

MACROECONOMIC IMPACT OF THE DRUG ECONOMY AND COUNTER-NARCOTICS EFFORTS

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I. THE MACROECONOMIC IMPACT OF DRUG-RELATED ACTIVITIES

The Government's and the donor community's counter-narcotics efforts have had a limited impact so far on Afghanistan's opium production, which has remained at historically high levels in the last few years. However, owing to the sustained growth of the licit economy, the size of the opium sector relative to the rest of the economy has declined significantly. Nevertheless, the opium sector remains Afghanistan's largest source of export earnings (although unrecorded) and a major source of incomes in the rural areas. Intensification of counter-narcotics efforts will therefore have a substantial economic and social impact. To explore this impact, a simple macroeconomic model has been developed. Given the uncertainty surrounding economic behavior as well as the values of a number of economic variables, the results essentially have an illustrative value. Nevertheless, this model seeks to capture, in an integrated way, the key economic transmission channels. The model suggests that even through interdiction and eradication have very different economic effects, the impact of counter-narcotics efforts on the real sector will be less pronounced to the extent that a large part of the decline in income would fall on traffickers, who have a lower propensity to consume. Similarly, both the high level of drug-related capital outflows and the large import content associated with drug-related spending could moderate the adverse effect of counter-narcotics efforts on the balance of payments. The fiscal impact would also be somewhat limited. Nevertheless, in view of the potential social impact of both eradication and interdiction, a gradual approach to the elimination of opium production, allowing the authorities to put in place the necessary sustainable income generation programs, appears warranted.

The Drug Sector in Afghanistan

Afghanistan remains, by far, the world's largest opium producer. Over the last 15 years, Afghanistan's opium production has increased steadily, from 1,570 tons in 1990 to 4,100 tons in 2004 (Table 2.1). The main disruption to this increase was the production ban imposed by the Taliban in 2001, which was successful, at least temporarily, in reducing production (but less so in reducing exports due to the existence of large inventories).

Table 2.1: Basic Indicators of Opium Production, 1986-2005

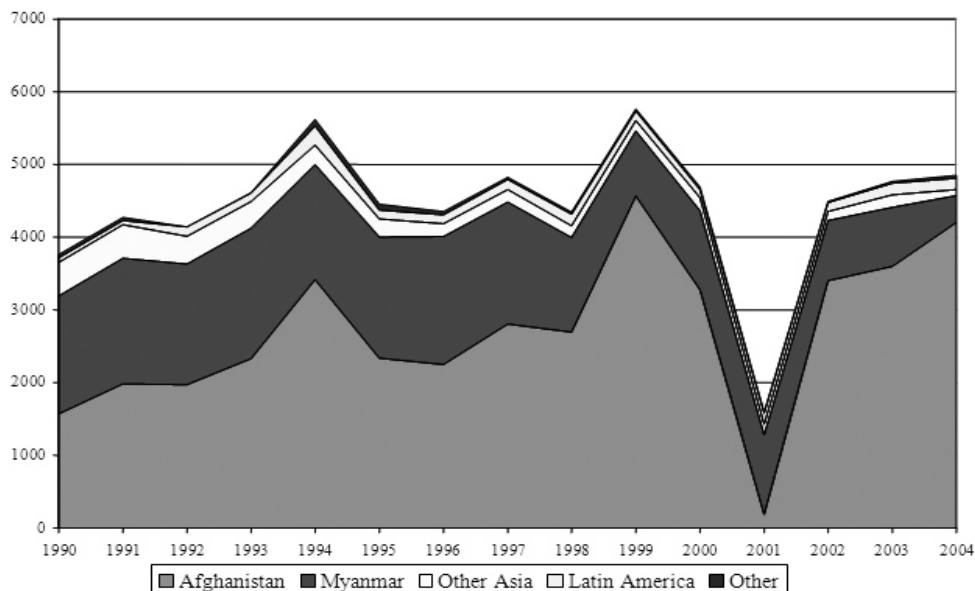
	1986	1990	1995	1999	2000	2001	2002	2003	2004	2005
Production (in metric tons)	350	1,570	2,335	4,565	3,276	185	3,400	3,600	4,200	4,100
Cultivated area (in ha)	29,000	41,300	53,759	90,583	82,171	7,606	74,100	80,000	131,000	104,000
Yield (in kilograms per ha)	12.1	38.0	43.4	50.4	39.9	24.3	45.9	45.0	32.1	39.4
Average farmgate price (in U.S. dollars per kilogram)	...	...	23	40	28	303	353	283	143	137
Gross income per ha (in U.S. dollars)	...	...	1,004	2,020	1,107	7,363	16,194	12,750	4,580	5,385

Sources: United Nations Office on Drugs and Crime (UNODC); and Fund staff estimates

¹ Middle East and Central Asia Department of the International Monetary Fund (IMF). The authors would like to thank Doris Buddenberg, William Byrd, and several UK officials of the Foreign and Commonwealth Office for their useful comments. An earlier version of this paper was published as an IMF selected issues paper (<http://www.imf.org/external/pubs/cat/longres.cfm?sk=19051.0>). The views, findings, interpretations, and conclusions expressed in this chapter are those of the authors and do not necessarily represent those of the IMF or IMF policy, or of the United Nations Office on Drugs and Crime or the World Bank or its affiliated institutions, Executive Board of Directors, or the countries they represent.

As the increase in production in Afghanistan coincided with a drop in production in the rest of the world triggered by strict bans and intensified counter-narcotics efforts, Afghanistan has become by far the world's main opium producer, with a share of world supplies that increased from 42% in 1990 to 87% in 2005 (Figure 2.1).

Figure 2.1: World's Opium Production (in metric tons)



- **Favorable cultivation conditions:** Owing to favorable conditions, yields in Afghanistan have been consistently higher than in other opium-producing countries. Over the 2000-04 period, and despite adverse weather, yields in Afghanistan were more than twice those in Latin America, more than three times those in Myanmar, and more than four times those in other Asian countries.
- **A high morphine content:** In many opium producing countries, notably in Southeast Asia, about 10 kg of opium is needed to produce one kg of heroin. However, the transformation yields are much higher in Afghanistan, where on average only 6 to 7 kg of opium are needed to produce one kg of heroin.²
- **Insecurity and institutional weaknesses:** The almost complete collapse of central government after the Soviet withdrawal, the warring parties' need for alternative sources of financing, and the fact that opium was a crop well adapted to the prevailing circumstances, greatly contributed to the development of opium cultivation. Following the fall of the Taliban, lingering insecurity and weak central government control, along with widespread corruption, contributed to further development of illicit activities.
- **Poor infrastructure:** Opium is relatively drought-resistant, making its cultivation easier than wheat in areas where irrigation is limited. Moreover, dry opium is easy to store and transport, which, given the poor state of roads and stocking facilities in Afghanistan, gives it an advantage over other crops.
- **Rural poverty:** The decision by many farmers to cultivate opium is primarily dictated by the lack of alternative sustainable livelihoods. In particular, following the sharp increase in opium farm-gate prices in 2001-02, the gross income farmers may expect from opium production far exceeds what they would get from cereal

²UNODC (2004). The morphine content of opium ranges from 8-24%. The highest opium content was observed in the province of Badakhshan (slightly more than 16% on average). It is worth noting that this high morphine content may be partly offset by inefficiencies in processing opium.

production (Table 2.2). Moreover, traders/traffickers often provide farmers with the necessary inputs (seeds, fertilizers) and financing, and take delivery of opium at the farm gate, relieving farmers from transportation or storage. While some other products (nuts, orchards) may generate higher revenues, they require substantial multi-year investments and infrastructure that many farmers cannot afford.

