opium poppy cultivation in **Farah** province decreased from 21,106 hectares to 9,101 hectares. 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 2016. Decrease took place in Bakwa, Bala Buluk, Khaki-Safid and Pusht-rod districts (73%, 71%, 40% and 31% respectively)

Figure 12: Opium poppy cultivation in Farah and Nimroz provinces, 2004-2016 (Hectares)



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

Poppy cultivation in **Ghor** decreased by 29% in 2016, from 1,721 hectares to 1,222 hectares (Ghor was poppy-free in 2011). The decrease can be partly attributed to the change in the estimation method from sampling approach last year to a census approach this year. The census approach has highest levels of accuracy, however, it can only reflect a minimum level of cultivation. No eradication took place in Ghor province in 2016.

In **Hirat** province, the level of opium poppy cultivation decreased by 27%, from 285 hectares in 2015 to 208 hectares in 2016. The only district in Hirat province where opium poppy cultivation took place was Shindand, where security is very poor.

In 2016, the level of opium poppy cultivation in **Nimroz** province decreased by 40% to 5,303 hectares. The main poppy cultivating district was Khash-Rod.

3 Eradication

3.1 Poppy eradication decreased by 91% in 2016

A total of 355 hectares of verified poppy eradication was carried out by the provincial Governors in 2016. This represented a decrease of 91% from 2015 when 3,760 hectares of Governor-led eradication (GLE) was verified by MCN/UNODC.

In 2016, MCN/UNODC field surveyors verified the eradication of 7,922 fields in 201 villages in 7 provinces, whereas in 2015 MCN/UNODC verifiers visited 619 villages (11,694 poppy fields) in 12 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 and Sari Pul provinces. Final figures for eradication in these provinces were confirmed after checking with high-resolution satellite imagery supported by GPS tracking files, and photographs from the ground. For the provinces of Takhar, Kandahar, Laghman and Nangarahar, the quality checks for eradication verification were based on scrutinizing the survey forms, checking area measurement calculations and on field photographs.

Major observations on eradication campaigns in 2015 and 2016 are given below (see tables also):

- Total eradication of opium poppy decreased by 91% in 2016, to 355 hectares, while more security incidents occurred than in 2015: in 2016, 8 lives were lost and 7 persons were injured. In 2015, 5 lives were lost and 18 persons were injured.
- Eradication took place in 7 provinces in 2016 (12 provinces in 2015): Badakhshan, Kandahar, Laghman, Nangarhar, Nimroz, Sari Pul and Takhar..
- An imperceptible amount of eradication (9 hectares) was carried out in the major opium poppy cultivating regions.
- The Governor-led poppy eradication campaign commenced late as compared to last year. The eradication started on 01 April 2016 in Nimroz, 11 April in Kandahar and 16 May in Badakhshan province, while the 2015 eradication activities began on 25 February in Kandahar and 27 February in Hilmand province.
- The largest amount of poppy eradication took place in Badakhshan province (270 hectares; 78% less than in 2015), followed by Saripul province (55 hectares).
- Since last two years the GLE campaigns were not carried out in Kabul province (Central region), Badghis and Ghor provinces (Western region) and Baghlan and Faryab (Northern region).
- Quality control of eradication verification (partially eradicated fields) was carried out using satellite data in Badakhshan province. The quality of eradication in Badakhshan province was very poor.

Table 11: Governor-led eradication, by province, 2016

Province	Eradication verified (ha)	No. of eradicated fields reported	No. of villages eradication reported
Badakhshan*	270	7,645	162
Kandahar	4	19	3
Laghman	3	10	1
Nangarahar	1	10	1
Nimroz	1	5	3
Sari-Pul*	55	167	16
Takhar	21	66	15
Grand Total	**355**	**7,922**	**201**

** Eradication verified by using satellite imagery.*

Table 12: Governor-led eradication, 2015-2016 (Hectares and percentage change)

Province	Eradication Verification (ha) 2015	Eradication Verification (ha) 2016	% Change
Hilmand	1,747	0	-100%
Kandahar	396	4	-99%
Nimroz	40	1	-97%
Farah	52	0	-100%
Kunar	9	0	-100%
Laghman	7	3	-64%
Nangarhar	137	1	-99%
Uruzgan	75	0	-100%
Daykundi	5	0	-100%
Sari-Pul	33	55	67%
Badakhshan	1,246	270	-78%
Takhar	12	21	74%
Total	**3760**	**355**	**-91%**

Figure 13: Percentage of total opium poppy eradication, by province, 2015-2016

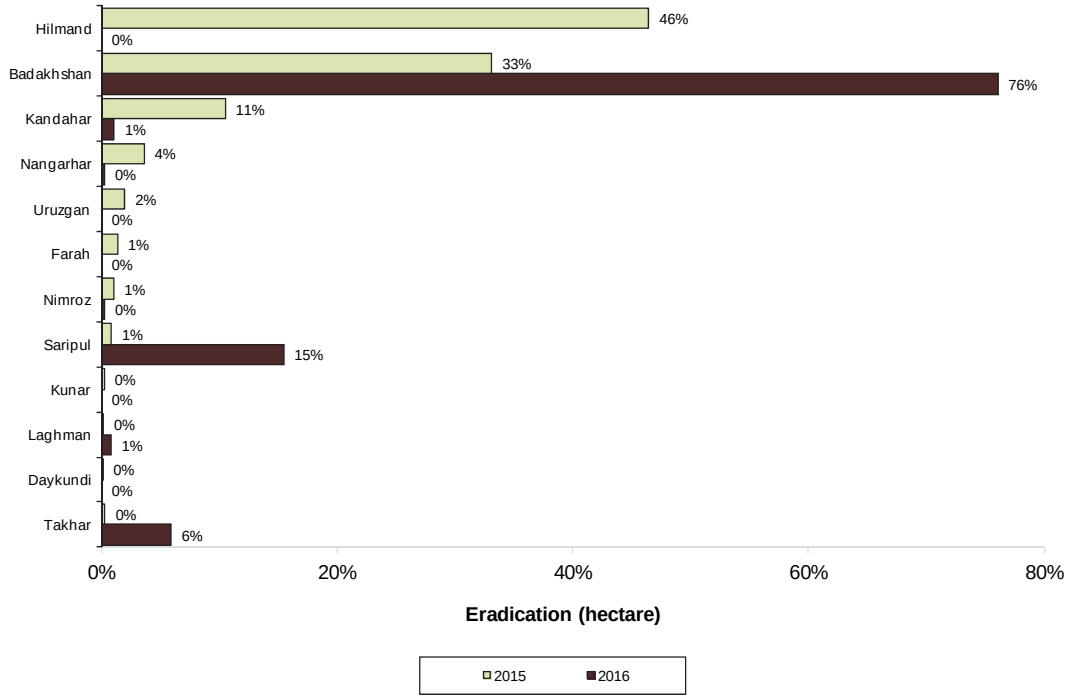


Table 13: Opium poppy eradication and cultivation in Afghanistan, 2011-2016 (Hectares)

Year	2011	2012	2013	2014	2015	2016
Number of provinces where eradication was carried out	18	18	18	17	12	7
Governor-led Eradication (GLE), (ha)	3,810	9,672	7,348	2,692	3,760	355
Total Eradication (hectares)	**3,810**	**9,672**	**7,348**	**2,692**	**3,760**	**355**
Cultivation (ha) *	131,000	154,000	209,000	224,000	183,000	201,000
% poppy in insecure provinces of the Southern and Western regions	95%	95%	89%	89%	90%	84%
Poppy-free provinces	17	17	15	15	14	13

** Net opium poppy cultivation after eradication.*

Figure 14: Area of opium poppy eradication, by different methods, 2015-2016 (Percentage of total)

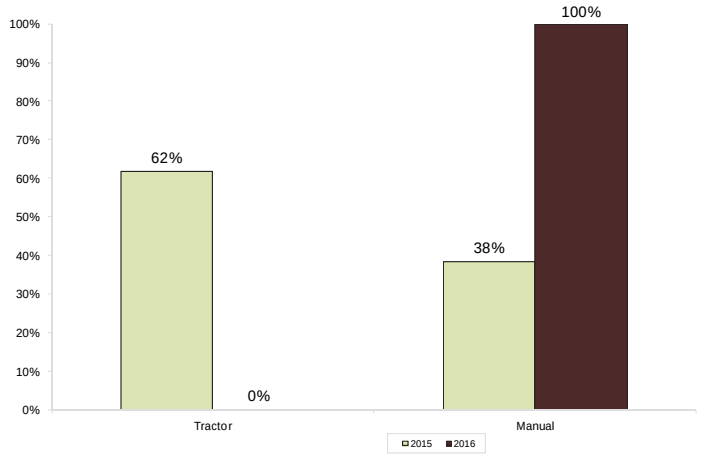


Figure 15: Area of opium poppy eradication, per month, 2015-2016 (Percentage of total)

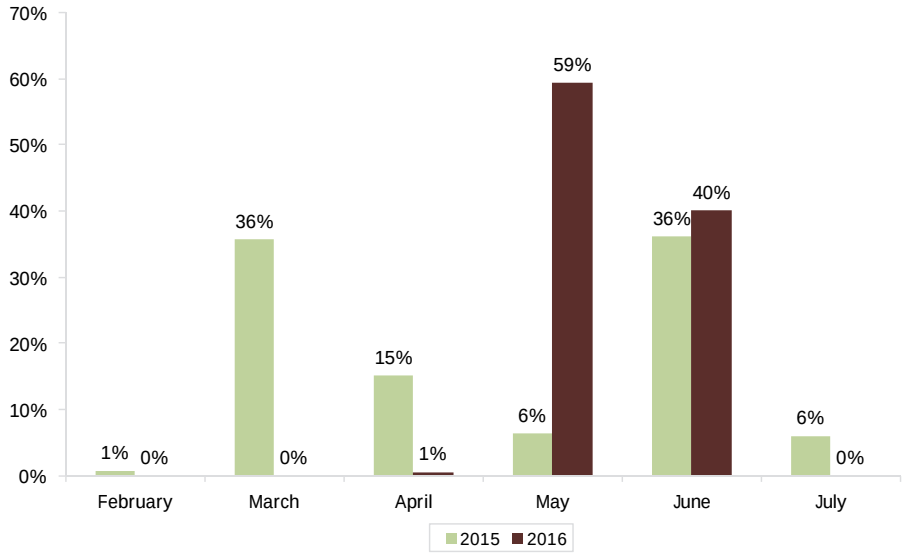


Table 14: Start and end dates of Governor-led eradication (GLE), 2016

Region	Province	Eradication Start Date	Eradication End Date	Eradication (ha)
East	Laghman	1-May-2016	2-May-2016	3
	Nangarhar	1-May-2016	2-May-2016	1
South	Kandahar	11-Apr-2016	20-Apr-2016	4
West	Nimroz	1-Apr-2016	2-Apr-2016	1
North	Sari Pul	1-May-2016	7-May-2016	55
North-east	Badakhshan	16-May-2016	5-Jul-2016	270
	Takhar	17-May-2016	24-May-2016	21

3.2 Quality control of reported eradication with satellite images

As in previous years, in 2016, 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.

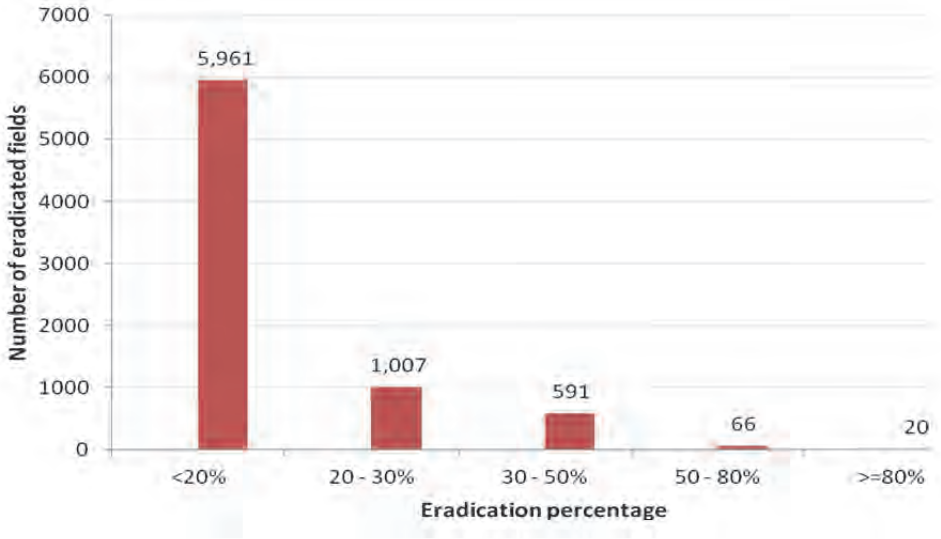
The Governor-led eradication of opium poppy in Badakhshan and Saripul provinces was checked with satellite images. Satellite images were supported with ground pictures and GPS tracking collected during eradication campaign.

Since 2013, surveyors generate 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 2016, 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, eradication reported by verifiers were checked with satellite imageries and an over reporting to the extent of 38% (162 hectares) was confirmed. The final eradication figures in Badakhshan province was corrected to 270 hectares. The quality of eradication was very poor in most of the eradicated fields. Out of 7,645 poppy eradicated fields, the quality verified with satellite imagery has indicated that 5961 poppy fields were eradicated less than 20% and 1007 poppy fields eradicated less than 30% and only 20 poppy fields were eradicated more than 80%.

Figure 16: Percentage of poppy eradication in each field by number of fields in 2016.



Eradication reported by verifiers in **Saripul** province was checked with satellite imagery and over-reporting to the extent of 72% (140 hectares) was confirmed. The final eradication figure in Saripul province was thus corrected to 55 hectares.

4 Potential opium yield and production

4.1 Potential opium yield and production increased in 2016[6]

In 2016, estimated potential opium production in Afghanistan amounted to 4,800 tons (4,000-5,600 tons), an increase of 43% from its 2015 level (3,300 tons). The average opium yield amounted to 23.8 kilograms per hectare in 2016, which was 30% more than in 2015 (18.3 kilograms per hectare).

The increase in potential opium production in 2016 is only partly explained by the larger area under opium poppy cultivation. The most important driver is the higher opium yield per hectare. The largest yield increase occurred in the Western region where the average yield grew by 37% (16.3 kg/ha in 2015 to 22.3 kg/ha in 2016) and the Southern region, with a 36% rise (from 16.1 in 2015 to 22 kg/ha in 2016). Since these two regions account for 84% of the total opium poppy cultivation in Afghanistan, the yield increases in these regions had a strong impact on the national potential opium production.

There are some limitations in these estimates since the yield survey was not implemented in all main cultivating provinces for security reasons. For the provinces not covered, the regional average was used. There are indications that the regional average may not reflect the situation in some of the provinces not included in the survey. In Badghis for example, a yield survey could not be implemented, but a comparison of the quality of the crop as observed on satellite images indicated that the potential opium yield might have been higher than the yield in other Western provinces used to calculate the regional average. As Badghis is the province with the second largest area under opium poppy cultivation in Afghanistan, this suggests that the national potential opium production in 2016 could be an underestimation.

In 2016, a total of 209 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 2016 met the strict quality criteria introduced in 2011.

The Southern region continued to produce the majority of the opium in Afghanistan, accounting for 54% of national production. With 24% of national production, the Western region was the country's second most important opium-producing region in 2016, followed by the Eastern region (12%) and Northern region (6%).

Table 15: Opium yield, by region, 2015-2016[8] (Kilograms per hectare)

REGION	2015 average yield (kg/ha)	2016 average yield (kg/ha)	% Change
Central	41.5	46.1	11%
Eastern	36.5	32.4	-11%
North-eastern	39.6	31.2	-21%
Northern	38.3	35.0	-9%
Southern	16.1	22.0	36%
Western	16.3	22.3	37%
Weighted national average	**18.3**	**23.8**	**30%**

[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.

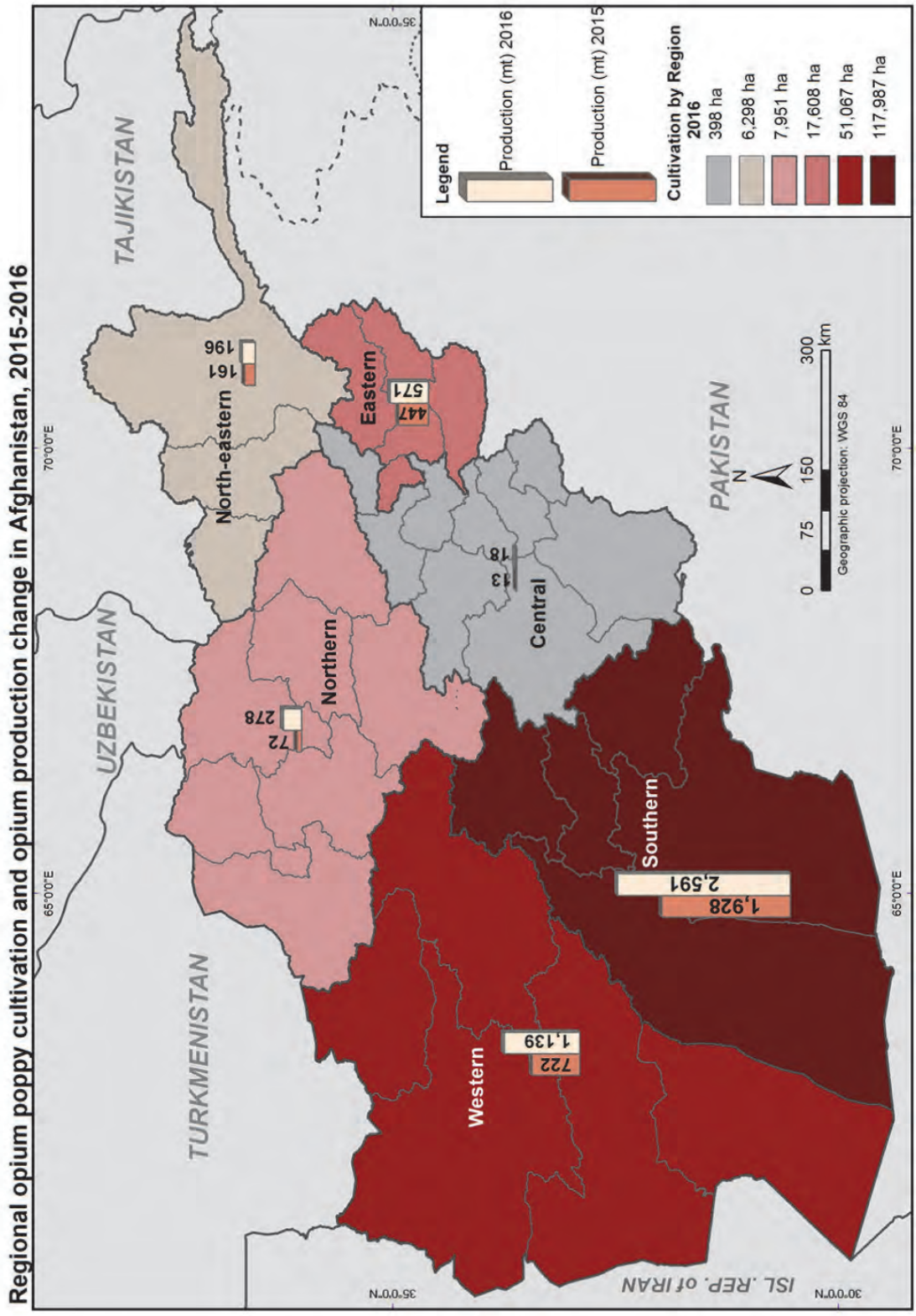
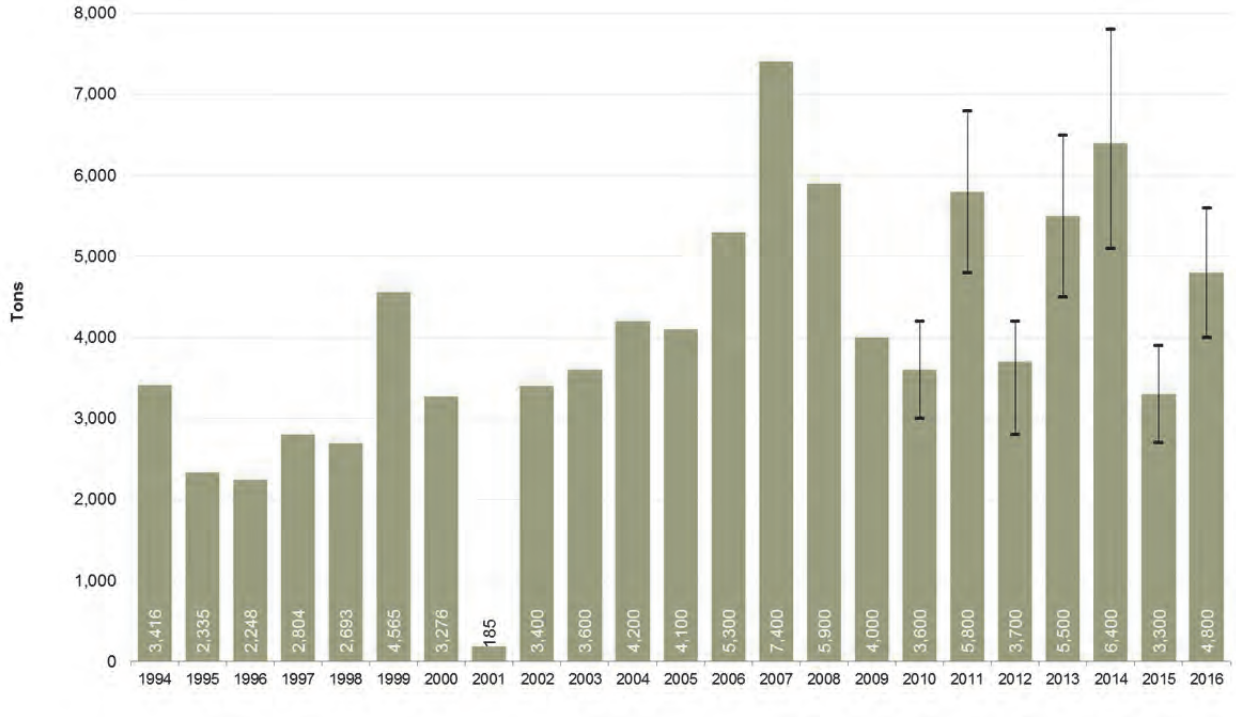