Table 2.2: Yields and Income per Hectare for Various Crops, 2005

	Opium	Irrigated wheat	Rainfed wheat	Rice
Yield (in kilograms per ha)	39	2,510	1,230	2,030
Average price (in U.S. dollars per kilogram)	136.59	0.23	0.23	0.47
Gross revenue (in U.S. dollars per Ha)	5,385	575	282	947

The potential export value of opium production in 2005 is estimated by the United Nations Office on Drugs and Crime (UNODC, 2005a) at US\$2.7 billion (Table 2.3). This was estimated on the basis of: (a) the physical transformation ratio of opium to heroin (6-7 to 1); (b) the share of opium production converted into heroin in Afghanistan (this has increased steadily over the last ten years, from 41% in 1995 to an average of 72% in 2002-04, reflecting primarily counter-narcotics efforts in neighboring countries and lingering insecurity in Afghanistan); (c) the estimated distribution of opium and heroin exports by neighboring countries (based on seizures in these countries); and (d) the opium and heroin prices observed in the main markets in the neighboring countries' border regions with Afghanistan. The UNODC estimate for 2005/06 corresponds to a potential export value of 420 tons of heroin (US\$1.6 billion) and 1,169 tons of unprocessed opium (US\$1.0 billion).

Table 2.3: Opium Production's Potential Export Value, 2004-05

	2004	2005
Opium Production (in tons)	4,200	4,100
Transformation rate	64%	71%
Heroin production (in tons)	414	420
Average export price (in U.S. dollars per kilogram)	4,171	3,856
Export value of heroin (in millions of U.S. dollars)	1,725	1,620
Opium available for export (in tons)	1,512	1,169
Average export price (in U.S. dollars per kilogram)	725	893
Export value of opium (in millions of U.S. dollars)	1,096	1,044
Total export value (in millions of U.S. dollars)	2,821	2,663

Sources: UNODC (2005a); and Fund staff estimates.

The share of the opium sector in the Afghan economy has declined steadily over the last few years. This largely reflects sustained growth in the licit economy rather than lower production and exports of illegal drugs, which have remained largely unchanged (Table 2.4). Between 2002/03 and 2005/06, the size of the drug sector relative to licit GDP declined from 62% to 38%, and its contribution to overall activity (including opium) from 38% to 27%. This compares with the contribution of the drug sector to overall economic activity of less than 2% in Colombia, the world's main producer of cocaine, with 57% of world supply

(the percentage remained below 2% during 1999-2001, when Colombian coca output reached its highest levels).³ Despite its declining share in the national economy, in 2005/06, nevertheless, in 2005/06 the potential export value of opium was still equivalent to 4.8 times the value of locally-produced exports (compared with 9.2 times in 2002/03).

Gross Income Distribution

Intermediate consumption is quite limited at the farm level.⁴ While production factor costs (family labor, hiring of daily workers, rental of tractors and/or of land) may be substantial, intermediate consumption, which comprises expenditure on seeds, fertilizers, and pesticides, is generally considered marginal. A microeconomic study of Pakistan's opiate industry in the early 1990s concluded that these costs amounted to about 4% of the total farm-gate value of opium (UNDCP, 1994). Intermediate consumption in Afghanistan is currently likely to be substantially lower, at about 1-2% of farm-gate value, owing to the sharp increase in opium prices, only marginally offset by rising seed and fertilizer prices.⁵

Table 2.4: Relative Size of Opium Production, 2002/03-2005/06

	2002/03	2003/04	2004/05	2005/06	2005/06		
	Est.	Est.	Est.	Proj.	Licit economy	Drug economy	
						Farming	Trading and processing
Licit GDP	4,084	4,585	5,971	7,139	7,139	0	0
Opium GDP	2,518	2,279	2,732	2,594	0	555	2,039
Opium production	2,540	2,300	2,800	2,700	0	560	2,140
Less intermediate consumption 1/	11	12	14	14	0	5	8
Less seizures	10	9	53	92	0	0	92
Total GDP	6,602	6,864	8,703	9,734	7,139	555	2,039
Income (net)	1	4	16	20	20	0	0
Gross national income	6,601	6,860	8,719	9,765	7,171	555	2,039
Current transfers (net)	1,222	2,476	2,787	3,149	3,149	0	0
Gross disposable income	7,823	9,336	11,506	12,914	10,320	555	2,039
Memorandum items:							
Drug income as as percentage of:							
Licit GDP	61.7	49.7	45.8	36.3			
Total GDP (licit and illicit)	38.1	33.2	31.4	26.7			
Gross disposable income	32.2	24.4	23.7	20.1			
Poppy farmer revenue as a percentage of:							
Licit agricultural revenue	59.6	46.7	27.3	22.1			
Total Agricultural revenue	37.4	31.8	21.4	18.1			

Sources: Afghan authorities and UNODC data; and Fund staff estimates.

1/ Estimated on the basis of UNDCP data (1994), using current seed, fertilizer, and chemical prices.

³ These estimates are based on UNODC (2004). Steiner (1998) estimates that Colombia's net income from illicit drugs could have been 7% of GDP and 70% of exports during the first half of the 1980s.

⁴ Intermediate consumption corresponds to the value of the goods and services consumed or used up as inputs in the production process, including raw materials and various other operating expenses.

⁵ Mansfield (2006) estimates these costs at US\$120 per ha, 2% of the farm-gate price. It is likely that in terms of farmer income, intermediate consumption is largely offset by revenue from sale of by-products.

In addition to these costs, however, many farmers have to service opium-related debts. In the absence of savings and other sources of financing, many farmers resort to borrowing, primarily from shopkeepers, traders, and relatives, to finance their intermediate consumption (seeds and fertilizers) and the hiring of production factors (such as day workers and tractors), as well as for household consumption requirements prior to the harvest. The most common form of credit is *salaam*, an advance on a fixed amount of expected future agricultural production, which is typically contracted at the beginning of the cultivation season and paid back, through delivery of opium, after the harvest. Even if these advances are usually reimbursed within a few months, their costs can be substantial: the amount of the advance is typically equivalent to half of the current market value. The fact that *salaam* credits are reimbursed through the delivery of opium protects farmers against the risk of a possible decline in farm-gate prices during the duration of the credit (while limiting potential upside gains). The 2005 UNODC survey (UNODC, 2005a) indicates that the average amount of outstanding loans for opium-cultivating farmers has stabilized over the last two years at around US\$700 per farmer. High farm-gate prices, along with increased caution by lenders in the face of intensified counter-narcotics efforts, contributed to a significant decline in the number of farmers contracting new loans, from 47% in 2003 to 33% in 2005.⁶

Intermediate consumption also appears quite limited at the trafficker level.⁴ In 2002-04 about 72% of Afghanistan's opium production is estimated to have been transformed into heroin in Afghanistan before being exported. The transformation process requires substantial amounts of chemicals (such as acetic anhydride, ammonium chloride, acetone, sodium carbonate, and hydrochloric acid). In Pakistan in the early 1990s, these chemicals were reported to cost about 7-8% of the heroin price (UNDCP, 1994). However, the sharp increase in heroin export prices over the last ten years has resulted in a sharp drop in the costs of these chemicals relative to heroin export receipts. In the case of Afghanistan, which produces primarily the lower-quality brown heroin, these costs are estimated to be equivalent to only 1-2% of the export price of heroin.