Regional opium poppy cultivation and opium production change in Afghanistan, 2015-2016
TAJIKISTAN
UZBEKISTAN
TURKMENISTAN
PAKISTAN
ISL. REP. of IRAN
North-eastern
196
161
Eastern
571
447
Central
18
13
Northern
278
72
Southern
2,591
1,928
Western
1,139
722
Legend
Production (mt) 2016
Production (mt) 2015
Cultivation by Region 2016
398 ha
6,298 ha
7,951 ha
17,608 ha
51,067 ha
117,987 ha
0 75 150 300 km
Geographic projection: WGS 84
65°0'0"E
70°0'0"E
35°0'0"N
30°0'0"N
Source: Government of Afghanistan - National monitoring system implemented by UNODC/MCN
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
The dotted line represents approximately the line of control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Table 16: Opium production in Afghanistan 2012-2016, by province (Tons)

Province	Production 2012 (mt)	Production 2013 (mt)	Production 2014 (mt)	Production 2015 (mt)	Production 2016 (mt)	Change 2015-2016(mt)	Change 2015-2016(%)
Kabul	4	14	11	13	18	+5	+41%
Khost	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Logar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Paktya	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Panjshir	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Parwan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Wardak	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Ghazni	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Paktika	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Central Region	**4**	**14**	**11**	**13**	**18**	**+5**	**+41%**
Kapisa	11	26	19	17	20	+3	+16%
Kunar	49	51	30	36	41	+5	+15%
Laghman	34	56	36	28	45	+17	+60%
Nangarhar	122	709	721	365	465	+100	+27%
Nuristan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Eastern Region	**216**	**842**	**805**	**446**	**571**	**+125**	**+28%**
Badakhshan	86	102	161	161	196	+35	+22%
Takhar	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Kunduz	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
North-eastern Region	**86**	**102**	**161**	**161**	**196**	**+35**	**+22%**
Baghlan	7	5	6	7	30	+23	+324%
Balkh	Poppy-free	14	Poppy-free	8	73	+65	+812%
Bamyan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Faryab	Poppy-free	6	7	44	102	+58	+132%
Jawzjan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	14	NA	NA
Samangan	Poppy-free	Poppy-free	Poppy-free	Poppy-free	Poppy-free	NA	NA
Sari Pul	Poppy-free	Poppy-free	7	13	59	+46	+354%
Northern Region	**7**	**25**	**20**	**72**	**278**	**+206**	**+286%**
Hilmand	1,699	2,339	3,048	1,392	1,763	+371	+27%
Kandahar	550	658	995	338	450	+112	+33%
Uruzgan	237	229	274	182	340	+158	+87%
Zabul	10	31	85	10	30	+20	+199%
Day Kundi	24	36	17	6	8	+2	+37%
Southern Region	**2,520**	**3,293**	**4,420**	**1,928**	**2,591**	**+663**	**+34%**
Badghis	55	97	117	202	786	584	+289%
Farah	651	658	561	343	203	-140	-41%
Ghor	3	7	10	28	27	-1	-3%
Hirat	25	26	15	5	5	0	-7%
Nimroz	89	437	297	143	118	-25	-17%
Western Region	**824**	**1,224**	**999**	**721**	**1,139**	**+418**	**+58%**

Figure 17: Potential opium production in Afghanistan, 1994-2016 (Tons)



Sources: MCN/UNODC opium surveys, 1994-2016. The vertical 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, 2015-2016 (Tons)

Region	Production 2015	Production 2016	Change 2015-2016 (%)	2015 (tons) as % of total	2016 (tons) as % of total
Central	13	18	+41%	0.4%	0.4%
Eastern	447	571	+28%	13%	12%
North-eastern	161	196	+22%	5%	4%
Northern	72	278	+286%	2%	6%
Southern	1,928	2,591	+34%	58%	54%
Western	722	1,139	+58%	22%	24%
Total (rounded)	**3,300**	**4,800**	**+43%**	**100%**	**100%**

Table 18: Potential opium production, by region, with ranges, 2016 (Tons)

REGION	Best estimate	Lower bound	Upper bound
Central	18	17	20
Eastern	571	415	730
North-eastern	196	151	244
Northern	278	251	305
Southern	2,591	2,216	2,953
Western	1,139	918	1,360
National	**4,794**	**3,970**	**5,612**
National (rounded)	**4,800**	**4,000**	**5,600**

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.

[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 kilogram 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.

Based on information from 2013-2015 on the distribution of opium, morphine and heroin seizures in Afghanistan and neighboring countries, and assuming a 51% purity of heroin of export quality, it can be estimated that out of every 100 kilograms of opium, 57 kilograms are converted into heroin of export quality and 43 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.

Estimated purity of heroin of export quality is based on the data available on purity of wholesale heroin reported by Turkey[11], an important transit country for opiates trafficked from Afghanistan to Europe. In general 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 (51 per cent purity) if 57% 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 (mt), 2016[14]

	If 57% of potential opium production converted (tons)	If total potential opium production converted (tons)
Pure heroin base	150 (120-180)	260 (210-300)
Heroin of export quality (51% purity)	290 (240-340)	510 (420-600)
Unprocessed opium	2,080 (1,720-2,410)	-

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 51% pure heroin, 9.5 kilograms (9 to 10 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 2015 seizure data were available for Afghanistan, Iran (Islamic Republic of) ,Pakistan, Kazakhstan and Uzbekistan from the Annual Report Questionnaires 2015. For the other countries, whose 2015 seizure data were missing, average of 2013 and 2014 was used.

[11] Annual Report Questionnaires 2015 – 2013. Differently from the past year, when only the latest available data on purity was taken into account, 2016 report considers the average of the last three years data on purity.

[12] Paris Pact Initiative

[13] Combined Maritime Forces (CMF), http://combinedmaritimeforces.com/

[14] Combined confidence intervals for converted heroin estimates were calculated applying the error propagation method, through the formula: $\delta Q/|Q| = [(\delta x/x)2 + (\delta y/y)2]^{0.5}$; in order to take into account the uncertainties related to both opium production and conversion factor.

5 Opium prices and farm-gate value of opium

5.1 Opium prices

Opium prices generally increased in all regions of Afghanistan in 2016, although prices did not reach the peak level of 2011.

Table 20: Regional farm-gate prices of dry opium at harvest time, reported by farmers through the price-monitoring system, 2015-2016 (US dollars per kilogram)

Region	Average Dry Opium Price (US$/kg) 2015	Average Dry Opium Price (US$/kg) 2016	Change 2015-2016 (%)
Central	NA	280	N
Eastern	184	239	+30%
North-eastern	81	126	+56%
Northern	113	126	+12%
Southern	153	155	+1%
Western	237	259	+9%
National average weighted by production*	**171**	**187**	**+10%**

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 ban opium in 2001) the average price increased strongly.

Between 2015 and 2016, prices increased from 171 to 187 US$ per kilogram), however, to a smaller degree when compared to 2010-2011 when prices increased from 169 to 241$ per kilogram.

Figure 18: Farm-gate prices of dry opium at harvest time weighted by production and annual opium production, 1999-2016 (tons; US dollars per kilogram)

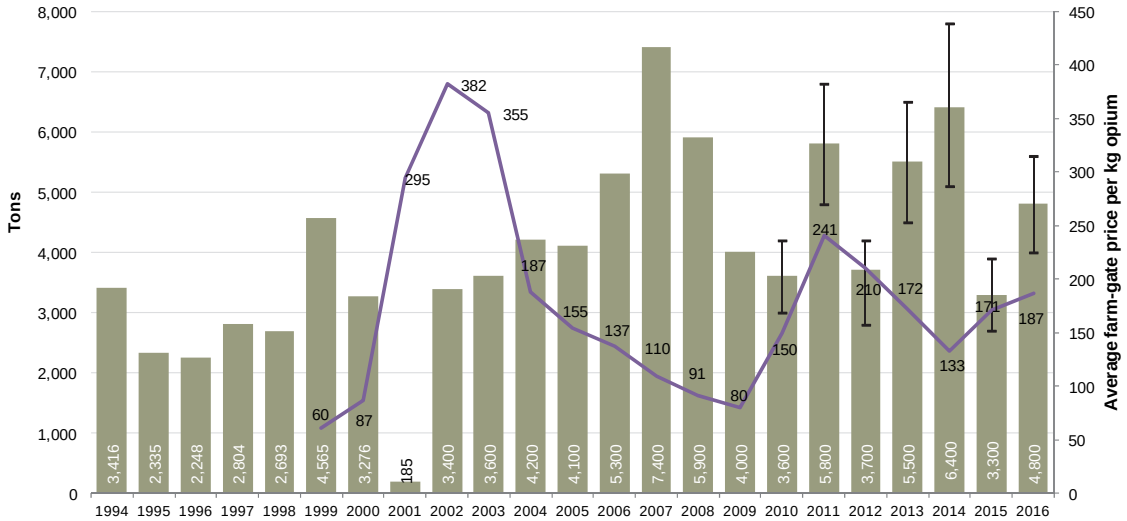
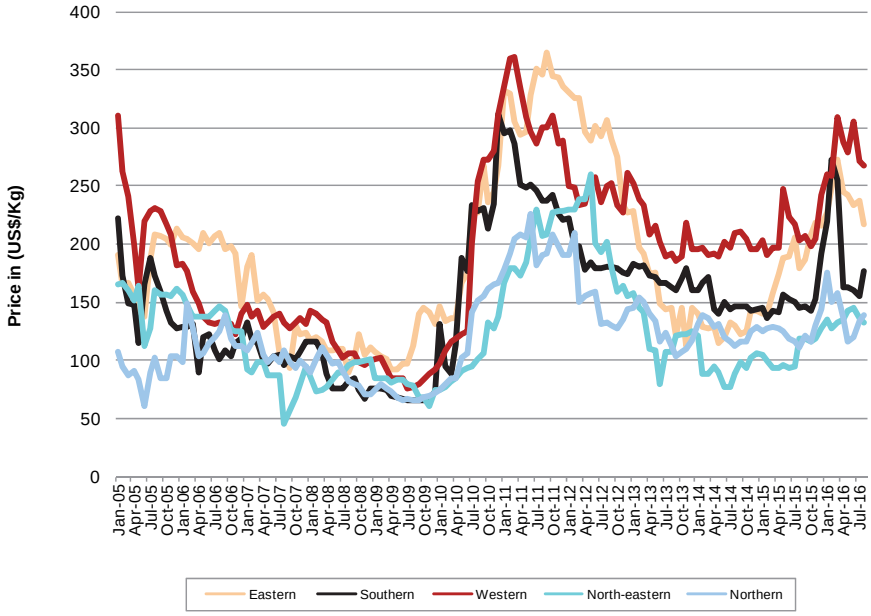


Figure 19: Regional average price of dry opium reported by opium traders, January 2005 to August 2016 (US dollars per kilogram)

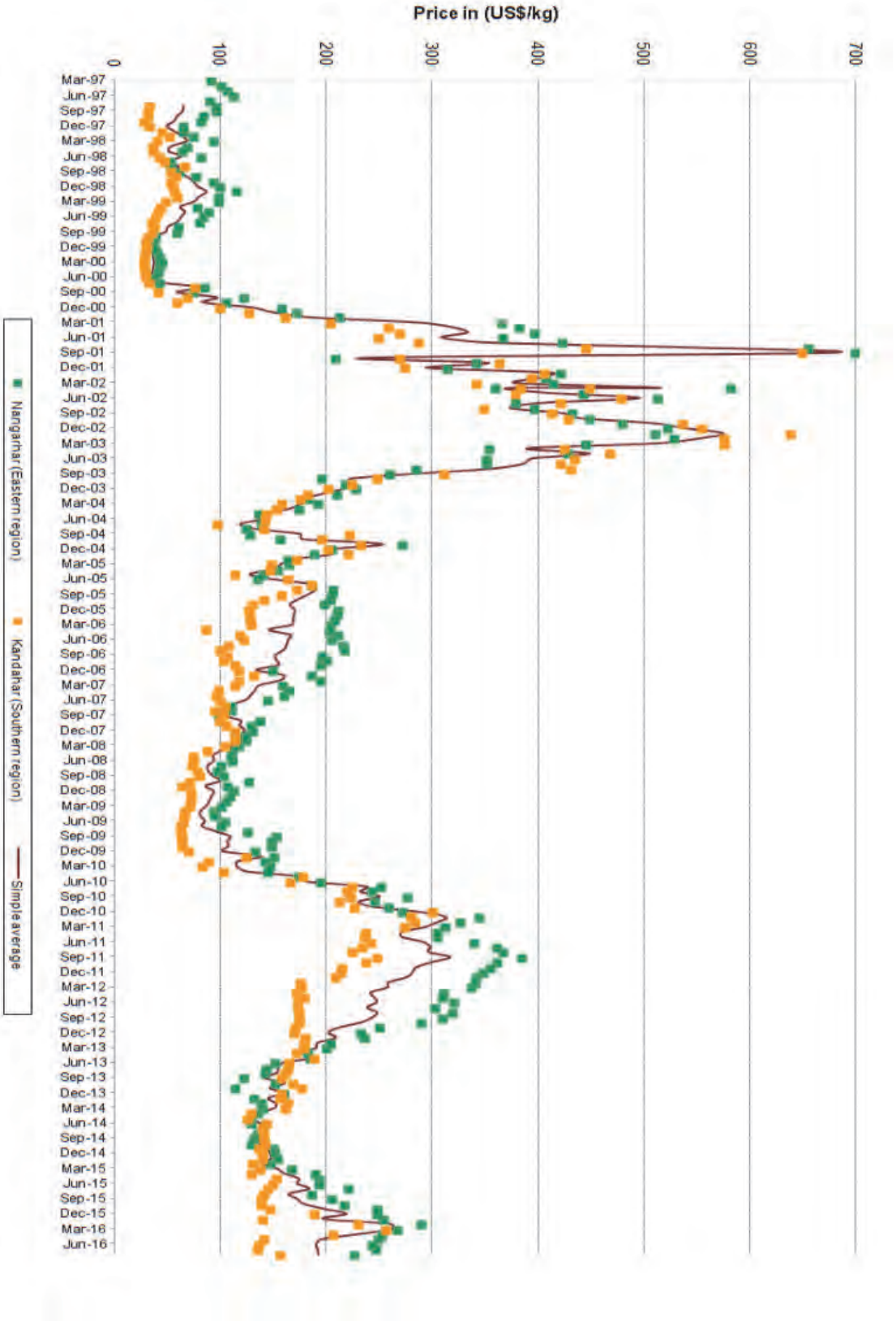


Source: MCN/UNODC Monthly Price Monitoring System.

Table 21: Dry opium prices reported by opium traders, by region, August 2015-August 2016
(US dollars per kilogram)

Region	Regional average price (US$/kg) August-2015	Regional average price (US$/kg) August-2016	Change 2015-2016 (%)
	Trader	Trader	
Eastern region (Kunar, Laghman, Nangarhar)	179	217	+22%
Southern region (Hilmand, Kandahar, Uruzgan, Zabul)	145	176	+21%
Western region (Badghis, Farah, Ghor, Hirat, Nimroz)	203	267	+32%
North-eastern region (Badakhshan, Kunduz, Takhar)	119	132	+11%
Northern region (Baghlan, Balkh, Faryab)	112	138	+24%
Average	**159**	**197**	**+24%**

Figure 20: Monthly prices of dry opium in Kandahar and Nangarhar province, as collected from March 1997 to August 2016 (US dollars per kilogram)



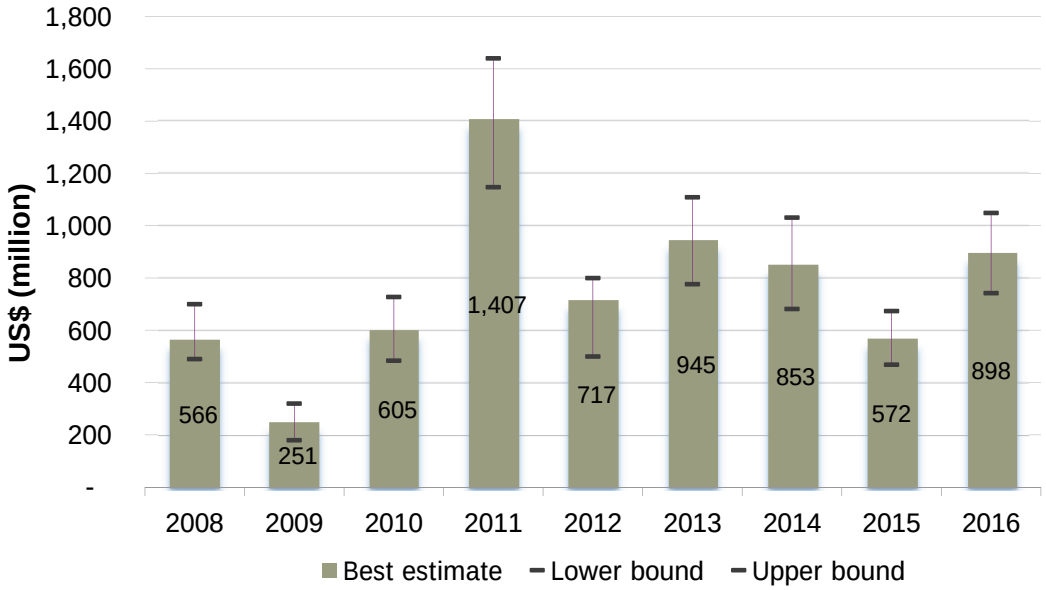
Source: MCN/UNODC Monthly Price Monitoring System.

5.2 Farm-gate value of opium production

Amounting to US$ 898 million (US$ 740-1,050 million), the estimated farm-gate value of opium production in 2016 increased by 57% from its 2015 level. The increase in farm-gate value was mainly due to the 43% increase in opium production this year.

Farmers in Hilmand, the country's largest opium-producing province, earned some estimated US$ 330 million, which was equivalent to 37% of the total farm-gate value of opium production in Afghanistan in 2016; an increase of 38% from 2015 (US$ 240 million).

Figure 21: Farm-gate value of opium production in Afghanistan, 2008-2016 (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.

From 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 2016, out of 34 provinces in Afghanistan, 11 were sampled and 13 were targeted. The remaining 10 provinces were considered to be poppy-free[15] 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, 2016

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, Ghor	Badghis, Farah, Nimroz,	

6.1.1 Study design

6.1.1.1 Sampling frame

The sampling frame was established in 2015 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 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 agricultural land in Afghanistan. Potential land refers to all land available for cultivation and also includes land that is currently fallow.