The income generated by drug-related activities is likely to be lower than the potential export value estimated by UNODC. The latter is the estimated total value of opium output (partly transformed into heroin), assuming it is all sold in the markets neighboring Afghanistan. This is considered a good proxy for the potential revenue accruing to Afghans, who are involved in opium production, conversion, and trade in Afghanistan and in the immediate neighboring countries, but do not appear to participate in international drug trafficking operations (UNODC, 2005a, p. 120). However, the actual income accrued by Afghan farmers and traffickers differs from this potential value due to seizures by counter-narcotics enforcement agencies and the change in inventories.

Inventories are considered to be substantial, as illustrated by the fact that the sharp fall in production in 2001 did not translate into major market disruptions.⁷ While farm-gate prices rose more than tenfold between 2000 and 2002, border prices increased by a bit less than three times. Following their depletion in 2001, stocks are assumed to have increased sharply over the last few years. This has contributed, along with the decline in production in the rest of the world, to maintenance of high export prices despite bumper crops. Under the assumption that Afghanistan's opium exports have increased regularly over the last ten years, the build-up in stocks could amount to 400 tons this year

⁶ Cash loans appear to have become more widespread in many areas due to fear of eradication and crop failure.

⁷ Raw opium is a durable good, which is more durable than processed opiates and does not lose value, as its loss of weight in the drying process is compensated by its higher price compared with "wet" opium.

(US\$260 million at export prices), bringing stocks to a level equivalent to more than six months of exports.⁸

After increasing sharply following the ban imposed by the Taliban, the share of revenue accruing to farmers has declined substantially. Reflecting a substantial drop in farm gate prices, this revenue, which had increased sharply in 2001-02, declined from US\$1,020 million (44% of the potential export value) in 2003 to US\$560 million (21% of the potential export value) in 2005. As the estimated number of farmers involved in opium production increased from 264,000 to 309,000 over the same period, the decline in gross revenue per farmer was even sharper, from US\$3,864 in 2003 to US\$1,812 in 2005. A significant share of the revenue accrued by farmers must be used to cover factor costs and pay for security. While intermediate consumption is very limited, labor costs are substantial as opium is a highly labor-intensive crop, with cultivation and harvesting labor needs per hectare estimated at about 350 and 200 person days, respectively (two to three times greater than those for wheat). Hence in 2003 UNODC estimated that on average, farmers retained slightly more than half of the gross revenue they accrued from opium production, with the rest spent on production factor costs (15-20% of gross revenue) and on taxes and other levies, including bribes and payments to local commanders (25-30%).

The remaining income is divided between different actors involved in the trading of opium from the farm gate to Afghanistan's borders (see IMF, 2003 and Ward and Byrd, 2004). While the farm-gate buyers are the most numerous among these actors, they are believed to receive a relatively small part of domestic trade revenue (i.e. drug export value minus farm gate value), owing to intense competition that limits profit margins. Likewise, the share of domestic trade revenue accruing to shop owners in the regional opium bazaars and to clandestine laboratories appears relatively small. The main part of domestic trade revenue is believed to accrue to a limited number of bulk buyers and large-scale specialist traders who buy opium throughout the year and organize shipping to border areas or directly abroad, and incur large risks. To reduce these risks, a significant part of their revenue is spent on "security providers", including warlords' militias. Contrary to the Colombian drug traffickers, these bulk buyers and specialist traders do not appear to be organized in cartels.

Macroeconomic Impact

While the potential export value of opium attracts the most attention, it is only one among many factors defining the macroeconomic impact of Afghanistan's opium economy. The impact on the real sector will in particular depend on what share of this export value actually enters the economy, how this share is divided between the different actors, and how these different actors allocate their income between consumption, investment, and savings. The drug economy, which is excluded from reported GDP, generates demand for domestic products. Although not recorded in official balance of payments data, it also has a net positive impact on the balance of payments.

Farmers consume a large part of their earnings, largely on domestic goods. For many farmers, opium is the main cash crop, whereas other crops are cultivated primarily to meet subsistence needs. It is generally assumed that farmers spend most of their income, and that opium-related income contributes primarily to higher consumption, in par-

30 ⁸ These estimates are based on the assumption that opium exports have increased regularly over the last ten years and that inventories amount to 15 months of exports prior to the ban enacted by the Taliban in 2001. These estimates may be conservative, as some experts consider that after four years of high production, stocks have likely returned to their pre-2001 level and amount to at least one year of exports.

ticular of non-subsistence goods including imported goods. This assumption is validated by field studies, such as Mansfield (2004), who estimated that in Nangarhar and Laghman expenditures of households involved in opium-related activities were, on average, equivalent to their net income. According to this study, most of farmers' consumption consisted of essential items, such as food, fuel, and health costs, while a small portion, which increased markedly with a farmer's income, consisted of "non-essential" items such as cars, televisions, motorbikes, and generators. There were disparities among opium farmers, with those cultivating more than 75% of their land saving up to one-third of their income, while the others were dissaving. A small part of spending corresponds to investment, either in productive assets (e.g. tractors) or housing, which is generally included in the official national accounts data.

In the absence of reliable data, it is generally assumed that processors and traffickers save a large part of their income.⁹ Benefiting from much higher revenue than opium farmers, the other actors involved in opium trade are likely to have a lower propensity to consume. While secure processing and transport of opium and heroin require investments in arms, laboratories, and vehicles, these capital expenditures are likely to be small relative to the revenue from trading, leaving processors and traffickers with substantial resources to invest in other productive or financial assets, domestic or foreign. Domestically, opium-financed investment may have contributed to the boom in construction observed in Kabul and other major cities, including those, such as Kandahar, located in the main opium-producing areas. Some of the traffickers' income is also believed to be recycled in formal and informal activities, such as trade/smuggling. Investments abroad are facilitated by the informal financial sector in Afghanistan: money-changers (*hawaladars*) provide low-cost, largely unregulated, and efficient transfer services to other countries (see Chapter 6). It is also likely that some opium export receipts never enter Afghanistan, as foreign buyers directly transfer the money to traffickers' offshore accounts. This, along with the illicit nature of the opium trade and the uncertainty about the various actors' propensities to consume, invest, and import, make accurate estimation of the shares of opium trade allocated to consumption and productive and financial investments extremely difficult and speculative. Table 2.5, which breaks down Afghanistan's gross disposable income (including opium) into these different uses, aims to illustrate the macroeconomic impact of the drug economy.

Sources: Afghan authorities and UNODC data; and Fund staff estimates.