[15] Note that more than these 10 provinces turned out to be poppy-free in the satellite survey, because less than 100 hectares of opium poppy cultivation was detected.

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. In 2016 Ghor province was changed from sample approach to target approach.

6.1.1.2 Sample size determination

The total number of images to be selected in the sampled provinces was determined in 2015 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. Further details on the sample size determination methodology can be found in O*pium Survey, December 2015*, page 42.

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 2016, high-resolution satellite images were acquired for 502 sampled locations 5 km by 5 km in size covering a total of 11 provinces. The difference to the 500

Table 23 Sample size and agricultural land and sampling ratio, by province, 2016

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%
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	**23,924**	**4,751**	**470**	**499**	**3,915**	**16%**

6.1.1.4 Sample design

The same image locations were used in 2016 as in 2015 for 11 out of the 12 sampled provinces. The sampling approach in Ghor province in 2015 was changed to o a census approach this year.

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 auxiliary 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 PPS, since correlation was driven by a few samples and not representative for the province (see the "Opium poppy 2015 – Cultivation and production" for more details).

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 24: Area estimates of sample provinces with 95% confidence interval, 2016 (Hectares)

Province	Point estimate (Hectares)	Lower bound (Hectares)	Upper bound (Hectares)
Badakhshan	6,298	2,710	9,886
Badghis	35,234	12,363	58,106
Day Kundi	374	320	428
Farah	9,101	5,694	12,509
Hilmand	80,273	61,935	98,611
Kandahar	20,475	17,475	23,476
Kunar	1,275.65	565	1,986
Nangarhar	14,344	8,784	19,905
Nimroz	5,303	3,680	6,926
Uruzgan	15,503	6,456	23,969
Zabul	1,363	625	2,101
Target provinces	**11,767**	**NA**	**NA**
National	**201,311**	**181,528**	**221,254**
National rounded	**201,000**	**182,000**	**221,000**

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 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

[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).

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

In 2015 and 2016 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.

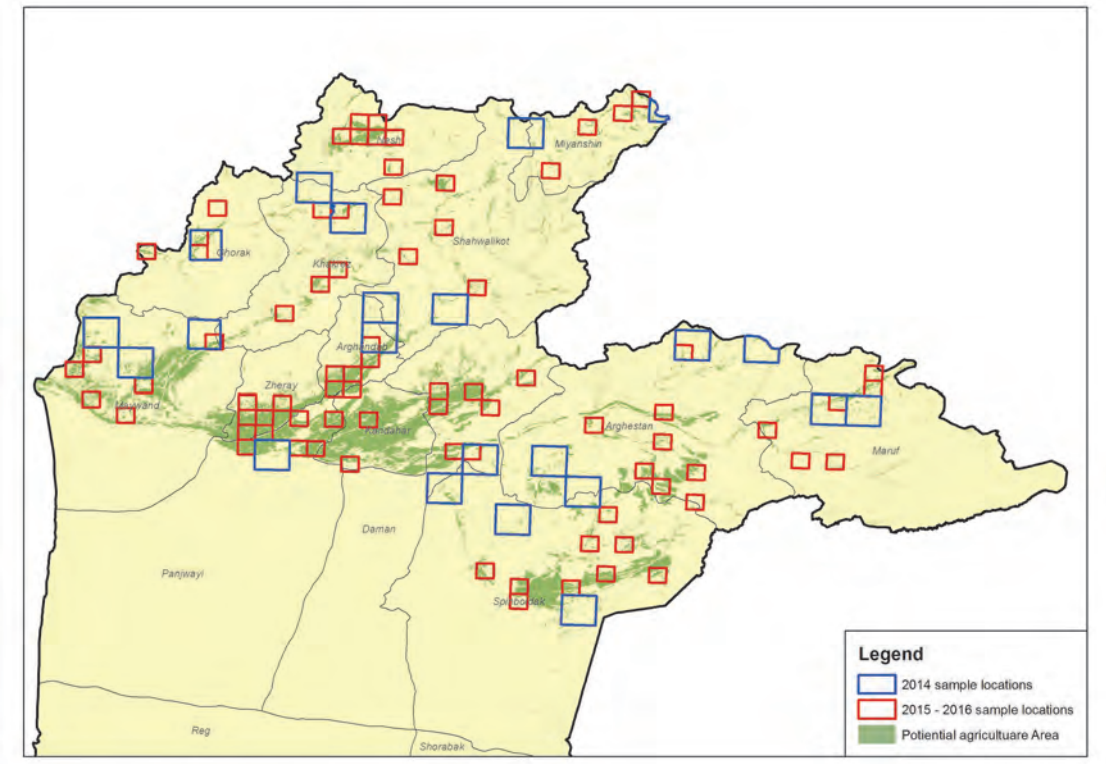
When by chance a previous sample did not cover areas with low (or high) density of opium poppy cultivation well, the new sample may have covered areas with low (or high) densities of cultivation much better and therefore can overstate the extent of change.

6.2.1 Kandahar province

In Kandahar province the same 80 images locations were used in 2016 as in 2015. The following figure shows the distribution of the samples in the province. The clusters of samples are due to probability-proportional-to-size sampling.

The map shows that in 2015 and 2016, 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 2015/2016, the overall distribution of poppy cultivation was better represented in the sample than in 2014.

Figure 22: Samples locations and potential agricultural land in Kandahar province



6.3 Satellite image interpretation

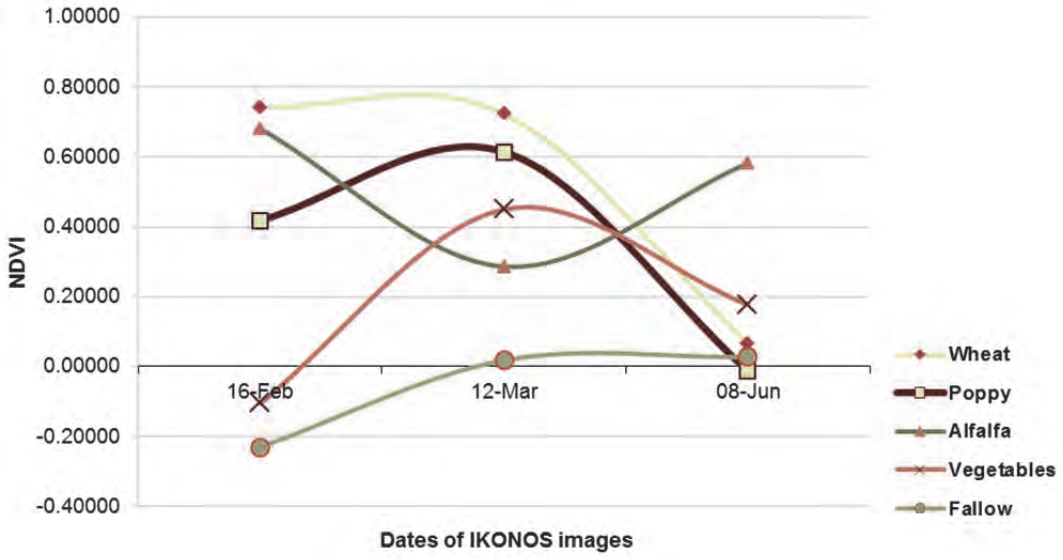
6.3.1 Acquisition of satellite images

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.

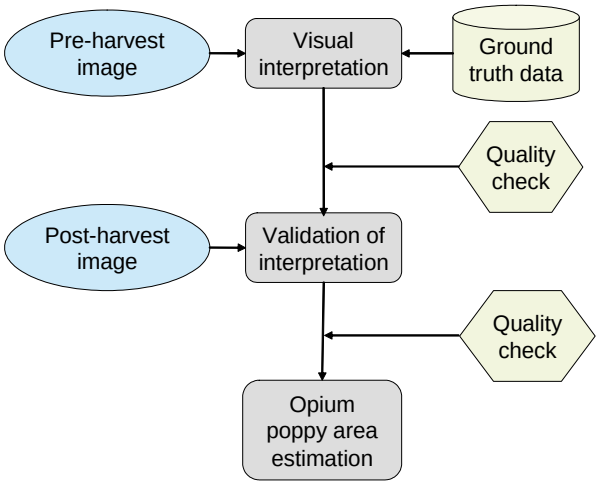
The figure below illustrates the spectral characteristics (Normalized Difference Vegetation Index; NDVI) of opium poppy and other crops between February and June. Wheat and opium poppy have the same growth cycle between March and June, as illustrated. The spectral differences between those two crops 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 23: 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 24: 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.