Opium-related demand causes, along with aid-related inflows, Dutch disease. There are two channels. First, by increasing demand for domestic goods and services, the drug economy contributes to higher consumer and asset prices. This is particularly marked for non-tradable goods and services such as rents, as their supply cannot adjust through imports. As noted above, it also explains in part, along with aid-related inflows, the increase in real estate prices observed in Afghanistan's major cities. Second, by increasing demand for production factors, the drug economy also contributes to an increase in their rates of remuneration, raising production costs for other sectors. Given the labor-intensive nature of opium production, this translates primarily into an increase in wages. Overall, these factors explain in part the significant appreciation of the real exchange rate over the last few years and contribute, along with other factors such as poor infrastructure and limited human capital, to the limited competitiveness of Afghanistan's tradable sector. While donor aid inflows also contribute to the Dutch disease through the demand for goods and labor they induce, this is partly offset by the associated increase in productivity.

⁹ This is consistent with the findings of UNDCP (1994) in the case of Pakistan.

Table 2.5: Use of Gross Disposable Income 2002/03-2005/06

	2002/03	2003/04	2004/05	2005/06			
	Est.	Est.	Est.	Proj.	Licit economy	Opium economy	
						Production	Trading and processing
(In millions of US dollars)							
Gross disposable income	7,823	9,336	11,506	12,914	10,320	555	2,039
Consumption 1/	4,038	4,992	5,951	7,087	5,934	444	709
Net factor income	-1	-3	16	32	32	0	0
Savings (incl. grants)	3,786	4,347	5,539	5,795	4,354	111	1,331
Gross fixed capital formation 1/	1,409	1,928	2,696	3,078	2,757	55	266
Change in opium inventories	84	114	428	267	0	0	267
Current account (incl. grants) 2/	2,293	2,306	2,415	2,450	1,597	55	798
Capital account	-533	-471	-352	-518	335	-55	-798
Foreign Direct Investment	50	58	187	253	253	0	0
Public loans (net disbursements)	94	90	290	82	82	0	0
Drug-related capital outflows 1/	-677	-619	-829	-853	0	-55	-798
Net errors and omissions	-1,605	-1,456	-1,574	-1,474	...	...	...
Overall balance	155	379	489	458	...	...	...
Impact on the balance of payments	1,025	867	855	852	0	347	505
Drug income	2,446	2,178	2,319	2,341	0	560	1,781
Drug-related imports	-744	-692	-634	-635	0	-157	-478
Drug-related capital outflows	-677	-619	-829	-853	0	-55	-798

1/ Assuming that 80% of the farmer's gross income is consumed, 10% invested in productive assets and housing, and 10% percent invested in foreign currency; and that 40% of the traffickers/traders' income is consumed, 15% invested in productive assets and housing and 45% invested in foreign assets. 2/ The drug sector's current account corresponds to the balance of its current transactions both with foreign countries (export of drugs minus consumption of imported goods) and with the Afghan licit sector (consumption of licit domestic goods).

Drug-related activities also hinder investment. Owing to its labor-intensive nature, the drug economy does not crowd out investment in other sectors. On the contrary, it may contribute marginally to the financing of investment in activities like trade and construction. However, the drug economy affects investment primarily through its negative impact on Afghanistan's investment climate. This manifests itself mainly through insecurity; sustained growth of informal activities; very high levels of corruption particularly at provincial and district levels (either directly through participation, or indirectly through "taxation"); and weak sub-national administrations.

The balance of payments impact of drug exports is partly offset by drug related outflows (Table 2.5). As noted above, a significant part of opium-related consumption and investment is on imported goods and services. Moreover, a large part of opium export receipts, primarily at the processor/trafficker level, is believed to be invested abroad. A large part of the savings retained in Afghanistan is probably held in foreign-denominated assets, as evidenced by the high degree of dollarization (in US dollars, but also in Pakistani rupees and Iranian Rials) of the Afghan economy. This limits even further the impact of the drug economy on the balance of payments and the central bank's international reserves. Taken together, these factors could be equivalent to about two-thirds of opium export receipts.

Drug-related flows affecting the Central Bank's international reserves are not explicitly reported in the official balance of payments. As currently constructed, the balance of payments does not report the main flows directly related to drug activities, such as opium and opiate exports, or capital outflows corresponding to investment of such revenues in foreign assets (including export receipts that do not enter the country). Other activities, such as imports of vehicles by drug traffickers or of food by opium farmers, which are statistically indistinguishable from non-drug related flows, tend to be captured by the officially recorded trade data or as "unrecorded imports" which are estimated and included in official trade data. While the drug revenue financing these imports is not recorded, the imported goods purchased through illicit income are mostly captured in balance of payments data. Thus, an implicit discrepancy stems from the fact that while substantial drug-related net inflows (i.e. opium exports minus drug-related capital outflows) are not recorded in the current presentation of the balance of payments, this does not translate into substantial positive errors and omissions.

The fact that as currently constructed the official balance of payments does not have a large statistical discrepancy is potentially worrisome and points to under-estimation of net outflows. This apparent absence of a discrepancy is not surprising given that the evaluation of some components of Afghanistan's balance of payments rests critically on informed guesses rather than on reliable statistical estimates. This is particularly the case for inward and outward smuggling (excluding the drug trade); aid related outflows (e.g. the share of aid-financed wages invested abroad); and drug-related outflows. The non-reporting of drug-related outflows may therefore be largely offset in the current presentation of the balance of payments by an underestimation of the licit trade deficit and/or an underestimation of capital outflows. From a national accounts point of view, the former would likely be largely counterbalanced by an underestimation of private consumption, which, in the absence of any reliable household expenditure data, is estimated as a residual. Table 2.5 attempts to integrate drug-related flows in the official balance of payments. By doing so, it makes explicit the aforementioned discrepancy.

The positive impact of the opium economy on fiscal revenue is marginal compared to its cost in terms of government spending. Owing to their illicit nature, most drug-related activities (production, processing, trade) are not directly taxed. Their primary impact on fiscal revenue results, therefore, from indirect taxation of consumption and imports financed by drug receipts, mainly through import duties. Even under the assumption that effective taxation of drug-related imports is similar to that of imports related to licit activities, duties collected on drug-related imports would amount to no more than US\$25 million annually. This amount represents only a small fraction of the government spending aimed at improving security and eliminating the drug economy.

II. THE GOVERNMENT'S COUNTER-NARCOTICS STRATEGY

A Multi-Pronged Approach

Counter-narcotics efforts have relied on a multi-pronged approach, aimed at combating cultivation and trafficking through eradication and interdiction while providing farmers with alternative livelihoods. Eradication involves destruction of

opium growing in fields and may be associated with sanctions against opium farmers. Interdiction consists of arresting drug traffickers and processors, seizing opium and heroin, destruction of processing laboratories, and closing opium markets. In its narrow definition, the concept of alternative livelihoods encompasses a number of programs aimed at providing farmers leaving the opium economy with short- and/or long-term alternative livelihoods. However, the concept of alternative livelihoods has been widened to cover all components of rural development, including farm and off-farm income.

In 2003 the Government adopted a multi-year counter-narcotics strategy, which aimed at reducing opium production by 75% in five years and completely eliminating it within ten years, while emphasizing the importance of alternative livelihood programs (Transitional Islamic State of Afghanistan, 2003). This strategy has since been updated, and now centers on four key priorities: targeting the traffickers and top end of the trade; strengthening and diversifying licit rural livelihoods; reducing demand for opium; and developing state institutions at central and provincial levels.

In the Interim Afghanistan National Development Strategy (I-ANDS), the Government redefined its counter-narcotics objectives and strategy. Counter-narcotics was identified as a fundamental cross-cutting issue for national development. Accordingly, the Government intends to mainstream counter-narcotics efforts in the overall development and reconstruction program, with the goal of securing a sustained decline in poppy cultivation, drug production, consumption of illicit drugs, and trafficking. More specifically, the Government intends to intensify and better coordinate efforts, with a view to: (i) building strong institutions; (ii) enhancing law enforcement and interdiction; (iii) continuing eradication efforts; (iv) reducing demand for narcotics and increasing treatment of drug addicts; (v) strengthening criminal justice; (vi) increasing public awareness; (vii) promoting international and regional cooperation; and (viii) developing sustainable alternative livelihoods.

Implementation and Results

Key institutions have been established. The Ministry of Interior, with help from the international community, has established the Counter-Narcotics Police of Afghanistan (CNPA), which comprises three sections: investigation, intelligence, and interdiction. The Central Poppy Eradication Force (CPEF) was established in May 2004 to carry out eradication. In November 2004 the position of Deputy Minister for Counter-Narcotics was created in the Ministry of Interior to oversee and coordinate counter-narcotics enforcement activities. A Criminal Justice Task Force was established and has convicted over 90 traffickers since May 2005. And in December 2004, the Government established the Ministry of Counter Narcotics (MCN) to coordinate and oversee its counter-narcotics policies. Moreover, a Counter Narcotics Trust Fund (CNTF) has recently been created to provide coordinated financing and improve resource allocation at central, provincial, and district levels. There is also a continuing effort to develop government capacity and coordination.

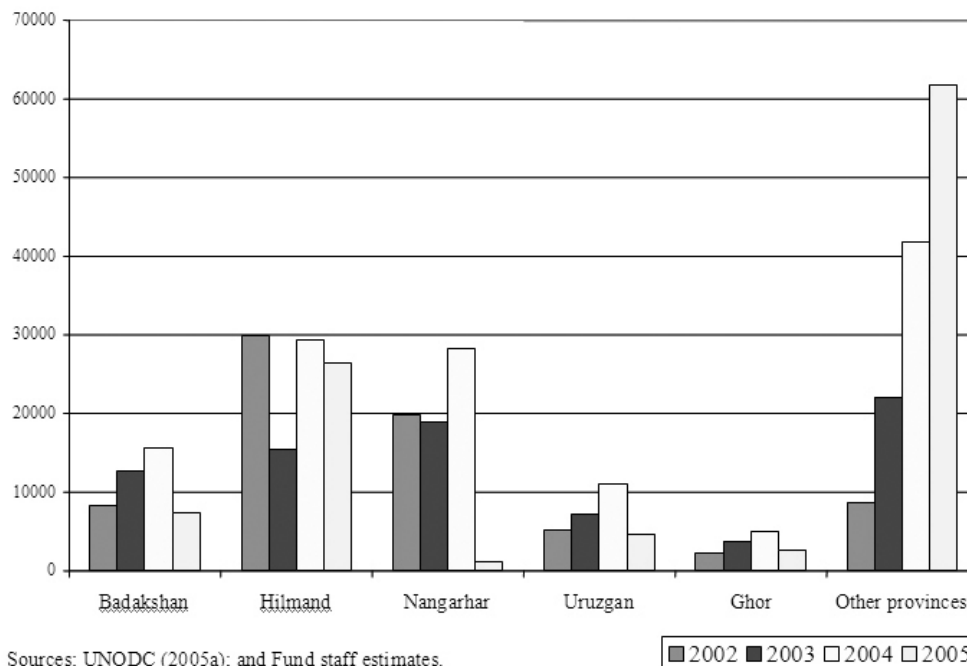
The counter-narcotics regulatory framework has been strengthened. The Government recently approved a new counter-narcotics law, which lays out significant penalties for corruption and bribery associated with drug trafficking; establishes the procedures for investigating and prosecuting major drug-trafficking offences; establishes the MCN as the

leading body to monitor, evaluate, and coordinate all counter-narcotics activities; and provides for creation of new tribunals for drug traffickers and drug regulation commissions. The enforcement of the Anti Money Laundering/Combating the Financing of Terrorism legislation and regulations should make the use of the formal and informal financial systems for opium-related transfers more difficult.

Results of counter-narcotics efforts have fallen short of objectives. UNODC estimates indicate that opium output declined by 2% in 2005 to 4,100 tons: a 21% drop in cultivation was largely offset by a rebound in yields due to favorable weather. The decline in opium cultivation was largely due to decisions by many farmers not to plant in anticipation of intensified government counter-narcotics efforts, and promises of alternative livelihoods programs. The decline was particularly marked in the five largest opium producing provinces, which accounted for 68% of production in 2004, and where output declined by 53%. Cultivation in other provinces increased by 48%, reflecting the drug economy's ability to relocate in response to counter-narcotics efforts (Figure 2.2). Reflecting a slight decline in prices, export and farm-gate values declined by 4% and 7%, respectively, to US\$2.7 billion and US\$560 million. Although counter-narcotics efforts so far have not had the desired degree of success, the expansion of the drug economy over the last few years might well have been more vigorous in their absence.

Interdiction increased sharply in 2004-05, albeit from a low base. In 2005, 86.6 tons of opium and 7.7 tons of heroin were seized – about 3.4% of opium output. This compares with seizures equivalent to 0.4% of output in 2002 and 2003 (UNODC, 2005b). The sharp increase in 2005 reflected strengthening of the Afghan Special Narcotics Force (ASNF) assigned to interdiction, and greater activity and effectiveness by the counter-narcotics police. Law enforcement organizations, including ASNF, CNPA, and Customs, have been authorized to carry out operations against drug trafficking.

Figure 2.2: Opium Cultivation by Province, 2002-2005 (in ha)



Eradication amounted to 5,100 ha in 2005, equivalent to about 5% of cultivated area. Some 4,000 ha were eradicated by provincial authorities, the majority in Nangarhar (46%) and Helmand (26%). In addition, 1,100 ha were eradicated by the central government agencies (CPEF and Afghan National Police). This latter figure was lower than targeted, owing in part to an exceptionally harsh winter which delayed CPEF's operations; strong opposition from local farmers; and limited cooperation from local authorities. Eradication worked more efficiently as a deterrent to planting, since it contributed significantly to "voluntary eradication" – i.e. decisions by many farmers not to plant because their production might be eradicated (Table 2.6). A new system (including a central Eradication Planning and Monitoring Cell within MCN) has been established to help governors and eradication forces plan, execute, and monitor eradication efforts.

Table 2.6: Main Factors Influencing Farmers' Decisions to Cultivate Opium, 2005

Main reasons for reducing opium cultivation	34.8%	Higher sale price	25.8%
Fear of eradication	19.7%	Personal consumption	20.6%
Fear of imprisonment	15.7%	High cost of wedding	15.7%
Forbidden by Islam	15.3%	Higher demand	14.5%
Poppy ban	4.9%	Expected compensation for eradication	7.3%
Lower opium prices	4.7%	"Salaam"	5.6%
Less demand	2.8%	Low cost of inputs	5.6%
Higher input costs	1.6%	Sufficient water	2.8%
No more "salaam"			

More progress in implementation of alternative livelihood programs is needed. Owing to capacity and security constraints, implementation of these programs, as in the case of most other development expenditures, has been lagging behind projected plans and budget estimates. Moreover, a large number of interventions labeled as alternative livelihood programs have been of a short-term nature, focused on a single sector (such as micro-finance or infrastructure), and insufficiently coordinated geographically and between donors.