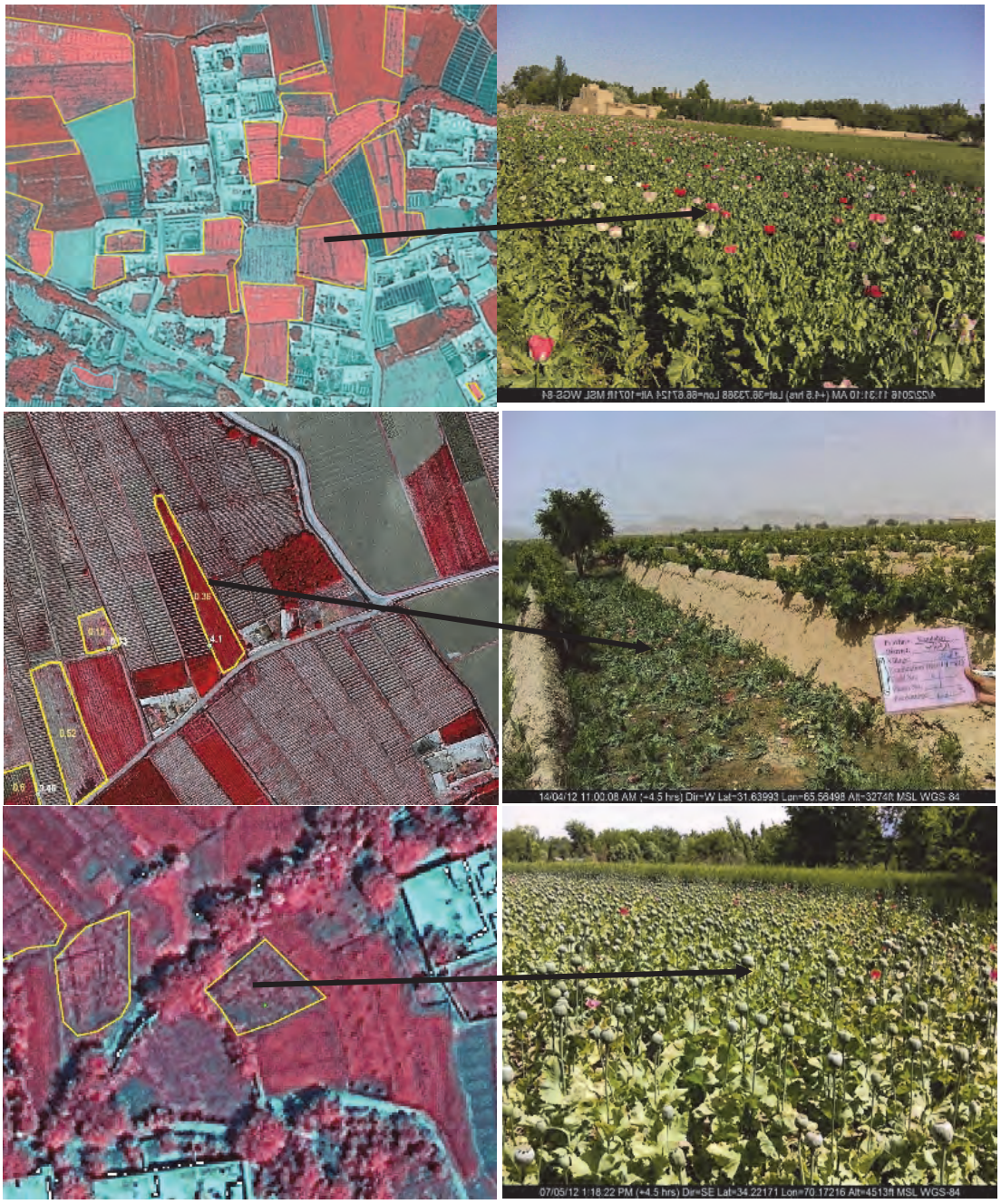
Some of the images could not be acquired at the appropriate time due to weather conditions and/or the time at which the satellite passed. The delayed acquisition of images makes it difficult to detect opium poppy, since fields may be at the senescence stage due to the lancing of capsules and can therefore 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. Some 2,700 GPS points of poppy fields, supported with pictures, were collected from the provinces of Sari Pul, Baghlan, Balkh and Faryab.

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

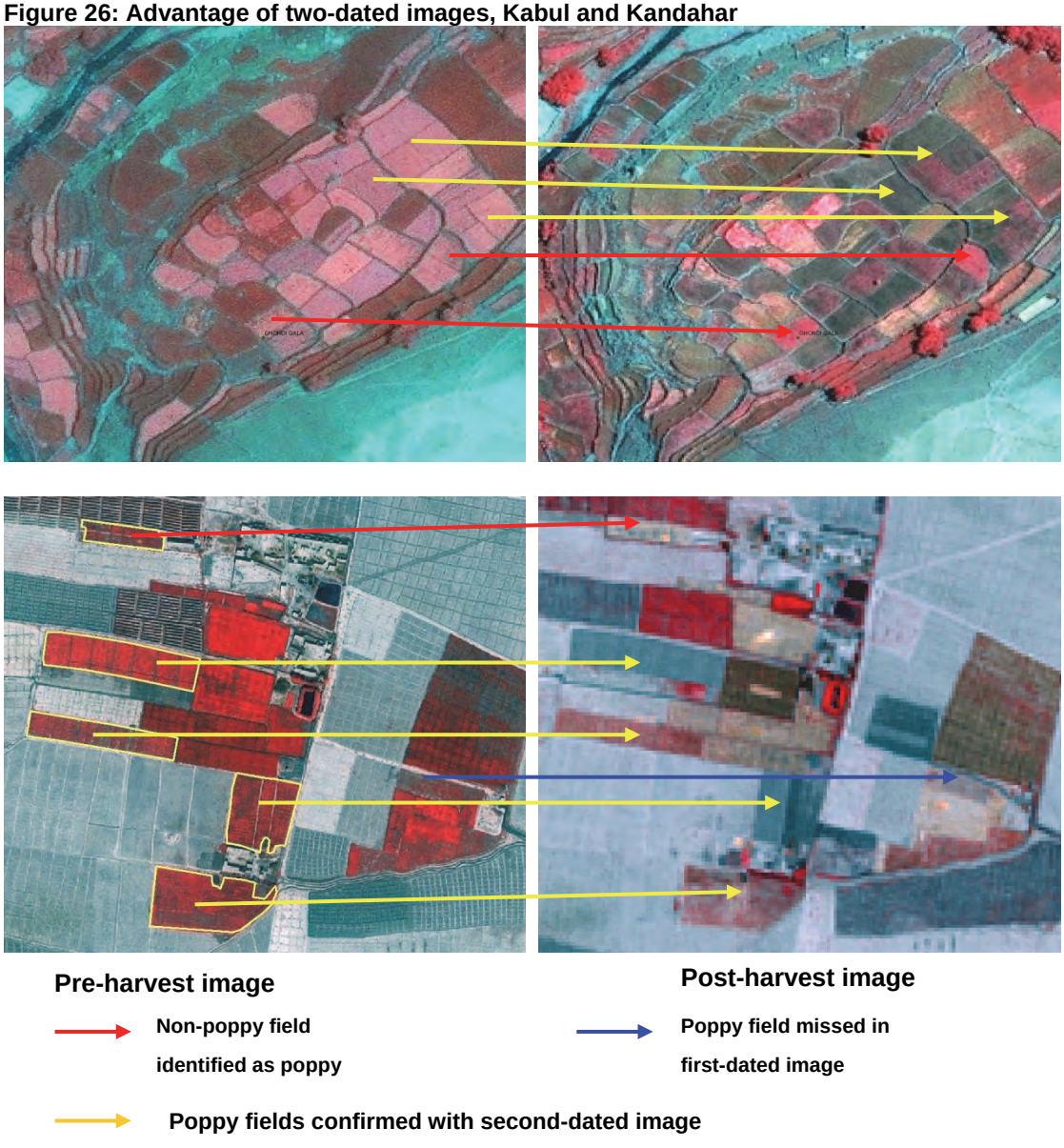
Figure 25: Use of geo-referenced ground photos for image interpretation



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 26: Advantage of two-dated images, Kabul and Kandahar



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 MCN/UNODC 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.

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.

Table 25: Regional opium yield values with 95% confidence intervals, 2016 (Kilograms per hectare)

REGION	Best estimate	Lower bound	Upper bound
Central	46.1	42.9	49.3
Eastern	32.4	23.5	41.4
North-eastern	31.2	23.9	38.5
Northern	35.0	31.6	38.4
Southern	22.0	18.8	25.1
Western	22.3	18.0	26.6
National weighted by opium poppy cultivation	**23.8**	**19.7**	**27.9**

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.

[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.

[19] See MCN/UNODC *Afghanistan Opium Survey , December 2011*, pages 94-95.

The results showed that data continued to be of a high quality. In 2016, the statistical tests were applied to the capsule measurements (values reported regarding height and diameter), all the data passed the test.

Table 26: Yield survey villages and fields surveyed (all data)**, 2009-2016**

Region	2009	2010	2011	2012	2013	2014	2015	2016
Number of Villages	248	240	232	41	48	45	63	76
Number of fields (max 3 Per village)	699	685	685	114	142	134	188	209
Number of plots (3 per field)	2415	2040	2055	342	426	401	553	620
Number of capsules measured	26901	20474	20769	3211	4009	3474	4280	5388

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.

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 neighboring 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 neighboring 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 27: Proportions of opiate seizures in Afghanistan and neighbouring countries
(Percentage)

Distribution	2013	2014	2015	Average 2013-2015 weighted by amounts seized
Opium	46%	53%	38%	43%
Heroin and morphine combined	54%	47%	62%	57%

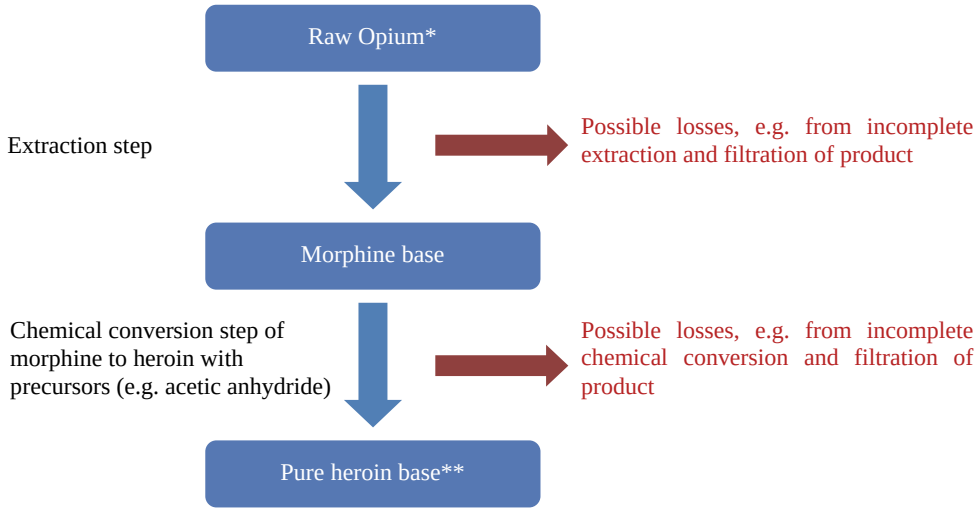
6.6.2 Conversion ratio from opium to heroin

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 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 27: 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

[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.*

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.

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

[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.
[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.

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 conversion 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.

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 2016, the average of typical purity of wholesale heroin quality reported by Turkey in the previous three years 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.

[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.