III. MACROECONOMIC IMPACT OF A COUNTER-NARCOTICS CAMPAIGN

The macroeconomic effects of a counter-narcotics campaign depend on policies, as different policies create different incentives/disincentives for farmers and traffickers. Eradication tends to raise farm-gate prices, while interdiction tends to lower farm-gate prices by reducing demand from traffickers. Moreover, development of sustainable alternative livelihoods is key to convincing farmers to quit, or not to return to opium. The impact of counter-narcotics efforts will also vary substantially among provinces.

To simulate the possible macroeconomic impact of the opium economy and counter-narcotics efforts, a simple macroeconomic model was developed. This model, which is based in part on the Corden and Neary model of Dutch disease, seeks to capture the key transmissions channels described above (see Annex A). Given the uncertainty surrounding various economic relationships and the values of a number of economic variables, the model aims primarily at illustrating, through normative simulations, the potential economic impact of different counter-narcotics strategies.

A successful counter-narcotics campaign could adversely affect licit GDP growth, the balance of payments, and government revenue. Based on the transmission channels described earlier, a decline in drug income would, at least temporarily, lead to a slowdown in real growth of the non-drug economy and a deterioration in the balance of payments, putting downward pressure on the real exchange rate. The size of the shock to GDP would be less pronounced to the extent that the burden falls on traffickers, owing to their lower propensity to consume. The large capital outflows and large import content associated with drug revenue suggest that the impact on the balance of payments would be substantially less than the total decline in drug revenue. The slowdown in growth and the decline in imports will in turn have an adverse effect on government revenue.

Long-term Impact: Reducing Dutch Disease

In the long run, reallocation of resources to the non-drug sector will allow higher growth in the licit economy. In macroeconomic terms, elimination of the drug economy has some similarities to a drop in oil revenue in an oil-producing country, with the decline in the risk-adjusted profitability of opium production leading to a shift of capital and labor toward the non-drug economy. The loss of income from elimination of the opium economy will also contribute to a reduction in aggregate demand.

Over time, the increase in opium production costs resulting from an effective counter-narcotics effort would affect the comparative advantage of Afghanistan in opium. Thus opium production is likely to move, at least partly, to other countries, reducing Afghanistan's opium export receipts. Moreover, reallocation of labor to the licit economy, combined with a decline in aggregate demand, will contribute to a depreciation of the real exchange rate and an improvement of the non-drug trade balance. The elimination of opium-related activities should also contribute to improving the business environment, and thereby to increasing domestic and foreign investment.

Short-term and Medium-term Impact

The short- and medium-term effects of the government's counter-narcotics efforts will differ substantially according to the strategy implemented, as discussed below.

In the short run, eradication will lead to a reallocation of opium income from traffickers to some farmers (Table 2.7). The primary impact of eradication is a decline in opium supply at farm gate due to decisions by farmers not to plant due to a higher risk premium and the direct impact of eradication. This may be partly offset by drawdown of inventories which, together with higher border prices, would limit somewhat the decline in overall export revenue. Given the observed low elasticity of traffickers' demand to farm-gate prices, higher farm-gate prices resulting from lower supply would increase the share of revenue accruing to non-eradicated farmers, at the expense of traders.

The increase in farm gate-prices may partly offset the impact of eradication on opium production. Eradication will result in a significant increase in farm-gate prices, which could induce some farmers to return to opium cultivation even in the face of a higher risk premium, especially if eradication is not accompanied by sustainable alternative livelihood. While export prices may increase, overall drug revenue is likely to decline, squeezing

the share accruing to traders/traffickers. Although the social impact on eradicated farmers will be serious (see Chapter 3), the overall adjustment of wages and prices should gradually contribute, along with alternative livelihood programs, to development of on-farm and off-farm employment. The overall increase in farmers' revenues would contribute to higher aggregate demand and to further deterioration in the trade balance. This deterioration would be partly offset by a substantial decline in the financial outflows corresponding to traffickers' investments in foreign assets and by higher growth in the tradable goods sector.

Table 2.7: Simulation of the Potential Macroeconomic Impact of an Eradication Campaign, 2006 - 2010

	2006	2007	2008	2009	2010
		(Change relative to 2005; in percent)			
Cultivation (in hectares)	-5.0	1.9	0.6	6.4	8.6
Inventories	-25.0	-48.0	-75.1	-91.6	-97.8
Drug production	-20.0	-23.1	-34.4	-38.6	-41.4
Drug exports	-7.5	-11.6	-20.9	-30.4	-38.4
Drug export price	5.0	8.1	15.7	24.9	34.5
Farm gate price	38.3	51.3	99.1	136.3	172.4
Drug export value	-2.9	-4.4	-8.5	-13.0	-17.1
Opium trade revenue	-7.1	-11.0	-20.8	-31.3	-41.3
Farm gate revenue	10.7	16.4	30.6	45.1	59.6
Labor in opium economy	-20.0	-23.1	-34.4	-38.6	-41.4
Labor in tradable sector	0.6	1.2	2.2	3.3	4.5
Labor in nontradable sector	0.4	0.8	1.5	2.2	3.0
Total employment	-1.8	-1.7	-2.2	-1.8	-1.1
Wages	-1.9	-4.0	-7.2	-10.5	-14.0
Price of non tradables (i.e. real exchange rate)	-0.5	-1.0	-1.8	-2.8	-3.7
Real GDP (excl. opium)	0.5	1.0	1.9	2.8	3.7
Real GDP (incl. opium)	-5.1	-5.6	-8.1	-8.6	-8.7
		(Change relative to 2005; in millions of U.S. dollars)			
Impact on balance of payments	-4	-14	-23	-34	-47
Impact on trade balance	-65	-107	-200	-301	-399
Change in opium exports	-67	-104	-198	-305	-401
Change in licit trade balance	2	-3	-2	4	2
Change in demand for tradables	-19	-48	-82	-117	-162
Change in production of tradables	21	44	80	121	163
Change in capital outflows	61	94	177	267	352

Source: Fund staff simulations.

1/ Based on the assumption that 15% of cultivated areas would be eradicated in 2006, and then 25% in 2007, 35 % in 2008, 45 % in 2009, and 50% in 2010.

Although targeted at traffickers, interdiction would also affect opium farmers through lower farm gate-prices (Table 2.8). By increasing the risk premium associated with opium trading and bringing to an end the activities of some traffickers, interdiction would contribute to a reduction of both demand at the farm gate and supply at the border. Overall, traffickers able to continue their operations would benefit from higher border prices, especially if they dispose of inventories. On the other hand, the decline in demand at the farm gate would lead to a reduction in farmers' income.