Annex I: Indicative district level estimates of opium poppy cultivation, 2001-2016 (Hectares)[34]

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Badakhshan	Arghanj Khwah	-	-	-	-	-	-	54	-	-	-	-	-	-	-	10	3
Badakhshan	Argo	-	-	-	-	-	-	210	60	203	327	617	610	565	2,046	1,273	2,648
Badakhshan	Baharak	345	180		5,544	1,635	710	-	14	2	-	-	43	322	41	271	0
Badakhshan	Darayim	-	-	-	-	-	-	682	43	145	289	662	898	684	1,282	1,530	1,744
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	1
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	23
Badakhshan	Khash	-	-	-	-	-	-	999	7	6	4	46	-	-	-	152	330
Badakhshan	Khwahan	-	-	-	-	-	-	-	-	-	-	-	-	5	21	7	40
Badakhshan	Kishim	2,191	2,840	4,530	2,883	1,076	3,165	-	2	68	204	73	45	141	117	35	674
Badakhshan	Kohistan	-	-	-	-	-	-	-	-	-	-	-	2	0	11	8	-
Badakhshan	Kuf Ab	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-
Badakhshan	Kiran wa Munjan	-	-	-	-	48	-	10	-	-	-	-	-	0	-	-	-
Badakhshan	Raghistan	-	-	-	-	-	-	400	-	-	-	-	19	9	26	-	44
Badakhshan	Shahri Buzurg	41	170	615		39	-	313	-	2	3	3	36	148	59	37	4
Badakhshan	Shighnan	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-
Badakhshan	Shiki	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-
Badakhshan	Shuhada	-	-	-	-	-	-	-	-	-	-	-	12	86	236	-	-
Badakhshan	Tagab	-	-	-	-	-	-	93	-	-	-	-	22	36	101	57	167
Badakhshan	Tashkan	-	-	-	-	-	-	136	-	57	163	145	73	107	92	595	582
Badakhshan	Wakhan	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-
Badakhshan	Wardooj	-	-	-	-	-	-	9	3	14	1	1	-	0	-	-	10
Badakhshan	Yaftal-i-Sufla	-	-	-	-	-	-	305	-	43	97	50	32	18	12	25	23
Badakhshan	Yamgan	-	-	-	-	-	-	10	-	-	-	1	-	5	10	-	4
Badakhshan	Yawan	-	-	-	-	-	-	166	-	-	-	-	30	-	-	2	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**	**6,298**
Badghis	Ab Kamari	-	-	-		-	127	-	11	161	16	5	14	24	-	1,996	71
Badghis	Ghormach	-	4	101	-	944	624	250	328	299	486	1,485	1,005	2,395	1,009	6,855	17,594
Badghis	Jawand	-	-	-	226	134	431	66	13	1,090	130	106	187	850	797	683	940
Badghis	Muqur	-	-	-	-	-	220	149	7	102	81	9	61	26	47	86	1,062
Badghis	Bala Murghab	-	22	69	345	1,889	1,034	3,557	81	2,754	2,055	284	870	-	3,762	1,417	12,372
Badghis	Qadis	-	-	-	-	-	391	198	146	906	135	92	152	264	57	1,331	3,185
Badghis	Qala-i-Now (Provincial Center)	-	-	-	43	-	378	-	-	99	55	9	75	37	49	23	11
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**	**35,234**
Baghlan	Andarab	81	31	301	564	548	947	130	475	-	-	18	5	3	4	8	92
Baghlan	Baghlan *	-	120	16	154	374	72	-	-	-	-	-	-	-	-	-	-
Baghlan	Baghlan-i-Jadeed	-	-	-	81	248	371	287	-	-	-	-	-	-	-	-	-
Baghlan	Burka	-	-	-	198	242	39	31	-	-	-	-	-	4	1	0	4
Baghlan	Dahana-i- Ghuri	-	-	37	200	24	35	-	-	-	-	-	-	-	-	-	-
Baghlan	Deh Salah	-	-	-	-	-	-	14	-	-	-	113	33	37	60	68	351
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	-	-	-	-	-	-	-	-	84
Baghlan	Nahreen	1	-	63	276	35	36	-	-	-	-	-	-	-	-	-	-
Baghlan	Pul-i-Hisar	-	-	-	-	-	-	-	-	-	-	30	139	97	103	104	319
Baghlan	Pul-i-Khumri (Provincial Center	-	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**	**849**
Balkh	Balkh	1	22	332	411	2,786	1,975	-	-	-	-	-	-	-	-	-	5
Balkh	Chahar Bolak	-	-	68	877	2,701	799	-	-	-	-	-	-	10	-	9	316
Balkh	Chahar Kent	-	-	-	23	25	16	-	-	-	-	-	-	-	-	-	-
Balkh	Chimtal	-	153	617	258	1,878	2,074	-	-	-	-	-	-	400	-	195	1,764
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**	**2,085**