Table 2.8: Simulation of the Potential Macroeconomic Impact of an Interdiction Campaign, 2006-2010

	2006	2007	2008	2009	2010
	(Change relative to 2005; in percent)				
Cultivation (in hectares)	0.0	-1.8	-4.9	-9.1	-14.0
Inventories	-9.4	-25.6	-47.4	-71.6	-90.4
Drug production	0.0	-1.8	-4.9	-9.1	-14.0
Drug exports	-2.8	-6.2	-11.5	-19.5	-29.6
Drug export price	1.9	4.3	8.2	14.7	24.3
Farm gate price	-6.5	-17.0	-30.3	-44.2	-57.8
Drug export value	-1.0	-2.2	-4.3	-7.7	-12.5
Opium trade revenue	0.7	2.9	5.0	5.4	3.6
Farm gate revenue	-6.5	-18.5	-33.7	-49.2	-63.7
Labor in opium economy	0.0	-1.8	-4.9	-9.1	-14.0
Labor in tradable sector	0.1	0.2	0.5	1.0	1.6
Labor in nontradable sector	-0.2	-0.5	-0.8	-1.2	-1.6
Total employment	0.0	-0.2	-0.4	-0.7	-0.9
Wages	-0.2	-0.8	-1.8	-3.3	-5.3
Price of non tradables (i.e. real exchange rate)	-0.7	-1.8	-3.3	-5.4	-7.8
Real GDP (excl. opium)	-0.1	-0.1	-0.1	-0.1	0.0
Real GDP (incl. opium)	-2.1	-4.0	-8.1	-8.7	-10.7
	(Change relative to 2005; in millions of U.S. dollars)				
Impact on balance of payments	-2	-8	-15	-23	-30
Impact on trade balance	4	17	27	23	1
Change in opium exports	-23	-52	-100	-180	-293
Change in licit trade balance	27	69	127	203	293
Change in demand for tradables	25	61	108	167	234
Change in production of tradables	3	8	19	36	59
Change in capital outflows	-6	-24	-42	-46	-31

Source: Fund staff simulations.

1/ Based on the assumption that 15% of drug production would be seized in 2006, and then 25% in 2007, 35% in 2008, 45% in 2009 and 50% in 2010.

The interdiction campaign should lead to a substantial improvement in the balance of payments. The decline in farmers' income should result in a substantial reduction of aggregate demand, including for traded goods. Moreover, the decline in labor costs relative to the price of tradable goods should boost investment and production in the tradable goods sector. Overall, the resulting improvement in the licit trade balance would largely offset the deterioration in the illicit balance of payments. The threat of seizure could induce further capital flight by encouraging some traffickers to move their existing assets abroad. This is, however, likely to be limited, as most of the traffickers' assets are either foreign assets or real estate, which might prove somewhat illiquid.

Policy Response

Successful implementation of eradication and interdiction is predicated on the Government making a serious effort to address corruption, requiring a strong political commitment. Corruption has been a major factor explaining the limited success of counter-narcotics efforts thus far. Intensification of counter-narcotics efforts could temporarily exacerbate the problem, as traffickers will likely use all possible means to oppose them.

Sustainable income generation programs are required to support eradication and interdiction. A campaign based solely on eradication and interdiction would result in an increase in unemployment (Table 2.9). While farmers may in the short-term implement coping strategies, such as borrowing and selling assets, in the medium-term their decision to remain outside the opium sector will depend on development of sustainable alternative livelihoods.

In line with the National Drugs Control Strategy and I-ANDS, the Government needs to develop and implement, in collaboration with the donor community, programs to address these social needs. While contributing to the growth of the licit economy, the development of credible and sustainable alternative livelihoods would help convince farmers to stay away from, or quit, opium production. By increasing farmers' income, these programs would also limit the decline in aggregate demand. Rather than quick fixes providing short-term employment to farmers, these programs should aim to create sustainable alternative livelihoods over the medium term. Given the limited capacity of line ministries and other implementing agencies, developing these programs will take time. This supports the argument for a gradual approach to combat the opium economy advocated by Ward and Byrd (2004), who argued for an "appropriately-sequenced" approach that focuses on interdiction first while working to improve alternative livelihoods, and then focuses efforts against farmers who continue to cultivate opium poppy even with viable alternatives.

Consistent with monetary policy objectives, the Government should not resist a nominal depreciation of the currency. Although prices and wages appear to have some downward flexibility in Afghanistan (see Box 2.1), the depreciation of the real exchange rate associated with elimination of drug-related activities, as demonstrated in these scenarios, might require a nominal depreciation of the Afghani. It should, however, be ensured that depreciation does not trigger a marked, permanent increase in inflation.

Assuming gradual elimination of the opium economy and strict implementation of tax policy and administration reforms, the impact on fiscal revenues should be limited. The decline in import duties should be partly offset by an increase in tax revenues stemming from the increase in licit activities.

Table 2.9: Simulation of the Potential Impact of a Counternarcotics Campaign Combining Eradication and Interdiction, 2006-10 1/

	2006	2007	2008	2009	2010
	(Change relative to 2005; in percent)				
Cultivation (in hectares)	-2.5	0.1	-2.3	-1.9	-3.2
Inventories	-17.2	-36.9	-62.0	-83.4	-95.5
Drug production	-10.0	-12.4	-19.8	-24.4	-28.2
Drug exports	-5.2	-8.8	-15.9	-24.9	-34.7
Drug export price	3.4	6.1	11.6	19.6	29.9
Farm gate price	15.9	14.3	22.1	22.1	17.6
Drug export value	-1.9	-3.2	-6.2	-10.2	-15.1
Opium trade revenue	-3.9	-4.3	-7.5	-11.1	-15.0
Farm gate revenue	4.3	0.2	-2.1	-7.6	-15.6
Labor in opium economy	-10.0	-12.4	-19.8	-24.4	-28.2
Labor in tradable sector	0.3	0.7	1.4	2.2	3.2
Labor in nontradable sector	0.1	0.2	0.3	0.4	0.5
Total employment	-0.9	-0.9	-1.3	-1.3	-1.1
Wages	-0.2	-2.4	-4.5	-7.1	-10.1
Price of non tradables (i.e. real exchange rate)					
Real GDP (excl. opium)	0.2	0.5	0.9	1.3	1.8
Real GDP (incl. opium)	-3.6	-4.8	-7.2	-8.8	-9.8
	(Change relative to 2005; in millions of U.S. dollars)				
Impact on trade balance	-35	-47	-83	-126	-172
Change in opium exports	-44	-76	-144	-240	-354
Change in licit trade balance	9	29	61	114	181
Change in demand for tradables	-2	3	12	34	66
Change in production of tradables	11	26	49	80	115
Change in capital outflows	33	37	64	94	128

Source: Fund staff simulations.

1/ Based on the assumption that eradication and interdiction efforts are equivalent to 50 % of those envisaged under Tables III.7 and III.8, respectively.