[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	2016
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**	**p-f**
Day Kundi	Gizab	-	-	1,305	2,109	-	2,243	1,054	665	810	722	621	684	727	Uruzgan	Uruzgan	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	273
Day Kundi	Khedir	-	-	-	-	-	-	531	289	160	5	8	9	4	6	24	6
Day Kundi	Kiti	-	-	-	-	-	-	282	168	284	134	151	14	-	-	13	-
Day Kundi	Mir Amor	-	-	-	-	-	-	512	281	703	19	22	5	12	16	72	15
Day Kundi	Nili (Provincial Center)	-	-	-	-	-	-	-	214	5	5	9	16	3	-	-	13
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	67
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**	**374**
Farah	Anar Darah	-	-	-	91	1,828	143	16	239	79	1	9	3	314	104	-	2
Farah	Bakwah	-	-	-	39	390	1,093	3,458	3,090	3,570	1,936	800	5,822	8,844	12,651	5,567	1,503
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	2,062
Farah	Delaram	-	-	-	-	-	-	-	-	3,011	4,404	4,263	8,899	Nimroz	Nimroz	Nimroz	Nimroz
Farah	Farah (Provincial Center)	-	-	-	87	729	905	1,328	1,013	1,142	51	-	129	4,451	4,760	128	72
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	841
Farah	Khaki-Safed	-	-	-	84	432	537	99	609	232	645	1,103	2,220	1,186	1,726	4,562	2,715
Farah	Lash-i-Juwayn	-	-	-	41	1,568	215	233	109	45	3	6	2	179	27	7	10
Farah	Pur Chaman	-	-	-	409	293	363	1,549	1,046	96	2,175	3,512	2,164	230	930	365	315
Farah	PushtRod	-	-	-	554	2,482	1,709	1,314	1,588	46	61	46	505	2,521	2,214	2,192	1,517
Farah	Qala-i-Kah	-	-	-	189	407	506	337	888	47	11	39	117	914	354	186	64
Farah	Shib Koh	-	-	-	12	283	352	87	163	77	18	-	-	149	17	1	-
Farah Total		**0**	**500**	**1,700**	**2,288**	**10,240**	**7,694**	**14,865**	**15,010**	**12,405**	**14,552**	**17,499**	**27,733**	**24,492**	**27,513**	**21,106**	**9,101**
Faryab	Almar	-	-	-	239	57	338	213	-	-	-	-	-	-	-	-	52
Faryab	Andkhoy	-	-	-	15	13	31	-	-	-	-	-	-	-	-	-	-
Faryab	Bil Chiragh	-	26	232	24	-	322	620	102	-	-	-	-	-	-	-	1
Faryab	Dowlat abad	-	-	-	78	133	27	-	-	-	-	-	-	-	-	-	-
Faryab	Gurziwan	-	-	-	-	-	-	101	-	-	-	75	-	46	40	108	39
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	89
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	2,742
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**	**2,923**
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 Khug	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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**	**p-f**
Ghor	Chaghcharan (Provincial Cente	-	700	1,189	872	1,149	1,233	910	-	-	-	-	71	72	222	397	356
Ghor	Chahar Sadah	-	-	-	-	-	-	41	-	-	-	-	-	64	95	-	182
Ghor	Dowlatyar	-	-	-	-	-	-	132	-	-	-	-	5	82	117	154	235
Ghor	Do Lainah	-	-	-	-	-	-	131	-	-	-	-	16	9	9	17	11
Ghor	Lal Wa Sarjangal	-	-	-	1,055	718	771	200	-	-	-	-	-	-	9	280	-
Ghor	Pasaband	-	700	805	175	48	241	17	-	-	-	-	-	-	-	633	258
Ghor	Saghar	-	300	256	340	120	283	18	-	-	-	-	-	-	-	8	-
Ghor	Shahrak	-	-	640	902	18	1,398	-	-	-	-	-	33	37	41	62	99
Ghor	Taywara	-	500	808	649	240	608	39	-	-	-	-	-	-	-	126	82
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**	**1,223**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
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	4,408
Hilmand	Dishu	-	-	-	369	911	851	1,160	688	475	119	481	1,601	4,161	3,338	3,528	4,391
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	10,574
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	8,490
Hilmand	Lashkargah (Provincial Center)	-	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	1,935
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	6,112
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	12,429
Hilmand	Marja	-	-	-	-	-	-	-	-	-	-	2,629	2,046	Nad Ali	Nad Ali	Nad Ali	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	11,050
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	7,256
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	559
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	8,352
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	2,955
Hilmand	Washer	-	800	590	892	386	735	865	1,653	1,188	1,555	2,275	2,757	5,445	3,710	2,076	1,759
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**	**80,273**
Hirat	Adraskan	-	-	-	133	9	99	196	22	1	-	-	-	3	10	5	1
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	207
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**	**208**
Jawzjan	Aqchah	-	47	171	247	631	30	-	-	-	-	-	-	-	-	-	-
Jawzjan	Darzab	-	-	-	625	272	16	803	-	-	-	-	-	-	-	-	85
Jawzjan	Faizabad	-	24	280	218	112	473	21	-	-	-	-	-	-	-	-	7
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	-	-	-	-	-	-	-	-	316
Jawzjan	Sheberghan (Provincial Center)	-	1	36	98	508	828	156	-	-	-	-	-	-	-	-	1
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**	**409**
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	398
Kabul Total		**29**	**58**	**237**	**282**	**0**	**80**	**500**	**310**	**132**	**152**	**220**	**120**	**298**	**233**	**321**	**398**
Kandahar	Arghandab	-	330	139	261	287	735	1,016	57	158	22	84	114	18	512	247	381
Kandahar	Arghistan	-	80	14	651	2,449	784	310	28	43	7	42	90	155	1,515	178	58
Kandahar	Daman	-	190	357	895	775	183	375	19	119	-	-	-	-	1,227	37	43
Kandahar	Ghorak	-	380	166	241	233	336	1,445	232	628	1,466	1,165	952	676	269	691	565
Kandahar	Kandahar (Provinclal Center)	-	640	293	-	-	1,367	1,220	590	425	108	262	11	46	-	56	74
Kandahar	Khakrez	-	560	312	145	185	217	132	1,224	1,474	1,215	1,190	794	1,006	867	433	459
Kandahar	Maruf	-	-	63	117	150	464	914	182	36	33	31	28	49	275	8	91
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	7,287
Kandahar	Miya Neshin	-	-	-	-	-	-	322	1,603	158	44	45	30	162	632	4	9
Kandahar	Nesh	-	-	-	-	-	-	432	3,284	1,717	2,842	2,096	620	1,057	405	1,065	1,986
Kandahar	Panjwayee	-	150	482	864	4,687	4,714	-	-	1,564	2,982	4,914	4,780	984	3,315	1,735	1,565
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	818
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	1,857
Kandahar	Zhire	-	-	-	-	-	-	5,232	2,923	5,405	4,978	5,288	3,867	7,017	5,108	4,886	5,282
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**	**20,475**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Kapisa	AlaSai	-	-	-	77	82	-	367	-	-	-	3	34	33	125	71	103
Kapisa	Hisah-i-Awal Kohistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kapisa	Hisah-i-Duwumi Kohistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kapisa	Koh Band	-	-	-	111	33	-	-	-	-	-	9	16	20	46	10	25
Kapisa	Kohistan	-	-	-	116	-	-	-	-	-	-	-	-	-	-	-	-
Kapisa	Mahmood-i-Raqi (Provincial Ce	-	-	-	10	-	-	-	-	-	-	-	-	1	-	-	-
Kapisa	Nijrab	-	-	-	92	-	-	-	-	-	-	14	21	20	30	21	26
Kapisa	Tagab	0	207	326	116	-	282	468	436	-	-	155	219	508	270	358	454
Kapisa Total		**0**	**207**	**326**	**522**	**115**	**282**	**835**	**436**	**p-f**	**p-f**	**181**	**290**	**582**	**472**	**460**	**608**
Khost	Bak	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-
Khost	Gurbuz	-	-	-	47	-	10	-	-	-	-	-	-	-	-	-	-
Khost	Jaji Maidan	-	-	-	8	-	16	-	-	-	-	-	-	-	-	-	-
Khost	Khost Matun (Provincial Cente	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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**	**p-f**
Kunar	Asad Abad (Provincial center)	1	140	396	841	270	356	42	252	4	-	-	61	342	209	1	1
Kunar	Bar Kunar (Asmar)	31	40	163	52	14	10	111	7	9	7	18	62	83	57	58	73
Kunar	Chapa Dara	-	-	-	535	147	23	-	-	-	12	42	-	-	-	-	4
Kunar	Dangam	4	49	-	44	22	9	90	-	9	-	43	30	46	46	28	15
Kunar	Dara-i-Pech	11	263	310	585	76	183	-	0	1	5	170	298	254	82	30	39
Kunar	Ghazi Abad	-	-	-	-	-	-	5	-	0	4	13	-	-	-	5	30
Kunar	Khas Kunar	-	70	-	298	41	18	8	1	-	-	-	57	79	21	116	36
Kunar	Mara warah	-	-	345	170	22	33	6	-	84	-	2	4	1	-	28	11
Kunar	Narang wa Badil	10	100	173	425	55	25	57	-	4	1	1	41	22	4	5	31
Kunar	Nari	1	-	60	-	19	-	80	15	1	-	-	21	18	7	20	25
Kunar	Noor Gal	9	70	353	460	58	88	7	-	4	20	20	101	-	79	9	241
Kunar	Sar Kani	8	100	141	385	50	75	11	6	1	-	-	14	25	-	476	359
Kunar	Shigal wa Sheltan	-	-	-	-	-	-	5	-	36	73	102	459	212	155	71	242
Kunar	Sawkai	8	140	83	571	284	111	19	9	4	33	30	124	-	50	8	6
Kunar	Watapoor	-	-	-	-	-	-	3	-	6	-	137	7	46	45	132	163
Kunar Total		**82**	**972**	**2,025**	**4,366**	**1,059**	**931**	**446**	**290**	**164**	**155**	**578**	**1,279**	**1,127**	**754**	**987**	**1,276**
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**	**p-f**
Laghman	Alingar	3	146	354	593	107	259	23	13	1	48	343	303	503	477	277	546
Laghman	Alisheng	0	104	148	597	69	192	237	370	1	65	124	335	472	278	285	471
Laghman	Dowlat Shah	12	-	571	233	44	118	124	3	0	31	52	158	142	5	90	180
Laghman	Mehterlam (Provincial Center)	-	240	366	580	25	-	-	16	43	90	104	69	119	137	123	175
Laghman	Qarghayee	0	460	468	753	30	140	177	23	90	-	-	12	-	5	4	8
Laghman Total		**15**	**950**	**1,907**	**2,756**	**274**	**709**	**561**	**425**	**135**	**234**	**624**	**877**	**1,236**	**901**	**779**	**1,380**
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**	**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	698
Nangarhar	Bati Kot	-	2,390	1,994	4,683	166	550	1,774	-	-	-	-	-	-	-	4	193
Nangarhar	Behsud	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nangarhar	Chaparhar	2	990	1,169	1,818	20	209	878	-	-	-	12	19	1,452	1,866	1,504	2,472
Nangarhar	Darah-i- Noor	-	380	24	472	2	-	322	-	-	-	-	-	-	162	11	326
Nangarhar	Deh Bala	11	650	927	358	17	68	1,075	-	-	-	-	14	-	-	275	55
Nangarhar	Dur Baba	-	40	31	99	5	19	36	-	-	-	-	-	-	-	-	-
Nangarhar	Goshta	99	150	13	217	10	41	109	-	-	-	-	-	19	95	6	3
Nangarhar	Hesarak	2	620	1,016	1,392	64	283	295	-	18	5	178	89	-	775	424	581
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	4,204
Nangarhar	Kot	-	-	-	-	-	-	-	-	-	-	-	-	993	2,040	872	80
Nangarhar	Kuzkunar	-	500	102	801	37	151	153	-	-	-	-	-	-	-	-	1
Nangarhar	Lalpoor	95	250	1	362	17	68	356	-	5	59	185	-	798	712	218	344
Nangarhar	Mohmand Dara	-	720	19	1,170	54	221	995	-	-	1	1	-	155	175	19	213
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	1,160
Nangarhar	Rodat	-	2,760	3,313	3,633	50	-	3,755	-	-	-	-	-	11	946	389	1,426
Nangarhar	Sherzad	2	1,470	1,641	1,229	57	430	864	-	148	513	1,510	550	2,650	1,876	884	1,393
Nangarhar	Shinwar	-	2,060	1,616	1,759	79	504	2,218	-	-	-	-	-	-	-	70	379
Nangarhar	Surkh Rud	0	1,440	118	1,229	-	-	-	-	-	-	-	-	-	219	188	818
Nangarhar Total		**218**	**19,780**	**18,904**	**28,213**	**1,093**	**4,871**	**18,739**	**p-f**	**294**	**719**	**2,700**	**3,151**	**15,719**	**18,227**	**10,016**	**14,344**
Nimroz	Asl-i-Chakhansur	-	-	-	-	-	-	-	1	-	183	855	98	9	-	57	34
Nimroz	Chahar Burjak	-	-	-	65	526	1,119	87	4	84	144	181	696	511	250	698	1,305
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	3,962
Nimroz	Zaranj (Provincial Center)	-	-	-	-	-	135	-	-	17	81	102	442	1	-	4	2
Nimroz Total		**0**	**300**	**26**	**115**	**1,690**	**1,955**	**6,507**	**6,203**	**428**	**2,039**	**2,493**	**3,808**	**16,252**	**14,584**	**8,805**	**5,303**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
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 Cer	-	-	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**	**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**	**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**	**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**	**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**	**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**	**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	-	-	-	-	-	-	-	-	72
Sari Pul	Sayyad	-	-	-	23	52	25	41	-	-	-	-	-	-	195	331	1614
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**	**1,686**

Province	District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
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**	**p-f**
Uruzgan	Chorah	-	1,330	975	1,402	259	2,024	71	316	306	221	301	349	611	502	275	454
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	4,743
Uruzgan	Khas Uruzgan	-	-	580	358	338	886	173	304	407	230	384	38	123	1,074	172	2,492
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	1,951
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	5,574
Uruzgan	Gizab*	-	-	-	-	-	-	-	-	-	-	-	-	-	148	107	290
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**	**15,503**
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 Cente	-	-	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**	**p-f**
Zabul	Arghandab	-	-	302	526	205	346	79	55	103	91	47	79	32	256	24	56
Zabul	Atghar	-	-	188	32	86	36	16	3	2	16	1	5	12	12	-	3
Zabul	Daychopan	-	-	646	431	1,016	742	389	422	147	122	26	25	259	178	25	35
Zabul	Kakar Kak-e Afghan	-	-	-	-	-	-	104	110	219	44	40	38	50	403	122	4
Zabul	Mizan	-	-	309	251	56	123	129	289	309	140	74	155	858	544	171	150
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	1,115
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**	**1,363**
TOTAL		**7,606**	**74,045**	**80,482**	**126,899**	**103,919**	**164,969**	**192,981**	**157,253**	**123,095**	**122,515**	**131,065**	**154,436**	**209,450**	**224,337**	**182,566**	**201,312**
Rounded Total		**8,000**	**74,000**	**80,000**	**131,000**	**104,000**	**165,000**	**193,000**	**157,000**	**123,000**	**123,000**	**131,000**	**154,000**	**209,000**	**224,000**	**183,000**	**201,000**

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 (2016)

Province	DISTRICT	Eradication verified (ha)	No. of fields eradication reported	No. of villages eradication reported
Badakhshan	Argo	113	3,759	67
	Darayim	22	904	24
	Kishim	67	1,542	36
	Tashkan	68	1,440	35
Badakhshan Total		**270**	**7,645**	**162**
Kandahar	Maiwand	1	2	1
	Panjwayee	0.1	3	1
	Zhire	3	14	1
Kandahar Total		**4**	**19**	**3**
Laghman	Mehterlam (Provincial Center)	3	10	1
Laghman Total		**3**	**10**	**1**
Nangarhar	Surkh Rud	1	10	1
Nangarhar Total		**1**	**10**	**1**
Nimroz	Khash Rod	1	5	3
Nimroz Total		**1**	**5**	**3**
Sari Pul	Sari Pul (Provincial Center)	20	93	8
	Sayyad	35	74	8
Saripul Total		**55**	**167**	**16**
Takhar	Eshkamish	21	66	15
Takhar Total		**21**	**66**	**15**
Grand Total		**355**	**7,922**	**201**