Box 2.1: Impact of the Counter-narcotics Campaign in Nangarhar ^{1/}
Combining moral suasion and eradication, the counter-narcotics campaign was highly successful in reducing opium cultivation in Nangarhar province. While Nangarhar was the largest opium producer in 2004,^{2/} opium cultivation in the province declined by 96%, from 28,213 ha in 2004 to 1,093 ha in 2005. Although eradication directly affected only 1,860 ha, this sharp decline reflected mainly the decisions of many farmers not to plant opium poppy, owing to fear of eradication or imprisonment, as well as relatively low farm-gate prices (especially in relation to wheat, whose price had increased following the poor 2004 crop). The decline in opium cultivation was much more pronounced than in other provinces owing to the local authorities' strong involvement in the counter-narcotics campaign, with particular emphasis on prevention. Informed by the provincial governor that they would be held responsible for the level of opium poppy cultivation in the areas under their responsibility, district administrators and security chiefs called tribal elders and the shura members from each village to the district centre and informed them that they should not cultivate poppy. These admonitions were accompanied by promises of development assistance.

The sharp decline in production had a substantial social and economic impact. While slightly offset by a rebound in yields, opium production fell by about 95%. This translated into a sharp decline in farmers' incomes. Moreover, as most farmers shifted to cultivation of wheat (the area planted with wheat increased from 36,000 to 51,000 ha), much less labor intensive than opium, demand for hired labor fell sharply. The consequent decline in aggregate demand from farmers and other drug industry actors led to a sharp reduction in activity in other sectors, in particular construction. In response to lower demand for labor and goods, wages and prices declined significantly, and some skilled workers moved to other provinces.

Many farmers had to rely on short-term coping strategies. The income loss from the reduction in opium production was only partly offset by additional revenue from alternative crops and work opportunities, including alternative livelihood programs. While this revenue was in some cases complemented by sale of assets (primarily livestock) and, less often, by some borrowing, most farmers had to reduce consumption substantially, including for food and health expenditures.

In the absence of credible alternatives, many farmers might return to opium production in 2006 or subsequently. Most of the coping strategies of farmers, such as sale of assets or borrowing to finance subsistence consumption, are not sustainable. Moreover, contrary to vineyards or orchards which require multi-year investments, planting of wheat and opium does not entail sunk costs, so returning to opium would not be costly. Finally, most farmers consider that the opportunities provided by the alternative livelihood programs are insufficient and fall far short of the authorities' promises. Faced with the need to replenish their assets, service debts, and fund spending, many farmers may choose to produce opium in 2006 or later. Preventing such a reversal will depend crucially on the continued involvement of the local and central authorities and development of credible and sustainable alternative sources of revenue.

^{1/} Based on the estimates of UNODC (2005a) and the findings of Mansfield (2005).

^{2/} While the cultivated area was slightly higher in Helmand province, in Nangarhar higher yields translated into higher production.

ANNEX 2A

MODEL OF THE MACROECONOMIC IMPACT OF THE OPIUM ECONOMY

A model has been developed to simulate the possible macroeconomic impact of the opium economy and of counter-narcotics efforts. This model is based in part on the Corden and Neary model of Dutch disease (see Corden and Neary, 1982). There are three sectors: nontradable (NT), tradable (T), and a booming third sector, which in Afghanistan is the opium sector (D). All production of opium is exported, and labor is perfectly mobile between the three sectors. To model the impact of different counter-narcotics efforts (eradication, interdiction, alternative livelihoods, prevention) on the licit economy, the drug sector is further divided between farmers and traffickers. Given its large share in the world supply of opium, Afghanistan is not considered a price taker on the opium market (i.e. the opium export price depends on Afghan supply). The model is dynamic, allowing opium price developments to affect farmers' decisions to cultivate in the following year.

As in the Corden and Neary model, the opium economy influences the licit sector equilibrium through: (a) resource movement which induces a reallocation of labor between sectors; and (b) a spending effect corresponding to the impact of change in opium-related income on the demand for tradables and nontradables. The traded good is the numeraire.

Exogenous variables:

rpi: risk premium for traffickers, increasing function of interdiction efforts;
 rpe: risk premium for farmers, increasing function of eradication efforts;
 alt: incentives related to the development of alternative livelihood programs;
 eradication: opium directly eradicated;
 interdiction: opium seized;
 Yield: opium yield.

Endogenous variables:

PD: opium price at the border (in terms of tradables);
 YD: opium supply by the traders/traffickers;
 Inv: opium inventories, which are assumed to be held by traders and traffickers;
 DD: Demand for opium outside Afghanistan;
 PFG: opium farm gate price(in terms of tradables);
 Cult: opium cultivation;
 Yfg: opium supply at the farm gate;
 Dfg: Demand for opium by the traffickers/traders (at the farm gate);
 w: wage rate;
 Y: real GDP, including opium income staying in Afghanistan;
 L: total employment;
 LT, LNT: labor in tradable and nontradable sectors, respectively;
 PNT: price of the nontradables (in terms of tradables—can be interpreted as the real exchange rate).

1. The opium sector

Equilibrium at the border

- The demand for opium declines with the opium export price:¹⁰ $D_D(\bar{P}_D)$;
- The supply of opium at the border by traffickers increases with the opium export price and declines with the farm gate price and the risk premium (which is related to interdiction efforts): $Y_D(\bar{P}_D, \bar{P}_{FG}, \bar{r}_p)$;
- The propensity of traffickers to deplete their inventories will depend on the level of current prices compared to average historical prices: $\Delta \text{Inv}(\bar{P}_D)$
- The opium market equilibrium at the border reads: $D_D = Y_D + \Delta \text{Inv}$ - interdiction

Equilibrium at the farm gate

- The demand for opium by traffickers is equivalent to the amount they want to supply: $(P_D, P_{FG}, r_p) = Y_D$;
- Cultivation rises with increases in farm gate prices and declines with the premium related to eradication efforts and with wages: $Cult(P_{FG}, w, r_p)$;
- The supply of opium at the farm gate increases with the cultivation and the yield, and declines with direct eradication. $Y_{fg} = Cult * Yield - eradication$;
- The opium market equilibrium at the farm gate reads: $D_{FG} = Y_{fg}$

2. The licit economy (tradables and nontradables)

Tradable sector

- The demand for labor in the nontradable sector is an increasing function of nontradable prices and a declining function of wages: $L_{NT}(P_{NT}, \bar{w})$
- The production of nontradables is an increasing function of labor employed in the sector: $Y_{NT}(L_{NT})$
- The demand for nontradables, which are consumed domestically, declines with nontradable prices and increases with the real income: $D_{NT}(\bar{Y}, \bar{P}_{NT})$
- The equilibrium in the nontradable sector reads: $D_{NT} = Y_{NT}$

Tradable sector

- The demand for labor in the tradable sector is a declining function of wages:¹¹
- The production of tradables is an increasing function of labor employed in the $L_T(\bar{w})$ sector: $Y_T(L_T)$
- The domestic demand for nontradables increases with the real income, corrected for the share of the traffickers' revenue staying abroad: $D_T(\bar{Y})$

3. Overall equilibrium

- The completion of the model comes from the equilibrium of the labor market.
- It is assumed that, in the absence of alternative livelihoods, the farmers/workers leaving the drug sector will be likely to experience unemployment for some time. $\Delta L(\Delta \bar{L}_D, \Delta \bar{L}_D(-1), \Delta \bar{L}_D(-2), \dots)$
- The equilibrium on the labor market reads: $L_T + L_{NT} + L_D = L$

¹⁰ While overall demand may be somewhat inelastic, Afghanistan is competing with other providers.

¹¹ The tradable good is used as the numeraire, which implies that its price is constantly equal to 1.

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